i-SPiKE 2021

Leading An Artificial Innovation In Knowledge, Education And Design

i-SPiKE 2021
INTERNATIONAL EXHIBITION & SYMPOSIUM

E-PROCEEDINGS

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PREFACE

International Exhibition & Symposium on Productivity, Innovation, Knowledge, Education & Design (i-SPiKe 2021) was a platform to inspire and cultivate innovative ideas from various fields of study for academicians, researchers, industries, junior and young inventors to showcase their innovative ideas. The development of novel ideas from the perspectives of innovation, invention, and design on interdisciplinarity promotes network and collaboration in line with the theme "Leading an Artificial Innovation in Knowledge, Education, and Design".

International Exhibition & Symposium on Productivity, Innovation, Knowledge, Education & Design (i-SPiKe 2021) attracted about 153 participants from national public universities across Malaysia. I would like to thank all participants in taking this opportunity to showcase their innovative ideas. Nonetheless, the success of this event is reflected of high level of papers of the inventions received. My gratitude and appreciation also goes to the members and committees of International Exhibition & Symposium on Productivity, Innovation, Knowledge, Education & Design (i-SPiKe 2021) in making this virtual event successful by putting a bundle of efforts herein.

I sincerely hope that International Exhibition & Symposium on Productivity, Innovation, Knowledge, Education & Design (i-SPiKe 2021) will put forward new ideas and keep on promoting collaborative inventions among scholars which may bring change for future with the advent of information era. Appearance of new inventions may make a great progress and improve the development of the whole society.

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PREFACE

Alhamdulillah, my utmost gratitude to Allah SWT as with His blessings and mercy, the International Exhibition & Symposium on Productivity, Innovation, Knowledge, Education, and Design (I-SPIKE 2021) can be successfully held. I want to thank the Rector of UiTM Kedah Branch, Deputy Rectors, and esteemed members of the management for their support and encouragement in making i-SPIKE 2021 a success. I would also like to extend my heartfelt thanks to Dr. Junaida Ismail, the Chairperson of i-SPiKE 2021 for her dedication and commitment in accomplishing this program. My humble gratitude also goes to i-SPiKE 2021 Committee Members and Team, for their continuous hard work and effort.

Innovation and research efforts are essential in educational organizations. These efforts are significant in fostering an innovative and creative culture. Not only that, innovation is also the foundation of quality education. This includes not only academic staffs, but also school students, teachers, and educational practitioners. The Faculty of Administrative Science and Policy Studies of UiTM Kedah as the organizer of i-SPiKE 2021 is very proud to share this avenue with academics, students, teachers, and industry practitioners. It is hoped that this program succeeds in cultivating the spirit of creating and innovating brilliant ideas and useful products for the future. Whether in a pandemic or endemic era, we are still able to pursue scholarly activities effectively. Thanks and congratulations to all involved.

Thank you.

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PREFACE

Alhamdulillah, all praises to Allah, by whose grace and blessings made it posssible to conduct our first online exhibition symposium. It is our great pleasure to have you here virtually with us in the International Exhibition and Symposium on Productivity, Innovation, Knowledge & Education (i-SpiKE 2021), with the theme *"Leading An Artificial Innovation in Knowledge, Education, and Design"*. i-SPiKE 2021 organised by the Faculty of Administrative Science and Policy Studies (FSPPP), UiTM Kedah Branch is inline with the objectives of IR4.0. i-SPiKE 2021 aims to encourage participants to participate in the Junior Inventor category (from schools) or the Young Inventor category (academicians from local or foreign universities).

i-SpiKE 2021 is a good platform for the industries, academicians, and students of local and foreign countries from different backgrounds to highlight innovation, invention, and design in their respective fields such as management and education. It is our hope that this exhibition will be a catalyst for all participants to present their best ideas to bring inspiring changes or introduce some innovations and inventions in their daily tasks or activities.

In total we received 154 projects and they are judged by professional juries from various backgrounds such as industries and academicians. On behalf of the conference organiser, I thank you for your participation and hoped that you had enjoyed the moments when your innovation became a reality. Special thanks to all the commitee members of the i-SpiKe 2021, I owed all of you so much and I want you to know that this is the best team ever!!! Last but not least, to all participants, we hope to see you in our next exhibition.

Thank you.

DR JUNAIDA ISMAIL
Chairperson
International Exhibition & Symposium On Productivity, Innovation, Knowledge, Education & Design (i-SPiKE 2021)

TABLE OF CONTENTS:-

i-SPiKE 2021 International Exhibition & Symposium E-Proceedings

NO.	TITLE	PAGE

'VIEWFINDER'
MOBILE LEARNING APPLICATION
FOR VIDEOGRAPHY AND CINEMATOGRAPHY
BASED ON THE RULES OF PERSPECTIVE

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ABSTRACT

Perspective is a way to represent three-dimensional space on a two-dimensional, flat surface. It is one of the fundamentals of art that is very important, to be learned by an artist as a preparation for the new explorations in visual art. As for videography and cinematography, the understanding on linear and atmospheric perspective does play a significant role in producing meaningful results (story build-up, camera shot and composition). Poor understanding on the rules of perspective will lead to poor visualization, that causing less impact in the video. This research aimed to develop a learning aid that will assist in improving the understanding among film, media studies and multimedia course students on the rules of perspective in videography and cinematography. A mobile learning application named 'Viewfinder' with a dedicated lesson plan has been developed through this Design & Development Research (DDR). Data were collected through qualitative approach and analyzed using the six phases thematic analysis by Braun & Clarke (2013). Usability evaluation has been conducted using Mobile Goal Question Metric (mGQM) Model) and results proved that this mobile application is usable to assist and improve user's understanding on linear and atmospheric perspective in videography and cinematography project.

Keywords: perspective, videography, cinematography, mobile application, learning aid

INTRODUCTION

In visual art, perspective is divided into two different types, which are the atmospheric and linear perspective. Linear perspective is the type of perspective that deals with lines and points. It consists of 4 components that are called Vanishing Point, Horizon Line (Eye Level Line), Orthogonal Line and Transversal Line. On the other hand, Atmospheric perspective (also known as aerial perspective) is a technique of creating the illusion of depth, or recession, in a very painting or drawing by modulating color to simulate changes established by the atmosphere on the colors of things seen at a distance. It deals with how the looks of an object are tormented by the area or atmosphere between it and the viewer (Martin, 2014). Both perspectives are the fundamental foundations for the novice learners in videography and cinematography related subjects. Linear, atmospheric perspective and movement based on these perspectives is part of cinematographic techniques that is important in completing a video project and it is also a common hurdle (Hewko, 2016). Poor understanding on the rules of perspective will lead to poor visualization, that causing less impact in the video (Andreas, 2017). This can be seen from the unsuitable selection of camera angles, flat and meaningless visuals and poor storytelling. Most of the students only thought that the elements of perspective are only meant for drawing, whereas it is actually can also be applied in videography and cinematography projects as well (Antoine, 2018). Thus, this research aim to develop a learning application dedicated to assist learners to use the element of perspective in their videography and cinematography projects.

MATERIALS & METHODOLOGY

This research employed the design and development research (DDR) based on the six DDR phases. The researcher will firstly test the reliability and validity of this research through a triangulation method analysis. Purposive sampling will be used in selecting the participants where six students from two classes from the Department of Graphic & Multimedia, Faculty of Creative Arts, Kuala Lumpur Metropolitan University College (KLMUC) will be randomly selected as the representative respondents. The classes are CBM 214 Digital Effects & Compositing and CBM 204 Digital Audio Video. These students were selected and categorized based on their level of results. They were grouped into low, moderate and high academic level based on the Student Achievement Report analysis. Two students from each group were selected respectively. They will involve throughout the research and all will be gathered and studied in a same focus group. Mr. Ahmad Ridwan Razak from Mira Digital, a company that is doing video and visual effects projects for local and international films will be involved in evaluating the newly developed mobile application learning aid. Two lecturers who have been teaching the subjects for semesters and years will be interviewed during the need analysis phase. The main purpose for this interview is to get their insight on the issues regarding the perspective among their students. All data will be collected using qualitative data collections, which are through document analysis, think-aloud protocol and interview. All students in the focus group will be gather in a studio where the think-aloud protocol and interview will be conducted. In analyzing the data set of this research, the researcher will adapt the thematic analysis steps by Braun & Clarke (2013). All data collected through think-

aloud protocols, interviews and survey forms will be manually analyzed, coded and converted into themes in order to formulate the research findings. Results from the triangulation have justified the relevancy of mobile application as the learning aid in this research. Thus, a new mobile application will be designed and used as the instrument in the next data collection phases.

'VIEWFINDER' APPLICATION DESIGN

The same layout design was used for all screens under each type of perspective where there are navigation buttons on the right and left screen position and one explainer video as the main content. This is to allow the user to click navigation button easily, with two hand positions, holding and use the application in a comfortable position. 'Replay', 'pause' as well as the 'back to menu' button, were placed on the right screen area, while the 'back' and 'next' button on the left screen area. The button designs for this mobile application are based on the Spatial Contiguity Principle in Mayer's CTML where people learn better when corresponding words and pictures are placed near each other rather than far from each other on the page or screen (Mayer, 2009). The semiotic concept where applied where the main three icons (linear, perspective) as well as the types of perspective's icon, the application logo icon (used for home button). White color is used to make the icon more vivid. Designing works were done in Adobe Illustrator. This Illustrator design files will be later imported into Adobe Flash during the final compositing and programming stage.
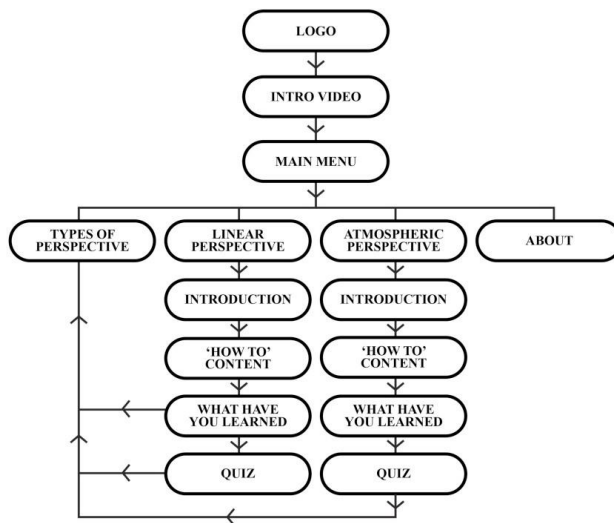
Figure 3.1 Application Flow Diagram

Plate 3.2 Usability Test with User

Figure 3.3 Viewfinder' Application's User Interface Design

RESULTS AND DISCUSSION

Findings of this research have been formulated from the analyzed data, which were collected through the usability evaluation. This usability evaluation that involved six students as respondents, consist of three different sessions, which are think-aloud protocol, evaluation tasks and interview. Coding process derived from students' responses has been conducted, listed and later simplified into themes in order to summarize the finding. This usability of mobile learning application was evaluated based on mGQM Model (Hussain, 2013). It can be seen that the themes emerged from all thematic analysis from three usability evaluations (think-aloud protocol, task and interview) are correlated. These themes then were mapped with the mGQM Usability Characteristics. Results indicate that the 'Viewfinder' mobile application learning aid has successfully met the characteristics, where most of the themes reflected the goal and guidelines proposed by this model. Table on the below shows the theme mapping:

Table 4.1 Thematic Analysis Map for Overall Usability Evaluation

mGQM Usability Chracteristic (Hussain 2013)			Usability Evaluation Theme Mapping (Extracted from Students' Responses)
Quality Characteristic	**Goal**	**Guidelines**	
Effectiveness	Simplicity	-Ease to input the data -Ease to use output -Ease to install -Ease to learn	**Understandable Noticeable Explorative Simple UI**
		-Accurate -Should be no error -Successful	**Memory retrieval Prior Knowledge Better Learning Experience**
	Accuracy		
Efficiency	Time taken	-To response -To complete a task	**Clear Instruction**
	Features	-Support/help -Touch screen facilities -Voice guidance	
Satisfaction	Attractiveness	-User interface	**Appealing Neutral Color**

No issues highlighted related to any error and comments on the voice guidance. Howeverthere was only one student mentioning about tapping and swiping features in the mobile application, but not highlighting it as a problem for him when he was using the mobile application. These are the reasons that support the usability of this newly developed mobile application:

i.   This mobile application is understandable, has successfully improved learner's prior knowledge, retrieved what they have learned while using it and provides better learning experience on the topic of perspective in videography and cinematography.

ii.   The UI design with simple and noticeable UI components (buttons, videos, text, animation and other graphics) as well as the use of neutral and vivid color combination are also the aspects to be considered in ensuring the usability of this mobile application (interactive multimedia).

iii.   Clear instruction is also essential to ensure the usability of this mobile application (interactive multimedia), where it determined its efficiency in responding to user's input, as well as time taken to complete a particular task

CONCLUSION

Based on the list of application in Google PlayStore and Apple Store (2020), there is still no mobile application dedicated to support the understanding on perspective in videography and cinematography. This has become advantage for this newly developed mobile application when it comes to commercialization. In addition, learners from any learning institution with media studies, film and multimedia courses, as well as self-taught novice learners can also use it. However, the researcher would like to highlight that this application is not designed to replace the conventional classroom teaching and learning. It is more as a platform to support the lesson where the student could use it for revision and exploration. In order to improve and maximize the benefit of this mobile application, following recommendations were made. First, in order to ensure the learners clear on the objective of this learning aid, future research should study and prepare a demo session between the instructors (educator) with the learners in order to provide better explanation to use the application. They should not only depending on the 'about' menu in the mobile application learning aid because there was one student (respondent) tend to neglected the menu during the think-aloud protocol session and straight away went through the other menu and did not click this 'about' button until the end of the session. So, there is possibility for similar situation to happen in future, with different user (learner). Apart from that, in today's pandemic situation, we have seen how

physical class has been deliberately shifted to online. Online Distance Learning (ODL) is one of the ways to cope with learning condition right now. To support ODL, educators need to have tools that students can depend on without full supervision from lecturer. Educators are required to make open distance learning experience enjoyable to students because of the challenged to transform themselves to digital learning by providing the technology supports required for learning (Zuhairi, Karthikeyan, Priyadarshana, 2019). This is where Viewfinder learning applications play a significant role and become increasingly relevant.

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SYSTEMATIC ALTERNATIVE FUZZY LOGIC EVALUATOR (SAFLE) FOR STUDENT PERFORMANCE EVALUATION

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ABSTRACT

Students' overall performance at school is essentially evaluated based on academic accomplishment. However, in high school or working environments, students must excel in other soft skills such as leadership, communication, and critical thinking. To evaluate criteria for student performance, for example, student behavior, which does not involve quantitative performance like academic scores, decision-making is critical. The assessment during the process of evaluation usually involves individuals with different opinions and thoughts. Therefore, the decision-making made based on human judgment may sometimes be time-consuming and unfair. Hence, a Systematic Alternative Fuzzy Logic Evaluator (SAFLE) is introduced to evaluate students' performance at school, particularly in identifying eligible students as the best student by implementing the fuzzy logic approach. The proposed evaluation also intends to simplify the evaluator's tasks due to time and fairness. The attribute measured includes the examination score, roles and responsibilities held in schools, and student's behaviour in school. The data is evaluated computationally using the Fuzzy Logic Toolbox in MATLAB. If-then rules are used as one way to identify the best student. The rules serve to ease the evaluator's decision-making by categorizing students into more flexible membership functions. The result obtained shows that the Fuzzy Logic Approach proposed can present an alternative systematic evaluation in selecting the best student to be awarded. The Fuzzy Logic approach can differentiate the score obtained and categorize students in the belongingness in the membership function.

Keywords: alternative evaluation, student performance, fuzzy logic

INTRODUCTION

Secondary school is a significant stage for students to demonstrate their academic and soft skills before enrolling in higher learning institutions. Given this, students' overall performance in secondary school should be assessed in every way includes academic and non-academic performance, because those with excellent academic background and soft skills can grow as a potential human resource contributing ideas and skills for their corporation. Therefore, the Best Student Award can be one of the initiatives introduced to recognize potential students who deliver excellence not only in academics but also in the ability to foster excellent soft skills such as leadership, discipline, teamwork, and communication (Tracy, Gran, Kanyan & Lajim, 2021). Amelia, Abdullah & Mulyadi (2019) also stated that student performance assessment

involves measuring abilities, competencies, and skills. However, ability, competency, and skills are fuzzy concepts and captured in fuzzy form (Amelia et al., 2019). The decision-making process to measure these abilities, competencies, and skills in the current approach comprising individuals' opinions and judgment are usually too time-consuming, unfair, and biased. On that account, evaluating student's academic performance using proper techniques is essential in ensuring a fair assessment of their qualities (Tarmudi, Sarahintu, and Lepit, 2015). Proper evaluation can help identify the strengths and weaknesses and provide opportunities for improvement and skills development (Guruprasad, Sridar, and Balasubramaniam, 2016).

Systematic Alternative Fuzzy Logic Evaluator (SAFLE), an alternative evaluation system based on the Fuzzy Logic Approach, was developed to identify the potential students eligible for the Best Student Award. The criteria considered for the evaluation are the academic performance, including the student examination score, roles, and responsibilities held by the students in school, including position held by the student in school, involvement in co-curricular and outdoor event competition, and lastly, student's behaviour. Students' behaviour refers to their responses towards the class's learning process, attendance, and disciplinary acts. MATLAB Fuzzy Logic Toolbox is used to demonstrate the evaluation process of student performance. The development of a Fuzzy Rule that utilizes if-then rules simplifies the evaluator's decision-making, primarily when more attributes are assessed.

The student's overall performance will be classified in the linguistic term, namely Poor, Average, Good, and Very Good, as shown in Table 1. The performance values will rank students and categorize them accordingly to the performance indicator specified. Figure 1 shows the features of the membership function in MATLAB Fuzzy Logic Toolbox.

Table 1. Output – Student Overall Performance

Linguistic Expression	Interval
Poor	[0 0 0.25]
Average	[0 0.25 0.5]
Good	[0.25 0.5 0.75]
Very Good	[0.5 0.75 1]
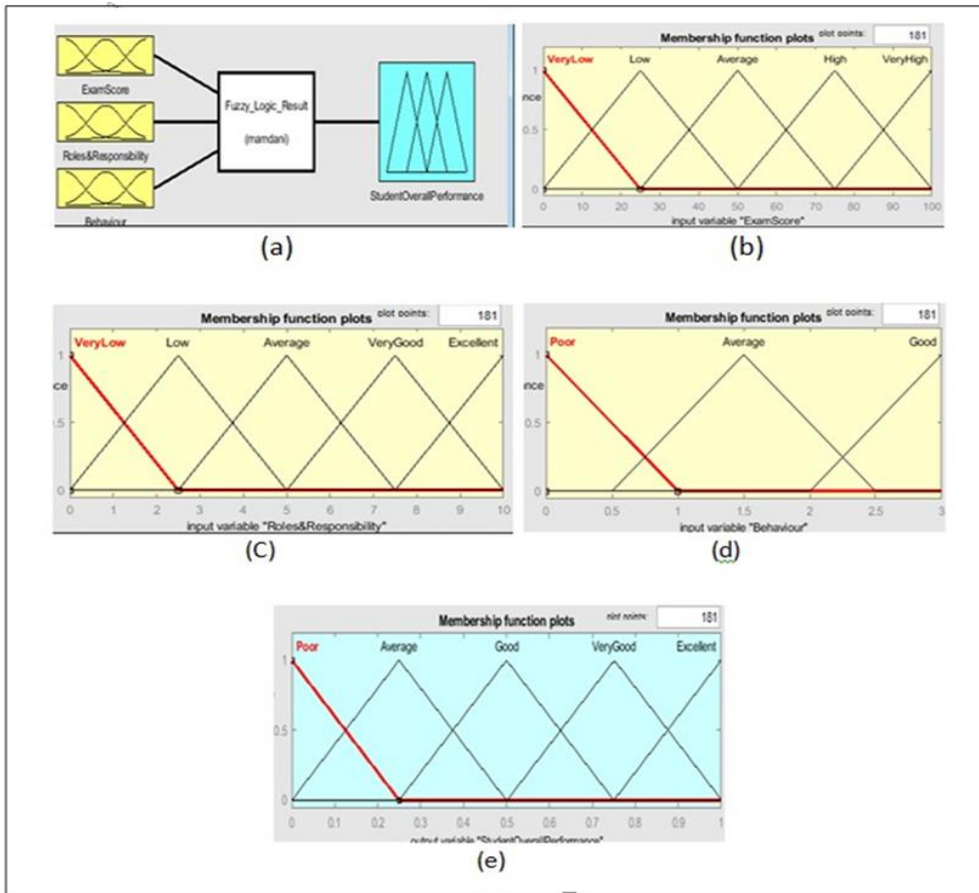
Figure 1: Features of Membership Function in MATLAB Fuzzy Logic Toolbox
(a) Setting of Input and Output Parameter
(b) Membership Function for Exam Score
(c) Membership Function for Roles and Responsibility
(d) Membership Function for Student's Behaviour Toward Learning
(e) Membership Function for Student's Overall Performance

OBJECTIVE

The Systematic Alternative Fuzzy Logic Evaluator (SAFLE) aimed to provides a systematic measurement to assess student performance and intends to simplify the evaluator task in decision- making pertaining to time saving and unfair decisions.

NOVELTY

The proposed evaluation system assists in the decision-making problem involving uncertainty and vagueness in selecting the potential best student in the secondary school, thus minimizing

unfairness and biased results. The system also provides more flexible evaluations for students based on the lingual result assign to the student.

COMMERCIALIZATION

It is beneficial for usage in any institutions where appraisal of performance is required, for example schools, universities and organization.

CONCLUSION

Fuzzy Logic is a mathematical method based on a logic that can take imprecise input and imitate human logical thinking in the decision-making process. In this study, a Systematic Alternative Fuzzy Logic Evaluator was developed to measure the performance of secondary students utilized the fuzzy logic approach. Qualitative data, which cannot be measured qualitatively, were categorized using a linguistic expression: low, very low, average, good, and others. The proposed approach can minimize the uncertainty and vagueness in the decision-making process to identify the best student based on the criteria that are being evaluated. It can be applied in a wide range of areas, including education and industries.

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360 EMPLOYEES – I

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ABSTRACT

The Coronavirus Disease 2019 (COVID 19) pandemic has significant effect on the unemployment rate around the world. Nowadays, we can see that the scarcity of protection awareness among Malaysians in handling the appropriate precautions remains of utmost. Along the subversion threats involving the people who were terminated by their employees without any wrong and loss to the company where this 360 Employees-i is the solution. There are problems whereby there are a lot of takaful medical products out there that cover only medical benefit plus a bit of investment. Besides, there is no takaful provider that offers such scheme which covers investment, medical benefit and at the same time covers a benefit during job loss. This research aims to analyze whether this product can benefit or assist the participants after losing their job. A qualitative research methodology is employed whereby the contracts that will be used in the products are similar to most Takaful products that are currently in the market such as Tabarru', Mudharabah, Wakalah and Qard al-Hassan. The result reveals of Mudharabah model and Wakalah model which have variations of Mudharabah and Wakala developed by the practitioners in order to address the limitation. But in Malaysia, many Takaful operators have opted for the Wakala structure especially Wakala Mudharabah model known as Hybrid, whereby a Wakala is applied on the underwriting fund and a Mudharabah on the investment profit. This study shows positive sign in providing the financial security to job seekers. Besides, this study can show a number of participants who maintain a good mental condition during unemployment. Moreover, this study purposely creates the innovative investment-linked Takaful Plan to be exposed in 360 Employees-i. This research may assist the participants after they lose their job by offering trainings and seminars on how to start life after job loss. This will give positive sign to the economy if the pandemic still happens in the future. This study can be used and utilized by future researchers who tend to exploit on the same area of study.

Keywords: Takaful, Mudharabah, Wakala, investment, saving

INTRODUCTION

In US country, they implement unemployment insurance (UI) which means it is a joint state-federal program that benefits a group of eligible workers in terms of providing cash benefits. Besides, it intends to provide temporary financial assistance to unemployment workers either the employees become unemployed through no fault of their own. Even though there are developing countries in Asia and Pacific regions, they still lack in the cases of unemployment protection to prevent workers and their families from sliding into poverty. What happened in Asia countries, unemployment protection schemes are very important features for working women and men in such countries as Japan, the Republic of Korea, Malaysia, Thailand, and the Socialist Republic of Vietnam, while Indonesia and the Republic of the Philippines are considering similar schemes. There is similarity to ASEAN countries whereby they are focusing on the unemployment insurance which benefits their children and families first and the unemployment benefits are less priority. In ASEAN countries, unemployment protections aim not only at providing income compensation due to the loss of job but also facilitating return to work, relying on the employment promotion programs, which include employment intensive programs, skills development and entrepreneurship support measures. So due to all these highlighted reasons, our group come out with 360 Employees-i. Seems like our product is not yet available in our local market, but we found it in international countries such as US and UK namely unemployment insurance. The 360 Employees-i is purposely to help the recovery of our economy downturn and the employees' welfare. Besides, this product is good in helping those people in needs because it is a combination of investment link, medical benefit and the loss of job benefits.

Problem Statement

The main reason why we want to offer this product is because there is no takaful provider that offers this type of product which is the combination of investment link, medical benefit and the loss of job benefit. The loss of job benefit is offered by Social Security Organization (SOCSO) but the problem is the amount that can be claimed is not sufficient in order for the participants to carry on with life after being terminated from their job. Besides, there is one takaful provider that offers loss of job benefit which is paired with Personal Accident. Due to the issues as stated above, we decided to come out with this product so that we can offer something that is demanded today by the potential participants which is to tackle the unemployment issue due to pandemic COVID 19. Many people are looking to this kind of product so that they can be ready if anything happens to them in future if the pandemic prolonged.

Objectives

There are five main objectives why we want to offer this product to the market. The first objective of this product is to protect the participants after they lose their job. The second objective of this product is to ease the burden of the participants during the unemployment period. As been mentioned earlier, this product offers three types of products in one. The products are medical benefit, investment link and the loss of job itself. This product will help the participants to save their money. The fourth objective is to ensure participants are able to receive a good medical service when they are not well as this product will also cover their medical benefit. The fifth objective of this product is to offer trainings and seminars to the

LITERATURE REVIEW

There are numerous factors contributing to unemployment among fresh graduates in Malaysia. Hanapi and Nordin (2013) states that, the lack of excellence is one of the factors that leads to the unemployment problem among the Malaysian graduates. In addition, Hanapi and Nordin (2013) stated in 2002 Central Bank of Malaysia conducted a study and concluded that the international graduates have higher employability compared to Malaysian graduates in terms of the skills which include but not limited to technical skills, problem-solving skills, communication skills, particularly in the English language. The previous research has discovered that fresh graduates are lack of employability skills, poor understanding of the English language and communication skills. Additionally, being too choosy about the job and at the same time demanding for a higher salary are among the major causes of unemployment among fresh graduates (Zahiid, 2015). Takaful provides positive externalities regarding increased purchases, profit and employment both within and alongside the Takaful sector (Ward, 2000). In addition, insurance (Takaful) facilitates innovation within an economy by offering to underwrite new risks. Therefore, Islamic economists emphasize fiscal policy rather than monetary policy (Chapra, 1991). Under Islamic State, the economy is controlled by non-interest fiscal policy.

METHODOLOGY

The contribution received from participants will go to participants' unit fund and operators' fund. The contribution made to the participants' unit fund will be further distributed to operators' fund to pay for the charges and tabarru' fund. In case the tabarru' fund is not able to cover for the cost of takaful, qard will be taken from the operators' fund to cover for the deficit. Once the fund is sufficient and having surplus, repayment of qard shall take place. Any benefits or claims to be made will be taken out from the tabarru' fund as well. This will include any medical claim, death claim, as well as the unemployment benefit of the certificate. The investment profit received from the product will be shared among the participants and the takaful operator using the contract of mudharabah.

RESULT AND DISCUSSION

360 Employees-i is a first of its kind. The product is not the typical family takaful products which cover for life and illness only. It also covers income protection in the form of salary coverage in the event the participants lose their job. The participants may claim for loss of job after the certificate has been in force for 1 year. There are 2 types of claims available for loss of job. The participants have the option to receive the job loss benefit in one lump sum, or monthly for up to 6 months. This is to cater for the needs of the participants and their financial planning once they have lost their job. The amount to be claimed depends on the type of plan chosen by the participants. The products will also waive the payment of contribution for 6 months effective from the date of the unemployment claim. This is to lessen the burden of the participants during the trying times. Other than that, the product also gives the option for the participants to participate in any trainings or seminars that might help them to get back on their feet after unemployment. The trainings and seminars will be

referred by the takaful operator.

Novelty and Originality

It seems that our product is not yet available in our local market, but we found similar product in international countries such as US and UK by the name unemployment insurance. This means that it is new in the market and the difference with the international product is the combination of investment link, medical benefit and the loss of job benefit.

Social Responsibility

The significance of this product is to protect life and to cover the medical expenses. If anything happens to the participants and they need to be treated in the hospital, everything is covered by this policy. As for life, if anything happens to the participants, their next of kin will be compensated. This will protect their heir as if the participants are the ones who generate income to the family, the heir future will be protected as they will be compensated. The participants are allowed to claim for loss of job benefit in one lump sum amount or to be paid monthly up to 6 months after the participants lost their job. This will allow the participants to survive for a certain period after they lost their source of income. They also can start a business with the amount of money that they claim. That is why the takaful provider allows them to claim one lump sum as they can use that money to start up a new business. Other than that, as been mentioned earlier the participants will get privilege not to pay the premium up to 6 months after they loss their job but the policy is still valid. This will ease the burden of the participants because they can utilize the benefit of the product which is to stay protected during the first six months of unemployment period and they do not have to pay for the premium during that period. This also will release the stress of the participants.

Commercialization Value

The 360 Employees-i is in the process of IP registration under Business Innovation and Technology Commercialization Centre (BITCOM).

Design, Display and Packaging of Product

The product will be using contracts that are similar to most Takaful products that are currently in the market. The diagram below shows the mechanism of the product and terms of its fund movement and contribution usage.
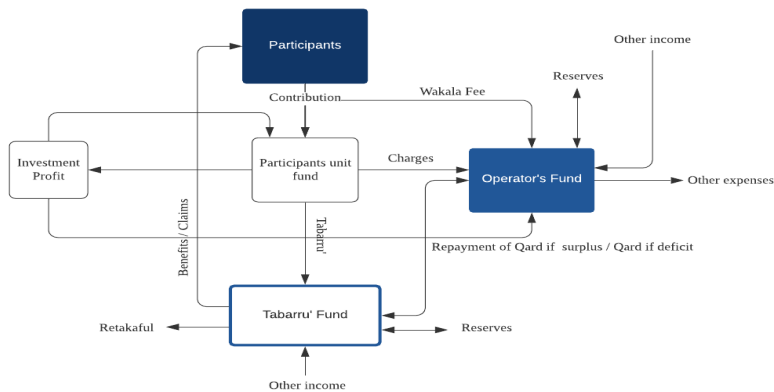
The product will provide sound financial security to the heir of the participants as well as financial security for the participants in the event they lost their job. This will not only help them financially but also mentally as it will ease their burden during the hard times.

CONCLUSION AND RECOMMENDATION

In conclusion, this new product can become the starting point to a new and innovative product that does not only cover the basic life and medical, but also protects the income of the participants. This is to ensure that the participants will be protected all around and not only for the times of medical emergency. Being out of job is hard for anyone. Hence, this product aims to help them not only financially, but also to help them to prepare for the next employment with new skills through trainings or seminars. We hope that this study can be used for future researchers to study possibilities of this product in more detail as it might help takaful operator to further provide the best protection for their participants.

ACKNOWLEDGEMENTS

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AbMTI: ADVENTURE BASED MENTAL TOUGHNESS INVENTORY FOR POST COVID-19 PANDEMIC ERA

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ABSTRACT

The COVID-19 pandemic has increased concerns about public well-being and mental toughness. Accordingly, the concept of mental toughness is highly relevant to the COVID-19 pandemic and there has been a rapid growth in research assessing the consequences of the coronavirus on individual mental toughness. In line with the issue, adventure-based training program believed to becomes part and parcel for any organization or institution in post pandemic era as part of the solutions in purpose to regain or improve individual mental toughness. However, there is limited measurement tool to assess mental toughness in adventure-based program. Now, it is a call to invent solutions. The innovation of Adventure- based Mental Toughness Inventory (AbMTI) rooted in the modified Design and Development Research (DDR: Saedah et. al., 2020). A total of 14 field's experts and 507 respondents was involved in a series of analysis using Structural Equation Modelling (SEM). The AbMTI potentially benefited to Malaysian active adventure-based training practitioners and professional. The AbMTI also becomes a part of the solutions to regain or improve mental toughness to more than 50% of Malaysian population that involved with active recreation (IYRES: Malaysia Sports Index, 2019). AbMTI offers new perspective of mental toughness and shifted to be more relevant towards challenges and opportunities in adventure- based training program setting. To conclude, AbMTI prepares and helping the adventure- based training industry to come back stronger after COVID-19.

Keywords: Adventure-based Mental Toughness Inventory (AbMTI), Structural Equation Modelling (SEM)

ADVENTURE-BASED MENTAL TOUGHNESS INVENTORY (AbMTI)

It should be noted, this innovation considerably as the first to develop a specific adventure-based mental toughness measurement tool. Over the years, adventure-based program is believed effective in improving participant's psychological aspects, including mental toughness. However, these claims can be questioned hence several items from the establish instruments are considerably unrepresentative when it applies in adventure-based program setting. There is a gap, which is many items from the established instruments are considerably irrelevant, such as; 1) the influence of fans distraction (PPI: Loehr, 1986); 2) pressure from the opponent (PPI-A: Golby et. al., 2007), and; 3) pressure of competition (CMTI: Gucciardi & Gordon, 2009; SMTQ: Sheard et. al., 2009) and 4) considerably too general (MTQ48; Clough, 2002). Despites the availability of these instruments, none estimates specifically in terms of environmental challenges (open weather condition, wilderness, discomforts zone) and risks, which are considerably as the nature in adventure- based program. Due to the problems, the accuracy of the tests can be questioned hence it was measured using sports context.

Furthermore, Institute for Youth Research of Malaysia (IYRES, 2019) stated, more than 50% of Malaysian are participated actively in adventure recreation, includes adventure-based mental toughness program. Based on the current practices, millions of dollars have been expended for the implementation of the programs on a year. As an example, Malaysia Sports Council and state's sports council reported to use the adventure-based program intervention to develop mental toughness among youth athletes. However, such programs are doubted in terms of effectiveness hence there are lack of specific instrument for measuring mental toughness in adventure-based settings. In fact, high costs are still being allocated and channeled to fund the programs despite its dubious effectiveness.

The innovation of AbMTI considered as the new horizons in mental toughness measure, globally. The current knowledges in the area are expanded as to foster deeper understanding on this matter. Issue on the accuracy of the tests be eliminated. Through the development and validation processes, the irrelevant and unrepresentative items of the AbMTI were minimized. Importantly, this innovation also verified the effectiveness of adventure-based program in improving mental toughness. Malaysian outdoor recreationist, professional and outdoor recreation related-industry practitioners eventually assisted by this innovation for their works. AbMTI useful as a guidance to design and boost the impact of adventure-based mental toughness program effectiveness.

Understanding mental toughness attributes

The concept of mental toughness is relatively new and has its origins in academic research and in sport. Over decades, numerous studies have been conducted in effort to reveal what is mental toughness. The researcher found that conceptualization and definition of mental toughness has been problematic since the term was first introduced in academic literature. Parallelly, Middleton, Marsh, Martin, Richards, and Perry (2004b) also claimed that mental toughness is remaining inadequately defined and conceptualized. Moreover, Kumar (2017) also stated that despite the wealth of research that has been conducted over the past two decades, there remains confusion and disagreement regarding the meaning, distinctiveness, and usefulness of mental toughness. As result, debates on what exactly is mental toughness are still ongoing. However, the results of extensive works, several psychological attributes that commonly highlighted in previous studies of mental toughness are: (1) self-confidence; (2) motivation; (3) coping skills;

(4) focus; (5) challenge; (6) commitment; and (7) control (Table 1).

Table 1: Common mental toughness attributes

Mental Toughness		
Common psychological constructs (Term used)	Mental toughness Studies	Proposed Constructs
Self confidence Self-belief	Loehr 1986, Tripathi et al. 2010; Mohamad et al. 2009; Kuan & Roy, 2007; Hogg, 2007; Fourie and Potgieter (2001); Jones, Hanton, and Connaughton (2002) Middleton et al. (2004a) Gucciardi and Gordon (2009) Connole (2009) Clough (2002)	Self confidence
Motivation	Loehr 1986, Fourie and Potgieter (2001) Jones, Hanton, and Connaughton (2002) Gucciardi and Gordon (2009) Butt, Weinberg, and Culp (2010) Connole (2009) Clough (2002)	Motivation
Fokus	Loehr 1986, Jones, Hanton, and Connaughton (2002) Jones, Hanton, and Connaughton (2002) Middleton et al. (2004a) Gucciardi and Gordon (2009) Connole (2009)	Fokus
Commitment	Fourie and Potgieter (2001) Middleton et al. (2004a) Gucciardi and Gordon (2009) Butt, Weinberg, and Culp (2010) Clough (2002)	Commitment
Control, Positive Energy Control, Negative energy Control,	Loehr 1986, Jones, Hanton, and Connaughton (2002) Gucciardi and Gordon (2009) Clough (2002)	Control
Risk Taking Attitude (Challenge)	Loehr 1986, Middleton et al. (2004a) Bull et al. (2003) Gucciardi and Gordon (2009) Butt, Weinberg, and Culp (2010) Connole (2009) Clough (2002)	Challenge
Coping Skills	Fourie and Potgieter (2001) Middleton et al. (2004a) Gucciardi and Gordon (2009) Butt, Weinberg, and Culp (2010) Connole (2009) Clough (2002)	Coping Skills

SEM - VALIDATION OF AbMTI

In this innovation, 38-items measurement model was developed and tested among 507 (N=507) respondents to examine the reliability and validity. This validation process was believed to foster accurate value of reliability of the items in each construct (Marzita, 2012; Hair, 2006; Zakaria, 2010). The values from the analysis assisted the researcher to further the analysis. Next, the researcher work on the Modification indices (MI) until the measurement model achieve model fit. In the last phase of the analysis, the researcher conducted a reliability and validity test. The study focused on several validation such as the Cronbach Alpha (interval consistency) (Ahmad, 2014; Omar, 2021), construct reliability (CR=>0.70) (Marzita, 2012), and Average variance extracted (AVE=>0.50) (Kline, 2010) that commonly to use to assess convergent validity. The validation of the model considerably as the final output of the study.

Table 2 shown the final validation analysis. In details, all constructs achieved construct reliability (CR=>.70) with Self Confidence (.86) Motivation (.85), Coping Skill (.86), Focus (.86), Challenge (.86), Control (0.85), and Commitment (0.84). Moreover, the Cronbach alpha analysis stated all constructs achieved high internal consistency (α=>.70). A measurement set of items per constructs stated Challenge is the highest (α=.90), followed by Self Confidence, Coping Skill, and Focus (α=.86), Motivation and Control (α=.85), and Commitment (α=.84). The analysis strongly suggested significant relationship a set of items as a group. It is also considered valid to be measured as a scale reliability.

Table 2 also recorded 7-constructs of AbMTI achieved minimum AVE (>.50) with Self Confidence (.51), Motivation (.55), Coping Skill (.51), Focus (.55), Challenge (.54), Control (.54), and Commitment (.52). The convergent validity is achieved and supporting the previous analysis for construct validity. Given that the model fits to the data adequately and all items loading represented constructs are above 0.50.

The validation of AbMTI significantly assists adventure-based training practitioners and professional to be more focused on creating programs and techniques in improving individual or group mental toughness.

Table 2: AbMTM validation (GoF)

Structural Equation Modelling analyses				Validation	
Constructs	Items	Std. Loading	CR (>.60)	CA (α) (>.70)	AVE (>.50)
Self Confidence (6-items)	SC4	.70			
	SC1	.72			
	SC7	.69	.86	.86	.51
	SC6	.80			
	SC8	.65			
	SC11	.74			
Motivation (5-items)	M6	.84			
	M1	.80			
	M11	.77	.85	.85	.55
	M5	.77			
	M8	.54			
Coping Skill (6-items)	CS6	.79			
	CS2	.70			
	CS7	.77	.86	.86	.51
	CS3	.71			
	CS1	.64			
	CS6	.66			
Focus (5-items)	F3	.76			
	F7	.67			
	F1	.82	.86	.86	.55
	F2	.75			
	F6	.72			
Challenge (6-items)	C3	.87			
	C2	.80			
	C1	.85	.86	.90	.54
	C7	.78			
	C6	.74			
	C5	.62			
Control (5-items)	CN1	.81			
	CN18	.81			
	CN14	.79	.85	.85	.54
	CN11	.67			
	CN5	.59			
Commitment (5-items)	CM6	.62			
	CM12	.74			
	CM8	.61	.84	.83	.52
	CM10	.75			
	CM5	.85			

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AbMTM: POST COVID-19 ADVENTURE-BASED MENTAL TOUGHNESS TRAINING MODEL

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ABSTRACT

To date, cases in COVID-19 have accelerated with new cases surfacing almost every day. Along with the issue, numerous cases related to mental health problem such as levels of anxiety, depression and attempting suicides were recorded. These problems claim to be associated with individual mental toughness. Work on this matter, it is a call to invent solutions. The innovation of Adventure-based Mental Toughness Model (AbMTM) rooted in the systematic modified Design and Development Research (DDR: Saedah et. al., 2020). A total of 14 field's experts and 507 respondents was involved in a series of analysis using Structural Equation Modelling (SEM). The AbMTM is a validated model with the excellence model fit (GoF). The innovation of AbMTM potentially contributes to Malaysian active adventure-based training practitioners and professional. AbMTM also significantly becomes a part of the solutions in purpose to regain or improve mental toughness to more than 50% Malaysian population that involved with active recreation (IYRES: Sports Index 2017, 2018, 2019) in post pandemic era. AbMTM useful to the adventure-based training program practitioners and professional to redesign and adapt their training programs that suit the current training needs in post pandemic era. AbMTM offers new collaboration mental toughness attributes and as communication tools to understand the development throughout the intervention of adventure-based training program. The term of adventure-based training that commonly refers to teambuilding, team cohesiveness and individual development is now shifted to be more relevant towards challenges and opportunities after pandemic outbreak. To conclude, with AbMTM, adventure-based training industry in Malaysia are ready to accept change and evolve with time in post pandemic era.

Keywords: Adventure-based Mental Toughness Model (AbMTM), Structural Equation Modelling (SEM)

ADVENTURE-BASED MENTAL TOUGHNESS MODEL (AbMTM)

It should be noted, this innovation considerably as the first attempt to develop a specific model of mental toughness in adventure-based program setting. Despites several studies related with mental toughness was conducted by local researchers (Shariman & Hisyam, 2014; Anizu,

Kumaraswamy, Singh & Rusli, 2003; Kuan & Roy, 2007), but none conducted specifically in focus of adventure-based mental toughness model development. This inovation focus on the conjunction between intervention of adventure-based program and mental toughness. Through the development and validation processes, the irrelevant and unrepresentative items of the developed instrument were minimized. Importantly, this innovation also verified the effectiveness of adventure-based program in improving mental toughness.

Furthermore, this innovation considered as the new horizons in designing adventure-based mental toughness training program. The current knowledges in the area are expanded as to foster deeper understanding on the problems. Malaysian outdoor recreationist, professional and outdoor recreation related-industry practitioners eventually assisted by this innovation for their works. AbMTM utilized as guidance to design and boost the impact of adventure-based mental toughness program effectiveness.

Adventure-based training program

Globally, it is undeniable that adventure-based programs have grown exponentially. In addition, as stated by Priest (1986) when he clearly emphasized how the adventurous-based program has grown exponentially with the diversity of its branches. This can also be seen through the increasing number of field studies that also contribute to this development.

Over decades, numerous researchers worked hard to prove outdoor adventure program develop participant's psychology aspects positively (Williams et. al., 2018; Williams & Allen, 2012; Clough et. al., 2016; Ewert & Yoshino, 2011; Bowen & Neill, 2013; Darst & Armstrong 1980; Ewert, 1989; Taylor, 1989; Webb, 1989; Boyle, 2002; Sheard & Golby, 2006; Wang, Liu, & Kahlid, 2006; Gatzemann, Schweizer & Hummel, 2008). These studies are very important in understanding the concept of adventure-based programs in the development of psychological aspects.

As example, Adventure Model was introduced by Ewert (1987) as a fundamental model to explain outdoor adventure pursuits. On the basis, Ewert highlighted four core variables of outdoor adventure, which are the 1) social orientation; 2) locus of control; 3) type of risk; and 4) motivations. The main idea in this model is how individual who involved in adventure-based program can effectively increase their mental and physical skills.

Additionally, the nature of adventure-based program in the open environment and weather known apparently related to risks, challenges, difficulties, and pressure (Virden, 2006). The experienced in the difficulties in the adventure-based program can be considered as the concept of the hardiness by (Crust, 2011). This idea is also in line with Swann, Crust and Allen-Collinson (2016) when they stated the experience of facing and overcoming past difficulties has a significant impact on mental toughness.

Mental toughness attributes

The concept of mental toughness is not new area of focus and its origins in academic research on sport. Loehr (1986), in his fundamental study defined mental toughness as when an individual is reflected in varying ways, which enable them to remain feeling relaxed, calm, and energized despite under pressures. Over decades, numerous studies have been conducted in effort to reveal what is mental toughness. Middleton et al. (2004a) defined mental toughness as a consistency or persistency to achieve

the goal despite in the tough, pressure or difficult situation. They also highlighted mental toughness as the unshakeable perseverance and conviction of an individual to overcome any adversities. Based on this definition, mental toughness is listed as one of the most important aspects of psychology. Supporting the idea, Gucciardi, Gordon, and Dimmock (2009) described mental toughness as a superior mental quality, and it is one of the important psychological constructs for performance in athletics context.

However, most of the studies were conducted based on the sports performance and coaching perspective. There are also several established sport-based mental toughness model (Loehr, 1986; Fourie & Potgieter, 2001; Jones, Hanton, & Connaughton, 2002; Middleton et al., 2004a; Gucciardi & Gordon, 2009; Clough, 2002). To sum, lack of the studies has integrated the adventure-based program and mental toughness. It considerably narrowing the perspective of mental toughness. According to Middleton et al. (2004), there are a limited number of quality studies on mental toughness been conducted, especially in the broad concept and perspective. Moreover, several common mental toughness attributes were found based such as self-confidence, motivation, coping skills, focus, challenge, control, and commitment.

VALIDATION OF AbMTM

In this innovation, 38-items measurement model was developed and tested among 507 (N=507) respondents to examine the reliability and validity. This validation process was believed to foster accurate value of reliability of the items in each construct (Marzita, 2012; Hair, 2006; Zakaria, 2010). The values from the analysis assisted the researcher to further the analysis. Next, the researcher work on the Modification indices (MI).

MI indicate how much the chi-square value of a model would drop if the parameter were free instead of constrained. MI assisted in improving model fit. This process again purifies and reduce the item. At this stage model fit also determined and AbMTI items also finalized.

In the last phase of the analysis, the researcher conducted a reliability and validity test. The study focused on several validation such as the Cronbach Alpha (interval consistency) (Ahmad, 2014; Omar, 2021), construct reliability (CR=>0.70) (Marzita, 2012), and Average variance extracted (AVE=>0.50) (Kline, 2010) that commonly to use to assess convergent validity. The validation of the model considerably as the final output of the study.

Figure 1 also recorded 7-constructs of AbMTM achieved minimum AVE (>.50) with Self Confidence (.51), Motivation (.55), Coping Skill (.51), Focus (.55), Challenge (.54), Control (.54), and Commitment (.52). The convergent validity is achieved and supporting the previous analysis for construct validity. Given that the model fits to the data adequately and all items loading represented constructs are above 0.50.

The Goodness of Fit (GoF) of AbMTM also recorded significant data. Referred to Figure 4.14.3a, the final examination on AbMTM provides greater fit to the data ($X2 = 1.904$, $p = .000$). The GFI is .839 AGFI = .792, NFI = .815, TLI = .924, CFI = .931 and RMSEA = .050. As conclusion, AbMTM achieved it reliability and validation and was strongly suggested model fit.

AbMTM useful in future adventure-based training program and believed to becomes part for many organizations or institution. Post pandemic era surely seeking for adventure-based training program that equipped with wellness aspect as to deal with individual mental toughness. AbMTM eventually assists adventure-based training practitioners and professional to be more focused on creating programs and techniques in improving individual or group mental toughness.
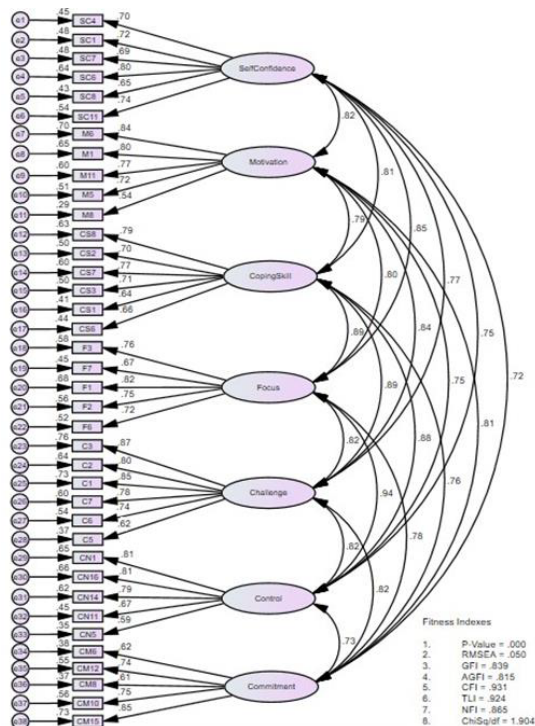
Figure 1: AbMTM validation (GoF)

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PEMBENTUKAN MODUL UNDI18@SCHOOL UNTUK PENDIDIKAN KENEGARAAN DAN DEMOKRASI KEPADA BELIA 18-21 TAHUN

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ABSTRACT

Pada 16 Julai 2019, Parlimen Malaysia melalui Perkara 119 Pindaan 2019 telah meluluskan Rang Undang-Undang (RUU) Undi 18. RUU ini membolehkan warganegara Malaysia yang berumur 18 tahun dan ke atas mengundi dan menjadi calon dalam pilihan raya. Ini merupakan satu pengiktirafan kepada golongan belia untuk sama berpartisipasi dalam politik, sekaligus menjadi ukuran awal kepada kematangan demokrasi di Malaysia. Namun, permasalahan paling ketara pada pelaksanaan RUU Undi18 adalah berkenaan dengan tahap pengetahuan politik kenegaraan yang cetek di kalangan golongan belia, di samping ketiadaan silibus khas berkaitan dengan politik, demokrasi dan kenegaraan di sekolah. Modul UNDI18@School tampil sebagai solusi untuk mengisi kelompongan ini, dengan menawarkan 4 modul interaktif yang ringkas namun padat dengan infomasi bersesuaian dengan tren pembelajaran di kalangan anak muda. Modul 1: Perjuangan Kemerdekaan di Tanah Melayu dan Asas Pembentukan Perlembagaan Negara; Modul 2: Sistem Pemerintahan Negara; Modul 3: Latar Belakang Parti Politik Utama di Malaysia; dan Modul 4: Simulasi Kempen Pilihanraya. Kesemua modul akan dipersembahkan menggunakan aplikasi Powtoon dan Toonly, manakala simulasi pilihanraya melibatkan penyertaan menyeluruh dari peserta. Modul UNDI18@School ini telah diaplikasikan kepada pelajar Tingkatan 6 Atas di Terengganu. Ukuran tahap pemahaman peserta terhadap modul ini adalah melalui 10 soalan yang diukur menggunakan aplikasi Kahoot!. Impak maksima Modul UNDI18@School adalah pendidikan politik dan kenegaraan dapat disuntik kepada bakal pengundi belia tanpa melalui proses pembelajaran ilmu politik dan kenegaraan secara formal dan membosankan di bilik darjah. Dengan ilmu yang diperolehi ini, para belia 18 – 21 tahun akan mengundi calon pilihanraya dengan ilmu dan maklumat yang tepat.

Keywords: Undi 18, Politik Malaysia, Pilihanraya, Undi Belia, Modul Politik

PENGENALAN

Tidak disangkal lagi, RUU Undi 18 merupakan satu langkah kehadapan dan berani yang telah diambil oleh Parlimen Malaysia. Malaysia kini bersekali dengan 205 negara di dunia termasuk Thailand, Kanada, Denmark, Jepun dan Amerika Syarikat yang menurunkan had umur

kelayakan mengundi dan menjadi wakil rakyat daripada 21 tahun ke 18 tahun. Ianya juga merupakan satu pengiktirafan kepada golongan belia untuk sama - sama berpartisipasi dan menjadi sebahagian daripada suara rakyat Malaysia. Ukuran kematangan demokrasi sesebuah negara adalah bergantung kepada sejauh mana suara orang muda didengari. Ini adalah kerana, mereka merupakan cerminan masa hadapan negara.

Namun, permasalahan paling ketara yang menyebabkan azam untuk mengangkat suara rakyat seramai mungkin akan terbantut adalah berkenaan dengan ceteknya tahap pengetahuan politik, kenegaraan dan demokrasi di kalangan golongan belia, di samping ketiadaan minat terhadap topik – topik berkaitan dengan pilihanraya, pendemokrasian, pemilihan pemimpin yang berkualiti, dan isu – isu semasa yang melingkari negara (Lee, 2020; Mohd. Azmir & Sabri, 2020). Ini dibuktikan oleh dapatan World Value Survey - Malaysia Chapter (2010- 2014) yang mendapati terdapat jurang lebar di antara penyertaan politik belia (65.4%) dan dewasa (92.5%), dengan belia Melayu merekodkan penyertaan politik paling tinggi (68%) berbanding belia India (63%) dan Cina (59%). Begitu juga dengan kadar keluar mengundi kohort belia pada PRU14 adalah jauh lebih rendah berbanding kohort 40-59, 60-79 and 80 ke atas. Dalam kalangan belia terpelajar sekalipun, hanya 27% peratus sahaja pelajar universiti mendaftar sebagai pengundi (Khairunnisa & Junaidi,2020). Belia dalam lingkungan umur 18 – 21 tahun baru selesai melalui alam persekolahan dan sibuk merencana masa hadapan, dengan samada menyambung pengajian di institusi pengajian tinggi atau pun bekerja. Perihal politik dan kenegaraan tidak menjadi keutamaan buat mereka. Sifat apati politik ini diburukkan lagi dengan ketiadaan silibus khas berkaitan dengan politik, demokrasi dan kenegaraan di sekolah (Haslina et al.,2020; Khairunnisa & Junaidi,2020). Para pengundi muda ini juga mudah menjadi mangsa ancaman politik berasaskan materialisme, gagal menapis berita tidak sahih yang berleluasa di media sosial dan mudah dipengaruhi oleh ibu bapa, rakan – rakan atau suasana sekeliling mereka. Sekiranya isu ini tidak ditangani dengan serius,natijahnya hampir 4 juta pengundi baharu berkemungkinan tidak keluar mengundi atau mengundi secara semberono, memangkah parti dan calon yang tidak selayaknya menang, sekaligus boleh menggugat survival parti pemerintah.

Pihak yang terlibat secara langsung dengan perkembangan belia seperti Majlis Belia Malaysia, Belia 4B, Angkatan Belia Islam Malaysia (ABIM) dan Malaysia Association Youth Council (MAYC) menyambut baik RUU Undi 18, namun bimbang akan tahap literasi politik belia 18-21 tahun ini. Selain daripada itu, permasalahan berita tidak sahih yang tular di media sosial akan memerangkap pengundi baharu ini. Kegagalan mereka untuk menapis setiap berita dan menaakul laporan dengan rational, liputan dan komentar di media sosial bukan setakat mampu mempengaruhi undi mereka, malah mampu merubah sebuah kerajaan (Chinnasamy & Manaf, 2018; Waikar, 2020). Dari sudut kelompongan kajian, kesemua kajian terkini mengenai pola pengundian dan penyertaan politik belia adalah merujuk kepada belia 21-40 tahun, manakala kajian bersifat fundamental mengenai pola pengundian dan penyertaan politik belia 18-21 tahun masih belum diteroka secara komprehensif oleh saintis politik di Malaysia.

TINJAUAN LITERATUR

RUU Undi18

Penyertaan rakyat dalam proses pilihanraya merupakan kemuncak amalan pendemokrasian sesebuah negara. Dengan iltizam untuk memperkukuh institusi demokrasi negara, dan mengangkat suara rakyat ke tahap yang lebih signifikan, Parlimen secara sebulat suara

meluluskan tanpa sebarang bantahan, Rang Undang-Undang (RUU) Perkara 119 Pindaan 2019 yang menyaksikan had umur kelayakan mengundi dan bertanding diturunkan daripada 21 ke 18 tahun. Ini bermakna Malaysia telah menyertai lebih 205 buah negara lain yang terlebih dahulu meletakkan 18 tahun sebagai umur mengundi. Langkah ini juga adalah bertepatan dengan Artikel 1, Konvensyen Hak Kanak-Kanak Pertubuhan Bangsa-Bangsa Bersatu (PBB) yang mentakrifkan Kanak - Kanak sebagai individu yang berusia 18 tahun ke bawah, manakala Akta Umur Dewasa 1971 menyatakan umur dewasa adalah bermula 18 tahun. Persoalan mengenai kematangan dan tahap penaakulan belia 18 tahun sering diperlekehkan, namun umur 18 tahun sebenarnya telah melayakkan seseorang untuk membayar cukai, memohon lesen perniagaan, memohon lesen memandu, memohon pinjaman kewangan, menyertai pasukan polis dan tentera, berkahwin dan mempunyai keluarga sendiri serta menandatangani sebarang kontrak.

Setakat ini, belum ada data rasmi mengenai jumlah sebenar pengundi 18-21 tahun pada Pilihanraya Umum ke 15 yang dijadualkan pada 2023. Mengikut perkiraan, belia yang berumur 18-21 tahun pada tahun 2023 adalah berusia 16 tahun (Tingkatan 4) pada tahun 2021. Berdasarkan statistik kemasukan ke sekolah, di anggarkan 1.3 juta pengundi baharu berumur 18-21 tahun akan mengundi pada PRU ke 15 nanti. Sarjana politik melihat perbahasan RUU Undi18 dalam dua aspek. Aspek yang pertama adalah komposisi kaum yang mana jumlah pengundi 18-21 tahun daripada kaum Melayu adalah 72.8 peratus, Cina (19.5%) dan India (6.6%). Mengikut tren pengundian sejak PRU 2008 lagi, kaum Melayu lebih cenderung mengundi Barisan Nasional (baca: Perikatan Nasional), manakala kaum bukan Melayu lebih cenderung untuk mengundi Pakatan Harapan (Junaidi,2020; Lee,2020). Maka, dengan jumlah pengundi Melayu 18-21 tahun yang sangat signifikan jumlahnya, RUU Undi18 dilihat memberi keuntungan politik kepada Perikatan Nasional. Rekod pilihanraya juga menunjukkan kadar keluar mengundi dalam kalangan pengundi muda adalah rendah, sekaligus memberi kelebihan kepada parti pemerintah (Lee,2020; Waikar,2020). Kajian Merdeka Center membuktikan tren ini apabila mendapati hanya 68 peratus pengundi 18-35 tahun berhasrat untuk keluar mengundi pada PRU15 nanti, manakala 85 peratus tidak pernah memuat naik sebarang status berkaitan politik di media sosial masing - masing.

Dari aspek kedua pula, saintis politik menjangka RUU Undi 18 akan memberi kelebihan kepada Pakatan Harapan. Rekod PRU 2008 dan PRU 2013 menunjukkan undi orang muda terhadap Pakatan Harapan (dahulu dikenali sebagai Pakatan Rakyat) meningkat sebanyak 40 peratus. Tren ini berterusan pada PRU 2018 yang lalu apabila Pakatan Harapan menerima 80 peratus undi orang muda daripada pelbagai segmen kaum (Haslina et al., 2020; Waikar, 2020; Wan Rozima et al., 2020), dengan majoriti pengundi muda dari kaum Cina dan India mengundi Pakatan Harapan (Mohd. Mahadee et al., 2020). Namun begitu, perkembangan mutakhir ini yang menyaksikan Pakatan Harapan telah berpecah kepada Pakatan Harapan Plus dan Pejuang, kerajaan telah bertukar daripada Pakatan Harapan kepada Perikatan Nasional, parti - parti Melayu melupakan sengketa lama dan bergabung atas nama Melayu- Islam, dan pandemik Covid-19 yang melumpuhkan ekonomi negara telah menyebabkan tren dan kecenderungan pengundi muda pada PRU-15 nanti sangat sukar untuk dijangka. Tidak seperti pilihanraya - pilihanraya yang lepas bila mana tren pengundian mudah diteka, PRU ke 15 menjadi pilihanraya yang paling sukar untuk ditebak kerana rakyat mula hilang kepercayaan kepada mana-mana parti politik ekoran daripada politiking yang keterlaluan (Mohd. Noor,2021; Mulakala, 2021; pnbbcportal.com;2021). Sarjana politik pula melahirkan kegusaran akan kebarangkalian pengundi terutamanya pengundi muda akan memboikot pilihanraya kerana merasakan pilihanraya tidak boleh mengubah keadaan (Mohd. Azmir & Sabri, 2020; Haslina et al.,2020).

Penyertaan Politik dalam Kalangan Belia di Malaysia

Sebelum menyentuh mengenai partisipasi politik belia di Malaysia, sorotan mengenai perkembangan partisipasi politik belia di negara-negara lain perlu diberi perhatian. Setakat ini, hampir 205 buah negara telah meletakkan had mengundi kepada belia 18 tahun, dan mengikut statistik , Malaysia agak terkebelakang memberikan keistimewaan ini kepada para belia. Namun, situasi apati (baca: tidak minat) politik bukan hanya ketara di Malaysia, kerana negara-negara maju juga berhadapan dengan permasalahan yang sama. Di Kanada sebagai contoh, kadar keluar mengundi belia adalah tidak sekata, iaitu 37% pada tahun 2001, 43% pada 2004, 37% pada tahun 2008 dan meroket ke 57% pada 2015. Para sarjana politik Kanada melihat situasi turun-naik ini ekoran daripada isu politik, ekonomi, pendidikan, pendatang dan sosial yang berlaku di Kanada (Young & Cross, 2016). Perkembangan terkini Pilihanraya Presiden di Amerika Syarikat pada November 2020 menyaksikan kadar keluar mengundi belia tertinggi dicatatkan negara Uncle Sam iaitu 55 peratus. McAndrew (2020) merumuskan kadar tinggi ini dicatatkan kerana rasa tidak puas hati yang amat tinggi pada kepimpinan Presiden Donald Trump pada penggal lepas. Ternyata, kajian kes di dua negara maju ini menunjukkan belia memilih untuk mengundi apabila ada isu mendesak yang melingkari suhu politik negara. Situasi sama juga dijangka akan berlaku di Malaysia ekoran daripada banyaknya isu - isu politik, ekonomi dan sosial yang memberi kesan kepada rakyat, apatah lagi di era pandemik Covid-19 ini.

Penyertaan politik terbahagi kepada dua; politik konvensional dan politik bukan konvensional. Politik konvensional boleh ditakrifkan sebagai sebarang aktiviti yang berbentuk norma dalam politik termasuklah berkempen, menjadi ahli parti politik dan berdiskusi mengenai politik. Selemah-lemah aktiviti politik konvensional adalah mengundi dalam pilihanraya . Manakala politik bukan konvensional termasuklah tindakan protes, boikot, demonstrasi, kempen secara maya dan revolusi yang menjurus kepada menggugat status quo pemerintah mahupun keganasan atas nama politik. Sebagai sebuah kerajaan yang sah, dan untuk diiktiraf sebagai sah, penyertaan seramai mungkin rakyat dalam proses pilihanraya menjadi keutamaan parti pemerintah. Dalam konteks Malaysia, kadar keluar mengundi sentiasa melebihi 80 peratus, sekaligus memberi legitimasi kepada parti pemerintah. Namun, dalam kita meraikan kadar keluar mengundi yang signifikan, golongan belia yang juga merupakan segmen pengundi yang besar sentiasa mencatatkan peratusan keluar mengundi yang sederhana. Kajian Indeks Belia Malaysia tahun 2019 yang dilaksanakan IYRES menunjukkan skor pencapaian bagi Domain Sosialisasi Politik adalah 29.03 (Sangat Tidak Memuaskan) dan jika dilihat dari segi perbandingan skor dari tahun 2017, pencapaian bagi tahun 2019 menunjukkan penurunan yang mendadak iaitu 21.04 (iyres.gov.my, 2020). Sarjana politik melihat tren 'apati politik belia' ini sebagai secara sengaja tidak mahu melibatkan diri dalam aktiviti politik termasuklah kehidupan sivik, pengundian dan keahlian parti politik kerana merasakan politik dan pilihanraya tidak merubah apa-apa. Ini merupakan satu kerugian yang besar kepada perkembangan institusi demokrasi negara kerana suara rakyat tidak didengari secara menyeluruh.

Modul Undi 18 @ School

Menyedari kepentingan untuk mewujudkan sebuah modul politik dan kenegaraan yang ringkas, interaktif namun berkesan untuk memastikan bakal pengundi 18 tahun pada PRU ke-15, modul UNDI18 @School tampil sebagai solusi. Modul ini mengandungi empat modul interaktif yang ringkas namun padat dengan infomasi bersesuaian dengan tren pembelajaran di kalangan anak muda. Modul 1: Perjuangan Kemerdekaan di Tanah Melayu dan Asas

Pembentukan Perlembagaan Negara; Modul 2: Sistem Pemerintahan Negara; Modul 3: Latar Belakang Parti Politik Utama di Malaysia; dan Modul 4: Simulasi Kempen Pilihanraya. Kesemua modul dipersembahkan menggunakan aplikasi Powtoon dan Toonly, manakala simulasi pilihanraya melibatkan penyertaan menyeluruh dari peserta. Modul UNDI18@School ini telah diaplikasikan kepada pelajar Tingkatan 6 Atas di Terengganu selama empat bulan. Ukuran tahap pemahaman peserta terhadap modul ini adalah melalui 10 soalan yang diukur menggunakan aplikasi Kahoot!. Impak maksima Modul UNDI18@School adalah pendidikan politik dan kenegaraan dapat disuntik kepada bakal pengundi belia tanpa melalui proses pembelajaran ilmu politik dan kenegaraan secara formal dan membosankan di bilik darjah.

Modul ini meminimakan ceramah berbentuk satu hala daripada fasilitator. Ini adalah kerana, kaedah ceramah satu hala telah terbukti tidak berkesan, malah membosankan. Setiap modul mempunyai 6 video animasi pendek, menjadikan kesemua 24 video interaktif. Oleh kerana kekakangan pandemik Covid-19, Modul UNDI18@School ini juga boleh digunakan secara atas talian. Projek rintis di tujuh buah sekolah agama Terengganu pada Januari – April secara bersemuka, dan dua buah Kolej Komuniti secara atas talian membuktikan para belia dan bakal pengundi faham dan hadam segala maklumat mengenai politik dan kenegaraan yang telah dikongsi. Hasil analisis markah penilaian mereka melalui Aplikasi Kahoot! mendapati 97 peratus peserta mendapat markah penuh, dan berjaya menjawab dalam masa kurang 15 minit. Modul ini terbukti berkesan kerana dengan hanya belajar secara interaktif selama empat jam, mereka sudah mampu menguasai dan memahami ilmu politik dan kenegaraan dengan pantas dan berkesan.

NOVELTI DAN PROSPEK KOMERSIALAN

Modul ini telah dibeli oleh Yang Dipertua Dewan Undangan Negeri Terengganu, dengan penambahbaikan isi kandungan mengenai politik dan pilihanraya di negeri Terengganu sahaja. Dato' Yang DiPertua telah mengarahkan agar semua sekolah agama milik Kerajaan Negeri menguna pakai modul ini, dan modul ini juga turut dimuat naik di laman sesawang DUN Terengganu. Selain daripada DUN Terengganu, modul ini sangat relevan diguna pakai oleh Kementerian Pendidikan Malaysia, Kementerian Belia dan Sukan, mana – mana Dewan Undangan Negeri, parti – parti politik, dan NGO-NGO belia. Modul ini juga telah memenangi pingat perak di pertandingan Minggu Penyelidikan dan Inovasi 2021 (MPI'21) anjuran UMT, UniSZA dan UCTATI.

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A PLANNING OF TEMPLER FOREST PARK AND TEMPLER FOREST RESERVE THROUGH MANAGEMENT PLAN

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ABSTRACT
The first step in the management preparation process is identifying specific organizational goals. The planning section should provide a detailed overview of each target, as well as the reasoning behind its selection and the expected outcome of goal-related projects. The goal of this research is to develop a management strategy and thus is involved planning and developing of Templer Forest Eco Park and Templer Forest Reserve strategically. Data collection is via observations, interviews and questionnaire

surveys. Through observations, data inventory of natural and physical resources in Templer Forest Eco Park and Templer Forest Reserve were gathered. For natural resources data inventory, flora and fauna of the area is documented as well as the physical resources such as the condition and types of soil, river water quality, infrastructures and amenities located at the vicinity. The identification of issues, concerns and opportunities (ICO) is one of the most important stages in the development of a management plan. Three factors that be considered in Issues, Concerns and Opportunities (ICO): managerial, social, and resources. All of the elements identified during the ICO study will form a list of all of the issues or problems that exist at Templer Forest Eco Park and Templer Forest Reserve. The Recreation Opportunity Spectrum (ROS) and Limited Acceptance Change (LAC) allow for limited growth in the natural environment without endangering or disrupting the park's natural elements. In Recreation Opportunity Spectrum, the study defined the framework for identifying the types of outdoor recreation activities and experiences that the public might desire. Templer Forest Eco Park and Templer Forest Reserve should be preserved as it is valuable to us and the natural habitats. The actions of the park management in order to find a solution to the issues raised in the issues, concerns, and opportunities identifying requirements improved, and some alternatives to those issues are proposed.

Keywords: Templer Forest Eco Park, Templer Forest Reserve, Management plan, Issues, Concerns and Opportunities (ICO), Recreation Opportunity Spectrum (ROS), Limit of Acceptable Change (LAC)

BACKGROUND OF THE STUDY

Management is the process of putting people together to achieve desired goals and objectives while making the best use of available resources. Management can also be described as human activity, including design, which promotes the creation of useful outcomes from a system, since organizations can be viewed as systems. Templer Forest Eco Park was established in 1996 and is administered under Selayang Municipal Council while Templer Forest Reserve is under the administration Jabatan Perhutanan Negeri Selangor. There is a river running through Templer Forest Eco Park and Templer Forest Reserve suitable for visitors to do leisure activities while enjoying the beauty of flora and fauna at the areas. Apart from visitors enjoying the beauty of flora and fauna in Templer Forest Eco Park and Templer Forest Reserve, at the vicinity areas also located business spaces for petty business activities such as food and beverages. Eco-friendly methods and approaches such as riverbank erosion control and man-made landscape elements are harmoniously blend in with the surrounding environment.

PROBLEM STATEMENT

Templer Forest Eco Park and Templer Forest Reserve is a visitors and tourist destination that focused on ecotourism and recreational activities. Templer Forest Eco Park and Templer Forest Reserve's ecological integrity is under threat as a result of the exacerbated development pressure. It is rich in natural pleasures, and visitors can enjoy the countryside to the fullest. The goal of this study is to use a specific methodology to assess the worth of improving Templer Forest Eco Park and Templer Forest Reserve for nature-based tourism. Apart from that, it is vital to study on the facilities and infrastructures at the parks in order to prevent any mishap and threats that occurred in the forested areas. As the place is well known to the local and international visitors, it is also importance to increase the public awareness about safety and encouraging more people to come to this area as there is a lot to offer for leisure and recreational activities.

ORIGINALITY/NOVELTY

1. New theory on management plan for Templer Forest Eco Park and Templer Forest Reserve utilization based on observation (data inventory on natural and physical resources in Templer Forest Eco Park and Templer Forest Reserve), questionnaire surveys (demographic profile, recreational activities), interviews (recreational use, activities, visitors, visitors'satisfaction, conservation).

2. Knowledge on management plan by the administrator namely Majlis Perbandaran Selayang, Jabatan Perhutanan Negeri Selangor and other stakeholders.

The outcomes can assist the respected Local Authority Government in developing management plan for developing socially responsive sustainable and conservation areas especially in forested areas such as Templer Forest Eco Park and Templer Forest Reserve as specific and in Malaysia as general.

RESEARCH OBJECTIVES

i. To plan and develop a clear management strategy.
ii. To ensure that the environment is in good condition as well as providing benefits.
iii. To provide high-quality services at a low cost.
iv. To improve the performance of each and every factor of production that workers are able to contribute their maximum in the company.
v. To minimize the elements of risk in the previous experience or existing circumstances.

LITERATURE REVIEW/CONCEPTUAL FRAMEWORK

In this management preparation, the Limit of Acceptable Change was used to identify the desired resource, social, and managerial conditions to be maintained or restored in an area, with desired conditions expressed as explicit, measurable standards. According to Stankey et al. (1985), L.A.C allows for the limiting and distribution of visitor use of specific portions in accordance with periodic estimates of the maximum levels of use that natural processes to operate freely and do not impair the values for which natural areas were created. The L.A.C concept is intended to halt the type and rate of change that would otherwise result in conditions deemed unacceptable, and it provides a framework within which the appropriate amount and extent of change can be identified. Furthermore, the Recreation Opportunity Spectrum (ROS) framework was used to create recreation opportunity classes that could be provided in Templer Forest Eco Park and Templer Forest Reserve (Finley, 1990). ROS is a method of identifying and determining the variety of recreation opportunities available in a natural area or group of natural areas. A ROS allows for the classification and management of a variety of recreational opportunities. It has been widely used in recreation planning around the world, but especially in natural areas (Limits, n.d.). To create a recreation management plan for Templer Forest Eco Park and Templer Forest Reserve, information on outdoor recreation behaviours, preferences, needs, and perceptions were gathered.

RESEARCH DESIGN/METHODOLOGY/APPROACH

The data was collected using both qualitative and quantitative methods. Qualitative referred to questionnaire surveys whereby the qualitative methods referred to interview and observation for data inventory. The information is also collected from secondary sources such as interviews and questionnaires. Moreover, data collection for resources and physical inventory was conducted via observation using checklist form. Questionnaire surveys were distributed among visitors of Templer Forest Eco Park and Templer Forest Reserve during Saturdays and Sundays. Interviews with visitors and other stakeholders were conducted for further information about their knowledge and perceptions towards Templer Forest Eco Park and Templer Forest Reserve. The data was also collected by organising a webinar with the Jabatan Landskap, Majlis Perbandaran Selayang and Jabatan Perhutanan Negeri Selangor.

SIGNIFICANT OF THE STUDY

This research will become an important process because it accurately documents the current state of a site while also critically evaluating how the space and its management systems are performing. With many parks and green spaces suffering from long-term neglect and a lack of improvements as a result of government austerity measures, a good Management Plan can assist in bringing focus to a community green space. Many neighbourhoods will have management strategy in place for all parks, while others will be more selective. A good Management Plan will frequently include a maintenance plan. This research will acknowledge and value the role of stakeholders, the public, and interest groups, and will engage them in a meaningful way. This is due to the fact that this planning is all inclusive. Everyone involved in the process is responsible for ensuring that management plans are created, reviewed, implemented, and monitored in a timely and effective manner.

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ADMINISTRATIVE MODEL FOR SEKOLAH AGAMA RAKYAT (SAR): EXCELLENCE PRACTICES

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ABSTRACT

People's Islamic Religious School (PIRS) or Sekolah Agama Rakyat (SAR) in Malaysia is a non-sponsored religious school that needs a paradigm shift to become more visible and luminous in the national education system. The management of a school that is not guided by an effective administrative model will affect the school excellence. The continuity of the school's excellent performance depends heavily on the efficiency and effectiveness of the SAR administration. Generally, most of the SAR administration are based on each administrator's discretion without relying on one common acceptable model for all SAR. Therefore, only a handful of SAR manage to excel in their operations. This study is done in order to identify the administrative practice and the challenges faced by SAR administrators in managing the SAR, based on these scenarios. Eight SAR administrators in three northern states of Peninsular Malaysia (namely Kedah, Penang, and Perlis) were interviewed individually using semi structured questions in this qualitative research. Data collected from the interview were then analysed with Atlas t.i version 8 (AV8) content analysis software. Findings indicated six administrative practices commonly adopted by selected SAR's administrators that makes them the finest and most outstanding SAR administrators of their respective states. The findings also suggested one administrative model that could be used by all SAR as a guide to ensure smoothness and excellence of each SAR in order to produce and develop great leaders of the future with Islamic teachings as its root.

Keywords: administrative model, education, Islamic religious school (SAR), SAR administration, waqf

INTRODUCTION

A competent and efficient waqf property administration is a priority or essential in managing waqf matters including educational waqf. It is a requirement in ensuring educational waqf is developed and expanded for it to produce continuous benefits. Educational waqf is also beginning to receive more attention in Malaysia. This is evident with the existence of educational institution such as Universiti Kolej Bestari (UKB) in Terengganu, Maktab Mahmud and Albukhary International University (AIU), both in the state of Kedah, apart from SARs and religious teaching huts or "pondok" that have been in existence since the early years

of education institution inception in Malaya using the waqf fund. The educational waqf in Malaysia has been in existence in various forms, such as scholarship, financing, building of student hostels, and furniture and utensils like tables, books, and others learning assistance (Amerudin Ismail & Jasni Sulong, 2017). The waqf fund financing has helped reduce the problems of school dropout among the local children due to poverty (Najibah Mustaffa & Mohd Zamro Muda, 2015).

Religious schools in Malaysia comprise of Sekolah Agama Rakyat (SAR) or People's Religious School, Sekolah Agama Negeri (SAN) or State Religious School, Madrasah and Pondok. SAR is a school built and administered by the people through an administrative board or teachers. Madrasah on the other hand is focused on cities or small towns, offered to whoever wants to learn, regardless of age. Pondok refers to a learning center set-up in houses or huts. They also function as student's accommodation. The Pondok institution focuses on kampong or village activities and does not impose any entry conditions to students who want to pursue religious education at the pondok. However, to date the educational waqf in Malaysia religious schools are unable to function as expected to produce continuous benefits. These existed due to constraints especially in the administration system of certain schools' educational waqf. This is an indication that the evolving educational wafq fund administration needs a transparent and systematic administrative system (Nor 'Azzah Kamri, Suhaili Sarif, Nik Azimah Nik Li & Siti Mashitoh Mahamood, 2014). Shortage of staff and of trained staff contributed to the weakness of the management of the educational waqf.

According to the Malaysia Education Development Plan 2013-2025, the cost of national education development increases every year. Government has increased the development budget for national education sector development. In the meantime, a satisfactory educational facility is an essential asset for ensuring educational quality. Therefore, Malaysia Qualification Agency (MQA) gave serious attention to that matter. In this case, without consistent and adequate funds, an educational institution cannot operate desirably.

Based on the previously mentioned issues, certain initiatives need to be implemented so that schools and educational institutions continue to play their role in developing intellectuals of students and the general community. Although there were studies done on educational fund waqf in modern and traditional institutions in Malaysia, specific studies about educational waqf administration and its sustainability in SAR in Malaysia are still lacking and need to be given appropriate attention.

DATA COLLECTION

This study intends to identify administrative practice and the challenges faced by SAR's administrators in managing their schools by using qualitative methods. It uses the explorative approach to analyze the administrative system of SAR in three selected states of Northern Peninsular Malaysia, namely Kedah, Perlis, and Penang.

The data collection was done in two phases. The first phase involved collection of secondary data by researching document sources such as book, thesis, journal, working paper, magazine, and others. The second phase involves collection of primer data. The primer data was acquired through a thorough face to face interview session with eight informants consisting of the best SAR administrator in Kedah, Penang, and Perlis using semi structured questions. Selection of informants uses a purposive sampling method based on suggestion from Pertubuhan Hal Ehwal

Sekolah Agama Kedah (HESA) or Kedah Religious School Affairs Association which is responsible for coordinating all SAR registered under it, especially in Kedah. The selected respondent were administrators from Ma'had Tahfiz Al-Quran Al Imam An-Nawawi (Perlis), Sekolah Rendah Islam Al Furqan (Perlis), Sekolah Rendah Islam Bahrul Ulum (Pulau Pinang), Maahad Tahfiz An-Nahdhoh (Pulau Pinang), Sekolah Rendah Islam Darul Ulum (Kedah), Maahad Tarbiah Islamiyah Derang (Kedah), Madrasah Zubaidiyah (Kedah), dan Sekolah Islam Al-Islah (Kedah). For the study's purpose, eight (8) SAR's best administrators in Northern Peninsular Malaysia were selected to get information in relation to the research title. SARs involved were two (2) for each SAR in Perlis and Penang, and four (4) from Kedah.

FINDINGS

A.   Chosen Sekolah Agama Rakyat (SAR)

SAR chosen from Perlis were Ma'had Tahfiz Al-Quran Al Imam An-Nawawi (MATIN), Jalan Abi Batas Paip, Kangar and Sekolah Rendah Islam Al Furqan (SRIAF) in Jejawi Dalam, Arau. SARs involved in Penang were Sekolah Rendah Islam Bahrul Ulum (SRIBU), Mengkuang Titi, Kubang Semang and Maahad Tahfiz An-Nahdhoh, Permatang Pauh. Four SARs were selected from Kedah, namely Sekolah Rendah Islam Darul Ulum (SRIDU), Batu 3, Tandop, Alor Setar, Maahad Tarbiah Islamiyah Derang, Pokok Sena, Madrasah Zubaidiyah, Merbok and Sekolah Islam Al-Islah, Pinang Tunggal, Sungai Petani.

B.   Challenge faced by SAR involved in the study

Basically, the challenge faced by the SARs in administering people's religious schools is almost like government mainstream schools. However, the most noticeable challenge in ensuring smooth operation of SARs is financial source constraint. Since the SARs operation does not receive financial aid from the government, they need to depend mostly on student fees, and also from waqf cash donation received. They also need quite a huge source of finance for the salary of their teachers, and administrative staff. Due to this constraint, some of the academic staff must take dual roles as teacher and school administrator at the same time. Some of them even sacrifice by receiving minimum wages just to ensure the school operates as planned. The sincerity and enthusiasm possessed by these teachers and school administrators became one of the secrets of the sustainability of the SARs involved. The second challenge relates to human resource aspects. The financial resources constraint makes the salary scheme offered in other places look more attractive. Only those enthusiastic and strong will could endure in giving their service in SAR. Staff come and go according to their need and suitability. Due to this condition, at certain SAR, there are academic staff who also serve as administrators. The next challenge relates to the level of awareness of waqf among Malaysians which is still at an unsatisfactory level. Most Malaysians, especially in the northern area of Peninsular Malaysia are still not fully clear about the waqf concept, especially the educational waqf. Awareness campaigns, and notification sessions at a more frequent rate are needed to overcome this challenge.

C.   Model Suggested for SAR Educational Waqf Administration.

The findings of the study indicated six (6) forms of administrative practice adopted by SAR's involved that may make them the best in administering educational waqf in their people's religious schools. Therefore, a model based on best practice adopted by the SAR's involved is

recommended to be used by other SAR as a guideline to ensure smoothness and sustainable operation of each SAR in order to be more effective and competitive. Figure 1 shows the suggested SAR Administrative Model resulted from this study.

Figure 1: SAR Administrative Model

SUGGESTION AND CONCLUSION

Constraint in terms of financial resources is the greatest challenge of most of the SAR. Therefore, to improve SAR financial resources, few suggestions have been put forward for the particular SAR consideration so that the wafq fund owned could be expanded and improved. Those developments could use the tenancy or lease method that could yield income for the administrators. The income earned could be used for improvement purposes and adding to more waqf assets. This situation shows that the benefit from funds generated could be used continuously, with more sustainability. The second challenge that needs to be addressed immediately is about the human resources aspect. Insufficient human resources either for academic or administrative fields is not a new challenge and is synonymous with most of SAR. Only those serving sincerely could endure working in SAR because SAR is not a place for those seeking worldly rewards. Therefore, the waqf fund generating and development strategy should be given priority and cooperation by all stakeholders in SAR because it could produce a multiplier effect. SARs could seek assistance and collaborate with public universities and

teacher training institutes for training their academic staff on teaching and learning methods, suitable with SAR's requirement in enhancing its staff expertise, periodically. SAR can also cooperate with government agencies as National Institute of Public Administration to provide training for its staff. This could be made easy if SAR has a good relationship with the government and its agencies as proposed by the model in Figure 1. The unsatisfactory level of awareness on waqf needs among Malaysians is another issue that needs to be handled continuously by SAR. All the promotional efforts whether conventionally or through social media need to be done continuously. Proof on waqf fund usage, and efforts to expand waqf fund by SAR should be attached and informed to waqf givers and the public so that they will be convinced of their hereafter investment. Findings of the study suggested that for SAR to manage its operation efficiently, one of its conditions is it must adopt an effective system of educational waqf administration. Since there is no model of educational waqf administration system that could be used as a guide by all SAR in Malaysia, especially in north of Peninsular Malaysia, each SAR administers their school according to their own style. This caused some of the SAR to be lifeless, withered, and pathetic.

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ADR-Now APPLICATION: BRIDGING THEORETICAL AND PRACTICAL APPROACH IN ALTERNATIVE DISPUTE RESOLUTION PROCESS AND PROCEDURES

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ABSTRACT

Construction Law Report, developed by the Construction Industry Development Board Malaysia (the CIDB), noted an increase in the total number of cases registered at the Specialist Construction High Court in Selangor and Wilayah Persekutuan in 2019, a rise of 14% from the previous year. This is from just one of the examples of industry in which legal disputes are piling up at the High Court, without looking at a total number of cases throughout the country and different levels of the court system. The rise of alternative dispute resolution (ADR) mechanisms is welcomed in addressing the need to resolve legal disputes between commercial and non-commercial parties. The introduction of this application is high time, noting the need for concise guidance and practical approaches to the process and procedures of ADR available in Malaysia. This application aims to provide an in-depth yet interactive platform for parties in a legal dispute to understand the nitty-gritty of ADR methods. This application will cover arbitration, adjudication, and mediation. Across industries, the tide has changed, increasing the incorporation of a dispute resolution method in commercial contracts. This is mainly evident in construction contracts, where there is almost always an agreement to arbitrate. Parties to construction contracts are also allowed to adjudicate their disputes regarding payment by resorting to the Construction Industry Payment and Adjudication Act 2012 (CIPAA 2012). The dispute resolution scene in Malaysia has become more robust with the continued acceptance of a simpler, considerably cheaper, and speedier ADR. Despite its advantages, ADR mechanisms could be arduous and complicated, depending on the complexities of each dispute. Accordingly, this ADR-Now application would greatly assist disputants who opted for any form of the ADR to be aware of each method's process and procedures. This user-friendly application employed an interactive interface that provides information with tips included to ensure a smooth process.

Keywords: ADR, Arbitration, Adjudication, Mediation, Legal Industry

INTRODUCTION

With the advancement of the global economy throughout various sectors, it is evident that the potentiality of disputes arising out of commercial transactions has also seen a steady increase for the past few years, and this is apparent, for example, in the construction industry (Dugane & Charhate, 2018). This is corroborated by the observation made by the CIDB, where there is a constant rise in the number of cases registered at the High Court throughout Malaysia (CIDB Malaysia, 2020). Across industries, parties to commercial and non-commercial agreements are increasingly becoming cautious of the potentiality of disputes and whereby the contractual parties are uncertain of what might happen in the due performance of the contract. The inclusion of a pre-dispute agreement as to the method of dispute resolution is, thus, especially pertinent to address this dilemma (Ware, 2006). The judicial tide in acknowledging pre-dispute agreement to choose a dispute resolution method, usually ADR, has seen a positive change in Malaysia whereby the courts have approved the agreements to arbitrate and redirect the parties to the arbitration proceedings (*Chut Nyak Hisyam Nyak Ariff v Malaysian Technology Development Corporation Sdn Bhd*, 2009) (*Renault Sa v Inokom Corporation Sdn Bhd & Anor And Other Applications*, 2010). This trend is not only evident in Malaysia. Across the European Union, it shows that the bulk of cases have been decided through ADR methods (Melenko, 2020). On the outset, choosing an ADR mechanism in advance is pertinent in ensuring contractual parties have a pre-set mechanism to resolve their prospective disputes. However, issues might arise as to what type of ADR would best resolve the parties' problems. There are several considerations that the parties need to give proper attention, to avoid unnecessary spending of resources in the performance of the contract. Ultimately, the parties would want to act in their best interest pursuant to the contract (Rajoo & Singh, 2012). These "considerations" that the parties need to give attention to may not be guided with proper process and procedures of the best mechanism to resolve their disputes. Hence, the coming of this application is high time in addressing the need to ensure parties to a dispute have the prior knowledge and essential information. It will thus enable them to make an informed decision to approach their disputes or prepare for any future dispute in the performance of their contractual duties.

METHODOLOGY

The methodology employed for this research is mainly qualitative research methodology. Therefore, a doctrinal approach is undertaken to provide a detailed technical understanding of ADR as applied in Malaysia. Legal analysis on the data collected through library and case law research is synthesized with secondary reference to sources of law provided in books, journal articles, and law reports. Qualitative research methodology also includes semi-structured interviews with respondents to provide an in-depth comprehension (Bryman, 2007) regarding the subject matter at hand, i.e., ADR and their point of view on their expertise would be of great assistance. Purposive sampling in choosing prospective respondents is vital to this research to gauge their knowledge and expertise. This technique is argued to be the best in ensuring the proper background of the respondents who have those qualities (Alston & Bowles, 2003).

FINDINGS

ADR mechanisms have increased importance in addressing the needs of contractual parties in

handling disputes or in anticipation of prospective disputes. Those who can afford legal advice might be able to ensure that whatever choice they make is based on the legal counsel presented to them. In contrast, those who cannot afford legal counsel might be disadvantaged in acquiring pre-requisite information on what mechanism best suits their position or prospective disputes. An ADR mechanism with a binding force might appear laborious to those untrained in the legal environment. The plethora of information on the process and procedures does little to assist a disputing party or those wishing to have an agreed dispute resolution process. Simplifying information on the matters is vital for the disputants to have an informed decision in choosing a proper dispute resolution process.

The introduction of a user-friendly application accessible through the smartphone is appropriate at this juncture to assist layman persons in having adequate information on the available avenues for them to have their disputes settled. This ADR-Now application seeks to ensure compliance with the statutory provisions governing each ADR mechanism available in Malaysia: arbitration, adjudication, and mediation. Prospective users of this ADR-Now application would be guided through a step-by-step process with hints for the disputants and the general public to gauge and assess their situations to decide on the best dispute resolution mechanism.

COMMERCIALIZATION POTENTIAL

This ADR-Now application serves as a coaching avenue for contractual parties or potential disputants of any commercial contracts in Malaysia to use. The user-friendly feature of this application would benefit not just commercial parties but also law students, the legal fraternity, and the general public. This application would be a vital tool in spreading legal awareness of the substance of each ADR and the procedural law attached to it. Thus, it would contribute to achieving compliance with the specific process and procedures of each mechanism.

CONCLUSIONS

Adequate information and proper understanding of the process and procedures to ADR would ultimately impact selecting the mechanism that would best serve the interest of the disputants or prospective contractual parties. Therefore, this application is an ideal tool for parties to decide on a pre-agreed dispute resolution process to address their future disputes. The coming of an application that would serve this particular purpose is much anticipated because the necessity to resort to ADR is increasing with the advancement of the global economy. The legal awareness provided by this application would benefit multiple levels of prospective users and ultimately assist them in making an informed decision as to the best ADR mechanism to cater to their individual needs.

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AGRICULTURAL CAREER TRAINING PROGRAM FOR DROP OUT STUDENTS THROUGH WORK BASED LEARNING

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ABSTRACT

Agriculture is a broad field that encompasses farming, cultivation, aquaculture, and downstream industries. The agricultural sector continues to face a shortage of skilled and semi-skilled professional labour, which is generally available in most Malaysian private farms. Graduates with agricultural degrees, diplomas, and certificates from universities, polytechnics, vocational colleges, training centers, and associated departments have filled some of the roles. All such academic programs, however, require at least a SPM certificate to apply. Nevertheless, three is another source of human capital that can be trained and optimized, and they are PT3 students who dropped out in education due to low academic achievement. It is the government's role, particularly for state governments, to provide a second educational opportunity for these young people, and to lessen the societal ills associated with adolescent dropouts. Therefore, an academic program in agriculture at the certificate level, specifically for PT3 dropouts needs to be developed into a good academic product that is ready to be commercialized. Basic knowledge in the field of cultivation, livestock, and fisheries should be emphasized in this program. Students will be exposed to the concept of entrepreneurship throughout the training, whether theoretically in the classroom or practically in the field, which will be beneficial for them. Hence, they will be able to meet the high demand for employment and be able to create commercialization opportunities in agriculture. It is envisaged that through this academic program, human capital that are produced will be able to develop their own careers using agricultural expertise acquired through entrepreneurial operations, as well as give employment chances for others.

Keywords: agricultural education, training program, drop out students, work based learning, entrepreneurial education.

INTRODUCTION

Malaysia has the potential to become a major hub in the agricultural industry. Therefore, it is the responsibility of the government to work on this challenge by using the existing resources in the form of human capital and land resources (Dardak, 2015) . Among the potential of human capital comes from PT3 students who dropped out in education due to low academic achievement (Rasmy, Selvadurai and Sulehan, 2017). It is the responsibility of the government to provide other opportunities for these young people to be able to become more beneficial and

successful human beings, and contribute to the development of the country (Rasmy, Selvadurai and Sulehan, 2017). In this context, the opportunity provided is a manpower training program to meet the needs of human resources in agriculture in Malaysia. To meet this need, an academic program in agriculture at the certificate level specifically for PT3 dropped out needs to be developed. This program should emphasize on basic knowledge in the fields of cultivation, livestock and fisheries. Throughout the training, whether theoretically in the classroom, or practically in the field, students will be exposed to the concept of entrepreneurship, which will be an advantage for the program. The training emphasizes on the way students view agriculture as something that can be translated into a high-potential enterprise. With adequate skills and training in the field of cultivation, livestock and fisheries - strengthened with entrepreneurial skills, students from this program will be able to meet the high demand for employment and be able to create commercialization opportunities in agriculture. The main goal of this academic program is to provide formal agricultural education to dropped out students of PT3 and hence reduce social ills involving those adolescents. This group of human resources needs to be helped and trained to become successful human beings that can contribute to the development of the country, especially in the agricultural sector which lacks semi-skilled labor force. Based on this goal, the curriculum developed also includes holistic learning with an emphasis on spiritual aspects, generic skills and entrepreneurship, as well as exposure to smart agriculture by applying ICT and digital technologies to compete in the agricultural sector globally. It is hoped that this academic program will produce human capital that will also be able to create their own careers using knowledge in agriculture owned through entrepreneurial activities, as well as provide employment opportunities for others.

PROBLEM STATEMENT

The field of agriculture is a very wide field, which includes farming, cultivation, aquaculture and downstream industries. To date, the agricultural sector is still experiencing a shortage of skilled and semi-skilled professional manpower which is widely offered by most private farms in Malaysia (Dardak, 2015) . Some of the positions have been filled by graduates of degrees, diplomas and certificates in agriculture offered at institutions of higher learning, polytechnics, vocational colleges, training centers and related departments. However, all such academic programs can only be applied for by at least SPM graduates. Subconsciously, we forget about another potential human capital that comes from PT3 students dropped out due to low academic achievement or poverty. This group also has the potential to get caught up in social ills that involve adolescents as early as primary school level (Rasmy, Selvadurai and Sulehan, 2017). Therefore, it is the responsibility of the government - especially the state governments to provide a second educational opportunity for these young people and further reduce the social ills that involve adolescents who drop out of education. Another issue is on wasteland resources. In Kelantan for example, there are 2% vacant land that approximates to 32,297 hectares that can be cultivated. This requires human resources among young people who are competitive and skilled. In this context, to address both issues the opportunity that needs to be provided is a workforce training program to meet the needs of human resources in the field of agriculture in Malaysia. Therefore, to realize the proposed training program, the potential of human capital that comes from PT3 dropped out students is a resource that needs to be developed optimally. With the availability of this trained workforce as well, then idle agricultural land can be reduced by encouraging them to cultivate it.

PRODUCT DESCRIPTION

This is an educational product with holistic curriculum structure that offers certificate of agriculture to the dropout PT3 students. The formation of this curriculum structure is based on the findings of two studies related to the field of agriculture since 2011. The first study entitled "Status and problems of ECER youth involvement in agriculture and agroindustry" was done under grants provided by the Malaysia Youth Development Research Institute while the second study entitled "Marketability status of graduates in the field of agriculture in Malaysia" was funded by UMK internal grant. Starting from these researches, it has led to a scholarly roundtable discussions with the Kelantan state government, relevant agencies and experts in the field of agriculture in UMK. In 2019, a holistic curriculum for agricultural certificate programs was successfully created. The program is classified into Agricultural Core Courses, Spiritual Core, Entrepreneurship Core and Language and Communication amounting to a minimum of 30 credit hours as in Table 1. Course offerings are as shown in Table 2. The complete syllabus of each course in the curriculum structure has also been completed.

Figure 1: Curriculum structure for Agricultural Certificate Program (ACF)
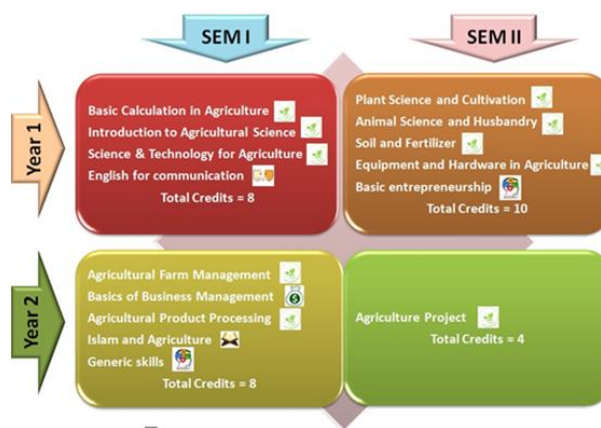
Figure 2: Agricultural Certificate Program (ACF)'s Course Structure

PRODUCT ACHIEVEMENT

Novelty

This educational product is the only course offers in Malaysia aimed to alleviate numbers of drop-out students. The complete syllabus for all courses in this program was developed by experts in UMK and has been agreed by academic committee of the members. The development of this syllabus had also considering human resources to be developed to optimize the opportunity in obtaining formal education for them that can produce better quality of human capital for the country.

Innovation Impact

This two (2) years agricultural academic program is a certificate level program. The minimum total credit to graduate is 30 credits, which gives emphasis on theoretical and practical learning (1 + 1). A student must spend at least four (4) semesters to be awarded for a certificate. However, the maximum number of semesters is six (6) semesters. This program is offered as a general field in agriculture to provide understanding in all aspects related to the agricultural industry. The curriculum formed using holistic approach which will produce a balanced and competent semi-skilled human capital in the field of agriculture. This academic program will be beneficial to any states governments who wanted to utilized their resources i.e.; drop-out students and wasteland in agriculture.

Commercialization Potential

- Curriculum structure and completed syllabus of all causes in this academic program can be apply for intellectual property (IP).
- A future ready curriculum in certificate program of agricultural.
- Module of each course can also be developed and applied for IP.
- As a franchise academic program that will be run by state governments through the potential sponsorship.
- Consultant/expert for accreditation process of this academic program to the interested state government or parties.

IP/Publication/Industry

- Two (2) journal articles have been published prior to the establishment of this program.
- Another there (3) Scopus articles will be submitted.

Table 1: Proof of Publications

No	Title	Journal
1	Competency of IPTA Agricultural Graduates in Malaysia	International Journal of Management Education
2	Perceptions of Agricultural Students on a career in agriculture	Research in Science Education
3	Status of career opportunities in plantations and commercial agriculture in Malaysia	Journal of Planning Education and Research

- Next steps will be focused on IP application for curriculum, syllabus and model

- Final steps is collaborating with state governments in franchising the proposed academic program and finding a potential agencies/industries to sponsor the students.

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AN ECO-FRIENDLY CONCRETE BLENDS FROM PALM OIL BOILER ASH

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ABSTRACT
Palm Oil Boiler Ash (POBA) is a subsequent by-product obtained from the combustion of fibers and kernel shells in palm oil mill boiler, abundantly available and often wasted without further usage. Utilising these materials in lightweight concrete blends offers a great opportunity, especially in addressing environmental issues. The replacement of natural sand and cement with 5% POBA by weight contributes to the highest and favourable compressive strength of the concrete. The compressive strength increases as the curing period of a sample increases up to a maximum of 28 days. The thermal conductivity of the sample was found to be decreased as the POBA replacement increases. In conclusion, an eco-friendly concrete blend from palm oil boiler ash provides a potential alternative in converting industrial waste to beneficial building and construction material. The use of ECO-BAC in

the construction sector can lead to a green structure while reducing the material costs and waste materials from industries. This project will drive to the development of POBA-foamed concrete, which possesses a lightweight characteristic and substantially a favourable compressive strength.

Keywords: palm oil boiler ash, compressive strength, thermal conductivity, lightweight concrete

INTRODUCTION

Over the past decade, a few studies had been carried out to resolve the shortage of natural sand and the upsurge in the waste disposal problems (Awang, Al-Mulali, Khalil, & Aljoumaily, 2014; Mohammad Hosseini et al., 2020; Muthusamy, Zamri, Zubir, Kusbiantoro, & Ahmad, 2015; Rashad, 2016) by using waste material as a replacement of cement and sand in concrete. One of the means to reduce the usage of natural sands in cement production is by partially replacing the cement and sand with supplementary cementitious materials (SCMs) sourced from industrial or agricultural wastes (Roslan, Mohamed Yusof, Sharipudin, Michael, & Sharul Azhar, 2020). Palm oil boiler ash, a local by-product produced by the   palm oil industry, is one of the industrial wastes that is in abundance. Palm oil boiler ash (POBA) is a subsequent by-product resulted from the combustion of fibers, kernel shells, and empty pal fruit bunches from the palm oil fruit (Bu, Tian, Zheng, & Tang, 2017). Many studies have been conducted on testing the compressive strength of lightweight concrete by fully or partially replacing the cement and the sand with palm oil shell (Mannan & Ganapathy, 2004; Muthusamy et al., 2015; Teo, Mannan, & Kurian, 2006), oil palm kernel shell (Alengaram, Al Muhit, & bin Jumaat, 2013) and palm oil fuel ash (Awang et al., 2014; Liu, Chua, Alengaram, & Jumaat, 2014; Muthusamy et al., 2015), but to date, no study has been found on utilising the palm oil boiler ash (POBA) as natural sand replacement in lightweight concrete. If POBA can be employed as sand and cement replacement in concrete for structural applications, it would be favourable to the environment by turning these profitless materials into a befitting product. Thus, the present study aims at evaluating the strength response of concrete manufactured with the partial substitution of cement and sand with palm oil boiler ash and to identify the optimum level of replacement. Compression test and thermal conductivity were conducted on the concrete sample with the variation on the percentage of palm oil boiler ash replacement. The optimal level refers to the amount of POBA required as a replacement of sand and ordinary Portland cement (OPC) up to which the compressive strength and thermal conductivity of blended concrete are equivalent or more than that of unblended OPC concrete.

METHODOLOGY

POBA samples were collected from the palm oil processing factory located in Telok Sengat Palm Oil Mill, Ayer Tawar, Johor, Malaysia. The details of the mixed proportions of plain concrete (control specimen, CM) and concrete containing various POBA content as cement and sand replacement is tabulated in Table 1. Ordinary Portland cement (OPC) was used as a binder to bind the sand and the aggregates. The mixing ingredients of two different sizes of POBA that were used in the experiment, 5 mm and 90 μm and were partly replaced with 5% (CM5), 10% (CM10) and 15% (CM15) by weight of cement and sand in concrete, respectively. All materials were dried in the oven to remove the moisture at the temperature of $110°C \pm 5$ for 24 hours and kept in a humidity-controlled room.

Table 1. Concrete sample mixtures by weight percentage

Sample Name	OPC (g)	Water (g)	Sand (g)	Aggregates (g)	POBA (90 µm ground)	POBA (5 mm ground)
CM	14.56	7.82	27.94	49.68	0.00	0.00
CM5	13.38	7.82	26.54	49.68	0.73	1.40
CM10	13.11	7.82	25.14	49.68	1.46	2.79
CM15	12.38	7.82	23.75	49.68	2.18	4.19

Compressive Strength Test

All samples (CM, CM5, CM10 and CM15) were tested for compressive strength at 7, 14, and 28 curing days. The compression test follows accordingly to the ASTM E4 standard (ASTM Standard E4-07, 2007). In this test, the compressive strength limits for all samples were assessed using the compression strength machine. Three replicates of each age were used to determine the average and experimental bounds of the data.

Thermal Conductivity Test

The measurement of thermal conductivity is conducted using KD2 Pro Thermal Properties Analyser at ambient temperature and pressure. The device uses the transient heated needle to measure the thermal properties of the concrete sample by evaluating the time and temperature response of the sudden electric signal. The thermal conductivity of all samples were measured at the age of 28 days. The corresponding thermal conductivity of three replicates were measured and their average were calculated.

RESULTS AND DISCUSSION

Compressive Strength of CM, CM5, CM10 and CM15

The results obtained show that the variation of compressive strength of four samples with different percentages of POBA mixture at the age of 7 to 28 days. The compressive strength for all samples show an increasing pattern as the amount of POBA increases. The amount of cement in the concrete mixtures plays an important role in the variation of concrete compressive strength. At a high amount of cement, it promotes higher hydration reaction to the concrete mixture, thus increasing the compressive strength of concrete mixtures. CM5 contains higher ratio of cement to POBA, when compared with other samples CM10 and CM15, and this promotes higher hydration reaction that results in higher compressive strength than others [Figure 1(a)] after 28 days.

It can be observed that CM5 and CM10 reached compressive strength above 30 N/mm2 of M30 concrete mixture and above control sample (CM) compressive strength. The increase in the percentage amount of POBA was observed to linearly reduce the strength of concrete mixture and reach an allowable limit of compressive strength at 28 days. Among three different

replacement levels, the use of POBA at the replacement level of 5% performed the best, contributes to the highest and favourable compressive strength of concrete.

Thermal Conductivity of Concrete Samples

From Figure 1(b) it is apparent that for the concrete mixture without presence of POBA (CM) results in thermal conductivity of 1.62 W/m.K, whereas for CM5, CM10 and CM15 are 1.54 W/m.k, 1.38 W/m.K, and 1.23 W/m.K, respectively. The reduction in the thermal conductivity ranged from 4% to 14% of the controlled sample. The decrease in the thermal conductivity as POBA replacement level increases could be attributed to the presence of porosity in the concrete samples (Sulaiman & Pahang, 2014) and interfacial distance between hydration products and aggregates. The density of concrete deceases as the voids in the concrete mixtures increases. This voids initially filled up with water and during the hydration process, this water will be consumed to proceed with the reactions. Drying of the concrete will remove its water content, creating voids and entrap air. The presence of entrapped air will therefore promote additional resistance to the thermal activity, thus decreasing the thermal conductivity of the concrete mixture.

(a) (b)
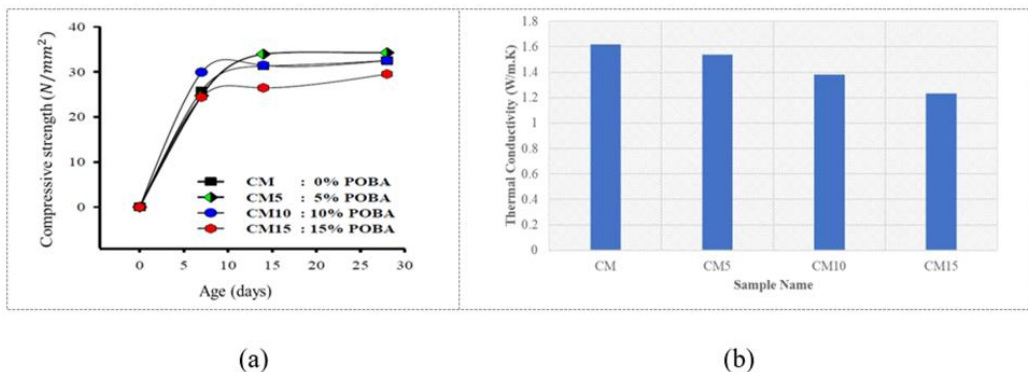
Figure 1. (a) Compressive strength development of CM, CM5, CM10 and CM15 at 7. 14 and 28 of curing days. (b) Thermal conductivity test results of concrete samples.

CONCLUSION

From the present study on the feasibility of POBA as cement and sand replacement, it is shown that the percentage replacement of the POBA contributes a significant effect to the properties of concrete. The compressive strength of concrete samples decreases as the replacement of POBA level increases. The thermal conductivity also decreases as the POBA replacement increases. Nevertheless, for future research it is recommended to study the effect of different POBA particle sizes on the concrete mixture's compressive strength and the stability of the concrete to the temperature treatment.

ACKNOWLEDGEMENTS

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AN INVESTIGATION OF CLOTHING FOR ELDERLY: EMPHASIZING SAFETY, PROTECTION AND FUNCTIONAL ATTRIBUTES

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ABSTRACT

This research discussed the potential of combinations between high-tech fashion and multi-function elements as a new approach in producing outdoor clothing for senior citizens. The design is appropriate with weather condition in Malaysia with high-tech fabric function that aims to provide comfort for users. The clothing is designed to provide protection and insulation. The objectives of this research are to: (i) identify the new potential of hi-tech wearable that is suitable to wear in Malaysia, (ii) examine the design styles of outdoor clothing that portray the comfort and protection for old age, and (iii) identify the design elements that can meet the multi-function purposes. Senior citizens become the primary focus in this study because elderly clothing is a line of clothing that is both age appropriate, easy to wear and easy to care for. As we know, it becomes more difficult for them to move, stretch, bend and twist. This clothing focuses on the challenges faced by those with decreased levels of mobility, arthritis, scoliosis, podiatry concerns, and incontinence issues.

Keywords: Elderly clothing, Hi-Tech wearable, Protective, Multi-function

INTRODUCTION

Every person needs to wear a good clothing that can give protection as well as safety when perform outdoor activities. The good outdoor attire will make people who love to do outdoor activities feel comfortable when travelling, working or playing in which the silhouette is flexible and customized for individual, lifestyle need and with protection elements. The multifunctional elements include waterproof, flexibility, hi-tech, high performance, and adjustable, which are suitable for the elderly. By emphasizing detailing features, users can carry goods without so much of hassle. This includes important documents such as passports, identity cards and gadgets such as mobile phones, laptops, GPS, IPods, and any other items that should

be brought together.

Physical Status of the Elderly

After stepping into middle-age, their skin color, somatotype, and other traits will change inevitably, which is universal. Its characteristics also constitute the Convex and prolapsed; back are broad but flat; arms are long and legs are short and so on, with various features. The contour of acromion, scapula, musculus biceps brachii changes, with blend shape. Bust points move down, due to increase of the fat of abdomen, waist, hip, so that the center of gravity move down, which makes them seem to be older, not tall and straight. From their complexion, sedimentary melanin is more obvious that mottling appears on the face, neck, hands and other parts of body, hence the complexion becomes deeper. This phenomenon has little effect on people with original darker skin, but will have greater influence on the original color not strongly pigmented, so that on the choice of dress, they should be different from the change before. Age-related medical conditions such as arthritis or osteoporosis can lead to a change in body shape, and functional limitations such as dexterity and mobility. As an example, curvature of the spine (scoliosis), a condition often associated with osteoporosis, causes slanting shoulders and waistline, which in turn lead to slanting garment hemlines. Fabric will tend to accumulate on one side of the body due to the uneven waistline. The deformity often causes a hunched back, which will require more fabric to be utilized in order to accommodate the disfigurement. Adapting the garment characteristics of old clothing. In their somatotypes, there are horizontal wrinkles of fat on the thick neck. Physiologically, due to the reduction of body fat, the elderly's skin being sags and prolapsed, wrinkles are obvious. From the type of their body, their chests are flat and back is bow, neck skating backward; waist are patterned to make allowance for these requirements that will provide a garment that is comfortable and offers a camouflage for the deviating body shape. Simple modifications to style details such as larger buttons, or Velcro fastenings, can assist dressing up and undressing where manual dexterity is limited.

Clothing

Clothing is divided into several functions such as casual, formal, travel, leisure, sport, sleep wear and so on. Clothing is a basic requirement in our life to protect our body. "All clothing is known to perform multi-functions - from aesthetic to basic protection from the element", (Gupta, 2011). Clothes are produced by various types of fabric, material, various types of style and function. "Before the 19th century children were dressed like miniature adults, in similar styles and fabrics. From the 1800s onward, the rise of new ideas about childhood prompted the appearance of clothing styles specifically for children, quite distinct from adult fashions. The last decades of the 20th century have some fashions in children's clothing begun to follow adult styles once again", (Lampron, 2007). Until today, children's clothing is still in the style of the current circulation and various brands on the market. However, not all types of clothing are suitable for children depending on the situations. Drawstring is a dress that was listed in the hazardous clothing for children on the playground. "Drawstrings on children's clothing can get caught on things, including playground equipment, car doors, and bus doors", (Iannelli, 2012). According to Rosenthal (2011), "we exercise great caution whenever purchasing any clothing with drawstring around the head, neck and waist areas for your youngest children. It's just too easy for them to suffer choking, strangulation and entanglement injuries due to such drawstring".

High-Tech

Global interest in smart clothing has risen rapidly in the 21st century. Ubiquitous environments demand digital lifestyles, and smart clothing represents state-of-the-art fashion. Also called wearable computers or digital clothing, smart clothing is defined as "garment- integrated devices which augment the functionality of clothing, or which impart information-processing functionality to a garment" (Dunne, Ashdown, & Smyth, 2005). With advances in digital technology and emphasis on user friendly design, smart clothing has begun to receive growing attention in the fashion industry as well as in computer engineering science. Digital wear is an innovation for a new generation of fashion and presumably the future garments for enhancing convenience in daily life. According to Rogers (1995), an innovation is defined as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption". Smart clothing can be considered an innovation because it is still at the introduction stage of the product life cycle (Kaiser, Nagasawa, & Hutton, 1995).

The future of fashion may be influenced by the postmodern society of today and its desire for constant and innovative change (Kaiser, 2005). Comfort and demands for profit often run counter to creative design innovation. To accommodate comfort in the fashion design process, one must consider the body's natural form, ease of movement, and functionality above aesthetic experimentation. Further impeding aesthetic progress is the profit motive for the clothing manufacturers, who seek to market clothing that can be sized and styled with a minimum of customization while maximizing sales (Lee, Kunz, Fiore, & Campbell, 2002).

In other factor, according to a spokesperson for the Environmental Transport Association (ETA), bicycle lights are getting brighter, and it can now be incorporated into clothing, so laser light jacket is a great idea for new technology of cycling gear (ETA, 2000). Smart clothing is a product that should look good and be appropriate for the culture of the end-user, with garment functionality enhanced by embedding technologies such as electronics and computing into the clothing (Jane McCann, Hurford & Martin, 2005).

Innovation

A jacket is a very good idea to facilitate the elderly but is still inadequate and not suitable for the weather and society in Malaysia. Regardless of gender, the study on the innovation of jacket will help the elderly to adventure the world with multi-activities and multi-weather attire. The good attire will make them feel perfect for travel, work or play with each flexible silhouette customizable for individual body type, lifestyle needs, and a lot of hidden pockets and protection. The multi-functions such as waterproof, flexibility, hi-tech, high performance, adjustability are suitable for multi-activities. Plenty of pockets is useful for the elderly to carry goods and important documents such as passports, identity cards, as well as gadgets such as mobile phones, GPS, IPods, and other relevant items. They need an adventure jacket with easy-access pockets for their items and this jacket probably even double as your carry-on luggage, therefore, this research is also to facilitate the travelers to carry their essential items together which is also safe for all goods carried in the pocket.

According to an article in The Chautauquan, a weekly news magazine, ''everyone possessing a bank account considers travel of some sort of imperative'' (Miller, 1895, p. 633). The evolution of fibre developments has gone through the phases of conventional fibres, high-functional fibres and high-performance fibres (Mukhopadhyay, 1993). Increased access to

travel, leisure, and recreational activities contributed to the growth, popularity, and need for waterproof garments. By the end of the century, many fashion columnists argued that every lady, no matter her station, should have a waterproof garment in her wardrobe (Gossip of Dame Fashion, 1896). Patents from 1880 through 1895 provided an excellent source to better understand the design and function of waterproof garments toward the end of the 19th century. Other relatively new technology of interest is cooling fibres by the introduction of water-retaining fibres into the fabric structure. These fibres are sandwiched between a breathable out fabric, such as cotton and Nomex and an inner layer conducting heat and moisture from the body (Stull, 2000).

It is generally believed that older people are less able to maintain core temperature during a cold challenge than younger people (Smolander, 2002). The greater drop in core temperature in the older people seems to be partly due to lower heat production and partly due to higher heat loss. When at rest in the cold, older people have a lower metabolic rate and a higher skin thermal conductance (Falk, 1994). Many older people have trouble putting on outdoor jackets because the garments are typically heavy and require flexibility, dexterity and strength levels that exceed their own. These difficulties are so problematic for some that they are often enough to keep older people from going outside (Row, Paul, McKeever & Fernie, 2005).

Protection

Protective featured clothing is able to provide protection to the body from harm. For the elderly, protection features may just provide some protection in certain parts of the body. It is because they need comfort for their clothes and do not interfere with movement and can make them feel uncomfortable. Most injuries encountered by the elderly during outdoor activities involve the upper body, hands, arm, knees, head and so on. Protection can be designed as removable if it is not necessary. Examples of protection features that can be tailored to children's clothing include the use of padded, layer of fabrics and attached or patch fabric, such as decoration motive or applique on clothing and camouflaged protection but still give comfort for the toddlers. According to Ekstein, "protection garment including a padded portion providing protection" (1992, pp.881-882). In addition, protection by the appropriate use of fabric can also be emphasized to protect the skin from the dangers of the sun or open air. Senior citizens are especially vulnerable to the potential harmful effects of UV light because their skin is thinner and has less melanin than adults (Talbert, 2012). Various protective clothing is known to prevent skin contact with toxic agents (Freund, 1987). Besides, materials used to make clothing for children must be nontoxic (Brown, 2001). These are several types of protections that can be applied on elderly's clothing that include foam padding and fabric layering.

RESEARCH METHODOLOGY

This study used both qualitative and quantitative methods because this study focuses more on subjective material and design that fulfil the wearers' needs. For the primary research, observation and surveys were used to obtain data from individuals and target group. The observation is important to study the design preference and problem. From the observation, researchers will find out about the problem and issues from the elderly's clothing before they were asked to fill in a questionnaire. Evaluation chart is one of the methods to justify which types of design that is appropriate to make as a suitable elderly clothing.

The researchers used the experimental method because it could help to achieve several objectives. The experiment is to explore types of design line, silhouette, material, colour, detailing and the technology which is appropriate to be applied in clothing. The second objective is to make this clothing wearable for multi-activities and various environments

Tables below show the way the methods were chosen and carried out by the researchers. The result and analysis are not only based on the experiment but the observation as well. The data from the experiment and testing process will be recorded and become the findings of this research.

Research Methodology Overview

Below is the overview of the method used to fulfil the objectives of this study.

Table 1. Objectives 1: To identify the new design and materials for elderly clothing.

NO	Purpose	Methods	Justification
1.	Develop understanding of the elderly clothing	Contextual review	Secondary data through readings to understand the shape form detailing and state-of-the-art of the appropriate elderly clothing locally and globally.
2.	Define the new designs and new materials in elderly clothing	Observation and Questionnaire	Visual experience is important to observe the type of elderly clothing.

Interview with the experts can gain information on elderly clothing. |

Table 2. Objectives 2: To examine the design elements to be considered appropriate on elderly clothing.

NO	Purpose	Methods	Justification
1.	Understand and identify the activities of target group.	Observation	Observation on target group to see what type of activities and how they solve their problems on comfort and functionality of the clothing.

Talk to them and understand what they need to improve the elderly clothing. |
| 2. | Define and categorize the design element that needs to be considered in designing elderly clothing for multi-activities | Interview and contextual review (case study and cluster table) | Questionnaire will help to understand the purpose of designing elderly clothing and how it can reflect the activities. |

Table 3. Objectives 3: To investigate the advantages of designing elderly clothing by focusing on high-tech fashion.

NO	Purpose	Methods	Justification
1.	Identify the new high-tech fashion and explore the appropriate elderly clothing.	Contextual review and observation	Secondary data through readings and internet to understand the high-tech fashion.

Talk to them to understand what they need to improve the elderly |

			clothing.
2.	Define what type of high-tech is suitable and can fulfil the needs of target groups.	Interview and contextual review	Questionnaires will define how the high-tech on elderly clothing can reflect the activities.

Based on primary and secondary data, the analysis has been done by the researchers. The analysis result suggests the gap in the existing elderly clothing and potential to innovate and improve the outdoor jacket based on activities and environments in Malaysia. The design statement has been identified based on data collection which is:

To design the innovation of elderly clothing

DESIGN PROCESS

This chapter explains in detail about the design process in this study. There are a few steps to follow to get the better result and good design criteria. The flow starts with the problem which is all the data and issues are obtained from the observation and evaluation. The entire problem has been stated in the introduction section. The material and user need also have been mentioned in methodology section. For this section, researchers need to study on design research which is about the market trend, aesthetic, and fashion forecast. All the data about design research will be gathered with the data that have been collected.

Design Consideration

Based on findings and design recommendation from the analysis, there are three important factors to make good design criteria.
  i.   Aesthetic - Aesthetic appearance (shape, colour, texture), the jacket will be designed with futuristic look. The shapes and silhouette will be more fit to the body but not too tight, easy for users to move and do their activities but still follow the fashion trend. The colour will be dark following the 2020/2021 colour forecast.
  ii.   Usability- Function: The jacket will be multifunctional, waterproof, flexible, adjustable and follow the fashion trend. It will create sense of protection and comfort which will enable the users to enjoy their activities and adventure. The jacket will protect the users and their items, tools or gadget with safety pocket and waterproof fabric.
  iii. Technical- Material: The clothing will use the hi-tech waterproof fabric which can protect the users and their items. The fiberglass also will be used as the padding to protect particular part of users. Reflection fabric and LED light will help users for night activities.

CONCLUSION

In conclusion, developments on elderly clothing have matched and meet the user requirements which is researchers believe that innovation of multi-activities jacket can give satisfaction for the consumers. Besides, there is also one designomic idea which is users only need to have this jacket for various activities. This research also succeeded in identifying the new potential design range for outdoor jacket that is suitable to wear in Malaysia. High-tech fashion is also appropriate to be applied on outdoor jacket. The entire respondents agreed with high-tech fashion on elderly clothing. Researchers also managed to find the design elements to be

considered in an elderly clothing for multi-activities. It is clear that both manufacturers and marketers are listening to the needs and wants of customers and are making new cases to meet these demands. Researchers believe additional innovations will bring even more new features to the outdoor jacket and this industry will add more convenience and usability. With high-tech fashion, safety padding, plenty of pockets, detachable particular panel and water-resistant feature, this jacket will be an interesting jacket and is suitable for all activities that meet the consumer demands.

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ARDU-ELECTROCHROMIC FILM FOR HOME SAFETY AND PRIVACY PURPOSE

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ABSTRACT

The demands for smart devices are increasing exponentially nowadays. This project presents the invention of a new, low cost, and user-controlled electrochromic film device for home safety and privacy purposes. The development of this system focuses on windows where electrochromism materials as a film had been layered for the safety and privacy plan. The film material was chosen instead of mirror due to its cost effectiveness, convenient properties which are more versatile, and installable to any pre-existing glass available. The excessive exposure of UV radiation over 15 minutes causes acute and chronic long-term skin effects. Meanwhile, high cost in cutting precise glass appliances due to high volume of heat trapped during daylight causes the application of this device to be crucial. This invention is equipped with IoT (Internet of Things) which helps users to control it remotely via Blynk Apps in smartphones and displaying all the sensor's output. The system comprises Arduino UNO as main controller, NodeMCU ESP8266 for IoT platform, solar battery as a power source, UV sensor together with PIR sensor to enhance safety purpose and DHT11 for monitoring temperature and humidity. The efficiency of the system was evaluated by measuring the changes in solar radiation and temperature in between inside/outside of the system. This simple, reliable, and economically smart Ardu-electrochromic film system is a new potential management device preventing excessive UV lighting in houses, promising privacy and safety as well.

Keywords: electrochromic film, UV radiation, UV sensor, automation, IoT

INTRODUCTION

Smart materials are materials that sense and react to environmental conditions or stimuli such as mechanical, chemical, electrical, or magnetic signals (Bandyopadhyay & Sinha Ray, 2012). In the construction industry, glass is one of the main elements used by architects and engineers for houses and buildings leading to a high demand from manufacturers for construction companies. According to Ho Sai Woo, the chairman of the Malaysia Glass Association (MGA), the glass industry is booming with a RM3 billion turnover for both glass manufacturing and processing streams of the industry (Zieman, 2013). One type of smart material glass is the electrochromic glass. Electrochromic materials are materials that change their optical properties when a voltage is applied across it (Granqvist, 2006). Normal transparent glass does not assist in keeping privacy and safety. It is also incapable in blocking the UV radiation from the sunlight and facing high price which requires individual installation which increases

construction cost (Switchable Smart Film vs Switchable Smart Glass, 2017). According to NOAA's Climate Prediction Center (CPC), January 2020 had a temperature departure of 1.14°C, which is 2.05°F above the 20th century average and the highest surface temperature of the Earth's land and sea in 141 years (Global Climate Report - February 2020, 2020). Meanwhile, the Meteorological Department stated that Malaysia's UV index reading could reach 15 in the afternoon on a clear day (Medical And Editorial Content Team, 2019).

Dermatologist Dr Nurashikin Ahmad said that long exposure to extreme UV radiation causes acute and chronic long-term skin effects. People with sensitive skin experience itchiness and sun burns while its long-term effect leads to photo-ageing effects like wrinkles or skin cancer ("UV Level Now Extreme," 2018).

Thus, a solution has been devised to develop a prototype of a smart house by using electrochromic film (Couput et al., 1992) (Green, 1997) to control the amount of UV light that passes through the house/building by providing safety and privacy as well to the residents. Electrochromic film was chosen instead of electrochromic mirror for its cost-effectiveness with much lower price, convenient properties which are more versatile, and installable to any pre-existing glass available. To achieve the intention of the project, three steps were designed. At first, an Arduino based system powered by a solar source was developed. Next, solar battery charger for the ardu-electrochromic film device was constructed and lastly, the evolution of an electrochromic film device that is remotely controlled by Arduino via Blynk Apps. The project focuses on the development of the electrochromic film to be attached in houses. Electrochromic film was chosen instead of electrochromic mirror due to its stick-on concept and ability to change its state from transparent to opaque. The efficiency of the electrochromic film was measured experimentally at different numbers of voltages. The size of the electrochromic film was estimated to be about 15cm x 10cm. Solar panel with a battery charger was implemented as the power source of the project. By embedding an infrared (IR) sensor to identify the motion of surrounding, ultraviolet (UV) sensor to measure the amount of UV light, DHT11 for monitoring temperature and humidity, this system not only fosters a privacy plan but safety as well.

METHODOLOGY

The procedures that were applied in the process were presented in the form of a block diagram.

<div align="center">Table 1: The whole project's methodology</div>

Hardware Implementation	NodeMCU (ESP8266)
	Arduino UNO
Software Implementation	Blynk Application
	Arduino IDE
Measuring Implementation	UV Sensor
	PIR Sensor
	DHT11

Block Diagram of the Device

The block diagram of the device consists of five separate parts combined into one system to be

constructed as one completed device. It consists of solar battery charger, PIR sensor (Ada, 2020), DHT11, UV sensor (Instruments, 2013) and smart control as shown in Figure 1.
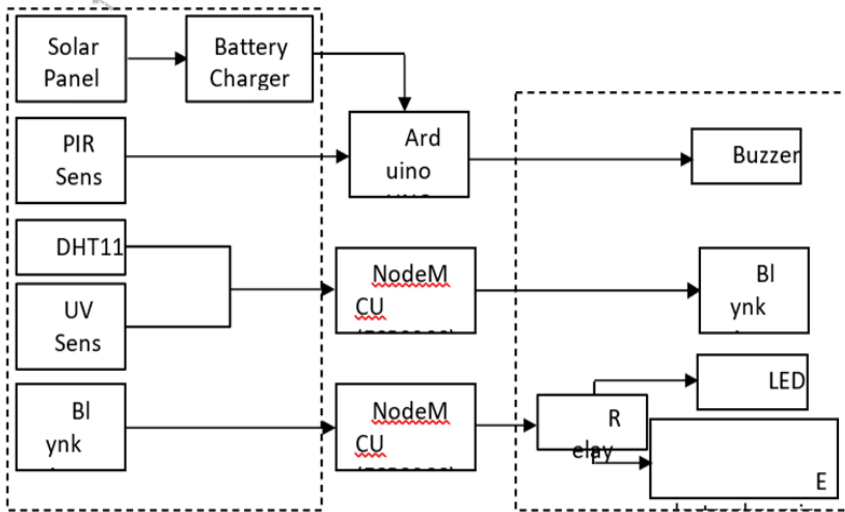
Figure 1: Block diagram for the ardu-electrochromic film device

Circuit Diagram of the Device

The circuit diagram of the device consists of four parts: The solar battery charger, security alarm, lights & film control and temperature and humidity monitoring. The security alarm uses Arduino Uno as the controller meanwhile ESP8266 used for the lights & film control and temperature humidity monitoring.
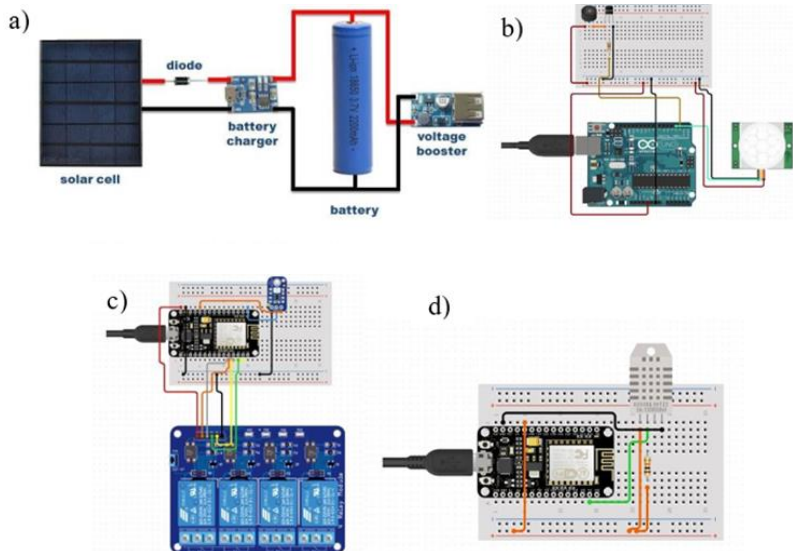
Figure 2: Circuit diagram of the device (a) solar battery charger (b) security alarm (c) lights & film control (d) temperature & humidity monitoring

RESULT AND DISCUSSION

In this section, experiments were conducted to investigate the efficiency of the solar battery charger and the efficiency of the electrochromic film.
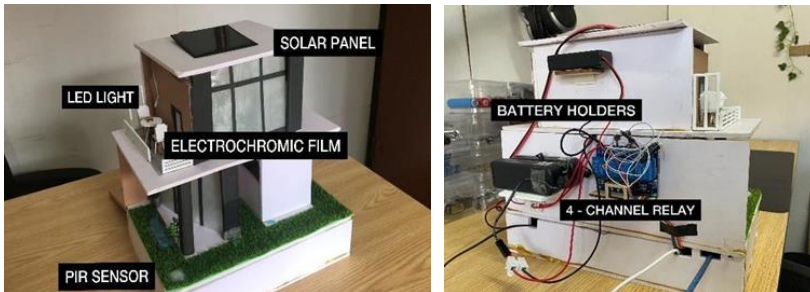
Figure 3: The smart house prototype (a) Front view (b) Back view
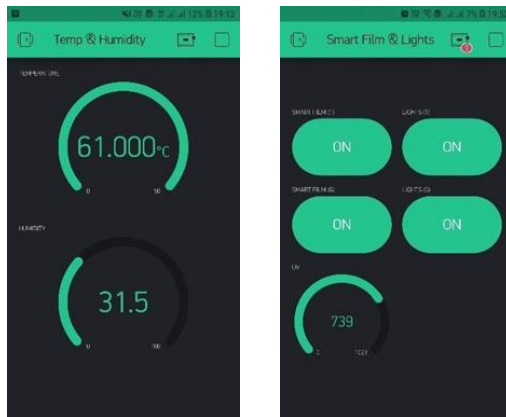
Figure 4: Electrochromic film control, UV light, temperature, and humidity monitoring in the Blynk application

A)   The efficiency of the solar battery charger

The efficiency of the solar battery charger was measured and calculated by measuring the voltages, currents and calculating its power (Guo et al., 2010). Figure 5 shows the consistent amount of voltage captured from the solar battery charger at different weather conditions.
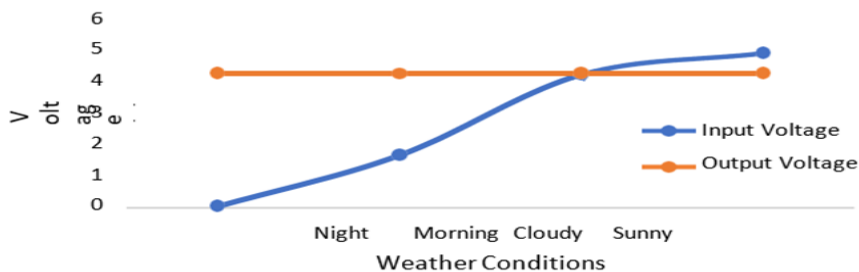
Figure 5: Graph of voltage (V) against different weather conditions.

B) The efficiency of the electrochromic film

The efficiency of the electrochromic film was determined by measuring the amount of sunlight passing through the device when the electrochromic film was at transparent and opaque states by using a pyranometer.
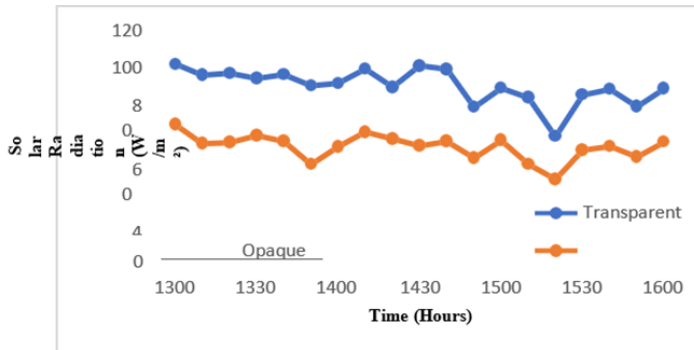
Figure 6: Graph of solar radiation at transparent and opaque states against time

CONCLUSION

The ardu-electrochromic film system was successfully developed, and the device was validated electronically by a smart house prototype. Based on the data collected, the ardu-electrochromic film device was proven to block the amount of UV light directly entering a house/building by 62% efficiency. In addition, the solar battery charger showed a constant and efficient amount of power to the ardu-electrochromic film device regardless of time and weather conditions. All the sensor's systems also exhibited good functionality. Thus, the intention of this system to provide privacy and safety was successfully demonstrated.

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LET'S TALK ABOUT THE MOVIES: THE MOVIE JOURNAL

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ABSTRACT

Let's Talk about the Movies: The Movie Journal is the first innovation for the teaching and learning of oral presentations. This originates from the difficulties faced by lecturers and students in using movies for their Open and Distance Learning (ODL) during the COVID-19 pandemic. Due to these difficulties, this innovation which comprised of The Movie Journal Innovative Infographic Notes - A Guide for Lecturers and The Movie Journal Innovative Infographic Template - A Guide for Students was developed and introduced to lecturers and students as teaching and learning resources at Universiti Teknologi MARA (UiTM), Negeri Sembilan, Kampus Rembau in March-July 2021 semester. Data on lecturers' perceptions were gathered in an interview session via Google Meet from two lecturers teaching the English course. A set of questionnaires was developed and distributed to students and 24 responses were obtained through online Google Form for the data on students' perceptions. Results showed that lecturers found this innovation as appealing, effective and well-received. Majority of the students agreed that they liked using this infographic Movie Journal because it was easy, more organized, with no missing contents for their oral presentation, and no repetition of contents in their slides presentation. The novelty of this innovation is from a standpoint that Let's Talk about the Movies: The Movie Journal is a new breakthrough for using movies during ODL in the teaching and learning of English compared to the traditional face-to-face method. Potentially, the future of this innovation

certainly could be used for other courses that require the use of movies in the syllabus. Hence, Let's Talk about the Movies: The Movie Journal could be commercialized and disseminated as physical resources and digital resources for lecturers, students, educators and instructors in both education and communication fields.

Keywords: Movies, Movie Journal, Open and Distance Learning (ODL), COVID-19.

INTRODUCTION

The COVID-19 pandemic is a huge challenge to education system and has resulted in the closure of schools and universities across the world. It has significantly disrupted the higher education in Malaysia and has certainly created challenges faced by the universities (Sia & Adamu, 2020). Universiti Teknologi MARA (UiTM) has taken an approach of Open and Distance Learning (ODL) system as a way to ensure continuity of education. It is undeniable that ODL is deemed to be the best solution during the COVID-19 pandemic, however, most educators and learners face challenges in this 'new norm'.

The shift from the traditional face-to-face method to ODL has caused difficulties for both lecturers and students in the teaching and learning of English at UiTM for an English course, ELC231: Integrated Language Skills III. An evaluation on students' speaking ability is made through their oral commentary presentation on movies as part of their assessment marks. Lecturers face difficulties in terms of displaying a clear guidelines and templates required for the presentations and students have difficulties in identifying the accurate guidelines and templates which then lead to missing and repetition of contents in their oral presentations. These difficulties have affected their speaking performance.

Hence, Let's Talk about the Movies: The Movie Journal which consisted of The Movie Journal Innovative Infographic Notes - A Guide for Lecturers and The Movie Journal Innovative Infographic Template - A Guide for Students was developed and introduced to both lecturers and students as teaching and learning resources. This innovation also attempts to find out the perceptions of lecturers and students towards the use of Let's Talk about the Movies: The Movie Journal in their teaching and learning of movies in English class during ODL

METHODOLOGY

There are four main phases for the innovation of **Let's Talk about the Movies: The Movie Journal.** Having identified the difficulties faced by lecturers and students in the teaching and learning of movies oral presentations, this innovation began with Phase 1: The development of **Let's Talk about the Movies: The Movie Journal**; Phase 2: The implementation of **The Movie Journal Innovative Infographic Notes - A Guide for Lecturers;** Phase 3: The implementation of **The Movie Journal Innovative Infographic Template – A Guide for Students;** and Phase 4: Evaluation – User Feedback on **Let's Talk about the Movies: The Movie Journal**. This is described as follows:

Phase 1:
The development of **Let's Talk about the Movies: The Movie Journal**

Let's Talk about the Movies: The Movie Journal innovation comprises of two items. They are The Movie Journal Innovative Infographic Notes - A Guide for Lecturers and The Movie Journal Innovative Infographic Template - A Guide for Students (Figure 1).

Figure 1. Let's Talk about the Movies: The Movie Journal

Phase 2:
The implementation of **The Movie Journal Innovative Infographic Notes - A Guide for Lecturers**

The Movie Journal Innovative Infographic Notes - A Guide for Lecturers consists of the introductory page (Figure 1) and the content page (Figure 2). Lecturers use this infographic notes to present the guidelines required for movie oral presentations to all students via Google Meet. The content page provides seven items for movie guidelines which include the movie title, genre, setting, characters, plot, memorable scene and overall opinion. The descriptions for each item are provided and explained by the lecturers.

Figure 1. The Movie Journal Innovative
Infographic Notes - A Guide for Lecturers
(Introductory Page)
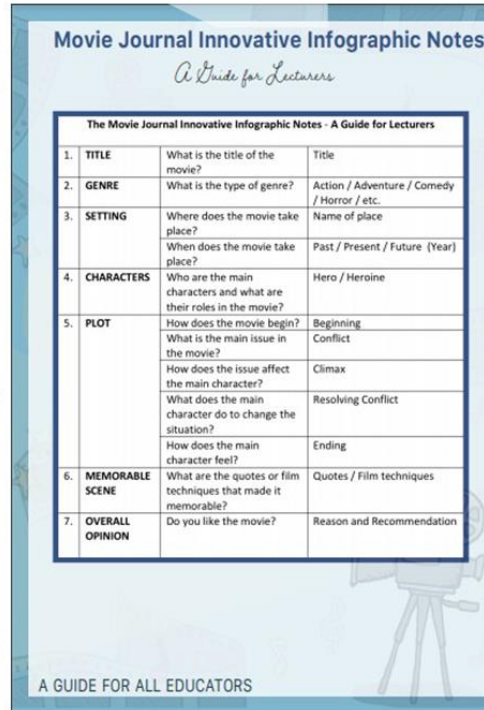
Figure 2. The Movie Journal Innovative
Infographic Notes - A Guide for Lecturers
(Content Page)

Phase 3:
The implementation of **The Movie Journal Innovative Infographic Template - A Guide for Students**

The Movie Journal Innovative Infographic Template - A Guide for Students consists of the introductory page (Figure 3) and the content page (Figure 4). Students use this infographic template to assist them in preparing appropriate contents for their slides presentations on movie oral commentary. The content page provides seven items similar to lecturer's notes, that is, the movie title, genre, setting, characters, plot, memorable scene and overall opinion. Students need to add their thoughts on the seven items when they present their movie's oral commentary.
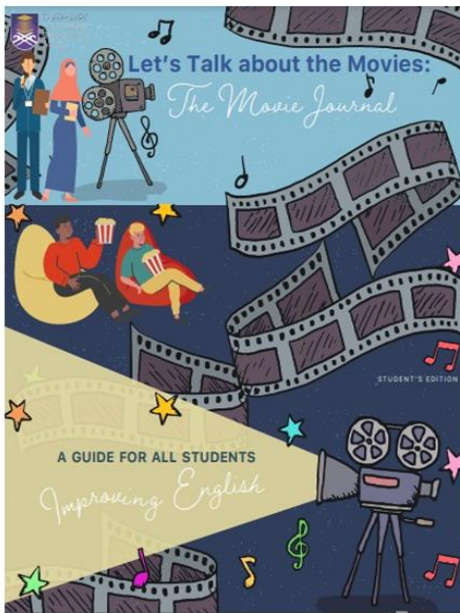
Figure 3. The Movie Journal Innovative
Infographic Template - A Guide for Students
(Introductory Page)
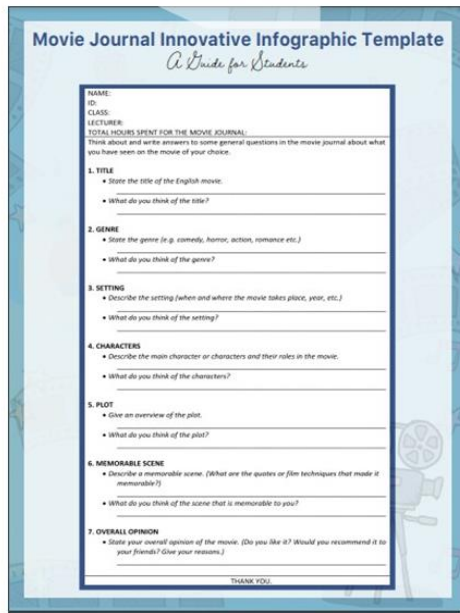
Figure 4. The Movie Journal Innovative
Infographic Template - A Guide for Students
(Content Page)

Phase 4:
Evaluation - User Feedback on **Let's Talk about the Movies: The Movie Journal**

Participants were lecturers and students of Universiti Teknologi MARA (UiTM), Negeri Sembilan, Kampus Rembau during March-July 2021 semester. Data on lecturers' perceptions were gathered from two lecturers teaching the English course in an interview session via Google Meet and were analysed qualitatively. Data on students' perceptions were collected online through Google Forms. A set of questionnaire using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) was developed and distributed to students and received 24 responses. These data were then analysed quantitatively in frequency and percentage.

FINDINGS

To find out the usefulness of this innovation, the data were gathered from lecturers and students on their perceptions towards using **Let's Talk about the Movies: The Movie Journal.**

Lecturers' Perceptions

The responses received from the lecturers showed that The Movie Journal Innovative Infographic Notes - A Guide for Lecturers is appealing, effective and well-received.

Students' Perceptions

Majority of the students agreed and strongly agreed that they liked using the Movie Journal (87.5%), it was easy (79.2%), more organized (87.3%), no missing contents for their oral

presentation (87.3%) and no repetition of contents in their slide's presentation (66.7%).

Table 1. Students' Responses towards Using the Movie Journal (n=24)

Students' Responses towards Using the Movie Journal (n=24)
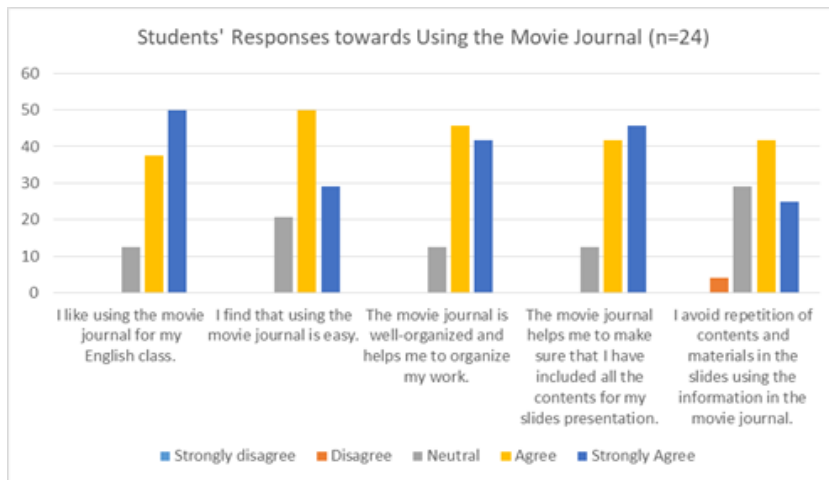
CONCLUSION

Let's Talk about the Movies: The Movie Journal is an innovation that benefits both lecturers and students in preparing appropriate contents for movie oral presentations. It is appealing, effective and well-received by lecturers. It is also liked by students, easy to use and the students become more organized in preparing their materials for oral presentations. Even though the number of participants was relatively small at the implementation stage, this could be extended to other lecturers and students in the following semesters. Potentially, this innovation could certainly be used for other courses that require the use of movies in the future. **Let's Talk about the Movies: The Movie Journal** also has commercial values to be used as physical resources and digital resources in academic settings in both education and communication fields.

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ASYMMETRIC IMPACT OF THE OIL PRICE CHANGES ON STOCKS MARKET FOR SELECTED ASEAN COUNTRIES.

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ABSTRACT

This paper complements a growing literature of stock market to reach several objectives. First, to investigate the asymmetric impact of oil price changes on stock market by focusing on selected ASEAN countries. The next objective is to compare the different impact on changes in stock price effect from current situation of pandemic Covid-19. Using daily data from year 2019 until 2020, the results can be explained by the NARDL model in which independent variable are decomposed into its positive and negative partial to determine the long-term and short-term relationship. The empirical findings would help economic players to diversify their portfolios across selected ASEAN countries to minimize risks and maximize returns.

Keywords: oil price, stock price index, institutions, NARDL

INTRODUCTION

The stock market is a place where stocks are traded. In the stock market, the stock will be channeled from a surplus to a deficit. The primary market and secondary market will be the two main parts of the stock market. The main market is a market where new businesses can issue their shares for the first time on the stock exchange. For the secondary market, it is the stock that already issued in the stock market and already traded in organize exchange.

Stock market a crucial indicator in the development of a country because with the existence of stock markets, shares are easily issued and traded to investors. Basically, stock markets are considered as the best way to reflect the economic position of a country (Najaf, 2016). However, the rise and fall in commodities prices (especially oil prices) cause large fluctuations in stock market returns. Hence, oil price volatility and its effect on stock markets is recognized as a great concern from scholars over the years.

The fluctuations in the oil market bring a huge impact on the world economic and financial markets because crude oil is a key input and vital to world production (Fernández, González, & Rodríguez, 2018; Wang, 2020). A significant number of studies in recent years examined the link between oil price and stock market. It can be viewed in different perspectives in example from nation, regional and global stock price. It is worth emphasizing the relationships between oil price and stock market in different sights because different stakeholder's variety stakeholders have different investment horizons. Meanwhile there are different opinions when it comes to relationship of oil prices and interest rates. The reality is that the swings of oil prices and interest rates are related. However, they are not tightly correlated. In truth, many factors influence the direction of both interest rates and oil prices. A lot of research has been undertaken on the relationship between oil prices and interest rates.

The first objective of this study is to investigate the asymmetric impact of oil price changes on stock market by focusing on selected ASEAN countries. Most of the previous studies have been conducted using a linear framework, whereas many economic variables incorporate nonlinear properties, especially in view of the existence of business cycles (Neftci, 1984: Falk, 1986). Therefore, asymmetry in the oil-stock relationships may appear when stock prices of different countries respond differently to changes in oil price during boom and recession. The next objective is to compare the different impact on changes in stock price effect from current situation of pandemic Covid-19. Limitations of this study is difficult to gain idea from previous study regarding data to from the whole ASEAN countries due to limited access of financial data from our institutions. The ASEAN countries including Indonesia (Jakarta Stock Exchange Composite Index: JKSE); Malaysia (Kuala Lumpur Stock Exchange Composite Index: KLSE); the Philippines (The Philippine Stock Exchange Index: PSE); the Thailand (Stock Exchange of Thailand Index: SET); the Singapore (Straits Times Index: STI) and The Vietnam Stock Index or VN-Index for Vietnam. We considered the stock markets of the Association of Southeast Asian Nations (ASEAN) as appropriate location for our study due to these countries has experienced rapid economic growth for decades. In addition, the Southeast Asian stock markets are more speculative than other developed regional markets such as US and Europe (Lu et al., 2018). Lastly, these countries comprise developed and developing markets, with Singapore well known be as developed in small country, while the rest are generally recognized as emerging markets. From these features, it would be possible to explore on asymmetric impact of the oil price changes on stocks market in the different regional market.

METHODOLOGY

The sample dataset comprises stock market is based on sources from the DataStream database. The oil data is obtained from the Energy Information Administration (EIA), and we use the Brent crude oil price (BRT) to represent the international oil price. The interest rate is proxy by the US 3-month T-bill rate extracted from DataStream database too. Institutions impact we use the proxy of financial fragility index from Federal Reserve St Louise. Our data set includes Islamic Stock Exchange from 8 countries that are listed from EIA as most exporters and importers with the highest dollar value worth of crude oil during 2019.

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AUTOMATED SYSTEM FOR CONCRETE DAMAGE CLASSIFICATION IDENTIFICATION USING VARIOUS CLASSIFICATION TECHNIQUES IN MACHINE LEARNING

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ABSTRACT

Reinforced concrete is the most widely used material for Malaysian building construction. However, the significant disadvantage of this material is it is prone to the material damage, which causes a decrease in the durability of the concrete and causes structural damage. To determine the suitable repair technique on this material, proper identification procedure on damage classification must be executed. Currently, manual inspection performed by a qualified inspector is the primary inspection method to determine the concrete damage. The manual inspection is a process that is subjective and scarcely effective since it depends heavily on the personal experience and expertise of the inspector to interpret the damage classification. Besides its subjective nature, manual inspection is also to be a time-consuming approach, dangerous, inconsistent, costly, and a laborious task. The demand of experienced inspectors also presents a challenge for the pressing lack of highly skilled and experienced construction inspectors. To overcome the issues, datasets of reinforced concrete damage images are intelligently trained and classified by selected Machine Learning algorithms such as Naïve-Bayesian, Discriminant Analysis, K-Nearest Neighbor, and Support Vector Machine. This invention can recognize a certain damage while the classification of defects is classified according to the features extracted from the images by using GLCM algorithm. The performance of these algorithms is evaluated by dividing the dataset into two sections: testing and training. Cost and time usage can be minimized by using this invention which can help the engineers or construction inspectors. This invention is a significant tool that can predict types of reinforced concrete damage accurately.

Keywords: Concrete Defect, Naïve-Bayesian, Discriminant Analysis, K-Nearest Neighbor, Support Vector Machine

INTRODUCTION

In the last three decades, Malaysia has witnessed immense growth in many sectors of the economy, not least in the construction industry. Malaysia's construction sector advanced 58.6 percent in the third quarter of 2020 which the civil engineering sub-sector remained dominant as the main contributor to the value of construction work done with 45.8 per cent share (Kei, 2016). As the growth of the construction industry, the demand for the structural defect inspectors of civil structures is increasing too. It is challenging to manage the number of demands by using the current approach, which is a visual inspection by trained inspectors combined with decision-making criteria. According to the Federal Highway Administration (FHWA) reports there are few limitations that might affect the efficiency and decision-making of visual inspection in terms of timing, interpretability and accessibility. There are thousands requests for inspection annually in Malaysia itself with 11,000 requests in 2018 according to the Department of Occupational Safety and Health (FMT Reporters, 2019). Steel corrosion, cracks, and spalling are structural defects that often occur in the construction world (Bakri & Mydin, 2014) . The concrete defects need to be secured to maintain the building's structure and to stop any more failures. The key to ensuring the 'health' of a building's construction is frequent inspection.

The automated system for structure inspection is much needed to carter this problem. In this research, supervised learning algorithms applied for defect classification are the Naïve-Bayesian, Discriminant Analysis, K-Nearest Neighbors (KNN), and Support Vector Machine (SVM) algorithm. This method uses machine learning algorithms to classify a particular type of defect. The detection defects identify or recognize a defect, while the classification of defects classified according to the features extracted from the area of defects. Machine learning is a subfield of Artificial Intelligence (AI) that is useful for classifying, predicting, and clustering data sets, depending on the application (Sitara, 2018). The researcher selected this classifier due to a straightforward method. It required less data and was reported to be highly efficient and effective in solving classification problems. Cost and time usage can be minimized over this method which can help improve the study. Furthermore, it can predict types of concrete defects accurately.

In this research, 200 images of concrete defects images are used to develop a supervised learning model to assess whether the model correctly classifies the concrete image as having "crack," "corrosion," "spalling," or "non-damage." The primary aim of this study is to examine and evaluate a concrete damage detection system based on picture classification with the use of Machine Learning Algorithms. The objectives of this study are:

i)   To employ adequate methods for data features extraction using GLCM that leads the classification identification using classification technique in machine learning
ii)   To implement Naïve-Bayesian, Discriminant Analysis, K-Nearest Neighbors, and Support Vector Machine (SVM) algorithms to classify the data.
iii)   To evaluate the results of classifiers and determine the best among them based on their accuracy and precision.

MATERIALS AND METHOD

This part summarized the method used in this study:
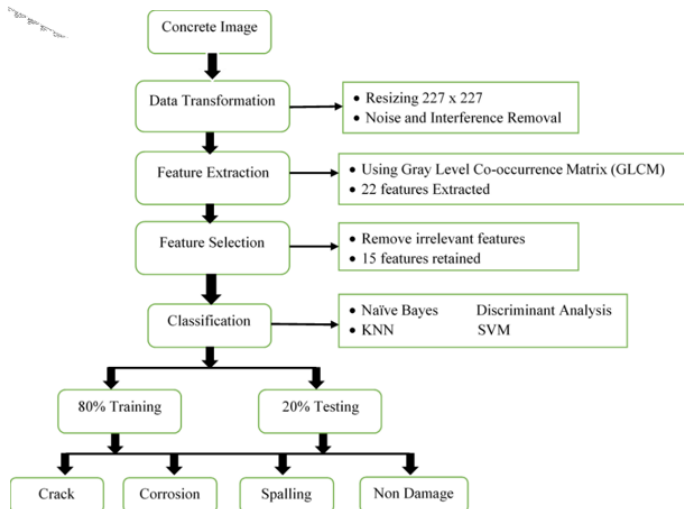
Figure 1: Flowchart of This Research

Features Extraction using Gray Level Co-Occurrence Matrix (GLCM)

Feature Extraction is a process for indexing and retrieving images to capture visual content (Mohanaiah et al., 2013). In this process was the extraction of features obtained after the MATLAB program had been run. Gray Level Co-Occurrence Matrix (GLCM) has proved to be a popular statistical method of extracting features from images (Mohanaiah et al., 2013). It is considered a process for converting the specified data into a suitable classifier format and determining the normalized images for classification identification. Finally, the images are to be displayed in the relevant recognition features to classify the object by the classifier.

Features Selection

One of the most important principles in machine learning is feature selection, which has a significant effect on the model's efficiency (Raheel Shaikh, 2018). Feature selection is the method of reducing the number of input variables to minimize the computational cost of modelling while also improving the model's output in some cases (Brownlee, n.d.). In other words, it is a method used to classify and exclude unneeded, insignificant and redundant attributes from data that do not even contribute to the accuracy of a predictive model or can reduce the model's accuracy (Brownlee, n.d.).

TYPE	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
CRACK	29.3380	0.0781	0.8807	0.8807	23.8386	-3.4983	0.0758	0.5997	0.9253	0.962
CORROSION	20.7320	0.5103	0.8782	0.8782	212.6452	-1.9687	0.4057	0.1020	2.6825	0.812
NON-DAMAGE	43.4108	-0.0544	0.7471	0.7471	1.1464	-0.1631	0.0543	0.7307	0.5589	0.972
SPALLING	26.4068	0.2569	0.8787	0.8787	107.6682	-6.8399	0.2327	0.2112	2.0378	0.887
VARIANCE	93.0302	0.0444	0.0044	0.0044	9190.7506	8.0165	0.0266	0.0911	0.9648	0.005

F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22
0.9623	0.7258	29.2101	10.7190	99.1784	0.8685	0.0781	0.2604	-0.617	0.7201	0.991	0.9988
0.8075	0.1980	20.8502	8.5370	49.3721	2.2988	0.5103	0.7622	-0.450	0.874	0.9566	0.9924
0.9729	0.8262	43.2331	13.0969	160.5881	0.5208	0.0544	0.1958	-0.514	0.5288	0.9948	0.9997
0.8861	0.3452	26.3844	9.9149	72.9486	1.8427	0.2569	0.5506	-0.529	0.8585	0.9748	0.9965
0.0059	0.0901	90.8347	3.6566	2295.4453	0.6860	0.0444	0.0693	0.004	0.0256	0.0001	0.0000

Figure 2: Feature Extraction and Selection

Classification model

i)   Naïve-Bayesian

Naive Bayesian classifier is an algorithm for classification that is based on Bayes Rule. It will forecast class membership probabilities. For example, it determines the possibility of a given sample belonging to a particular class. The Bayesian classifier is based on Bayes' theorem and the posterior hypothesis. Besides that, Naive Bayesian classifiers provide a vital concept that an attribute value is independent of all attribute values. This naive theory is called "conditional class independence," which is structured to minimize the computation involved and is defined as "naive" because of this (Shahi et al., 2015).

ii)   Discriminant Analysis

Discriminant Analysis is a loose derivation from the term discrimination where it is a widely used concept for classifying levels of an outcome. In other words, it is helpful in evaluating whether a set of variables are successful in predicting category membership (Pranov Mishra, n.d.).

iii)   K-Nearest Neighbor (KNN)

K-Nearest Neighbor (KNN) is one of the simplest Machine Learning algorithms. It is based on the approach of Supervised Learning. KNN algorithm assumes the similarity between the new case/data and available cases and puts the new matter into the most similar category to the general categories. KNN is a non-parametric, lazy learning algorithm (Garcia et al., 2010). Its objective is to use a database in which data points are classified into several classes to predict a new classification of the sample points.

iv)   Support Vector Machine (SVM)

A Support Vector Machine (SVM) is a formally defined hyperplane-separating discriminative classifier. In other words, the algorithm outputs an optimal hyperplane that categorizes new instances, given labelled training data (supervised learning). This hyperplane is a line dividing a plane into two sections in two-dimensional space, where each class is located on either side. Support Vector Machine represents the training data as space points divided into categories by a simple gap as large as possible (Chen, 2009).

RESULT AND DISCUSSION

The performance of all the classifiers are evaluated and shown in the figure 2 and table below. The training data is used to train the data and minimize the probability of misclassification and produce the best classification model. The accuracy and precision of the training and testing data are evaluated to determine the best classifier among Naïve Bayes, Discriminant Analysis, K-Nearest Neighbor and Support Vector Machine.

Table 1: Training and Testing Accuracy for Each Classifier

Classifier	Training	Testing
Naïve	90%	79%
Discriminant	89.4%	85%
KNN	88.88%	83.33%
SVM	92.50%	87.50%

Table 2: Performance of Each Classifier on Testing Dataset

	Crack		Corrosion		Spalling		Non-Damage	
	Precision	Recall	Precision	Recall	Precision	Recall	Precision	Recall
Naïve	100.00%	91%	100%	93%	93%	100%	90%	100%
Discriminant	100.00%	93%	100%	93%	93%	100%	93%	100%
KNN	100.00%	91%	100%	93%	93%	100%	90%	100%
SVM	100.00%	93%	100%	95%	95%	100%	95%	100%
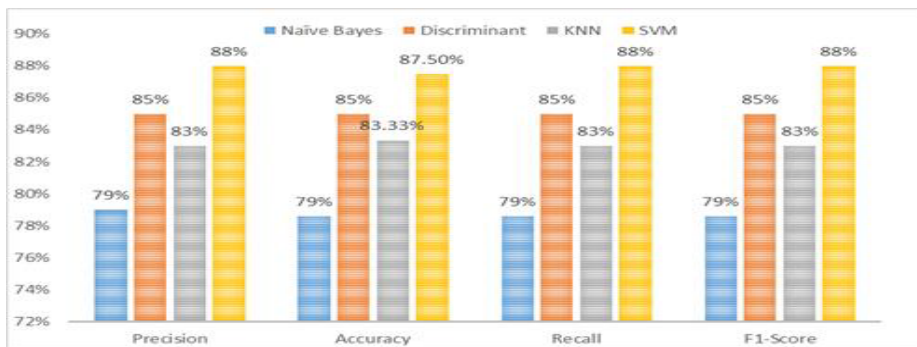
Figure 3: Overall Performance for Each Classifier for Testing Data

It is observed that the performance in terms of accuracy for each classifier for training dataset is high. There is a slight decrease of the accuracy of the testing datasets but this is maybe due to the small size of data testing. The accuracy of the testing can be improved by increasing the amount of data. The preliminary findings demonstrate that the proposed approaches are effective for detecting concrete damage in reasonable conditions. This allows for a more exact detection of concrete damage in a more effective and timely manner.

This technology could be used in the construction industry to improve the capacity to detect defects in massive solid constructions. As a result, the model developed may be employed by the structural health monitoring system (SHM) to classify concrete photos according to their classifications automatically. Support Vector Machine has the highest accuracy of 87.5 percent.

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AUTOMATIC PRICE SCANNING SYSTEM

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ABSTRACT

This paper proposes an automatic price scanning system to be used in supermarkets to overcome the drawback of conventional systems i.e manual scanner. The existing method for price scanning is by using the barcode scanner which requires the cashier to scan the items manually before the price is displayed on the monitor. This method is inconvenient as the cashier has multiple tasks to be performed concurrently such as scanning the items, packaging the items, and processing the payment which can lead to longer waiting time for the customer. The mentioned issues can be accommodated by the use of Automatic Price Scanning System. This proposed system offers automatic item detection via the use of an infrared (IR) sensor which will operate the conveyor upon the item detection. The items will then move towards the cashier and stop at the Radio-frequency Identification (RFID) reader for further action i.e scanning the price. This system employs RFID reader to scan the tags attached to the items prior to data processing by the Arduino Mega 2560. The Arduino will then command the Liquid Crystal Display (LCD) to display the total price of the items. The proposed system was tested with two different types of RFID tags where each of them is assigned to a dissimilar value of price. The accuracy of the proposed development has been assessed in terms of movement of conveyor and price detection with an average of 86.67% accuracy. With this reliable measurement, the automatic price scanning system enables cashiers to optimize their task. Consequently, the waiting time for the customers can be minimized.

Keywords: automatic scanner, RFID, price detection, IR sensor

INTRODUCTION

Nowadays, every supermarket employs a barcode scanner (or barcode reader) to scan the barcode labels attached to each of the products at the store prior to price display on the monitor. A barcode scanner is an electronic device used to read the printed barcodes. It comprises a light source, a lens and a light sensor converting optical impulses into electrical signals. The scanning process is quite tedious and time consuming especially during public holidays or festive seasons. This will lead to a scenario of customers waiting in line at the counter while the cashiers are performing their tasks such as scanning the items manually and packing them. During the overload event, there is a possibility that the cashier did not scan the items and

packed it, or they might scan the items twice without noticing the error. The error occurred due to several tasks that need to be performed concurrently such as scanning the items, packaging the items, and processing the payment.

Consequently, an automatic price scanning system is proposed. This automatic price scanning system is designed in such a way that it will operate the conveyor upon the items detection and stop the items at the RFID reader for automatic price scanning. Therefore, the cashier can optimize their task on packaging the items and process the payment. The main aim for this system is it enables the conveyor to move/stop and display the correct price, with the highest possible accuracy. The development of the system using IR sensor, RFID, Arduino Mega 2560, DC motor and LCD is discussed in this paper. The performance of the system to read different tags is also examined.

SYSTEM OVERVIEW

This section is dedicated to the development of an automatic price scanning system. Each of the phases involved in the system development is thoroughly discussed.
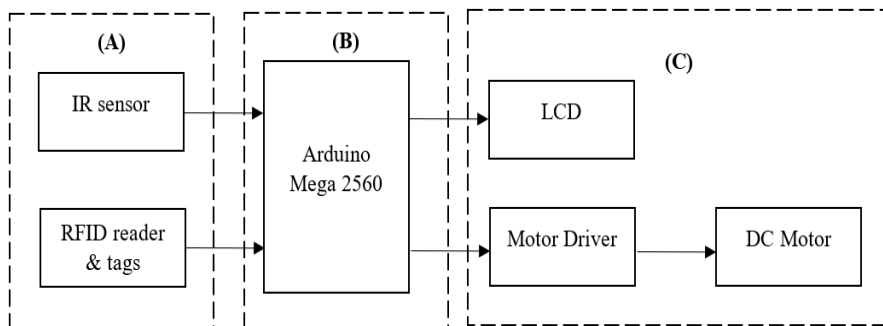
Figure 1. Overall System Design

The overall system of an automatic price scanning system is shown in Figure 1 above. Arduino Mega 2560 is the main processor that acts as an interface between the input (A) and output (C). IR sensor is used to detect the presence of the items placed on the conveyor and the information obtained will be sent to the Arduino. Upon receiving the information, the Arduino will activate the motor such that the conveyor will start moving until the item is more than 9 cm away from the IR sensor before it stops. The system is designed to stop precisely at the location of the RFID reader. The RFID tags attached to the items will then be automatically scanned and the price of the items will be displayed on the LCD.

I. Input of Automatic Price Scanning System

From Figure 1, the input of the system is labelled as A. This part consists of two components which are IR sensor and RFID reader and tags.

Figure 2. Infrared (IR) sensor
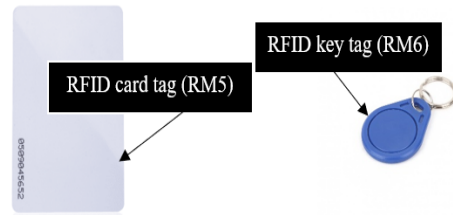
Figure 3. RFID tags used in Automatic Price Scanning System

IR sensor consists of an emitter and receiver as depicted in Figure 2. The infrared sensor is used as an item detector in this project. The emitter will emit an infrared light that is invisible to human eyes. If there is an item present within the radius of detection, the emitted light will be reflected to the receiver. The received signal then will be fed to the digital pins of the Arduino. The IR sensor also consists of a potentiometer that is used to adjust the distance of the detection. For this project, the IR sensor was set to be able to detect items placed less than 9 cm from the IR sensor. On the other hand, RFID tags used in this project involved two different types which are RFID card tag and RFID key tag where they are assigned with value of RM5 and RM6 respectively, as shown in Figure 3. If both tags are detected by the RFID reader, the total amount of RM11 will be displayed on the LCD.

II. Controller of Automatic Price Scanning System

From Figure 1, the controller of the system (i.e., Arduino Mega 2560) is identified as B. In this project, Arduino is used to execute the output coming from both IR sensor and RFID reader (A). It has 54 digital input or output pins, 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The specification of Arduino Mega 2560 is compatible to cater the requirement of automatic price scanning system.

III. Output of Automatic Price Scanning System

The output of the system is labelled as C in Figure 1. This part comprises three components which are motor driver, DC motor and also LCD. Each of these components has their particular task according to the input fed to the Arduino. The motor driver acts as an interface between Arduino and the DC motor. The DC motor used in this project represents the conveyor system that will operate according to the distance of the items from the IR sensor. If the item placed on the conveyor is less than 9 cm from the IR sensor, the conveyor will be moving. Otherwise, the conveyor will stop. On the other hand, the LCD is used to display the price of the items after the RFID reader has read the tags attached to the items.

IV. Prototype Setup of Automatic Price Scanning System

Figure 4 illustrates the setup of the Automatic Price Scanning System prototype. The item with RFID tags attached on it will be placed at Point A. Upon item detection by the IR sensor, the conveyor will start moving, transporting the item from Point A towards the cashier (Point B). Once the item is more than 9 cm away from the IR sensor, the conveyor will stop moving and the item will be within the range of RFID reader detection. Thus, the RFID reader will automatically scan the RFID tags and LCD will display the price of the item. The status of DC

motor and LCD for each condition involved are summarized in both Table 1 and Table 2 respectively.
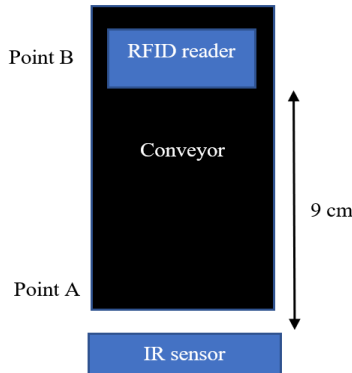
Figure 4. Prototype setup of the system
Table 1. Distance of items from IR sensor and status of DC Motor

Distance of items from IR sensor	Status of DC Motor
Less than 9 cm	Moving
More than 9cm	Stop

Table 2. RFID tags detection and status of LCD

Type of RFID tag scanned by RFID reader	Status of LCD
RFID card tag	RM5
RFID key tag	RM6
Both RFID card and key tags	RM11

RESULT

This section focuses on experimental results that have been conducted throughout the development of the automatic price scanning system. The experiment includes an investigation on the accuracy of the system towards the item detection by the IR sensor as well as the RFID tag detection by the RFID reader. The final product of the developed prototype is also presented in this section.

I. Measurement Results and Outcome of the System

Figure 5 demonstrates the outcome from LCD when the RFID reader scans the RFID card tag, RFID key tag and both of the tags, from left to the right of the figure. The value of 11 (represent RM 11) is an outcome of an addition of RM5 and RM6.

Figure 5. LCD outcome upon RFID tags detection

On the other hand, the measurement of voltage for both IR sensor and DC motor are obtained for two different distances of item i.e 6 cm (Table 3) and 9.2 cm (Table 4). The measurement obtained from the IR sensor for both tables does fit with its working principle that is coded into Arduino where it will produce an output of LOW (0 V) and HIGH (5 V) for detection and no

detection of items, respectively. Whilst, for the DC motor, it was powered up by 5 V supply.

Table 3. Voltage reading when an item detected by IR sensor

Components	Voltage	Status
IR sensor	0.33 V	ON
DC motor	4.34 V	ON

Table 4. Voltage reading when no item detected by IR sensor

Components	Voltage	Status
IR sensor	3.28 V	OFF
DC motor	0	OFF

II. Accuracy of Automatic Price Scanning System

The accuracy of the system is measured on how the system adheres towards the items and RFID tags detection. Therefore, several tests had been conducted on the automatic price scanning system to assess its responsiveness.

Table 5. Percentage of the successful action

Action	Percentage of responsiveness (%)
Motor ON when IR sensor detects any item	100
LCD display the price when RFID card tag detected	100
LCD display the price when RFID key tag detected	60

The average accuracy of automatic price scanning system is 86.67% and is calculated by using Equation (1) as follows:

$$2\frac{d}{dt}y(t) + 5y(t) = 8t^2 + \sin 3t$$

$$\text{Average accuracy} = \frac{100 + 100 + 60}{300} x100 = 86.67\% \dots\dots\dots \text{Equation (1)}$$

III. Final Prototype of Automatic Price Scanning System

Figure 6 shows the final product of the prototype for the automatic price scanning system. The working principle of this prototype is explained in the previous section. The RFID reader is placed underneath the conveyor; hence it is invisible in Figure 6.
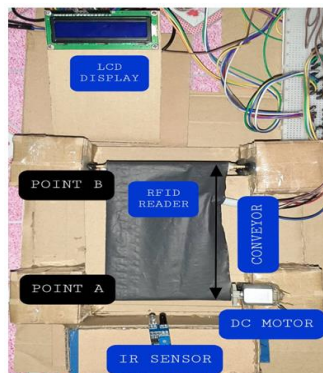
Figure 6. The developed prototype of the automatic price scanning system

CONCLUSION

In this paper, the development of the automatic price scanning system is explained. The experimental result of more than 80% accuracy supports that it is a reliable system that could potentially be employed in supermarkets for the billing checkout process. Thus, with the implementation of the system, the waiting time for the customers can be minimized. In addition, this system comes with a feature of non-contact scanner that emphasizes its significance to the user especially during the COVID-19 pandemic outbreak where physical touch is preferably avoided.

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AL HIJAEI V1

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ABSTRAK

AlHijaei adalah model bacaan al-Quran yang baharu yang berdasarkan teori fonologi bahasa Arab, fonetik dan psikolinguistik(Ph2-Psyco). AlHijaei mengandungi empat buku mewakili semua 28 huruf Hijai yang disusun berdasarkan tahap kesukaran. Setiap buku hanya akan memfokuskan 7 huruf Hijai mengikut artikulasi bunyi, pemerolehan bahasa di kalangan bayi dan ciri-ciri huruf. Gabungan bunyi semua huruf telah dipilih dari Al-Quran sepenuhnya. Produk ini boleh digunakan untuk belajar membaca Al-Quran dari usia bayi seawal 8 bulan hingga dewasa dalam masa yang singkat. Produk ini dibangunkan adalah untuk membantu mereka yang baru belajar membaca Al-Quran samada yang celik atau yang ada masalah penglihatan (buta) dengan cara mudah, cepat dan berkesan, Juga bagi mereka yang berfikiran bahawa belajar quran sangat susah. Produk ini didatangkan dalam 2 versi, iaitu bercetak dan brail. Produk ini juga akan mengeluarkan ebook& aplikasi android. alHijaei boleh diekses menggunakan smrtphone atau tablet selapas selesai fasa percubaan yang sedang dijalankan di taska yang terpilih, Macma, PERKIM, sekolah-sekolah khas. Produk mesra pengguna ini boleh digunakan di mana-mana dan pada bila-bila masa. Produk ini akan memberi manfaat kepada rakyat Malaysia dan umat Islam seluruh dunia. Permintaan terhadap produk ini sangat memberangsangkan, dan telah mendapat sambutan dari alBaghdadi, alFurqan, Gym Academy, akademi alFakeh, Macma dan PKIB.

Kata kunci: Model bacaan alQuran; Huruf Hijaid; Fonetik; Fonik.

PENGENALAN

Al Hijaei adalah model bacaan alQuran yang berasaskan Ph^2 Psyco (Phonology-Phonetic-Psycholinguistic) melalui kaedah analisis kontra artikulasi organ pertuturan, bunyi dan perkembangan bahasa kanak-kanak. Model ini dibangunkan dengan tujuan membantu masyarakat yang buta alQuran, tidak minat belajar atau membaca alQuran dan mereka yang berpersepsi negatif bahawa belajar alQuran sangat susah terutamanya golongan dewasa dan kanak-kanak istimewa. Walau bagaimanakan model ini tidak terhad kepada golongan di atas sahaja bahkan ianya boleh digunakan untuk kanak-kanak peringkat permulaan termasuk bayi seawal 1 tahun dan golongan kanak-kanak istimewa seperti: *down syndrome*, *autism* dan *slow learner*. Ianya juga sesuai untuk golongan muallaf yang baru hendak belajar membaca alQuran.

Al Hijaei adalah satu model yang mempunyai kaedah pendekatannya yang tersendiri, sesuai untuk semua golongan di semua peringkat. Al Hijaei juga boleh diperkenalkan disekolah-sekolah KAFA bagi peringkat rendah di Malaysia, Tabika KEMAS , semua rangkaian tadika atau pre school dan Nursery + playschool. Al Hijaei juga boleh digunakan sebagai bahan pengajaran bagi program JQAF di sekolah-sekolah di Malaysia dan dapat membantu pelajar serta menarik minat utk belajar membaca alQuran dalam kontek dalam negara kita.

AlHijaei boleh membantu 1.6 Billion ummah islam serata dunia untuk belajar membaca alQuran melalui produk alHijaei Online dan Alhijaei App. Jika diamati, sebanyak 257 negara di dunia bukan penutur jati bahasa Arab, dengan demikain, alHijaei berusaha untuk melebarkannya ke serata dunia dan mengharap semua ummah islam boleh mengambil manfaat dari Model Hijaei ini sebagai kaeadh asas bacaan alQuran.

AlHijaei adalah satu produk baru, ia dihasilkan melalui kajian IQIT pada Jun2017, setelah menghasilkan model, alHijaei telah bangunkan Brail IQIT dan diikuti alHIjaei bercetak pada Oktober 2017. Telah menyertai Pecipta pada Oktober 2017, Inovasi P&P UKM pada Desember 2017 dan iInova 2018 dengan pencapaian Gangsa, Perak dan Emas. alHijaei telah mendapat tempahan yang melebihi 100 set sehingga kini.

AlHijaei telah siap merangka kertas kerja TOT (Training of Trainner) untuk peringkat permulaan alHijaei akan train 10 pelajar tahun akhir pengajian Quran di darul Quran dan Guru-guru alQuran di bawah pengurusan NGO Bank Rakyat.

Walau bagaimanapun, pembangunan Al Hijaei masih lagi berada pada tahap permulaan dan perlu diperkenalkan secara *all-out* kepada masyarakat bagi mencapai objektif yang dikehendaki. Semoga dengan pengenalan produk ini dapat meramaikan lagi golongan yang belajar membaca alQuran dan menjadi magnet untuk minat membaca alQuran dalam mencapai misi negara rahmat dan rakyatnya sejahtera.

PEMBANGUNAN ALHIJAEI

Berikut adalah fasa-fasa proses pembangunan AlHijaei

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┌─────────────────────────────────────────────┐
│      Fasa 1: Pengumpulan Maklumat            │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│   Fasa 2: Pembinaan Konsep dan Prototaip     │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│  Fasa 3: Uji kaji Produk dan Penambahbaikan  │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│      Fasa 4: Pengesahan Pakar                │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ Fasa 5: Pendaftaran Hak Cipta dan Pengkomersilan │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│            FASA SETERUSNYA                   │
└─────────────────────────────────────────────┘
        ↓              ↓              ↓
┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│ Pendaftaran  │ │  Promosi /   │ │ Penyelidikan │
│ Cop Dagangan │ │  Showcase    │ │ dan          │
│              │ │              │ │ Pembangunan  │
│              │ │              │ │    (R&D)     │
└──────────────┘ └──────────────┘ └──────────────┘
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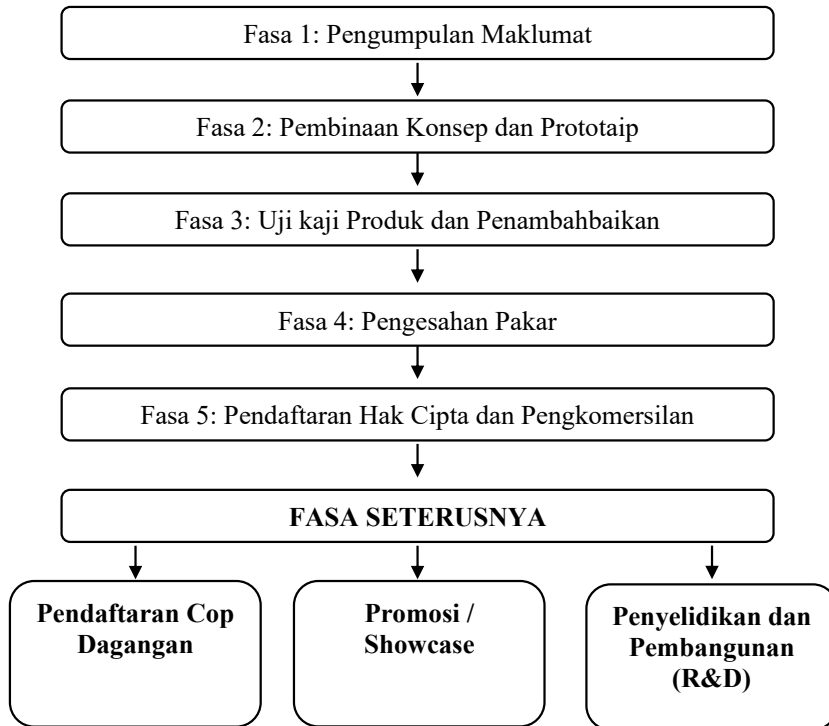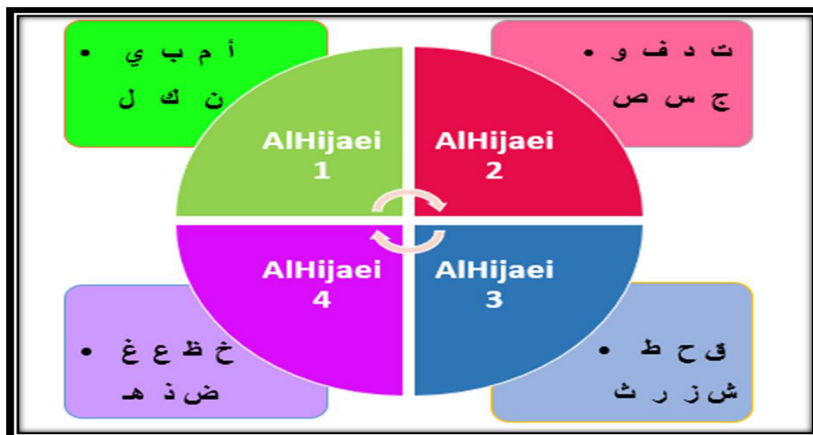
Model Al Hijaei

Gambar 1: Model alHijaei

Berikut adalah model alHijaei yang telah dikategori mengikut warna yang diletakkan dalam empat tahap. Susunan huruf adalah hasil dapatan analisa kontra huruf hijaiyyah sebanyak 28 huruf berdasarkan teori Ph2Psyco. Susunan huruf mudah kepada huruf susah.

KEPENTINGAN TERHADAP PENDIDIKAN

Sebagai seorang muslim, membaca Alquran adalah salah satu amalan yang wajib, ini kerana setiap muslim mesti manjalani tanggungjawab individu seperti solat, puasa, zakat dan sebagainya, sesungguhnya solat merupakan tiang asas kepada semua amalam seseorang individu muslim, maka tidak sah solat seseorang individu muslim sekiranya tidak membaca ayat alquran dalam solatnya.

Gambar 2: Kepentingan alHijaei

KELEBIHAN INOVASI

Inovasi ini mempunyai keunikan dan asli. Bercirikan mudah, cepat dan jimat berasaskan ph2 Psycho, manakala presentasinya sangat menarik melalui susunan pembentukan alHijaei yang memainkan peranan warna. Ianya sangat sesuai bagi golongan yang ingin belajar membaca alQuran dari kalangan dewasa, muallaf, kanak-kanak seawal setahun, kanak-kanak istimewa (sindrom down, autism dan slow learner). Selain itu, ia manpu menarik minat mereka yang tidak minat mempelajari alQuran dan merasakan bahawa ianya susah.
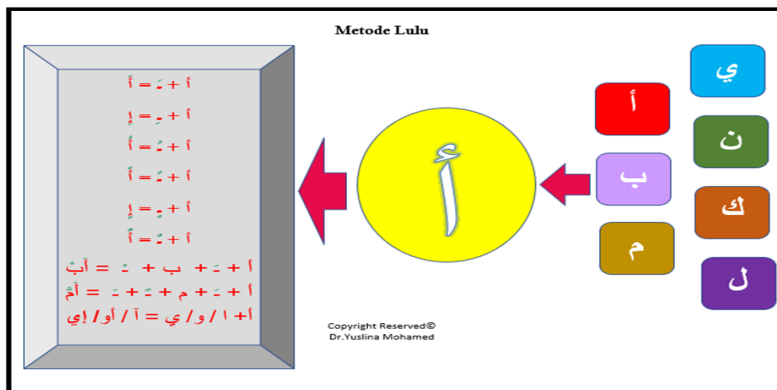
Gambar 3: Kaedah Lulu

NILAI PEKOMERSIALAN

AlQuran adalah kitab panduan setiap individu muslim di dunia ini. Masyarakat muslim telah meningkat setiap tahun, 1/3 penduduk dunia adalah beragama Islam, dengan demikian kepentingan AlQuran dalam kalangan masyarakat Islam amatlah tinggi untuk tujuan ibadah terutamanya solat. Alhijaei adalah satu model yang menjadi *option* pengguna Islam untuk mempelajari AlQuran.

Gambar 4: Komersial, Novelti dan Sumbangan alHijaei

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Setinggi-tinggi penghargaan kepada Universiti Sains Islam Malaysia dan Kementerian Pendidikan Malaysia. FRGS Reference JPT.S(BPK)2000/09/01 Jld.28(10), USIM/FRGS/FPBU/055002/50518

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INFOGRAPHIC OF BENEVOLENCE PRACTICES: PUBLIC SECTOR'S MYTH OR REALITY

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ABSTRACT
Government has the responsibility to provide the best service to the people. Thus, accountability and integrity of government are important to ensure that the ruling government stays in power by gaining public trust. Consequently, a shortfall in these aspects will cause the ruling parties to lost public trust and eventually the national election. As a result, many conflicting issues arise especially in administration of service delivery. However, several challenges faced by the government can tarnish the confidence of public towards the public sector. Among the challenges are the accessibility of public goods, performance of service delivery, public servant's productivity, and bureaucracy. However, the roles and responsibilities of public servant must be carried out in the efficient and effective manner. Thus, there are many efforts done by the government to enhance the quality-of-service delivery but, there are still issues on administrative and public expectation that led to public complaints and grievances. In line with this and as to minimize the occurrence and continuation of this dilemma, public sectors have come up with several key values on accountability and integrity. Accordingly, benevolence tends to be invisible as compared to other key values practicing in public sector. As such, the premise of this project is to develop infographic on benevolence practices, even the exercise of benevolence is seen as unrealistic or inevitable to secure public trust towards public sectors. This infographic is a simple and friendly platform to further describe on benevolence aspects. It will also serve as a guide to public sector. It helps to develop inner value of public servants in term of commitment, sense of urgency and honesty in delivering services. It is interesting to note that, the commercialization potential towards this infographic may provide platform for government agencies to have clear knowledge, skills, and abilities in determining the benevolence aspects that they need to carry out. Lastly, this infographic is useful to enhance intrinsic value of public servant to become more compassionate, trustworthy, and reliable to public needs.

Keywords: benevolence, integrity, accountability, public servants, public sector service delivery

INTRODUCTION

A government is created to bring order and to serve the public. The existence of a government is an indication that a body of institution should exist and direct the administration for their people. The proper functioning of government carries the stability and harmony in a country. Thus, the presence of a government should cater to every aspect of a public's life in urban and rural areas. The failure to give efficient services to the public will result in the loss of public trust and, in turn, the loss of power for the ruling government. Furthermore, today's government always been questioned with many issues, especially in the management of public service. The public concerns on the responsibility of government and they need the government to be more accountable in their daily duties. Alas, accountability of public service becomes imminent due to the rise of challenges to the nature of service in public organizations, as well as the rise of ethical concern becomes prominent. In regards towards this, benevolence should be practiced by public servants together with other ethical aspects.

The feeling of benevolence is the concern between two people who have the desire to make each other happy. This is called as private benevolence, which is narrow in scope and the area of concern is centered on those close to each other such as family, friends and fellow citizens (Vitz, 2002). In addition, Vitz (2002) also prescribed a broad scope of benevolence or public benevolence, which means benevolence to persons other than close relations, such as to mankind.

Dimensions of Benevolence

There are three dimensions of benevolence. The first is benevolence as a psychological state (desire), for example, the desire of happiness for a friend. The second dimension is benevolence with cause and object. The object of such benevolence is another person or thinking being. The last dimension is benevolence with a goal, which is the wellbeing of a person. In other words, benevolence is a selfless feeling of care and concern for another individual and the desire to satisfy the needs of the other party.

In an institution, benevolence means the extent to which a trustee is believed to want to do good to the trustor, aside from egocentric motives (Kim, 2005). Benevolence is construed as people thinking that an institution such as government organization genuinely cares about the citizens living in the community and sincerely serves citizens who need the services (Grimmellikhuijsen, 2011). It is also considered as a motivation to do good for citizens (Xie & Peng, 2009). Without motivation, genuine care maybe short lives and public sector may apply it only when necessary. In public sectors, authentic leaders can be seen through their motivation to do good.

In short, benevolence is also known as compassion and altruism. The act of benevolence can lead to effective leadership practice and empathy in establishing quality service to public.

PROBLEM STATEMENT

Benevolence is seldom seen in public service and most of the time, public sector overlooks on this factor. In most practices, efficiency and effectiveness of service delivery is seen in

timely and fast services. Public services use to disregard benevolence aspect to satisfy the public and gain public trust. Public servants need to apply benevolence behavior as to show that they have genuine care towards the public and express empathy in solving public issues. When the public servants show their concern and genuine care towards public, the credibility of service delivery especially on the staff is enhanced in the aspect of protecting the public welfare. This is aligned with the nature of public sector which focuses in providing benefits to public. This scenario confirms that public officials need the encouragement that is beneficial at the individual or at the organizational level of administration (Hill, 2006). Thus, the act of benevolence is significant in public sectors and the government should focus on this positive value. Through the infographic, it may provide platform for government agencies to have clear knowledge, skills, and abilities in determining the benevolence aspects that they need to carry out.

OBJECTIVE

The objectives of this project are: -
✓ To propagate understanding and enhance benevolence practices of public servants in service delivery.
✓ To highlight dimensions of benevolence with friendly infographic that is easy to understand, catchy and interesting.

NOVELTY

The novelties of this project are: -
✓ Benevolence infographic is a proactive & unique product that serves as a clear guideline for public servants in their duties.
✓ This infographic of benevolence will inculcate the positive vibes through acculturation of ethical values.
✓ Infographic of benevolence will inspire everyone to reflect on their actions and behavior.

POTENTIAL FOR COMMERCIALIZATION

The potentials for commercialization of this project are:-
✓ This infographic is environmentally friendly since it is an electronic publication (electronic flyers).
✓ Providing a beneficial toolkit for public servants to comply with good values.
✓ This infographic is a must have guide and serves as an initiative for the administrators to have clear understanding on benevolence dimensions in public sectors.

CONCLUSION

The infographic of benevolence provides an important message to public sector in promoting employees' motivation. The genuine care and noble values are part and parcel in benevolence aspects that happened to be within a human being. Thus, this infographic can work as an important guide for public sector in becoming a compassionate, caring, and able to deliver

quality services to the public. As a result, public trust and confidence towards government can turn to be a reality.

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BIO-CHEM KIT:
UNDERSTANDING BIOGEOCHEMICAL CYCLES

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ABSTRACT

One way of handling significant amounts of information is through visuals. Infographics can transfer knowledge about a topic faster and more effectively than pure text. BIO-CHEM KIT is a set that uses QR codes and online quizzes in learning activities, consisting of quick and important elements on the principles of the ecology field for students, lecturers, and practitioners. The main purpose of this graphic visual is to enhance learners' basic knowledge of important biogeochemical cycles and. The innovation ideas also serve as teaching and learning materials for lecturers and students. It also benefits the practitioners in environmental administration, which use can be used as a quick reference guide. Furthermore, this innovative idea is hoped to make teaching and learning environmental courses easy, memorising, and faster especially during the online distance learning in the era of the Covid-19 pandemic.

Keywords: Biogeochemical Cycles, QR Code, Online Quiz, Teaching, Learning

INTRODUCTION

According to Smiciklas (2012), infographics can be defined as images of data and ideas that try to convey complex information to ease the process of learning and understanding. An infographic explains the complex and illuminates the obscure through illustrations, some short-written explanations, and data visualization through charts or graphs (Yuvaraj, 2017). Adams (2011) categorized infographics into three categories. First is a static infographic that presents information all at once and in its entirety. Second, motion infographics are used in cinema and presentations to present information consistently and in a sequence. The third is interactive infographics in which the information is presented according to the reader's choice. The historic record has shown that

humanity has used infographics to display information. These include cave paintings, later maps, and now charts. Moving on to 1975, while teaching at Princeton, Edward Tufte developed a seminar on statistical graphics with John Tukey, a pioneer in the field of information design. Tufte later self-published Visual Display in 1982, establishing himself as an infographic expert. The recent history of infographics includes the advent of charts in office-oriented software, particularly Excel and PowerPoint. This explosion of easy-to-use data visualization tools led to an expansion of infographics in academia and the popularization of business intelligence. Nowadays, of course, web-based data visualization design tools are making it easier than ever to create infographics like motion graphics, interactive infographics, and others. Figure 1 presents a summary of events leading to the origin of infographics.
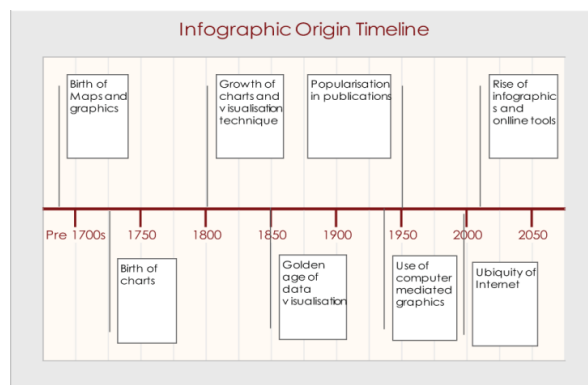
Figure 1. Origin of Infographics

The usage of an infographic could help to improve student understanding of a particular topic (Elena Gallagher et al., 2017; Thoma et al., 2018). Infographics help capture attention and make complex knowledge understandable, making them a useful teaching-learning strategy (Chicca & Chunta, 2020; Provvidenza et al., 2019). According to the Cognitive Load Theory, working memory has some limitations and the usage of infographics could help to foster working memory to process the information and enhanced information retention. In addition, Dual-Coding Theory suggests that infographics could improve information retrieval (Van Merriënboer, & Sweller, 2010). However, there is limited research assessing their effectiveness. Moreover, although infographics can be effective to engage students, they are infrequently used because of educators' inexperience with this approach. To overcome those problems, a plethora of research has urged educators to employed advance and interactive teaching strategies that could enhance student participation, brainstorming, engaging, interactive, and others. Realising the difficulties facing them and solutions to their problems, the idea of BIO-CHEM KIT is introduced aims to facilitate the learning activities by using the graphic visual presentation of information and knowledge related to the subjects in a more simple, quicker, and effective way.

OBJECTIVE

BIO-CHEM KIT is designed, which combined two (2) learning methods comprising of online quiz and technology usage of QR Code to facilitate the teaching and learning process. The contents consist of the essential elements in the subject of the principles of ecology, with the simplified versions of SIX (6) main areas of the biogeochemical cycles (tectonic cycle, rock cycle, nitrogen cycle, phosphorus cycle, hydrogeological cycle, and carbon cycle) that students need to know. The online quiz is provided to test and examine the effectiveness of the infographic. Besides, innovation also injects the element of technology usage through the graphic visual presentation using the QR Code.

All the infographic data contents will be made available in the QR Code, which aims to facilitate the students and educators in their teaching and learning activities in a more simple, easy, and fun way. It also aims to help the students for easy memorising and understanding the subject through creative learning methods.

APPLICATION

BIO-CHEM KIT is introducing to first-year students of the Bachelor of Environmental Administration at the Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM) Seremban 3 campus. It has been introduced to those who undertake the principles of ecology subject. BIO-CHEM KIT is appropriate for all levels of students in varied settings, such as in the classroom and online environments. Lecturers can use BIO-CHEM KIT as a teaching-learning strategy. BIO-CHEM KIT helps to explain complex (6) main areas of the biogeochemical cycles (tectonic cycle, rock cycle, nitrogen cycle, phosphorus cycle, hydrogeological cycle, and carbon cycle). The students are required to scan a QR code and infographics note on biogeochemical cycles can be retrieved. A simple and short essay online quiz is provided with the QR Code. Table 1 summarizes the post-test results after the application of BIO-CHEM KIT. Figure 2 displays a sample infographic "BIO-CHEM KIT." This infographic could help the students understand the biogeochemical cycle process and its important elements. Infographics could also help focus students' attention during reading or other assignments. For example, students could be given a short article to read and an infographic to prepare them for a group discussion.

Figure 2. Sample Infographic BIO-CHEM KIT

Table 1. Online Quiz and Score Obtained

Questions	Student Score
1) Stated Three Types of Tectonic Cycles	37 Out of 38 Obtained Full Marks
2) Granite is One Example of Which Rock Cycle?	34 Out of 38 Obtained Full Marks
3) 5 Steps in Nitrogen Cycle	All of 38 Students Obtained Full Marks
4) 4 Ways of Phosphorus Cycle	All of 38 Students Obtained Full Marks
5) 5 Ways of Hydrologic Cycles	All of 38 Students Obtained Full Marks
6) 5 Ways of Hydrologic Cycles	All of 38 Students Obtained Full Marks

NOVELTY

As there are limited learning materials and references related to biogeochemical cycles in the market. This product of innovation uses creative and graphic materials to help the students and educators facilitate their learning and teaching. Since the market only produced traditional books than innovative learning materials, this innovative idea that embedded online quiz and technology elements guaranteed fun learning activities in class. As we move towards sustainable development, this product supports environmentally friendly, going paperless, and becoming a vital part of embracing Industry 4.0. Since the education system is now favouring online learning due to the impact of the Covid-19, having the complete package of learning materials makes the learning process more accessible and sustainable.

COMMERCIALIZATION

Commercialization of the results of scientific research and developments is a necessary condition for strategic development because it provides the creation of new products, expanding the range, and improving the quality of products. BIO-CHEM KIT has potential for commercialization since it can be used by environmental administration students. It is related to both lecturers' and students' needs. BIO-CHEM KIT can also be used by practitioners or educators in creating awareness of the effect of biogeochemical cycles on the eco-systems. Since there is no textbook used by the students, therefore, the potential for commercialization is high and good.

AWARDS

In the first phase, the project has obtained and won some awards in the innovation competition. For example, Infographic Kit - Biogeochemical Cycle has won diamond and special award (best presentation) during the 2019 Student Invention and Innovation Competition organized by the Faculty of Administrative Science and Policy Studies, UiTM Seremban 3. In the same year, this project also has won the silver award at the 2nd International Invention, Innovation, Technology (ITEC 2019). BIO-CHEM KIT is the advancement of the previous project in which we have to improve the innovation by including all six biogeochemical cycles and a short online quiz to test the effectiveness of the infographic.

Figure 3. Award Obtained by the First Version of the Project

CONCLUSION

Infographics provide some of the greatest opportunities for effective and efficient communication to an audience. Principles of ecology subject is an interesting subject however it involves a large number of facts and data. Thus, lecturers need to balance the information overload. Considering their potential to provide influential bursts of insight and knowledge, BIO-CHEM KIT includes an infographic with QR Code and a short online quiz to test student knowledge.

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BIODEGRADABLE AND RECYCLE HUSK MAILER
FROM *Cocos nucifera*

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ABSTRACT

Coconut, the fruit of the coconut palm (*Cocos nucifera*) is a tree of the palm family of *Arecaceae*. Coconuts probably originated somewhere in Indo-Malaya and are one of the most important crops of the tropics (Ahuja et al., 2014). Besides the edible kernels and the drink obtained from green nuts, the harvested coconut also yields the dried extracted kernel, or meat, from which coconut oil, major vegetable oil is expressed. The dry husk yields coir or husk, a fibre highly resistant to saltwater and used in the manufacture of ropes, mats, baskets, brushes, and brooms. Through this coconut, our group is going to produce sustainable and environmental-friendly types of mailers which are made of coconut husk or coir named "Husk Mailer". Husk Mailer is a very simple product to be produced. Mailer has been using since decades ago and there are few or zero sustainable mailers that have been produced. Mailers have two types which are padded and bubble wrap, the padded mailers can easily be recycled while for the bubble wrap mailers cannot be recycled as it is made of plastic. Our group creates the paper of the mailer from the recycled paper and mix them with the coconut husk. We choose them because we want to avoid wasting any of the waste from the coconut, that is when the idea of coconut husk mailer is generated. Through this biodegradable and recycle Husk Mailer, we are highly wanting to reduce plastic uses to sustain and keep our environment great again.

Keywords: *Cocos nucifera*, post harvest waste, husk mailer, biodegrable

USES OF HUSK MAILER

The eco-friendly husk mailers use in shipping products or items that promote safety and protection in sustaining and saving the world. Different sizes of husk mailers give the consumer preference in choosing the size to deliver their items safely.

NOVELTY OF HUSK MAILER

Husk mailer is designed to reduce the use of plastic by replacing it with the post-harvest product from the coconut crop. Coconut husk is used in this new post-harvest product to create the husk mailer with the recycled paper that the other ingredient to produce this new product. The idea of utilizing the coconut husk to supplant the bubble wrap in the mailers that functioning to protect the items or product in the mailers. There will be more plastic consumption for the wrapping and cover in delivering the products nowadays especially for online stores or e-commerce in shipping. The consumption of plastic in our daily life should be lessened to save our world in the future and to make the environment clean. To deliver the products or goods, people need mailers that are safe to use can protect the item in delivering the product. Husk mailer comprehends the enthralling of the consumer in the poly mailer used for shipping alternative. Coconut husk is originated as an element in the husk mailer because it is lightweight to reduce the severe impact in protecting the products or items. The other factor in designing the mailers is the lightweight packaging to reduce the shipping cost particularly in the shipping bulk for the consumer. Cost-effective is another principal in producing the mailers so that the consumers have more desire to choose biodegradable products than plastic items in shipping. Even though the mailers created in a lightweight but it still can protect and reduce pressure for the items in it because coco husk act as layer absorbs the impact. Generating the idea of producing a product from the post-harvest is beneficial because we can reuse the product from being wasted. High quality of husk mailers characteristic that comes from different size to fulfill the customers need in the shipping ocess. Combination of the coconut husk with the recycled paper to create the husk mailer as an eco-friendly product that helps in conserving the resource and come out the green living.

TARGETED CUSTOMER

The main targeted customer for the husk mailer product is the business owner that runs an online store business to deliver their product to the customer that needs good packaging that can secure their item. Nowadays, business online trends keep rising so the consumption 7 of plastic for packaging also increasing. To prevent this continue happen the eco-friendly husk mailer should initiate the people to reduce the use of plastic. The customer can purchase the mailers in a small quantity or in a bulk in the online store or physical store based on their need at that time. Next, the targeted customer also for all the people that want to use mailers for shipping purposes, and they can get them in the store. The eco-friendly husk mailers that identical in the uses to other mailers can attract new customers to purchase the product and save for the environment.

PROCEDURES FOR MAKING THE HUSK MAILER
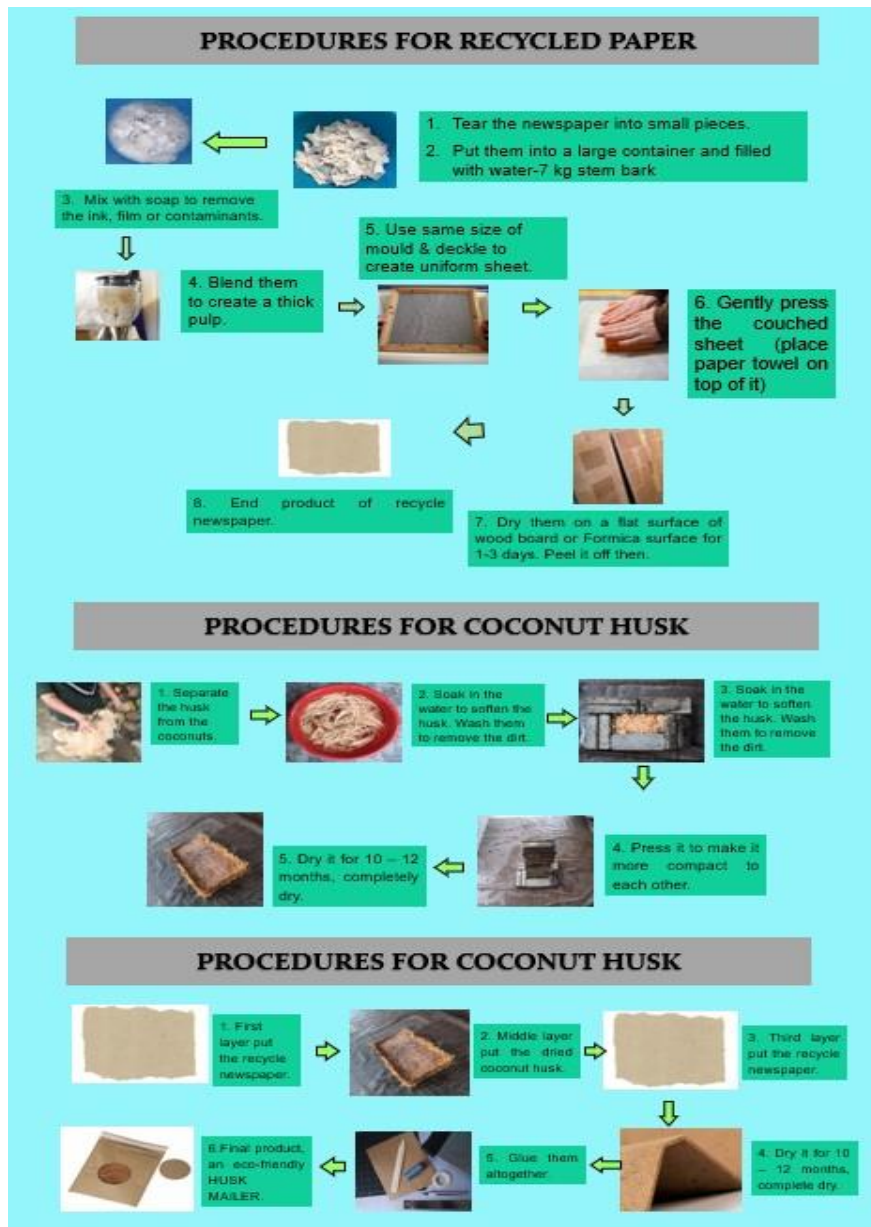
Figure 1. Procedure for making the husk mailer

COSTING

Below is the calculation for one (1) piece of mailer according to each size (S, M, L) – The overhead and tools cost are excluded from this table.

Table 1. Costing of the coconut husk mailer

MATERIAL	COST		
	S	M	L
Unused newspaper	RM 0.10	RM 0. 15	RM 0.20
Coconut husk	RM 0.15	RM 0.30	RM 0. 50
TOTAL	RM 0.25	RM 0.45	RM 0.70

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BUNNY'S PELLET: NATURAL MULBERRY PELLET

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ABSTRACT
Rabbit farming is a thriving industry in Malaysia. Normally in rabbit production farm, farmers use commercial pellet as the main diet of the rabbits and feed is the main expense as it accounts for between 70 to 80% of animal production. In fact, the prices of commercial pellet in recent years have increased, making the rabbit farming more expensive. Mulberry (*Morus* spp) is one of the legumes that is highly palatable and digestible to herbivorous and monogastric animals. Crude protein in mulberry leaves can go up to 18.9 to 21.9%. Mulberry leaves have a good potential to replace the concentrate inthe rabbit feed and can be used as the main feed for rabbits. However, the rabbits tend to pick all the high sugar and low fibre bits only from the fresh hay or green leave. Hence, in the current study, mulberry leave with other ingredients were processed into uniform pellets for a balanced nutrient source; called Bunny's pellets. This Bunny's pellet can be a new replacement of commercial pellet as it contains similar nutritional values as a commercial pellet. The benefits of Bunny's pellet include high crude protein, nutritional values similar to the imported commercial pellet, low cost compared to commercial pellet as well as no artificial colour and preservatives. The product was tested in a 60-day rabbit feeding trial using 15 New Zealand White cross California rabbits. The findings demonstrated that the Bunny's pellets are high in terms of digestibility and palatability, good feed intake, thus promoting a satisfactory weight gain in rabbits. The average daily gain and feed conversion ratio of the results were

not significantly different between control (commercial pellet) and mulberry pellet. A few industries and university that we worked with closely on the development of this Bunny's pellets are Persatuan Penternak Arnab Pedaging (APEK), Taman Arnab IQ, Bumi Barakah Agro Enterprise and Universiti Malaysia Terengganu. This product has been published in two undergraduate theses, a book chapter, and a journal article (in review). This product was previously awarded a Silver medal in UMK Carnival of Research & Innovation 2019.

Keywords: pellet, mulberry leave, rabbit, rabbit feed, growth performance

INTRODUCTION

In the context of the livestock industry in Malaysia, it is well known that ruminant animal is slow in growth and in reproduction and need a large area to provide forages. Poultry is the biggest producer of meat at present. However, the feed cost is the biggest constraint in poultry production. China has started to reduce the use of cereal for poultry and swine, hence the rabbit production has more opportunities to develop. In such situation, rabbit, with its high production potential, seems to fit in as another source of meat for human consumption.

In rabbit production farm, farmers normally use commercial pellet as the main diet of the rabbits. Rabbits commonly eat dried forage such as hay as the staple diet item. In animal farming, feed is the main expense as it accounts for between 70 and 80% of animal production. In fact, the prices of commercial pellet in recent years have increased making the rabbit farming more expensive.

Mulberry (*Morus* spp) is one of the legumes that is highly palatable and digestible to herbivorousand monogastric animals. Crude protein in mulberry leaves can up to 18.9 to 21.9% (Yao et al., 2000). Bamikole *et al*. (2005) reported that the mulberry leaves can replace 50% of the commercial pellet in the rabbit's diet. Mulberry leave has a good potential to replace the concentrate in the rabbit feed and can be used as a main feed for rabbits. However, the rabbits tend to pick all the high sugar and low fibre bits only from the fresh hay or green leave. Hence, in the current study, mulberry leave with other ingredients was processed into uniform pellets for a balanced nutrient source. Pelleting is very easy and convenient to operate. In addition, pelleting reduces farmers' transportation, handling, and storage costs of forages or fresh vegetables. Research on the use of mulberry pellet in feeding rabbits has been limited. Therefore, this current study aimed to evaluate the effect of mulberry leaf pellet on the growth performance of rabbits as well as to determine the feed conversion ratio of the rabbit following the feeding of mulberry leaf pellet.

MATERIALS AND METHODS

Chemical analysis

The commercial pellet, mulberry leaf pellet (Figure 1) and fresh mulberry leaf were analysed for dry matter (DM), ash, crude fibre (CF) and crude protein (CP) (AOAC, 1997) contents. Ether extract (EE) was determined by Foss Extraction system (Foss, Gerhardt, Germany) by extraction with petroleum ether. Organic matter (OM) was calculated from 100-ash.

Experimental design

At the start of the experiment, fifteen (15) New Zealand White cross California rabbits were randomly assigned into 3 treatment groups (n=5). Group 1 (control) was the control group fed on a normal diet, which were 100% commercial pellet. Group 2 (T1) was fed 75% of mulberry leaf pellet and 25% of commercial pellet, Group 3 (T2) with 50% of mulberry leaf pellet and 50% of commercial pellet. All animals were also given fresh Napier grass for supplementation and munching. For the treatment groups, the mulberry leaf pellet and commercial pellet were mixed before feeding them to the rabbits. The duration of feeding trial was 60 days excluding the adaptation periods. The experimental site was at Rabbit House, Agro Techno Park in Universiti Malaysia Kelantan, Jeli Campus.

Evaluation of feed intake, body weight gain and feed conversion ratio

The feeds were weighed and fed to the rabbits every morning and evening. Each rabbit was served different amounts of feed based on their body weight and calculated with dry matter (DM). The leftover of the next meal was weighed using digital balance. In order to calculate the feed intake of the rabbit, the leftover of the feed was subtracted with the total amount of feed. The amount of feed was increased as the age increased. The weight of rabbits was weighed twice a week. The individual rabbit was weighed using a weighing scale. The weight of the rabbits was recorded inside a logbook which acts as record keeping book. The feed conversion ratio was calculated to determine the measurement proportion of the effectiveness of the rabbits' bodies in changing the feed into nutrient. The feed conversion ratio was calculated by dividing the feed given over the animal's weight gain.

Statistical analysis

All the data of the experiment was calculated using One-Way analysis of variance (ANOVA) by IBM SPSS statistic. Differences between the least squared means were considered to be significant at $p<0.05$ and Tukey's test was employed to elucidate significant differences.

RESULTS AND DISCUSSION

Chemical composition of feed

Based on the proximate analysis in Table 1, Mulberry leaf pellet had the highest dry matter content (%), which was $91.07\% \pm 0.10$ compared to commercial pellet and mulberry leaf. However, in terms of crude protein content (%), Mulberry leaf contained $24.10\% \pm 0.32$ which was the highest among the feed samples, followed by Mulberry leaf pellet ($19.43\% \pm 0.08$) and commercial pellet ($17.20\% \pm 0.16$). Next, Mulberry leaf contained higher crude fibre content (41.55%) than commercial pellet and Mulberry leaf pellet which were 18% and 8.17% respectively. But ether extract (EE) and ash content (%) of the Mulberry leaf pellet were the highest compared to commercial pellet and Mulberry leaf. The commercial pellet contained $2.24\% \pm 0.04$ of EE and $10.84\% \pm 0.37$ of ash content whereas Mulberry leaf contained $1.58\% \pm 0.05$ of EE and ash content of $10.15\% \pm 0.09$ respectively. The result from proximate analysis indicates that both mulberry pellet and commercial pellet contain higher dry matter content as well as lower in moisture content compared to mulberry leaf. Nowadays, most rabbit pellets sold commercially are nutritionally complete with the correct balance protein, fibre, fat, vitamin and mineral.

Growth performance of rabbits and feed conversion ratio

Based on Table 2, there is no significant difference of average daily gain (ADG) in control, T1 and T2 groups. The total feed intake for 60 days for control, T1 and T2 are 143.06±1.83, 132.77±5.15 and 140.85±4.82, respectively (Table 2). The daily feed intake was not significantly affected by the diet ($p \geq 0.05$). The feed intakes recorded in all dietary treatments were close to 149.9 g/day (Gidenne et al., 2009), but higher than 78.7g/day (Baba, 2003) and 53.3-60.4 g/day (Mohammed et al., 2011). It was suggested that Mulberry leaf pellet had high digestibility and palatability, similar to the commercial pellet. This finding is in agreement with Kandylis et al. (2009), who reported that Mulberry leaf also had high digestibility and palatability. Bamikole, et al., (2005) also reported that mulberry leaves can support good feed intake, digestibility and thus promote a satisfactory weight gain in rabbits.

Table 2 also shows the feed conversion ratio (FCR) of all groups. There was a significant difference ($p \leq 0.05$) between treatments on FCR which were at 6.65, 8.37 and 6.89 for CD, T1 and T2 respectively. It was shown that T1 was significantly higher than CD and T2, while for CD and T2 there were no significant differences. A possible explanation for the finding may be the similar crude protein content in CD and T2 diets, as these nutrients play significant roles in growth and reproduction in animals.

Table 1. Proximate composition (%) of mulberry leaf, mulberry leaf pellet and commercial pellet.

Constituents (%)	Mulberry leaf	Mulberry leaf pellet	Commercial pellet
Dry matter	33.97 ± 1.06	91.07 ± 0.10	89.43 ± 0.04
Moisture	66.02 ± 1.07	8.92 ± 0.10	10.57 ± 0.04
Crude protein	24.10 ± 0.32	19.43 ± 0.08	17.20 ± 0.16
Crude fibre	41.55±8.90	8.17±0.12	18.00±1.35
Ether extract	1.58 ± 0.05	5.98 ± 0.04	2.24 ± 0.04
Ash content	10.15 ± 0.09	10.96 ± 0.02	10.84 ± 0.37

Table 2. Average daily body weight changes (g/d) between groups (Mean±SE)

Parameters	Control	Treatment 1	Treatment 2
Average daily weight gain (g)	17.33±1.60	13.33±1.36	16.08±1.22
Total feed intake	143.06±1.83	132.77±5.15	140.85±4.82
FCR	6.65±0.53[a]	10.37±1.34[b]	6.89±1.13[a]

Control: the control group fed with based on normal diet (100% commercial pellet); Treatment 1: the animals were fed 75% of mulberry leaf pellet and 25% of commercial pellet; Treatment 2: the animals were fed 50% of mulberry leaf pellet and 50% of commercial pellet.

Figure 1. Mulberry leaf pellet

CONCLUSION

The use of 50% mulberry leaf pellet as substitute for commercial pellet in rabbit rations, has no adverse effects on growth and carcass characteristics of the animals. Similarly, the FCR was also not affected by the mulberry leaf pellet as compared to the commercial pellet. It is recommended that 50% mulberry leaf pellet could be used successfully to replace commercial pellet in rabbit rations.

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CAILS PAPER WASH

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ABSTRACT
The Transportation Security Administration (TSA) has restricted liquids in carry-on bags on all airlines to travel-sized containers weighing 3.4 ounces (100 milliliters) or less per item. Apart from the security reasons stated by the TSA on their website, it is widely known that liquids require very good and proper packaging, especially when traveling by plane. With all of these constraints, Cails Paper Wash was created to cut down on the time spent preparing all of the essentials that any traveler requires. Cails Paper Wash is an organic sheets face wash that will save the traveler not only time but also money by reducing the chance of spilled liquid, which is normally messy because it contaminates other products in the same bag. The fact that Cails paper wash is made of paper would also help to minimize the weight and space taken up by liquid products that are usually packaged in larger containers. The key ingredients of paper, distilled water, oatmeal extract, and vegetable glycerin. It is also suitable for all skin types because the main ingredient is vegetable glycerin, which has a smooth reaction to all skin types and reduces inflammation. Cails Paper Wash is simple to use - just take one sheet, place it on your palm, add some water, rub it in gently, and begin foaming. The user then only needs to gently massage it onto their face before rinsing it away. Cails Paper Wash is seen as having a high potential for commercialization due to its comfortability, low cost, and packaging value. This product was developed with two objectives in mind: to reduce the dilemma of carrying a small amount of liquid on board, and to make the product a solution to any traveler's packaging concern

Keywords: Cails paper wash, paper wash, sheet face wash

INTRODUCTION

Face wash is something that everyone, of all genders, needs. Face wash is an essential item in everyone's life since it has few purposes: it cleanses and refreshes the skin and most importantly, it removes makeup. Whether they preferred liquid, multi-use, eco-friendly, scented, unscented, or something completely different, choosing a version that travels well is the critical part. The liquid restrictions for flying have always become an issue, particularly for those who travel frequently. Since Transportation Security Administration (TSA) has banned liquids in carry-on luggage on all planes, it has created a slew of problems for passengers, forcing them to spend money on containers that can hold 100ml of liquids, particularly face cleanser. Unfortunately, liquids that are placed in the containers are frequently spilled. Furthermore, the containers will take up most of the space in their carry-on bags. Cails Paper Wash was designed in response to all of the problems that travelers must endure. Cails Paper Wash's unusual qualities may attract customers, particularly travelers, to switch from their customary liquid face wash to the organic sheets face wash.

OBJECTIVES

Cails Paper Wash was created to achieve some objectives which are:
1.   To reduce plastic usage
2.   Travel convenient especially for those who need to bring liquids with them on flights
3.   To encourage people to use skin-friendly organic products

NOVELTY

The novelty of Cails Paper Wash is on the appropriate packaging for carry-on liquids on travel arrangements, while also reducing plastic waste, which is a priority for most businesses and individuals today. Furthermore, this product is made from environmentally safe and natural components that are biodegradable and harmless, making it suitable for all skin types and beneficial for the environment. The use of eco-friendly materials such as paper, distilled water, oat extract, and vegetable glycerin that do not contain harmful substances and meet the product's requirements will not only ensure cleanser face skin but also hope to moisturize dry patches as these compounds are clinically claimed to have a content of vitamin C derivatives.

IMPACT AND USEFULNESS

Because it is made of paper and is lightweight, it can reduce the burden of travelers carrying heavy stuff when travelling. Moreover, airline passengers are only permitted to bring 100 milliliters of liquids on board. Cails Paper Wash was created to reduce the time spent preparing all of the necessities that any traveler needs to get ready with before going to any flight. Cails Paper Wash is an organic sheets face wash that will not only save the traveler time but also money by eliminating the possibility of spilled liquid, which is typically messy and risky as it will contaminates and ruin other goods in the same bag. Cails paper wash is composed of paper, which helps to reduce the weight and space taken up by liquid goods, which are typically packaged in larger containers. Paper, distilled water, oatmeal extract, and vegetable glycerin are the main ingredients, which is known to be suitable for all skin types as it uses eco-friendly materials. Cails Paper Wash's contribution to the community is to help in keeping the skin cleanse, fresh and healthy at all times. Healthy skin is essential for everyone, and the material used for Cails Paper Wash is also good for the environment. Cails Paper Wash has a very high

commercial value as cosmetics and personal care products business is one of the most dynamic and innovative businesses driving the economy. Furthermore, it will attract most people not only frequent travelers but those who moves a lot to purchase this type of face wash that is not only eco-friendly but also very light to be carried everywhere and anytime.

PROCESS OF CONSUMING THE PRODUCT AND PRODUCT SPECIFICATION

Cails Paper Wash is created to ease the tourists or travelers to wash their faces. There are some steps to use Cails Paper Wash.

Step 1: Take one Cails Paper Wash and place it on your palm

Step 2: Add some water

Step 3: Rub it in gently, and begin foaming. The user then only needs to gently massage it onto their face before rinsing it away

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CAPCUT

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ABSTRACT

Capcut refers to a medicine cutter at the cap of the medication bottle. The Capcut has been designed to split a medication in tablet or pills as easily as possible and without needing another device because this cutter is placed in the cap of the medication bottle. For example, if the pill cutter is missing or used by another person, the nurse must use a sharp object to cut the medicine such as a knife. This action can lead to injury. In order to avoid this accident from happening, we get inspired to upgrade the pill cutter into Capcut, which is the cutter attached at the cap of the medication bottle. Basically, at the hospital the nurse will use a device called a pill-cutter to cut the tablet or pills to provide a lower dose to the patient as prescribed by the doctor. The pill cutter will be placed on a flat surface. A medication which is pill or tablet will be put between the guides. Then, the nurses will bring the bladed section fully down to divide the medication. The fingers should be kept away from the blade all the time as a precaution. The pill-cutter consists of a V-shaped pill positioner, blade at the right of center and usually a compartment in which to store the unused part. Usually, nurses and people can buy the pill cutter at the pharmacy. Outpatients that have to consume a lower dose of the medicine or have to crush the pill will buy this pill cutter at the pharmacy because the hospital did not provide the cutter to the patient. So, the Capcut is very important to the nurses and outpatients to cut the pill appropriately without using another device.

Keywords: Capcut, pill-cutter, medication

PROBLEM STATEMENT

This innovation, Capcut, is produced because of some weaknesses of the current pill cutter.

Based on our experience in the hospital, there is a limited number of pill cutters in the ward, and it is always missing because the nurses will use the pill cutter to cut the medications and sometimes, they have forgotten where they put the cutter after being used. It is because the current pill cutter is a mobile tool and can be carried everywhere by the nurses and is not placed at the medication bottle, this always can lead to misplacement. So, it is quite hard for other nurses on the next shift to do their duty if the pill cutter is missing. Besides, other nurses have to buy another pill cutter at the pharmacy repeatedly if the pill cutter keeps missing. If a student nurse is having a practical in a hospital, they also have to buy their own pill cutter to ease their work without borrowing the cutter with the staff nurses. So, the Capcut is one of the innovations that can solve this problem. Furthermore, our Capcut was designed as an individual cutter that is placed in the individual medication bottle which serves as another function that is prevention of cross transmission of the infection.

EXPLANATION ABOUT THE PRODUCT

Benefit of the product and commercial price

Capcut is a great product that will be useful for all health care providers especially nurses and also useful to the patients because they will cut the medication in tablets and pills easily without using another device such as pill cutter. Basically, the Capcut will be placed in the cap of the medication bottle to cut the medication. The items that we used in the Capcut product are stainless steel blade, hot glue, acrylic sheet, acrylic sheet cutter and lid of plastic container. The Capcut will be placed in the cap of the medication bottle which will be covered with another cap or lid that will be attached with a stainless-steel blade to act as a cutter of medication. The acrylic sheet will be used as a V-shaped pill positioner before we cut the medication with a stainless-steel blade. The acrylic sheet will be cut by the acrylic sheet cutter to make a V-shaped. So, this innovation will be helpful to health care providers to cut the medication easily and can prevent cross transmission of infection because individual cutters are being used and it is not a sharing item.

COMPONENT IN CAPCUT

Components that we use include medication bottle, stainless steel blade, hot glue, hot glue gun, acrylic sheet, acrylic sheet cutter and lid of plastic container.

Figure 1: Medication bottle	**Figure 2**: Stainless steel blade	**Figure 3**: Hot glue gun

Figure 4: Hot Glue	**Figure 5**: Acrylic sheet	**Figure 6**: Acrylic sheet cutter

Figure 7: Lid of plastic container
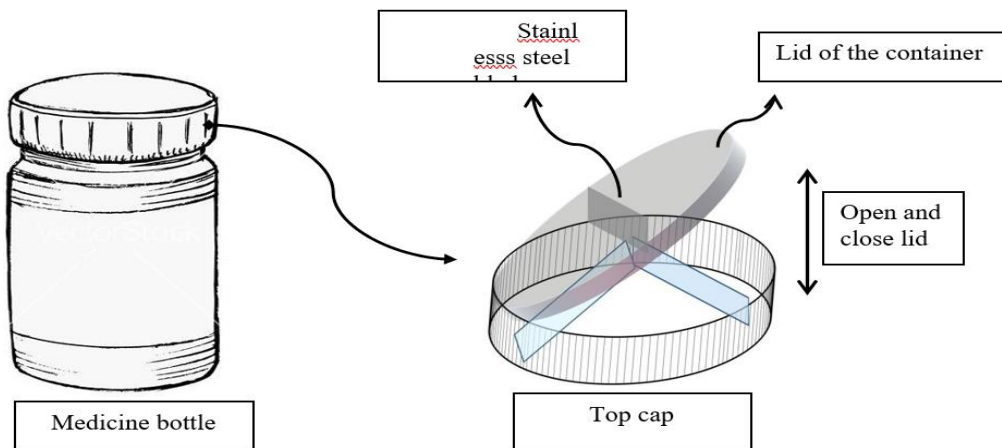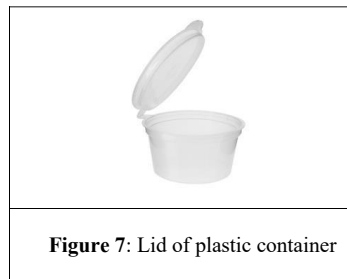
Figure 8 : Overview image of Capcut

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REGENERATED KENAF CORE CELLULOSE HYDROGELS AND FILMS PREPARED VIA PRE-COOLED METHOD

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ABSTRACT

Hydrogels are an emerging technology in the agriculture industry. Hydrogel refers to water-retention granule because of its ability to swell to many times its original size when it encounters water. The aims of this study are to extract cellulose from kenaf and investigate the properties of the produced regenerated cellulose hydrogel and film. The kenaf underwent bleaching and alkali treatment processes to extract the cellulose. Consequently, the kenaf cellulose extracted was dissolved in alkaline/urea solvent to form a transparent cellulose solution. This solution was separated into two parts. One part was used to form cellulose hydrogel by adding crosslinker and the other part was used to form cellulose film through the coagulation process. The average viscosity molecular weight of kenaf cellulose measured using Ubbelohde viscometer was 1.7 x 105. Meanwhile, the dissolution of kenaf cellulose shows the long cellulose chains becomes shorter. The FTIR result shows that kenaf was successfully extracted to form cellulose where the cellulose functional groups appeared on the spectrum. In addition, the transparency of cellulose hydrogel is higher compared to cellulose film due to the high porosity of cellulose hydrogel compared to closed surface porosity of cellulose film revealed from the morphological study

Keywords: Biodegradable; green solvent; INAQ; regenerated cellulose; water retention

INTRODUCTION

Hydrogels are an emerging technology in the agriculture industry. Hydrogel refers to water-retention granule because of its ability to swell to many times its original size when it encounters water (Das et al. 2021; Mohd Salleh et al. 2019). The hydrogels used in agriculture can absorb and release water. The speed of water absorption and release is dependent on the

type of hydrogels used. The volume transitions – absorbing and releasing water–depend on the external stimuli which can be physical or chemical. This hydrogel can help in reducing the drought stress for agriculture (Li & Chen; 2020; Mohd Salleh et al., 2019). Despite its unique properties, due to environmental issues raised by using synthetic polymer, the usage of environmental-friendly hydrogel is preferable. Therefore, polysaccharides-based hydrogel derived from natural polymer with attractive properties such as non-toxic, biocompatibility, biodegradable, and permeable are favoured to be applied in tissue engineering, food, agriculture, and water treatment (Li & Chen, 2020).

Cellulose is one of the most important and abundantly available renewable resources on the Earth. It possesses many attractive properties such as biocompatibility, biodegradable and thermally and chemically stable (Mohan et al. 2020) and it is improving from time to time due to the increasing demand on environmental-friendly and biocompatible products from consumers. Cellulose can be obtained from many types of natural resources such as cotton linter, wheat straw, bagasse, kenaf (Kaco et al., 2015; Li & Chen, 2020) and so forth. Cellulose is hydrophilic in nature and tends to absorb high proportion of water (Mohan et al., 2020) which makes it suitable to use for cellulose hydrogel production. Due to the unique properties of hydrogel such as permeable, biocompatibility, biodegradable, and nontoxicity, it has been extensively used in various industries, including food, contact lenses, biomedical, tissue engineering, water treatment, agriculture, and personal care products (Kaco et al. 2015; Mohd Salleh et al. 2019).

In this study, cellulose was isolated from kenaf through bleaching and alkaline treatment processes. The extracted cellulose underwent acid hydrolysis process at different times to obtain different molecular weight of cellulose. Consequently, the hydrolysed cellulose was dissolved in LiOH/urea solvents. Cellulose hydrogel was produced using different averages viscosity molecular weight of cellulose. The properties of hydrogel were characterised using UV-Vis, SEM, FTIR and XRD and water uptake.

MATERIALS AND METHOD

Materials

Kenaf core powder was supplied by the Malaysian Agricultural Research and Development Institute (MARDI). Lithium hydroxide (LiOH), urea, epichlorohydrin, sodium chlorite and sulfuric acid (H_2SO_4) were purchased from Sigma Aldrich.

Extraction of cellulose from kenaf

Bleaching and alkaline process of kenaf was carried out. In the bleaching process, buffer solution was prepared containing NaOH, acetic acid, sodium chlorite and distilled water that reacted with kenaf at 80 oC. Consequently, the bleached kenaf was alkaline treated in 2% NaOH at 80 oC as well. After every single stage was performed, the sample was washed until neutral prior to entering the next stage. Then, the sample was dried at 105 oC for 24 h.

Dissolution of cellulose

A green aqueous solvent of LiOH/urea with 4.6 % LiOH, 15 % urea and 80.4 % distilled water was prepared and pre-cooled at −13 oC in a refrigerator. Consequently, the extracted kenaf cellulose (EKC) was added into the frozen solid to be thawed and stirred extensively at room temperature to obtain a transparent cellulose solution. The transparent solution underwent centrifugation at 10,000 rpm for 5 min to remove gas bubbles.

Formation of cellulose hydrogel and membrane

The acquired cellulose solution was divided into two portions where a portion was mixed with crosslinker of 5% epichlorohydrin and stirred until a homogeneous solution was formed. Consequently, the solution was stored in a fridge at 5 oC until the hydrogel was formed. Meanwhile, the other portion of cellulose solution was cast on a glass plate and coagulated into a coagulated bath containing 5% H_2SO_4 to form regenerated cellulose films. The hydrogel and film were washed in distilled water to remove excess chemicals.

Characterization

The average viscosity molecular weight of cellulose obtained was measured using Ubbelohde viscometer. Meanwhile the transparency for both hydrogel and film were measured and scanned with UV–visible spectrophotometer model Jenway 7315 Spectrometer at wavelengths ranging from 200 to 700 nm. The surface morphology observation of the membranes samples was studied using scanning electron microscope (SEM) model LEO 1450VP. The samples were sputtered with gold, observed, and photographed.

RESULTS AND DISCUSSION

Properties of kenaf cellulose

Figure 1(a) shows the optical microscope image of kenaf cellulose dissolved in LiOH/urea solvent. It shows that the long chain of kenaf cellulose was dissolved, and it becomes shorter after the dissolution process was carried out. During the dissolution process, the chemical is insufficient to dissolve the cellulose with longer fiber length. Intrinsic viscosity (Mŋ) is a direct measure of the flow behaviour of macromolecules and an indirect measure of their size and shape. Figure 1(b) shows the plot of reduced viscosity and inherent viscosity against cellulose concentration. The intercept of each straight line determined the intrinsic viscosity of the cellulose samples. The results show that the intrinsic viscosity of kenaf cellulose extracted was 1.7 x 105. Figure 1(c) shows the ATR-FTIR absorption peaks for kenaf and kenaf cellulose. The peak observed at 1735 cm−1 is attributed to the C=O stretching of acetal and ester group which contributes to the presence of hemicelluloses in kenaf (Tawakkal et al. 2010). The presence of peak at 1593 cm−1 is due to the aromatic symmetric stretching of lignin, while the vibration peak at 1507 cm−1 is attributed to the benzene ring in lignin (Chan et al. 2012). Peak observed at 1293 cm−1 is assigned to C−O stretching vibration of acetal group in lignin. Meanwhile, peak presence at 836 cm−1 in KC Raw is due to the presence of phenolic group in lignin (Bakarudin et al. 2012). The absence of these peaks in cellulose sample indicates that lignin has been removed during the alkaline treatment (Tawakkal et al. 2010). The peak ranging

between 1020 to 1160 cm−1 is assigned to asymmetric C−O−C stretching region of cellulose and lignin (Wu et al. 2009).
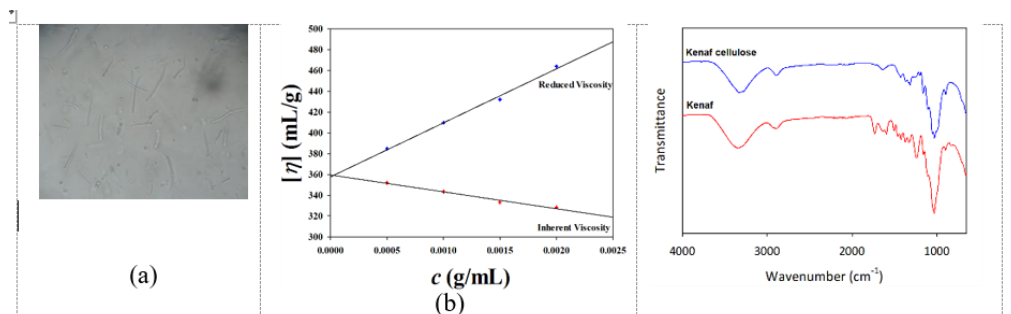
Figure 1. (a) Optical microscope image of kenaf cellulose dissolved in LiOH/urea and (b) average viscosity molecular weight through using reduced and inherent viscosities.

Transparency of cellulose hydrogel and film

Figure 2 shows the transparency of cellulose hydrogel and cellulose film produced where the light transmittance was measured in the wavelength range of 200-700 nm. The result shows the cellulose hydrogel can achieve up to 75 % transparency meanwhile cellulose film can achieve up to 30% transparency, respectively. This may be due to the high porosity of cellulose hydrogel due to the crosslinking effect between the cellulose chain and crosslinker (Mohd Sallet et al., 2019). Meanwhile, cellulose film has lower transparency due to the porosity of the air-dried film has been closed during the slow drying process.
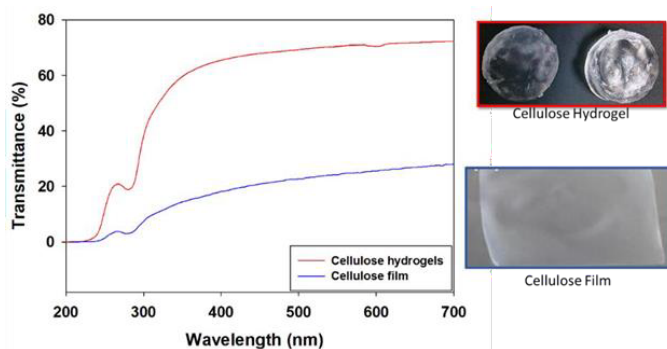
Figure 2. Transparency of cellulose hydrogel and cellulose film

Morphology of kenaf cellulose, cellulose hydrogel, and film

Figure 3(a) shows SEM images on surface morphology of extracted kenaf cellulose. It shows that the fibres are stacked onto one another with the existence of individual fibres that started to separate from the fibre bundle. Hence, it shows that lignin which is located between the fibres has been removed during the bleaching process. Figure 3(b) shows the SEM images for the cross section of hydrogel produced. The hydrogel samples have been freeze-dried and possess a highly porous structure. During the freeze-drying process, water was trapped in the hydrogel and turned into crystals and phase separation, followed by subsequent sublimation which has resulted in the formation of voids (Annabi et al. 2010). However, in the film

morphology, it shows that the pore structure of the dried film smooth and closed structure. This result correlates with the transparency of cellulose hydrogel and film.
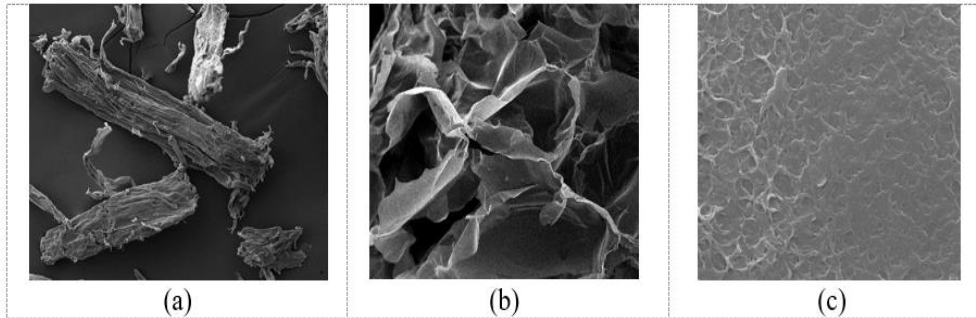
Figure 3. Surface morphology of kenaf cellulose, cellulose hydrogel, and cellulose film

CONCLUSION

Cellulose has been successfully extracted from kenaf using bleaching and alkaline treatment. The dissolution of cellulose in alkaline/urea shows the cellulose chain becomes shorter. Meanwhile, hydrogel possesses higher transparency compared to cellulose film. From SEM images, it shows that the lignin bonded to the fibre was removed after the bleaching process and the surface morphology becomes smoother in cellulose film but highly porous in cellulose hydrogel due to the crosslinking effect

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ENCAPSULATION OF WINGED TERMITES IN CELLULOSE NANOFIBRE FOR THE FABRICATION OF CELLULOSE BIOPLASTIC

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ABSTRACT

Currently, bioplastic has become a trend due to the undegraded petroleum-based plastic, hence leading to environmental pollution. Meanwhile, the winged termite swarmers come out when the environment is wet or damp, so they are often found after rain. Meanwhile, cellulose is the most abundant biopolymer on Earth. It is highly valuable, renewable, biodegradable, bio-compatible, and most importantly, not fully utilised. Hence, the aims of this study were to integrate winged termites and cellulose in the production of bioplastic and study the thermal and chemical properties of the bioplastic produced which will become an alternative to save the environment. Cellulose was dissolved in pre-cooled LiOH/urea solvent at -13°C to form a cellulose solution. Termite wings were then grinded using pestle and mortar. The termite wings powder was added and mixed with cellulose solution until it was fully dissolved. The termite wings powder-infused cellulose solution was cast on a glass plate and flattened out and consequently was coagulated in acid bath to form a cellulose membrane. The sample was then frozen and air-dried. From the FTIR analysis, the functional group of termites and cellulose were changed after the regeneration of cellulose and mixing with termites has been carried out. This portrayed that the reaction has taken place. The thermal properties of the bioplastic were investigated using DSC and revealed that winged termites have enhanced the thermal properties of the plastic. Consequently, this bioplastic also serves as green plastic which helps to reduce pollution by making bioplastics using the waste from natural source

Keywords: Biodegradable plastics; FTIR; green solvent; INAQ winged termites

INTRODUCTION

Plastic or plastic bags that are commonly used in our daily life are mostly made of polyethylene. Polyethylene is an inert material that is very difficult to degrade thus making plastic bags harmful to the environment. Plastic bags can cause pollution which is bad for human's health, can harm marine creatures and wildlife, poisonous and many more. That is why it is a problem to the environment since it can cause further damage (Ghatge et al. 2020).

Cellulose is a long-chain polymer of glucose molecules joined together. It can be dissolved by using certain solvents including concentrated phosphoric acid, N-methylmorpholine-N-oxide, cuprammonium hydroxide and more. Cellulose can be used to produce regenerated cellulose hydrogel, paperboard, cellophane, films, bioplastic, and others. It also functions as a membrane and is an ideal candidate for medical modifications and for tissue engineering uses (Kaco et al. 2017).

Winged termite swarmers, scientifically known as Isoptera sp., are termites with wings. They leave their nest to reproduce and mate so new colonies are built. Usually, swarmers leave their nest during spring to fall, or when the weather is humid. The colour of the termites can be gray or pale brown depending on the species. Their wings are lightweight and thin, enabling these swarmers to fly easily. The winged termite swarmers are attracted to light which can damage their wings, thus that is why their wings have good thermal properties (Etuk et al. 2017; Miller et al. 2010). They are constantly at risk of drying out and dying from dehydration, so they mostly stay in the soil to find moisture. Their bodies are also high in protein, calcium and iron and are edible (Adepoju et al. 2014).

Therefore, in this study, cellulose was integrated with winged termite to produce bioplastic as a potential plastic with better thermal properties. The physical and chemical properties of cellulose and cellulose/termites were analysed. The surface morphology and the chemical changes observed were investigated.

MATERIALS AND METHOD

Materials

Oil palm EFB fibres were purchased from Szetech Engineering Sdn Bhd (Selangor, Malaysia) at desired sizes of 106 to 500 µm. The isolation of cellulose was done using sodium chlorite and acetic acid (Sigma Aldrich). The dissolution of cellulose was done using lithium hydroxide, LiOH and urea (Sigma Aldrich). The coagulation bath was prepared containing 5% sulphuric acid, H_2SO_4 (Sigma Aldrich).

Preparation of EFB cellulose

Bleaching and alkaline process of kenaf was carried out. In bleaching process, buffer solution was prepared containing NaOH, acetic acid, sodium chlorite and distilled water reacted with kenaf at 80 oC. Consequently, the bleached kenaf was alkaline treated in 2% NaOH at 80 oC as well. After every single stage was performed, the sample was washed until neutral prior to entering the next stage. Then, the sample was dried at 105 oC for 24 h.

Preparation of winged termite's powder

Winged termites were obtained from the surrounding of Kolej GENIUS Insan after the rain stops. The termite's wings were separated from its body and were grinded using pestle and mortar to obtain the powdered form of termite's wing as shown in Figure 1(a).

Alkaline dissolution process

A green aqueous solvent of LiOH/urea with the 4.6 % LiOH, 15 % urea and 80.4 % distilled water was prepared and pre-cooled at -13 oC in a refrigerator. Consequently, the extracted EFB cellulose was added into the frozen solid was thawed and stirred extensively at room temperature to obtain a transparent cellulose solution. The transparent solution underwent centrifugation at 10,000 rpm for 5 mins to remove gas bubbles as presented in Figure 1(b).

Cellulose/termites encapsulation for bioplastic fabrication

The powder of the wing's termites was embedded into the formed cellulose solution and stirred until homogeneous cellulose/termites' solution was formed. Consequently, the solution was cast on a glass plate and immediately put into coagulation bath containing 5% H_2SO_4 solution. After a minute of solvent transfer between solution and the acid, a piece of transparent film was formed. Ultimately, the cellulose film was air dried to form a bioplastic film as shown in Figure 1(c).

(a)
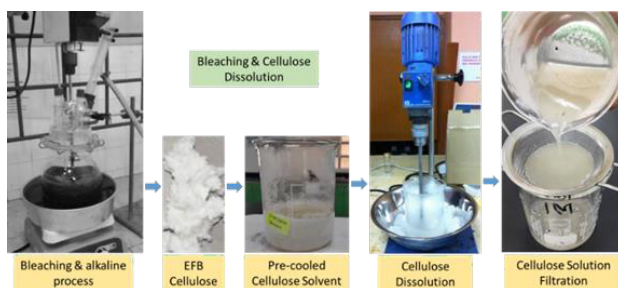
(b)
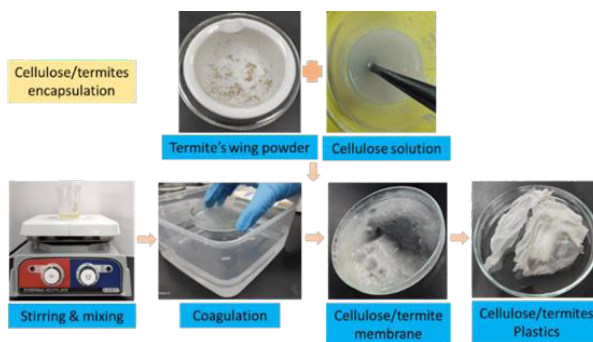
(c)

Figure 1. Flow process of (a) grinding of wing's termites (b) bleaching and cellulose dissolution and (c) cellulose/termite's encapsulation.

Characterisation

Physical properties of the samples were observed based on the colour and structure of the samples. Meanwhile the chemical properties of the samples were analysed using Fourier-transform infrared spectroscopy (FTIR). The surface morphology observation of the membranes samples was studied using scanning electron microscope (SEM).

RESULTS AND DISCUSSION

Physical Properties of cellulose and cellulose/termites bioplastic

Figure 2 shows the physical structure of the samples. Figure 2(a) shows the colour for EFB has been changed from brownish to white (Figure 2(b)) which represent the loss of lignin in the EFB due to the bleaching process. Meanwhile, the sample of EFB cellulose was transformed from Cellulose I (EFB cellulose) into cellulose II (regenerated cellulose film) as can be seen in Figure 2(c). The regenerated cellulose film then was air-dried, and it becomes plastic (Figure 2(d).

EFB Fibre   EFB Cellulose   EFB Cellulose film   EFB Cellulose/termites Plastics

(a)   (b)   (c)   (d)
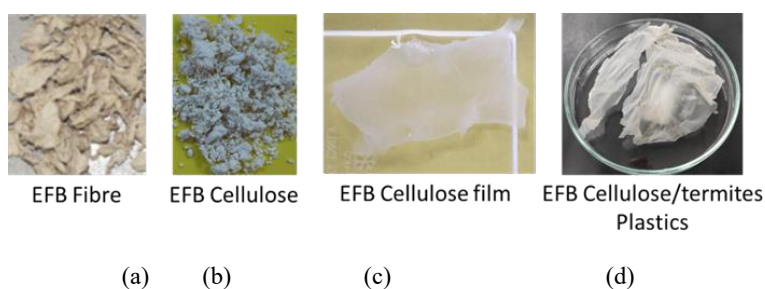
Chemical Properties of cellulose and cellulose/termites bioplastic

Figure 3(a) shows the functional groups analyses of EFB and the transformation of functional groups after the bleaching process which is the EFB cellulose. The major peak can be observed at 3329 cm-1 which represents OH stretching vibration of the samples. Meanwhile, Figure 3(b) shows the functional group of termites and cellulose were changed after the regeneration of

cellulose and mixing with termites has been carried out. This portrayed that the reaction has taken place
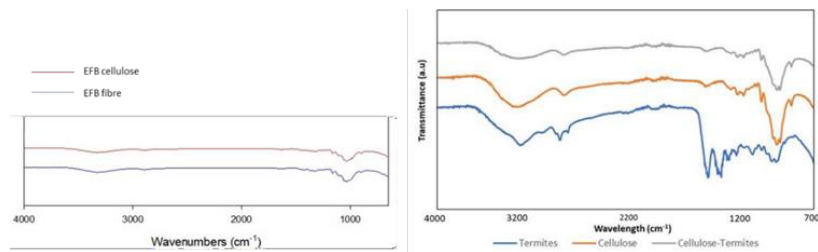
Figure 3. FTIR spectrum for (a) EFB fibre to EFB cellulose and (b) EFB cellulose, termites, and cellulose/termites.

Surface morphology (SEM)

Figure 4 (a) shows SEM images on surface morphology of the EFB cellulose and cellulose bioplastics. After bleaching and alkaline processes, it shows the existence of individual fibre of cellulose. Hence, it shows that lignin which is located between the fibres has been removed during the bleaching process (Zaini et al. 2013). It is well known that the bleaching process is a process which is conducted to remove lignin from raw fiber (Tawakkal et al. 2010). Meanwhile, smooth surface of cellulose bioplastic has been observed as shown in Figure 4(b). The contact between the cellulose solution and the glass plate has contributed to the smooth and low porosity of the regenerated cellulose. In addition, the diffusion of acid during the coagulation process was slower on the surface which contacted the glass plate making it slow solvent exchange process (Kaco et al. 2014).
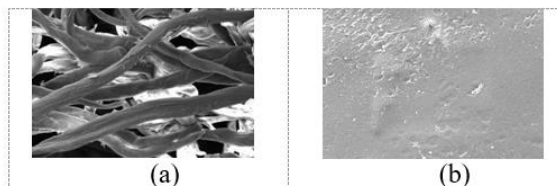
Figure 4. SEM images of (a) EFB-Cellulose and (b) EFB cellulose bioplastics

CONCLUSION

Cellulose has been extracted from oil palm empty fruit using the bleaching process and winged termites were collected and underwent physical treatment. Both cellulose and winged termites was mixed to produce cellulose/termite bioplastic. FTIR result shows the cellulose functional groups were changed after the existence of termites. From SEM images, it shows that the fibrous cellulose was disturbed and become smooth after dissolution and regeneration process takes place. This cellulose/termite bioplastic has the potential to be used as bioplastic for food packaging and other applications.

ACKNOWLEDGEMENTS

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CHINESE CHARACTER CARD GAME: LEARNERS' ATTITUDES AND MOTIVATION

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ABSTRACT

Chinese character recognition is the first step to learn Chinese characters. However, due to the complexity structure of Chinese characters, learners often show unsatisfactory result in their Chinese character recognition. As a result, this can affect Mandarin learners to further their understanding in Mandarin language learning. Numerous researches proven that educational game help in learning process and it is essential to adopt in this millennial era. Due to that, an innovative teaching and learning card game, Chinese Character Battle (CCB, 汉字对决) which may give a great impact on learners' performance in Chinese characters learning was designed and implemented in Mandarin language classroom. This card game is suitable for Mandarin learners from different level of proficiency. The CCB provided plethora of advantage for native-Mandarin learners and non-native Mandarin learners in their learning of Chinese characters. As for its novelties, CCB equipped with the knowledge that learners need to acquire in learning Chinese characters and reinforce learners' memories on each Chinese character through visualization of each character. This card game is recommended for Mandarin teacher and Mandarin learners as it offer a fun and engaging learning environment. This study was carried out to explore the attitudes and motivation of learners in using CCB as a Chinese character learning tool. The findings from the survey revealed the positive attitudes and high level of motivation among students in using CCB. Most of participants agreed that CCB gave them a lot of benefits. They also responded that CCB is useful and effective learning tool for them to learn and improve their performance on learning Chinese Characters.

Keywords: Chinese character, motivation, attitude, card game

INTRODUCTION

Educational games are designed in the form of board, videos, cards, mobile applications and etc with the aims to helps students in their learning process of subject. Research done by scholars (Ting & Lam, 2021; Ting, Ch'ng & Norseha, 2020; Aguilar & Qian, 2015) proven that game-based approach has improved learners' performance in language learning process. Apart from that, attitudes and motivation also have a clear link with the language learning process (Ellis, 1997; Gardner, 2001b). Most of the scholar (Holmes, 1992; Gardner, 1985) claimed that, learners' positive attitude on language learning will be highly motivated and led them to be success in acquiring the target language. In contrast, learners with negative attitude on language learning will display a low motivation on learning a language which prevent them from acquiring the target language. Hence, positive attitude and motivation of learners is said to be a factor to achieve a successful language learning. This study was carried out with the aims to investigate attitudes and motivation of learners in using

educational card game, namely Chinese Character Battle (CCB-汉字对决) in learning Chinese characters.

DESCRIPTION OF CHINESE CHARACTER BATTLE (CCB- 汉字对决)

Chinese Character Battle (CCB- 汉字对决) is an educational card game which designed for Mandarin learners neither Chinese nor non-native Chinese. Selection of Chinese character in CCB were based on the syllabus of Foundation Mandarin (Level I & II) that offered in Universiti Teknologi MARA (UiTM). The game pack of CCB was shown in figure 1 and figure 2 shows implementation of CCB in MFL classroom at initial stage of product development. This Chinese character card game is ideal to be played by 2 to 4 players. With CCB, students will be able to learn Mandarin new words, pronunciation, meanings, part of speech and the origin of Chinese characters effectively. The visualized Chinese characters not only cater for learners' learning styles but also reinforce learners' memories on each characters. Clear instruction attached in the game pack help players to understood the rules and regulations of the game easily. This game can also be played without the asssitance of teacher as the suggested answers have been provided along with the guidebook.

Chinese character Battle (CCB- 汉字对决) game pack consists of the following items:
- 72- Chinese character cards
- 72- Question cards
- 1- Guidebook with suggested answer

Figure 1. Game pack of Chinese Character Battle (CCB), 汉字对决

Figure 2. MFL Students' Involvement in CCB Game Play

Usefulness of CCB

CCB may be beneficial for Mandarin learners, Mandarin language teachers and parents. Mandarin learners can get a clearer picture of the origin of the Chinese characters from the information and explaination provided in CCB. Mandarin teacher can used CCB as part of their teaching aid in classroom. Mandarin teachers can use CCB to motivate their students' engagement in learning Chinese characters. As for parents, they can play CCB with their children to foster strong relationship with family members.

Potential commercialization

Since there is no card game on the market that combines CCB's elements, it has a good marketability and commercial potential for any institutions that offer Mandarin language course for their students. Moreover, parents can use CCB as part of the teaching tools at home. Students can also compete and bond with their classmates, friends, and family.This card game is also suitable for adults who want to learn or enhance their Chinese characters acquisition. Thus, CCB is suitable for Mandarin learners from different level of proficiency.

The advantages of using CCB are:
1. It is ideal for learners with little or no prior knowledge of Chinese characters.
2. It makes Chinese character learning fun, enjoyable and engaging.
3. It can be used to achieve the course objectives.
4. It promotes self-paced learning.

METHOD

This study employed purely qualitative method. Population of this study were 125 diploma students from Universiti Teknologi MARA, Sarawak branch. According to figure 3, there are 11% of participants was male and 89% of participants was female. Only students who taking Foundation Mandarin courses were chosen to participate in this study. All participants were asked to fill up a set of questionnaires which consisted of participants' profile in part A and 10-item about students' attitudes (Question 1-5) and motivation (Question 6-10) in part B. Items in part B was five Likert scale items that adapted from Masrom (2006). The five Likert scale items was ranging from "1= strongly disagree" to "5= strongly agree". The questionnaire was generated via Google Form. The survey link was shared to the participants through WhatsApp. Data collected was analyzed using Statistical Package for Social Science (SPSS) version 25. The agreement level of each item was classified into three categories which are low (1.00-2.33), medium (2.34-3.67) and high (3.68-5.00).
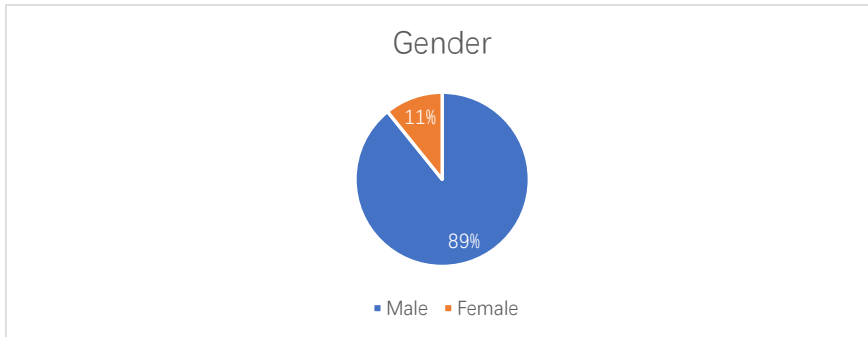
Figure 3. Population of Study

DATA ANALYSIS

Table 1 demonstrates the mean score and standard deviation of students' attitude in using CCB to learn Chinese characters. The findings depicted that all items of students' attitude are in the range of high mean scores that ranging from 3.904 (1.145) to 4.192 (SD= 1.133). Among the items, Item 5 (The content of the card games matches my Mandarin subject syllabus) had the highest mean of score (Mean= 4.192, SD= 1.133). Respondents agreed that using CCB enable them "to learn better (Item 1, Mean= 4.064, SD= 1.126)". They also agreed that the card game enable them to learn according their own pace and sequence (Item 2, Mean= 3.960, SD= 1.088)" since the CCB had the "flexible" characteristic (Item 4, M= 3.992, SD= 1.181; Item 3, M= 3.904, SD= 1.145). It can be concluded that the participants show positive attitude towards the use of CCB in their Chinese characters learning.

Table 1. Mean Score and Standard Deviation of Students' Attitude

No	Item	Mean	Standard Deviation
1.	I can learn better by myself.	4.064	1.126
2.	I can learn according my own paced and sequence.	3.960	1.088
3.	It is more flexible for me to determine my own learning time.	3.904	1.145
4.	It is more flexible for me to choose my learning place.	3.992	1.181
5.	The content of the card games matches my Mandarin subject syllabus.	4.192	1.133

Table 2 presented the mean score and standard deviation for each item in analyzing students' motivation in using CCB to learn Chinese characters. The result of the study depicted that all items were accepted on the high mean scores ranging from 3.952 (SD= 1.169) to 4.328 (SD= 1.112). Item 10 (The usage of card games makes learning more interesting and fun) has the highest mean of score (M= 4.328, SD= 1.112) among the items corresponded to students' motivation in using CCB. It is followed by item 8 (I am very interested in using card games to learn Chinese characters) with mean of score 4.288 (SD=1.127) and item 6 (I think this learning material give me lots of benefits) with mean of score 4.224 (SD= 1.084). The findings found that students prefer to use CCB as practice rather than using book (Item 7, M= 3.952, SD= 1.169; Item 9, M= 4.104, SD= 1.162). Based on the findings, it can be concluded that the participants are highly motivated with the use of CCB in their Chinese characters learning. This finding is in line with Papastergious's study (2009) that indicated game-based learning shown to be more motivational for students in the learning process.

Table 2. Mean Score and Standard Deviation of Students' Motivation

No	Item	Mean	Standard Deviation

6.	I think this learning material gives me lots of benefits.	4.224	1.084
7.	I prefer to answer questions this way compared using books.	3.952	1.169
8.	I am very interested in using card games to learn Chinese characters.	4.288	1.127
9.	I prefer to do practices in the form of card games rather than quizzes during class.	4.104	1.162
10.	The usage of card games makes learning more interesting and fun.	4.328	1.112

CONCLUSION

As conclusion, respondents show high motivation and positive attitude in using CCB as CCB give them a lot of benefits. Most of them perceived CCB as a useful and effective learning tool to improve their Chinese Characters learning. Flexibility of CCB is high whereby the learners can learn Chinese characters at anywhere and anytime. Learners also show their preference to use CCB as part of lesson. In short, this innovation product has successfully increase learners' motivation and help them to display positive attitude in learning Chinese characters.

ACKNOWLEDGEMENTS

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COFFEE CAPSULE VENDING MACHINE

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ABSTRACT

For a coffee lover, a coffee vending machine is one of the must-have-appliances that should be placed in the public area such as at shopping malls, offices, colleges, and other attractive spots. The machine is the new generation of vending machines that are widely used nowadays, where it is a self-service vending machine. Just follow a few simple steps, insert a coin, choose a flavor and you are done. But the existing vending machine lacks two-way communications especially between the machine itself and the machine's supplier. The suppliers do not have any information about the stocks left in the vending machine. Besides that, the machine user is also exposed to the non-hygienic environment when using the vending machine. The user indirectly needs to touch the vending machine to complete the process. The main objective of this project is to provide a substantial solution to the problems of manufacturing coffee capsule vending machines while keeping it at low costs. The coffee capsule vending machine can be accessed by the supplier using the Internet of Things (IOT) and Bluetooth modules (HC-05) which have been used for wireless communication between smartphone and machine. This machine is also incorporated with infrared sensors for obstacle detection. This project consists of two inputs: an IR sensor and push button and three outputs which are Bluetooth Module (HC05), LCD and servo motor. This Vending machine used Bluetooth module (HC05) as the IOT part. By utilizing the IOT, the information about the stock quantity available inside the machine can be easily obtained. In addition, with this new generation of vending machines it does not need any human interface for every transaction.

Keywords: IOT, Coffee capsule vending machine.

FLOW OF DESIGNING COFFEE CAPSULE VENDING MACHINE

This section describes the process of designing the circuit of the coffee capsule vending machine. The first step is to identify all components to be used for the machine. Next, the block diagram of the machine is illustrated to classify between input, output, and main controller of

the circuit. Next process is to design the circuit by using Proteus Software. The simulation procedure is run and tested until simulation is successful before hardware connection can be made.

Block Diagram of the Coffee Capsule Vending Machine

Block diagram of the coffee capsule vending machine as shown in Figure 1. The block diagram shows the overall components used for this project. There are expected to be two inputs and three outputs. IR Sensor and Push buttons are used as input parameters. Meanwhile for the outputs, RC SM-S4306R servo motors, and 16x2 LCD Display are used to indicate the current activity of the machine. Bluetooth Modules and Smartphones are used as the communication module.
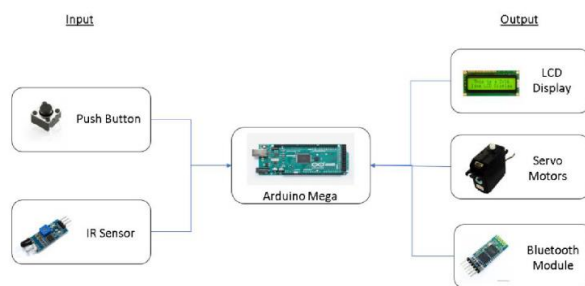
Figure 1. Block Diagram of the Coffee Capsule Vending Machine

Circuit Design of the Coffee Capsule Vending Machine

Circuit design of the Coffee Capsule Vending Machine as shown in Figure 2. The circuit is designed by using Proteus Software to enable project simulations and to write encodings before proceeding with project hardware connections. Proteus 8 Professional is used to illustrate the coffee capsule vending machine. The software is associated with detailed animation of components used to simulate the process of the coffee capsule vending machine.
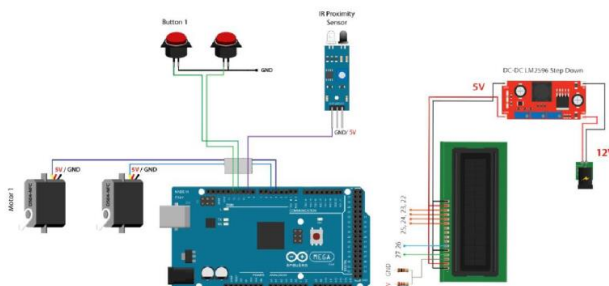
Figure 2. Circuit Design of the Coffee Capsule Vending Machine

PROCESS AND FINAL PROTOTYPE OF COFFEE CAPSULE VENDING MACHINE

This section describes the overall process and final prototype of the coffee capsule vending machine. The process will be illustrated by using a flow chart. The prototype is designed by using Adobe Photoshop CC software.

Flow Chart of the Coffee Capsule Vending Machine

The process starts when the switch is turned on and Arduino will trigger all pins, motor, IR sensors, LCD, and Bluetooth Modules. After the machine detects the presence of the coins, the list of coffee capsule flavors will be available for customers. Then, the machine lets customers select the type of coffee capsule flavors by pressing the available push button. The flow chart of the Coffee Capsule Vending Machine as illustrated in Figure 3.
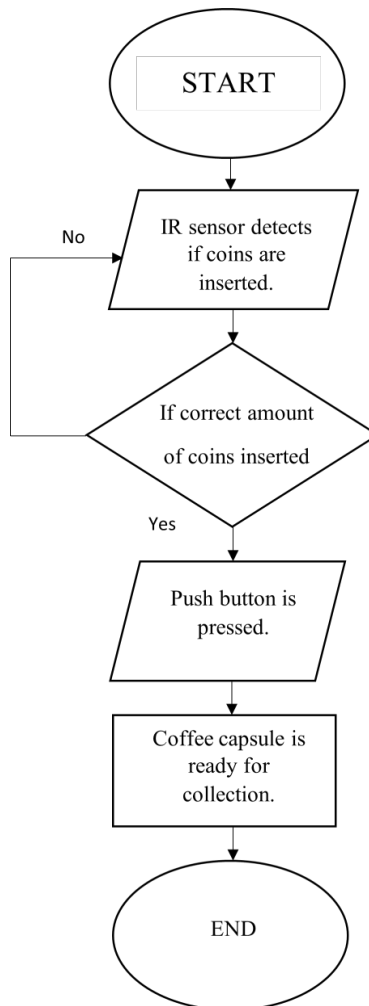
Figure 3. Flow chart of the Coffee Capsule Vending Machine

Prototype of the Coffee Capsule Vending Machine

The design and final prototype of the coffee capsule vending machine is shown in Figure 4a and Figure 4b, respectively. Firstly, the prototype is designed by using Adobe Photoshop CC software. Then, the final prototype is produced based on the design and it uses recycled materials to build the vending machine.
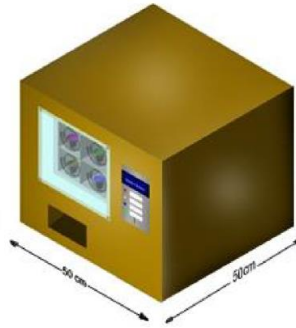
Figure 4a: Prototype of the Coffee Capsule Vending Machine

Figure 4b: Final Prototype of the Coffee Capsule Vending Machine

CONCLUSION

In conclusion, the Coffee Capsule Vending Machine is the new generation of vending machines that utilize the IOT as an interface between the machine and the user. The information about the quantity of the capsules available inside the machine can be obtained at fingertips. In a nutshell, the Coffee Capsule Vending Machine is the new plan to sell without human interface with low cost to build the project.

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CORN-BASED BIOPLASTIC AS SEEDLING BAG

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ABSTRACT

Polyethylene bags have traditionally been used in the production of seedling bags, which are discarded in the soil or burned after transplantation due to the enormous amount of organic material connected to the bags, which is impossible to recycle or decompose. Furthermore, when a seedling is removed from its bag for transplant, there is a potential of root damage, which directly impacts the plant's growth. In this study, seedling bags that made from corn starch with filler (diammonium phosphate or potassium nitrate) to be used in plant seedling. Corn-based bioplastic offers a seedling bag that can be planted directly into the soil, do not required to transplant the plant, decompose naturally and also supply nutrients to plants. Which is it will reduce the risk of root damage and encouraging the plant's growth. Due to increasing public awareness around the world have opened up new market opportunities. Besides, with a similar feature with polyethylene bag, it's an ideal alternative in the sense of environmental sustainability and also compatibility.

Keywords: bioplastic, starch-based, corn starch, filler, seedling bag

INTRODUCTION

Polyethylene bags are commonly used in agriculture for seedling production. There hasn't been much research done on how to dispose of these bags or what happens to them once they've been used as plant seedlings. Most of the plastic waste used in agriculture is either buried in the soil which will causing permanent pollution or incinerated and then releasing hazardous pollutants into the air (Bilck et al.). This is because of an expensive labor expense as well as the lack of a cost-effective disposal mechanism. Other than that, polyethylene bag is hard to recycle and decomposed due to the high amount of organic matter that adheres to the material.

Due to increasing public awareness, this is where the bioplastic was introduced. Bioplastic can be biomass or bio-based or both depending on raw material used according to European Bioplastic. The focus of recent research has shifted to starch-based bioplastics. Starch based plastic are usually from rice, wheat, corn and potatoes. Corn starch is the cheapest and most used for starch-based plastic. However, because of their hydrophilic nature, this type of plastics faces the several drawbacks which is weak mechanical, thermal, and water vapor barrier properties when compared to synthetic composites, which limits the functions and their applications.

Nonetheless, to overcome those drawbacks, a filler was added into corn-based bioplastic to improve their properties. Diammonium phosphate and potassium nitrate was used as filler.

Diammonium phosphate and potassium nitrate were chosen as fillers not only to improve the corn-based bioplastic qualities, but also to provide nutrients to plants and encourage plant growth because diammonium phosphate and potassium nitrate are commonly used soil fertilizers (Abdul Khalil et al.).

Corn-based bioplastic as seedling bag offers a seedling bag that can be planted directly into the soil, needless transplant the seedling, decompose naturally and supply nutrients to plants. Which is it will reduce the risk of root damage and encouraging the plant's growth.

Usefulness

One of the major advantages of this corn-based bioplastic as seedling bag, it will decomposes naturally and then led to the reduction of non-biodegradable waste that pollutes the environment. Second, when using this corn-based bioplastic as seedling bag, this bag can directly plant into the soil without damaging the plant's root and also promoting plant development. Next, this seedling bag used renewable resources eventually reduce carbon footprint, significantly lower source and minimum electricity during manufacturing. Also, this seedling bag does not contain harmful chemicals and safe for human and environment.

Novelty

Current biodegradable seedling bag are made from non-woven material however this seedling bag is from starch-based material. This seedling bag is made from corn which means it can directly plant and decompose naturally in soil, without transplant the bag without damaging the root and compromise the plant's growth. Also, additional of diammonium phosphate and potassium nitrate as filler to enhance corn-based bioplastic (seedling bag) properties and supply nutrients to soil and also plants.

METHODOLOGY

The corn-based bioplastic solution was prepared by mixing 100 ml of distilled water and (20 % w/w of distilled water) corn starch. Then, the glycerol (40 % w/v of starch) was added as a plasticizer and lastly, 5 cm3 of acetic acid with 5% acidity was poured into the solution. After that, the filler (25 % from total corn starch) was added into the solution. There are 2 fillers used in this product which is diammonium phosphate and potassium nitrate. The film solution was heated to 75 ℃ under constant stirring using a magnetic stirrer with a stirring speed of 300 rpm to 90 rpm to obtain starch gelatinization and continue to stir manually until the solution becomes viscous and transparent. After that, the solution was poured into the petri dish which acts as a casting plate and dried in the air-conditioned room (25±1 ℃) for 72 hours (to ensure the film was dried) on the flat surface (to ensure the film thickness was consistent). Before that, the film undergoes pre-drying process in the oven for 2 hours. The drying process was using a solvent casting method. The solvent casting method is practical, preferable and widely used due to its simple process. Figure 1. show the corn-based bioplastic after a drying process.
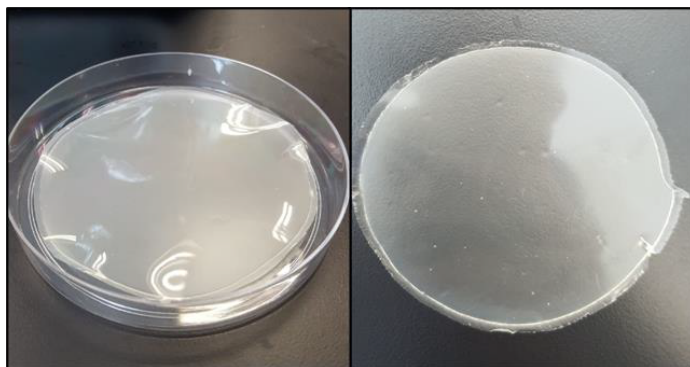
Figure 1. Corn-based Bioplastic

Characterization: Mechanical properties

By using Universal Testing Machine, the tensile strength (TS) and elongation at break (EAB) were determined. Each sample and method were prepared based on standard test method for tensile properties of thin plastic sheeting which is ASTM D882. Each sample were cut into 100 mm × 15 mm with initial separation length of 60 mm and crosshead speed 0.5 mm/sec.

Characterization: Moisture content

The film was weighed before the film goes into the oven (weight before) and the film left in the oven for 24 hours or until getting the constant weight at 50°C (weight after). The moisture content in the film was calculated using the following equation:

Moisture content (%) = ((Weight Before – Weight After)/ Weight Before)×100%

RESULT & DISCUSSION

From the Figure 2, when compared to corn-based bioplastic without filler, addition of diammonium phosphate filler has increase the tensile strength value but lack of flexibility but potassium nitrate filler has an adverse result. This is due to diammonium phosphate filler has higher surface area compared to potassium nitrate filler which is resulting the diammonium phosphate filler to be more effective in transferring the stress or surface tension from the matrix to the filler (Abdul Khalil et al.).
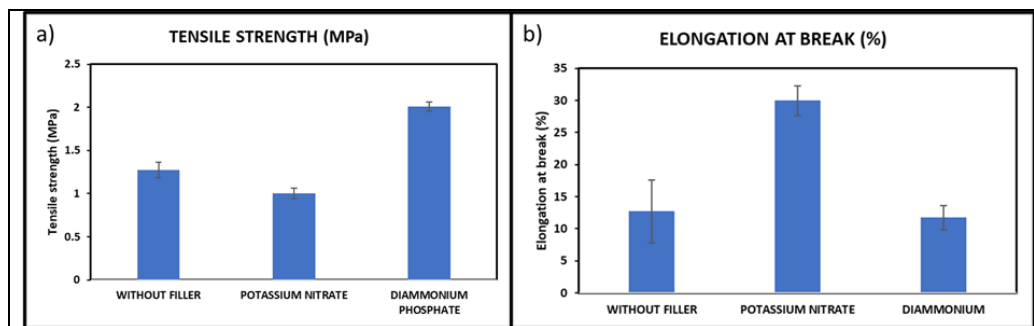
Figure 2. a) Tensile strength and b) Elongation at break

Moisture is one of the most important factors affecting the properties of starch-based films. From the Figure 3, addition of DP and PN filler into the matrix has greatly reduce the percentage of moisture content of corn-based bioplastic (6.49 % and 6.89 % respectively) compared to film without filler (20.09%). The is because of the filler acts as a discontinuous phase in the composite, dispersed and disseminated throughout the matrix (Jiawei Ren et al.). Jiawei et al. also report same finding which is addition of filler greatly reduces the percentage of moisture content.
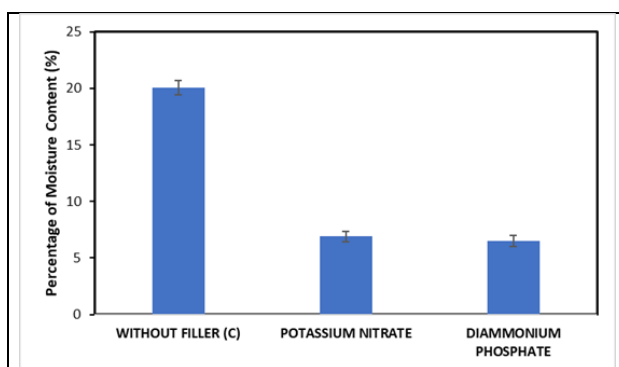
Figure 3. Moisture Content

CONCLUSION

From the result, can been seen that addition of filler are needed to maximize the corn-based bioplastic properties. An increasing knowledge of the climate around the world have opened up new market opportunities. Besides, with a similar feature with polyethylene bag for seedling production, it's an ideal alternative in the sense of environmental sustainability and also compatibility.

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COUPIERS: COURSE PRE-REGISTRATION SYSTEM

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ABSTRACT

In any academic institution, a timetable committees may consists of selected people of academics that are responsbible in planning, operational decisions and executions of academic courses offer to students. Preparing a faculty's timetable can be a difficult and complicated tasks for the timetable committees. The timetable preparation requires several numbers of meeting, identfy requirements and accurate data acquires from students, new students intake and must comply with academic regulations. The practice can be trickier and exhaustive if programs have different academic structures to accommadate students backgrounds. Collecting data on courses to offer from students can be executed with more quicker and accurate using online system as compared to manually conducted. The Pre-registration Course System (COUPIERS) is a working online system developed to automate the process of gather data on courses that are required to offers in the coming semester starts. The data collected are critical so that the committees can prepare the initial process before allocate lecturers their academic loads. COUPIERS has executed it first run of the prototype. The results are expected in gathering data from assigned students to do pre-register courses as instructed by academic advisor before the semester ends. The data on courses were later used to assist committees in offering courses and amount classes to be opened or closed. With COUPIERS, data on courses to offer can be collected quicker, more accurate than manual process and can be stored in a database for future references. Finally, in any similar academic setting and structures, COUPIERS can also be used at any other campus or institutions.

Keywords: Pre-registration system, timetable process, online system development, academic courses, courses registration

INTRODUCTION

Preparing a faculty's timetable can be a difficult tasks for the timetable committees. The preparation also requires several numbers of meeting and good decision making by the committees that abides with academic regulations. The practice can be trickier and exhaustive if programs have different academic structures to accommadate students backgrounds (i.e. matriculations, diploma holder from computer sciences and non computer sciences; e.g. accountacy or accounting information system). In any academic institution, a timetable committees is consists of selected people of academics that enable decision and execution of academic programs. This committee ensures that each groups of students has their subjects and classrooms known according to study plan (Abdullah, 2008). The initial process of timetable is to collect data on courses based on program study plan and students' background requirement. However, the process of information gathering can be a non productive task and time consuming. Currently, the process of data collection is done manually, thus with the development of a web-based system helped in facilitating these repetitive and exhaustive tasks (Singh et al, 2016). Another input of data are collected from Coordinator (KF) after he attended a meeting with Jawatankuasa Akademik Negeri to identify repeated students as part as the requirement to offer courses. The process of collecting the data is shown in Figure 1.
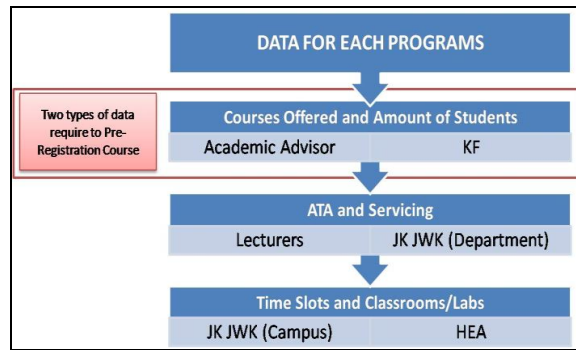
Figure 1. Input data for schedule preparation

Problem Highlights

There are several issues that need to be highlighted as part as the initial process in preparing the timetable. Thus, it may effect the execution of study plan for the students if proper and accurate data are not gathered. Primarily, the critical issues are as follows:

i.   *Pre-requisite Courses*: There are several courses that have pre-requisite course. The students must complete the pre-requisite course before taking the subsequent course.
ii.   *Repeated Cources*: Repeated courses are not offer in current semester but in later semester. This may effects issue iv.
iii. *Clashed Courses*: Clashes with another courses, groups of students, lecturers or even classes.
iv.   *Missed/Jumped Cources*: Earlier part courses but students register the courses after a or few semesters. Or later part courses but students register in advance. Hence, the committees need to decide either to offer or not.
v.   *Elective Courses Offered*: In the case of CS244, four electives courses are offered every semester can be registered by three different parts and groups.

METHODOLOGY

The Course Pre-Registration System (COUPIERS) is a web based development using current popular script language PHP and MYSQL for the relational database. The rapid software (Sommerville, 2016) development allow COUPIERS to be tested as soon as possible. The development involved these following steps:

i.   Requirement Planning: Identifying main problem and propose a solution based on experience setting up timetable on previous semester.
ii.   User Design: Quick user interface design based on the experience of developer.
iii. Construction: Agile development to eccelarate delivery and user involvement.
iv.   Testing: Quick Unit and System testing for first running.
v.   Cutover: First run of the prototype and evaluate its efficiency. However, this activity will be done continously.

The users for COUPIERS are categorize as students, academic advisors, Coordinator (acted as system administrator) and timetable committees. Students are able to access COUPIERS as instructed by their academic advisors. The committee will able to retrieve a number

summaries to kick off timetable activities. The system architecture for COUPIERS is illustrate in Figure 2. The students data are pulled based on their Academic Advisor.
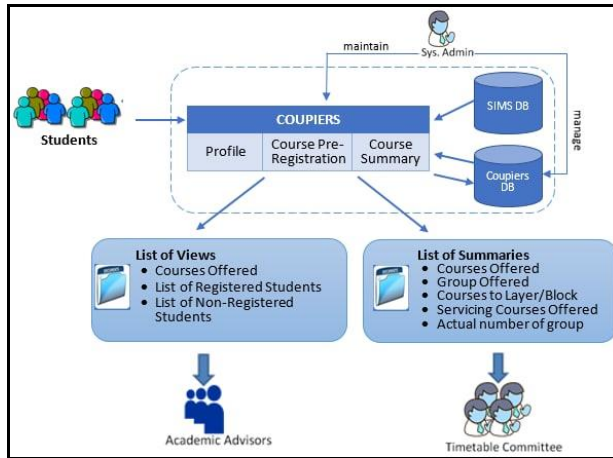
Figure 2. COUPIERS's System Architecture

RESULTS

With COUPIERS first run, the timetable committees has improvised several practices.

i.   *List of Summaries*: With COUPIERS, a summary of students that registered can be view by academic advisors and committees. In Figure 3 shows the list of summaries that COUPIERS is able to generate at this first run. This view can be sorted by courses and produces a list of student name, course, group and ademic advisor incharged.
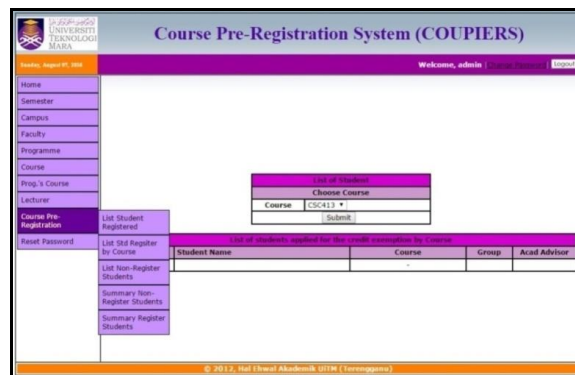
Figure 3. Lists of Summary generates by COUPIERS

ii.   *Amount of Students, Groups and Course Codes Summary*: Figure 4 shows a list that generates summary on amount of students pre-registered sorted by group and course code. This summary gives the courses that required to be offered in the coming semester.

Figure 4. Amount of Pre-registered Students

iii. Course vs Students Summary: Figure 5 shows the detailed students' name and course that they registered. Committees can view each course by choosing the code at the dropdown list. The data on students are consists of student ID, name, program, part, group and academic advisor in one interface. An added feature of COUPIERS is enable to link students ID to their profile for further reference.

Figure 5. Details Student and Courses Summary

The system was tested for its first execution and data were collected from students who directly used COUPIERS. The rate of 1 to 10 were used to measure the usability of the system. Table 1 shows the result of mean with standard deviation; users rated all items at 6.7 points mean to 6.90 mean. The mean shows some positive feedback from users, however more efforts are required to further improvise COUPIERS usability in the future.

Table 1. The result for Mean and Standard Deviation COUPIERS usability.

Items	Mean	Standard Deviation
Rate COUPIERS from terrible to wonderful.	6.70	1.489
Rate COUPIERS from difficult to easy.	6.90	1.568
Rate COUPIERS from frustrating to satisfying.	6.71	1.526
Rate COUPIERS from dull to stimulating.	6.67	1.603
Rate COUPIERS from rigid to flexible.	6.75	1.497

CONCLUSION

With COUPIERS, the timetable commitees are able to gather data on courses and students requirement as part of preparing the timetable. Data can be more accurate than manual process and can be stored in a database for future references. Hence, the repetitive process of corrective measurement can be reduced. COUPIERS are able to produces required summaries after the data are collected. Thus, the results are positive in reducing repetitive and non efficient execution. With rapid software development helps in accelerating deliverables of summaries. Finally, in any similar academic setting and structures, COUPIERS also be used at any other campus or institutions.

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DIVORCE PROTECTION TAKAFUL

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ABSTRACT

Divorce can be a highly unpleasant experience to anyone involved. Compared to married couples, those who are divorced may encounter several psychological and emotional effects such as greater stress, decreased life satisfaction, depression, higher medical visits, and an overall increase in mortality risk. There's also the divorce process to consider, in addition to losing the benefits of a happy marriage, which may function as a buffer against life's typical stresses. On top of all that, after divorce, divorced women especially, often face financial hardships. How can parties have involved in a divorce cope with life after divorce especially from the financial aspect? One of the ways is to have divorce protection takaful policy to cushion life after divorce. The likelihood of a bad outcome appears to fluctuate depending on how well people adjust after divorce. There are various ways that the potential of getting takaful coverage might impact a marriage. This approach addresses how the likelihood of acquiring coverage might have a direct impact on life after divorce. This research is designed to study public interest in takaful for divorce protection at a competitive rate through the primary data collection using survey questionnaires. The survey is conducted via Google Form. The sample was drawn from the general population using random selection. The data indicate that, out of all the respondents, 74% choose to acquire takaful protection to protect themselves and their children in the case of divorce. 70% respondents are willing to pay a contribution or premium of less than RM 500 for divorce protection takaful, since the survey indicates that 70% respondents have a household income of less than RM 3,000. The takaful that is less than RM 500 is the most suited package for Malaysians for B40 income classification in Malaysia.

Keywords: divorce, marriage, protection, takaful

MARRIAGE AND DIVORCE IN MALAYSIA

Table 1. Number of marriages and Crude Marriage Rate (CMR), Malaysia, 2018 and 2019

Year	Number of marriages			Rate (per 1,000 population)		
	Malaysia	Muslim	Non-Muslim	Malaysia	Muslim	Non-Muslim
2018	206,352	150,098	56,254	6.4	7.6	4.5
2019	203,821	147,847	55,974	6.3	7.4	4.4

According to the study that is conducted by Mahidin (2020), marriages dropped by 1.2 percent, from 206,352 in 2018 to 203,821 in 2019. As a result, the CMR decreased from 6.4 per thousand people in 2018 to 6.3 in 2019. The number of Muslim weddings registered in 2019 was 147,847, a reduction of 1.5% from 150,098 in 2018. CMR dropped from 7.6 per thousand Muslim population in 2018 to 7.4 in 2019. Non-Muslim weddings also decreased by 0.5 percent, from 56,254 in 2018 to 55,974 in 2019. As a result, the CMR decreased from 4.5 per thousand non-Muslims in 2018 to 4.4 in 2019.

Figure 1: Median age at marriage by sex, Malaysia, 2018 and 2019

The grooms' median age stayed at 28.0. In the meantime, the median age of brides has risen from 26.0 to 27.0 years. The median age of Muslim and non-Muslim grooms and brides remained constant.

Divorce or dissolution of marriage is a legal term that refers to the final legal separation of married spouses by a civil or religious court. It grants a spouse the right to remarry before the end of the divorce process (Nations, 2021). According to Dolan and Hoffman (1998), World War II was a watershed moment in the participation of women in the workforce, with 57% of women entering the labour market in response to the war's job need. Following the war's end, American families had shown a significant proclivity towards increasing their consumption of goods and services because many married women entered the workforce to sustain these expanding spending tendencies. To a certain extent, the high divorce rate that the globe is experiencing is attributed to a high female labour force participation rate. Becker (1991) asserted as referenced in Andersen and Hansen (2012) that women's participation in the labour market contributed significantly to the dramatic increase in the divorce rate throughout the 1970s and 1980s because women spent more time at work than at home, making them less effective at household activities.

Table 2. Number of divorces and Crude Divorce Rate (CDR), Malaysia, 2018 and 2019

Year	Number of divorces			Rate (per 1,000 population)		
	Malaysia	Muslim	Non-Muslim	Malaysia	Muslim	Non-Muslim
2018	50,862	40,269	10,593	1.6	2.0	0.8
2019	56,975	45,502	11,473	1.8	2.3	0.9

According to the study that is conducted by Mahidin (2020), the number of divorces grew by 12.0% from 50,862 in 2018 to 56,975 in 2019. As a result, CDR climbed from 1.6 per thousand people in 2018 to 1.8 per thousand population in 2019. In 2019, 45,502 Muslim divorces were registered, up 13.0% over the previous year's figure of 40,269 divorces. CDR grew from 2.0 per thousand Muslim population in 2018 to 2.3 per thousand Muslim population in 2019. Similarly, the number of non-Muslim divorces climbed by 8.3% from 10,593 in 2018 to 11,473 in 2019. As a result, the CDR for non-Muslims increased from 0.8 to 0.9 per thousand non-Muslims in 2019.
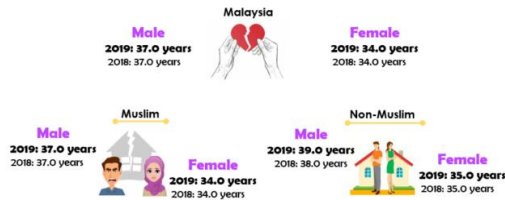
Figure 2: Median age at divorce by sex, Malaysia, 2018 and 2019

Males and females' median ages at divorce remained at 37.0 and 34.0 years, respectively. A similar tendency was found among Muslim divorcees. In the meantime, the median age of Non-Muslim males increased from 38.0 to 39.0 years.

RESEARCH METHODOLOGY

This study utilized a questionnaire as its primary source of data. Primary data was collected by distributing survey questionnaires from customers in Malaysia. The sample was randomly selected from the known population and all the items in the population have an equivalent chance to be selected. All 43 questionnaires were sent to Malaysians via google form. Descriptive statistics is used to define the profile of customers. This is a mutual method of describing the profiles of respondents and their other characteristics.

FINDINGS AND DISCUSSION

The study was conducted based on 43 respondents, consisting of 20 males (46.5%) and 23 females (53.5%). The majority of the respondents fall under the age range of 20 to 30 years (79.1%), followed by the age range of 31-40 (9.3%), 41-50 (4.7%), less than 20 years old, 51 to 60 and above 61 (2.3%). In the case of religion, out of 43 respondents, 88.4% are Muslim respondents and 11.6% are non-Muslims. Respondents' occupations include private sector employees (32.6%), students (23.3%), self-employed (18.6%), government sector employees (14%), housewives (9.3%), and retirees (2.3%). 67.4% of the respondents are single, 20.9% are married, 9.3% are divorced/separated, and 2.3% are widowed. 72.1% of the respondents' household income is below RM 3,000, followed by 18.6% of them receiving between RM 3,001 to RM 5,000. Meanwhile, 2.3% of the respondents receive between RM 5,001 to RM 10,000 as well as more than RM 20,000 of household income respectively, 4.8% receive between RM 10,001 to RM 15, 000, and 4.7% receive between RM 15,001 to RM 20,000. 25.6% of respondents have takaful products, and 74.4% do not have takaful products.

Financial problem is one of the major factors that is associated with high risk of divorce. Financial difficulties might create a schism in a marriage. Constant anxiety, stress, and concern about how to pay expenses, as well as the fatigue associated with not having enough money for leisure, vacation, or travel, may lose their grip on marriage. From the survey, 74% respondents decided to have takaful protection to protect respondents and the children if divorce turns the respondents into single parents. 37% respondents mentioned that they are extremely likely to get a new divorce protection takaful aimed at protecting respondents and the children with the competitive rates. 70% respondents are willing to pay for the divorce protection takaful below RM 500 for contribution or premium because the survey shows that 70% respondents have below RM 3,000 for their household income. Divorce Protection Takaful covers the loss of a dependent on the wife or for the survival of a husband. For a wife, a woman who is a housewife will be affected by the consequences of divorce when they do not have a job and are more likely to have savings. On the other hand, men have to fulfil claims for rights after divorces. Thus, both parties need divorce compensation to help them get on with life. The benefits are the act of generosity and kindness enables people to gain two types of benefits via the spirit of collaboration and shared responsibility, there are financial perks associated with the Takaful plan itself. Besides, the benefit in the spiritual sense is that participants will receive God's mercy and blessings in the Hereafter via the act of Tabarru' (giving). The Takaful method is visually impaired and creed neutral; it is designed to benefit all participants regardless of their religious beliefs.

This plan will pay a lump sum payment upon the divorce. For individual package, price starts as low as RM 80, and for couple package, price starts as low as RM 150. Sum covered: RM 250,000.00. Coverage term: Up to age 80 years old next birthday. For mental or physical treatments for persons involved with abuse and emotional stress, the amounts payable is 10% of the sum covered, subject to a maximum of RM25,000 per life. Such payout will reduce the sum covered of this plan accordingly. Third Party liability is set up to RM50,000.00. Third party refers to the person who is responsible towards the children in case the spouse passes away before the divorce case is decided by the Court. The followings are the additional covers subject to an additional contribution: children born with disabilities, a child with a critical health problem, psychiatric treatment to a mother or father suffering from depression, and increased sum covered for third party liability from RM50,000.00. The total contribution and certificate terms are subject to change based on underwriting criteria. Contribution rates vary according to the person's attained age, number of children, health status and the sum covered. Contribution rates are not fixed in the future and may change.

MyTakaful has developed a smartphone application for online takaful applications and services. These MyTakaful apps collaborate with Pusat Zakat Malaysia. Through MyZakat application, customers may fulfil the zakat requirement more swiftly, conveniently, and securely. Moreover, the features include a calculator for calculating the zakat payment. Customers can pay zakat via internet banking (fpx), an Islamic credit or debit card, or a debit card and review their prior zakat payment history. Furthermore, this software includes a basic application that provides rapid access to the process of filling out and submitting income tax forms, as well as a feature for updating personal profile. These MyTakaful applications are developed in collaboration with Lembaga Hasil Dalam Negeri (LHDN). The partnership between MyTakaful and LHDN aims to ensure that members of the M40 and T20 groups receive tax exemption when making a *hibah* using these applications. *Hibah* provides an advantage to individuals who are required to pay tax in these apps. Since all data is stored in MyTakaful system, individuals of the M40 and T20 groups are no longer required to visit the LHDN counter to get a tax exemption. When a client makes a *hibah* payment via MyTakaful

application, the LHDN receives data, including the donation amount. Likewise, this application provides essential information about *hibah*, distribution rates, *hibah* processes, and questions and answers about *hibah*.

This product has its novelty and originality since it is a brand-new product that has never been done before in the world. This product is considered a revolutionary concept for protecting the spouse if something turns out badly in their relationship. This is analogous to a matter of course, as preventing is better than cure. This product is highly beneficial since it enables the spouse to have a better life following divorce while also ensures that the children have a bright future regardless of the parents' separation. The application is incredibly user-friendly since people can use it to pay *hibah*, tax exemption, and zakat due to the app's collaboration with LHDN and Pusat Zakat Malaysia.

CONCLUSION

When it comes to the cost of divorce, there are two main factors to take into account, which are the court fees and legal fees. The court fees are fixed, but legal fees largely depend on the complexity of the case and a lawyer's charges. Therefore, it is not easy to determine the cost of divorce but understanding the difference between professional legal fees and court awarded costs (court fees) is important. There are different procedures for Muslim and non-Muslim couples, as Muslim divorce proceedings take place at the Syariah court. Financial concerns and the dispute over the division of assets, which vary from real estate and physical property to money and investments, sometimes worsen the emotional and family upheaval that normally accompany this process. At the end of the line, the concept of divorce takaful will show that there is always a solution for those who are afraid of life after marriage and also a way of learning to cope with the grief and then moving on can be the key to a happy life.

ACKNOWLEDGEMENTS

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ENTREPRENEURIAL WEBSITE PROJECT
"WWW.BUSINESSLETTER4YOU.COM"

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ABSTRACT

Graduates often lack the capability and soft skills critical to the modern business environment. According to Ruzaimi Mat Rani (2019), about 75 percent of project management is ineffective due to ineffective communication skills. Essentially, one of the most common incapabilities of our graduates to perform effectively in the real business environment is poor writing skills. Examples of poor writing skills include spelling errors, incorrect grammar and confusing messaging (Thompson, 2019). Poorly written business letters produce various negative results such as low productivity, poor customer satisfaction and loss of revenue. Moreover, there is insufficient material and information related to business letters on the Internet usable for the Malaysian contexts. In addition, it is observed that none of the current websites highlight sample material documents which could be referred to as guidelines specifically for business communication documents in Malaysia, resulting in a language barrier problem for the Bumiputras in expanding their businesses. Hence, our proposed website project called the "www.BusinessLetter4You.com: solving your business letters hassles" is created to solve all of the issues mentioned above. www.BusinessLetter4You.com is a website project aimed to be a platform which offers assorted guides and examples on different types of business letters while providing proofreading and translation services inclusively for business letters in Malaysia. This website project is to provide assistance for students or graduates to utilize in improving their writing skills and better prepare themselves for the workplace.

Keywords: Workplace communication, Writing, Letters, Website, Webpage

PROJECT OVERVIEW

"www.BusinessLetter4You.com" is a website project designed by the researchers which aims to become a platform which offers assorted documented Guides and Sample References comprising seven (7) types of business letters, which include : - 1. Enquiry, 2. Reply to enquiry, 3. Order, 4. Acceptance, 5. Confirmation, 6. Complaint, and 7. Adjustment. On top of that, this website, "www.BusinessLetter4You.com" also provides proofreading and translation services inclusively for business letters in Malaysia.

Figure 1. Project Logo

In brief, the "*www.BusinessLetter4You.com*" website consists of 6 components, which are:- Home, 2. About, 3. Business Letters, 4. Services, 5. How Do I Work, and 6. Contact. Firstly, The "Business Letters" section contains the posts for each type of business letters as the main attraction of the website. Next, each post contains the description, elements, tips, format and samples for a certain type of business letter. Here are the descriptions and illustrations:
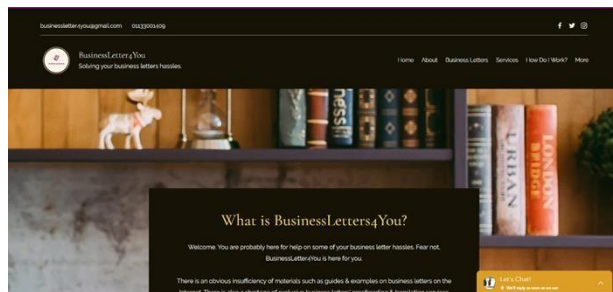
Figure 2. The home page of www.BusinessLetter4You.com website
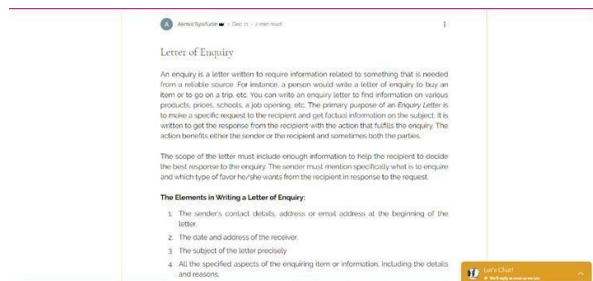
Figure 3. Example of "Letter of Enquiry" post

Figure 4. Sample for Letter of Enquiry

www.BusinessLetter4You.com is designed to become a user-friendly website which highlights comprehensive and clear-cut essential characteristics, such as mobile compatibility, well-formatted content, effective navigation and attractive web design.

Entrepreneurial Opportunities

Another main appeal of "www.BusinessLetter4You.com" is the proofreading and translation services in the "Services" section of the website. These services serve as an entrepreneurial opportunity by providing proofreading and translation services from English-Malay and Malay-English specifically for business letters. This platform would be able to generate income and entrepreneurial opportunities to professional student graduates who wish to get networking and business exposure.

Figure 5. The "Services" section on www.BusinessLetter4You.com website

The goal of the proofreading service is to help students and graduates by assessing documents for mechanical correctness, such as grammar, punctuation, spelling, omitted words, repeated words, spacing and format, and typographical errors. It is important for business letters to be proofread before being sent to the recipients to ensure that the letters are free of errors so that a clear message is conveyed to the audience as it represents the image of the writer and the owner of the business. In addition, the translation services offered are for those who need English-Malay and Malay-English translation services for their business letters. This is important in business especially when ones' goal is to expand their business to different places, cultures and fields in the entire world.

Discussion of Result and Outcome of Project

- The development of this website project called the www.BusinessLetter4You.com could contribute to the addition of knowledge on business communication and Technical English in our society. In consequence, www.BusinessLetter4You.com could become a platform focusing on the expertise of business letters writing while providing cheaper proofreading and translation services exclusively for business letters in Malaysia.
- Significantly, our project highlights documents, reference materials, guides and examples presented in our websites - www.BusinessLetter4You.com in a simple yet compact and precise way to make it easy to understand and learn. By referring to our websites, users such as students would have the opportunities to improve their writing skills while undergoing business communication courses and preparing themselves for the workplace.
- Moreover, graduates would then be able to avoid written communication handicap and failure at the workplace. In addition, our project website, *www.BusinessLetter4You.com* aims to be a user-friendly website by offering mobile compatibility, well-formatted content, effective navigation and attractive web design.
- Subsequently, the website creator, who is actually a student undergoing degree course in Professional English would have the chance to make good use of the content and practical knowledge in workplace writing, proofreading, translation and website designing learnt from the various courses in the LG120 diploma and degree programmes in Universiti Teknologi MARA (UiTM) Alor Gajah and Shah Alam Campuses. The website creator would then be able to improve all those skills while creating this project.

OBJECTIVES

- To create a website platform which offers various guides and references for different types of business letters
- To provide proofreading and translation services from English-Malay and Malay-English specifically for business documents in Malaysia.

AIM OF PROJECT

- *www.BusinessLetter4You.com* aims to be the website that offers assorted guides and examples on different types of business letters including enquiry, reply to enquiry, order, acceptance, confirmation, complaints, and adjustment.
- This is a measure to increase the number of materials and information such as guides, and examples related to business letters on the Internet, in hope to help students and graduates to improve their writing skills as a preparation for the workplace.
- In addition, www.BusinessLetter4You.com plans to provide proofreading and translation services from English-Malay and Malay-English specifically for business letters in Malaysia as an effort to help business companies or the general community to convey their ideas and messages clearly while maintaining their image in doing business. These services serve as language aid for those who have language difficulties in writing business letters, particularly in English.

CONCLUSION

In brief, this website project called the *www.BusinessLetter4You.com* aims to be the website that offers assorted guides and also reference documents comprising of various types of business letters which would serve to add to the number of materials, information and knowledge on business communication, especially with regards to the Malaysian context in the Internet platform. It is hoped that these materials and information could contribute towards helping the community, especially for students and graduates to improve their writing skills and avoid communication failures in business correspondences or at the workplace.

Essentially, *www.BusinessLetter4You.com* also acts as a platform that provides proofreading and translation services from English-Malay and Malay-English specifically for business letters. Conveying ideas and messages clearly while maintaining a good image will not be a problem for students and graduates. Thus, *www.BusinessLetter 4You.com* has the potential to be the centre for the field of workplace writing, business documents, proofreading and translation; a saviour for students and graduate

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EARLY FLASH FLOOD DETECTION AND AVOIDANCE SYSTEM

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ABSTRACT

In Malaysia, flash floods are common occurrences throughout the year and commonly occur in urbanized areas. Flash floods are mostly caused by the seasonal monsoon rain when inadequate drainage systems are unable to channel the water flow properly. The overflow of the rivers is also a major reason for occurring flash floods in the city. Late detection of this disaster may cause damage to property and infrastructure, disrupts the traffic flow, endangering human life, psychological impact to the user etc. This project is to detect a flash flood and avoidance system that aims to detect heavy rainfall followed by detecting high water level at the specified area. The system works as an indicator that will give an early warning to users and as an avoidance system that controls the flood basin gate when flood is high. This project uses Arduino UNO as a microcontroller, Ultrasonic Sensor and rain sensor as an input, and global system for mobile communication (GSM) module, buzzer, motor and liquid-crystal display (LCD) as the output of the system. A GSM is used to alert the flood condition to the user and rescue team by transmitting the water level condition measured by ultrasonic sensor. With this reliable detection system, the flash flood in urban areas can be avoided by users and authorities at an early stage. Consequently, the infrastructure damage and psychological impact to people can be minimized.

Keywords: Flash flood, rain detection, water level detection, GSM

INTRODUCTION

Floods in Malaysia can be categorized into monsoon floods and flash floods. Flash floods usually occur in areas with rapid development by a rapid rise in water level, high velocity, and large amounts of debris. This disaster is mostly caused by the seasonal monsoon rain when

inadequate drainage systems are unable to channel the water flow properly. This project will work as a flood monitoring system which is one of the technologies that can be used to prevent loss in places where floods always occur such as in Kuala Lumpur, Selangor and Penang. This project will be placed at the urban area to alert the surroundings to evacuate or to inform people about the road with flood. This project will be placed near the neighborhood or town to alarm the surroundings to evacuate. This project used an ultrasonic sensor as the input to measure the height of the water, rain sensor to notify the user if it is raining, GSM to send notification, and a siren and motor to open the gate to let the water flow into the flood basin.

This project focuses on the city that is affected by rivers or drains that are the main cause of flash floods in Malaysia. This project will be developed using an ultrasonic sensor to monitor the water level thus determining whether it is necessary to operate the motor and a rain sensor to monitor the weather. This project uses Arduino, which requires programming, a motor to control the flow of the water, a siren and utilizes GSM to transmit the message.

METHODOLOGY

The prototype design of the flood detection system is built by integrating 6 components such as the system block diagram in Figure 1. It is seen that in the input section there is an input section consisting of an ultrasonic sensor and rain sensor, while on the controller part, there is Arduino Microcontroller and in the output part there is DC Motor, siren and GSM.
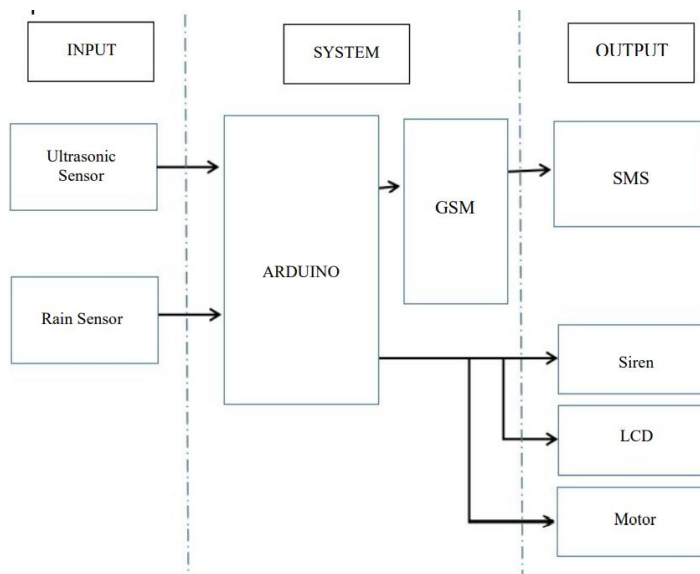
Figure 1. Block Diagram of flood detection and avoidance

The information from the input will be sent to Arduino for the decision process. This component in the system communicates with each other by using the programming code in the Arduino controller. In this system, there are two DC motors needed to operate the flood basin gate. The output will be activated when water reaches the danger level which is measured from the surface of the water to the ultrasonic sensor.

Flowchart of the system is structured as in Figure 2. It starts with the system detecting the

rainwater that will cause flash floods. Once the rainwater is detected, the LCD will display the rain status and the GSM module will send a message to the user. For the flood detection part, it is divided into two parts, low level and high (danger) level. If the water level is in low condition, it means the water level is harmless and the system is in power save mode. If the water level is high (10cm or lower from water surface to the sensor) it means the water level is dangerous to people and the system will proceed to evacuation procedure while the motor and buzzer are activated simultaneously. The ultrasonic sensor setup to the water surface is shown in Figure 3.
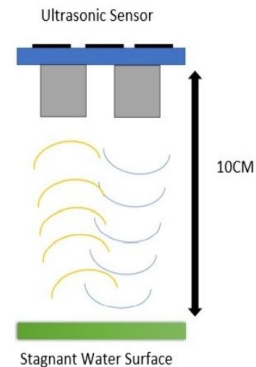
Figure 3. Ultrasonic sensor setup from water surface

Figure 2. Flow chart
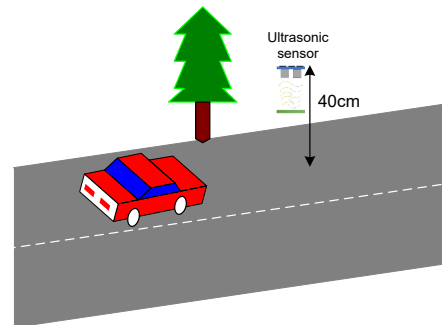
Figure 4. Ultrasonic sensor setup from water surface to road

Table 1. shows the water level status and flood condition based on the distance setup from ultrasonic sensor to the water surface. In this prototype, the ultrasonic sensor is placed 40cm from the road as in Figure 4. Meanwhile in the programming, 0 to 10cm distance water surface to ultrasonic sensor is set as HIGH level status (danger condition) and the distance greater than 10cm is set as LOW level (safe condition).

Table 1. Water level status and flood condition

Distance from water surface to ultrasonic sensor	Distance from road to ultrasonic sensor	Water level status	Condition of flood
0 -10cm	40cm	High	Danger
More than 10cm	40cm	Low	Safe

RESULT

Simulation Result

Figure 5 shows a schematic diagram of the system using the Proteus simulation. Due to lack of components in the Proteus simulation library, the siren is replaced by the buzzer, the rain sensor is replaced by logic toggle and the GSM module is replaced by the serial monitor. For the rain sensor, the logic toggle will switch to logic '1' when water is detected and '0' for no water detected.
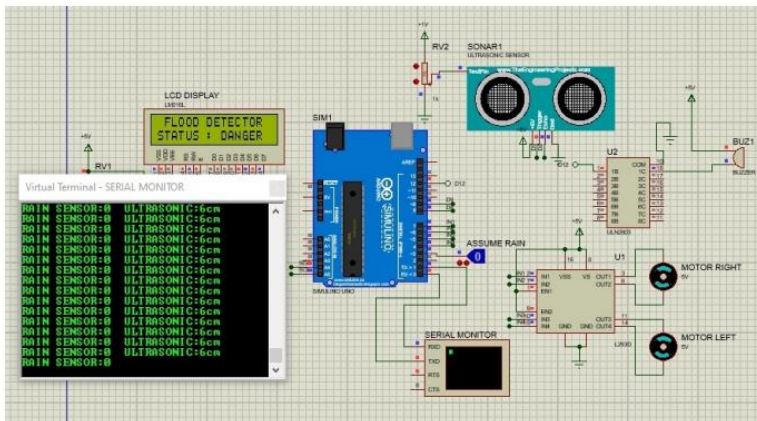
Figure 5. Schematic diagram

When the rain sensor senses rainwater, it will activate two outputs which are the LCD and GSM module. The LCD will show "Raining Day". The GSM module will send a message "Raining Day !!! beware" to the user and authorities. The Ultrasonic sensor will measure water level (if less than 10cm) and activate four outputs - buzzer, DC motor, LCD and GSM module as in Figure 4. 10cm is the maximum value for ultrasonic to sense the Danger condition. The LCD will display "DANGER" in the second row. The buzzer will switch ON and the motor will operate clockwise (gate open) to allow stagnant water to flow into the flood basin.

Hardware Result

Hardware result is focusing on assembling all the components which are the two input sensors; the rain sensor and the ultrasonic sensor and four output; GSM module, 16X2 LCD, two DC motors and buzzer as in Figure 6. All the assembling process must refer to each component data sheet. After finishing the assembling process, proceed to the next step which is to make a prototype with the main material from PVC pipe, used box, plastic food container and plastic

water container. The PVC pipe and plastic water container construction represent the gate that allows stagnant water to flow into the flood basin.

When the rain sensor senses rainwater, it will activate two outputs which are the LCD and GSM module. The measured voltage and current when the rain sensor detects rainwater are 5V and 0.25A. Meanwhile, voltage for GSM module and LCD display are 4.1V and 5V respectively. The GSM module will send the message "RAINING!!! Beware" to the user and the LCD will show "RAINING".

Figure 6. Complete prototype

Table 2. LCD Display and DC motor movement result

Distance from water surface to ultrasonic sensor (cm)	LCD Display (2ndrow)	DC motor movement
2	DANGER	Clockwise
4	DANGER	Clockwise
6	DANGER	Clockwise
8	DANGER	Clockwise
10	DANGER	Clockwise
12	NORMAL	Anticlockwise
14	NORMAL	Anticlockwise
16	NORMAL	Anticlockwise
18	NORMAL	Anticlockwise
20	NORMAL	Anticlockwise
22	NORMAL	Anticlockwise
24	NORMAL	Anticlockwise

Table 2 shows the result of LCD display and DC motor movement when the distance 2 to 24 cm from water surface to ultrasonic sensor. For the distance from 2 to 10 cm, the DC motor movement is clockwise to open the gate for water to flow into the flood basin. While for the distance from 12 to 24 cm, the DC motor movement is anti clockwise to close the gate.

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EBOOK: EASY RESEARCH FOR ALL

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ABSTRACT

In this digital age, each of us needs to embrace technology to make our daily lives more manageable and efficient. Furthermore, in this pandemic where our movement is restricted and made it difficult to meet face-to-face, the use of technology as a medium of communication becomes our new normal. The postgraduate research students were having difficulty meeting face to face with their supervisor. Some of them cannot cope with this situation and cause delays in their progress, and the stress level is accelerated. Therefore, to cater for this problem, the author decided to write the eBooks that can be accessed everywhere and anytime. The ebook consists of complete guidelines with examples of writing a research proposal that consists of Chapter 1, Chapter 2 and Chapter 3 in a thesis. The ebook divided into three series according to chapter. These eBooks enhanced the understanding of research students on preparing an effective research proposal. Now, the research students can breathe a sigh of relief with the help of eBooks. As an implication, from the testimonials and author observation, the students can complete their proposal within the time frame and defence their proposal with confidence and passed with flying colours.

Keywords: digital, ebook, research, research proposal, postgraduates

INTRODUCTION

Ebook has grown in popularity around the world as a viable, appropriate, and efficient option. Previously, most people relied on printed books such as textbooks to read and educate themselves on various topics. People nowadays, in the digital era, rely on internet sources and do most of their reading online. Of course, this does not imply that books are obsolete; in reality, in 2020, digital books will be increasingly common (Richard, 2020). The ebook has many advantages over physical copies; ii) easy to access anywhere and everywhere, ii) lower cost due to no requirement on printing in large scales, iii) no delivery cost, iv) saving the environment, v) more attractive and more enjoyable because if we do not know the meaning of the words, we can search it on the internet just by clicking the word.

The COVID-19 pandemic has forever changed our daily life. The COVID-19 pandemic has accelerated the shift towards a more digital world (*UNCTAD*, 2020). Therefore, it is timely to shift towards digital ebook. This innovation is due to the movement control order (MCO) that started in March 2020. It is difficult for the supervisor and supervisee to meet face to face. The online video call is not enough to explain and guide the students in their write up. Thus, the author comes up with the ebook idea—these ebooks presented interestingly and uniquely. The language is easier to understand, colourful, and straightforward, with every subtopic, explained using a simple explanation that everyone can understand.

Innovation Objectives:

This innovation, "Ebook: Easy Research for All", aims are:
  i. Provide the ebook that using simple language for easy understanding. For the novice researcher, it is not easy to understand the research term.
  ii. As a guideline for the research students to prepare an effective research proposal
  iii. To enhance students' understanding of how to write Chapter 1: Introduction, Chapter 2: Literature Review and Chapter 3: Research Methodology.
  iv. Easy to access and fast delivery (within 24 hours).
  v. On the author side, the ebook is easier to be edited if there is a new development in the area.
  vi. To ensure students completed their proposal within the time frame.
  vii. To attract the interest of the students to read research book.

EBOOK: EASY RESEARCH FOR ALL

As the name of the ebook, this ebook is enjoyable and easier to understand. The students can carry this ebook all the time on their smartphone, tablet or laptop. They can refer anytime. Among the unique features of the eBook are;

  i. Infographic;
  ii. Step by Steps;
  iii. Dual Languages;
  iv. Barcode for further reading;
  v. Interesting presentation; and
  vi. Unique

IMPLICATION

Since the publication of these ebooks in Jun 2020, it received many positive feedback from its readers. They can easily understand and come out with a better proposal. Many of them have successfully defended their thesis with minor corrections. Some of them managed to be awarded the "Research Excellent Award at University level and Graduate on Time or Graduate Before Time.

CONCLUSION

Overall, this ebook's objective to provide an easy understanding of how to write an effective research proposal has achieved. The ebooks are available at http://drnabilaazwa.com. The outcome from this innovation idea implied from the students' progress and achievement.

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e-INFO_JK FORMATION COMMITTEE SYSTEM FOR THE SCHOOL OF CIVIL ENGINEERING (PKA) UNIVERSITI TEKNOLOGI MARA

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ABSTRACT

The formation of committee in an organization is very important in driving the success of achieving the mission and vision of the organization. The committees established with specific functions and composed of staff at various levels can together move the organization unit to achieve the work targets set. Conventional method involved tedious manual appointment of academic staff including the preparation of appointment letter and workload calculation. This conventional method takes a longtime, unsystematic management and updating of records made it difficult for information to be accessed in the required time. In addition, it is quite challenging to ensure equal distribution of workload to be made among the organization members. For an organization with large number ofstaff including academic, technical, administrative, and management staff, for instance, the School of Civil Engineering (PKA) under the College of Engineering, Universiti Teknologi MARA (UiTM), several constraints will be raised in the work process of appointment of committee members and the formation of committees. To overcome the problem, this innovation highlights the digital system of the Formation and Monitoring Committee, known as e-Info_JK under the Quality Assurance Unit, School of Civil Engineering, Universiti Teknologi MARA (UiTM) Shah Alam. This e-Info_JK system is also integrated with the website of the Quality Assurance Unit and will enhance the development of

Formation and Monitoring Committee including the calculation of workload, formulation template, pivot chart for the division of committee appointment, and appointment letter retrieval. The e-Info_JK system require less time and able to minimize calculation error by establishing a score reference value to facilitate the division of the committee and ensure fair and equitable distribution among faculty members.

Keywords: Committee management, formulation template, score reference value, e- Info_JK

INTRODUCTION

The formation of committee in an organization is very important in driving the success of achieving the mission and vision of the organization. The committees established with specific functions and composed of staff at various levels can together move the organization unit to achieve the work targets set. A committee as a device for achieving coordination of activities and sharing information among various departments and divisions of anorganizations (Ogbogu, 2013). Conventional method involved tedious manual appointment ofacademic staff including the preparation of appointment letter and workload calculation. This conventional method takes a long time, unsystematic management and updating of records made it difficult for information to be accessed in the required time. In addition, it is quite challenging to ensure equal distribution of workload to be made among the organization members. One of the efficient and effective method is the utilization of digital information incorporating the Industrial Revolution 4.0 (IR4.0) in the administration and management of committee's appointment in an organization. Digitizing public services is an essential necessity for numerous governments around the world. An improved government through digitization will not only have a growing effect on businesses, but it will also be able to intensify citizen engagement and push for economic growth (Alvarenga et al., 2020). The IR4.0 has changed not only in the manufacturing industry but also in the organizationmanagement (Mayer, 2020). Mayer & Oosthuizen (2020) found five important themes when transforming organization into the 4IR including employee management, innovative technological and systemic change, work organization, environment, and network and cooperation. Out of 9 main pillars in 4IR, cloud computing and Internet of Thing (IoT) are two mostly influenced pillars in organization management. Cloud computing is used widelyas a room to store documents related to human recourses, capital resources, financial and many others. Compared to the conventional management with lots of papers fordocumentations, cloud computing offers those documents stored in the cloud. A study by Lv, Tan, Wang, & Yang (2018) found the group level human resource management information system based on cloud computing can help enterprises to complete the task of human resource management efficiently, which reduces the communication costs and improves the management efficiency.

For an organization with large number of staff including academic, technical, and administrative staff, for instance, the School of Civil Engineering (PKA) under the College of Engineering, Universiti Teknologi MARA (UiTM), several constraints will be raised in the work process of appointment of committee members and the formation of committees. To overcome the problem, this innovation highlights the automation of the Formation and Monitoring Committee, known as e-Info_JK under the Quality Assurance Unit, School of Civil Engineering, Universiti Teknologi MARA (UiTM) Shah Alam. This e-Info_JK system is also integrated with the website of the Quality Assurance Unit and will enhance the development of Formation and Monitoring Committee including the calculation of workload, formulation template, pivot chart for the division of committee appointment, and appointment letter retrieval. The e-Info_JK system require less time and able to minimize calculation error by establishing a score reference value to facilitate the division of the committee and ensure fair

and equitable distribution among faculty members.

Conventional method of committee appointment for large organization lead to the following problems:

1.   Management of committee appointments among staff is less systematic.

The conventional method of selecting staff to be appointed as a committee require several integrations from the management, where there is no complete database recording the history of appointments and the list of appointments, causing top management to repeatedly refer to the respective division for a list of staff names. The management of appointment letters is also unstructured because it is divided into administrative staff based on categories (Academic Affairs, Student Affairs, Research, Management and Quality Unit). All of them, have different and non -uniform recording methods. This makes it difficult to search for data and information for reference in the time required.

2.   Unbalance division of the committee.

As there is no available database that fully records all committee appointments and there is no good review system, hence, the division of staff to be appointed as committee members is unbalanced. For example, there are staff who are appointed as committee members for 7 different committees, while there are also staff who are only committee members for 2 committees.

3.   Updates and additions of appointments are not recorded in an orderly manner.

Any information updates and additions of appointments are not processed properly, this results in inaccurate information. Especially when the top management makes the evaluation of the Annual Work Target (SKT), there are errors in the information of the staff evaluated related to the involvement in the committee.

4.   Staff could not check the committee membership list.

There are staff who are confused with the number of committee members, because there is no easy and fast system, and it is difficult to review. Due to the constraints of limited staff, the review is also difficult to do in the required time. This makes it difficult for the committee to plan and execute tasks more quickly.

To overcome the limitation of conventional method, this innovation highlights the following objectives (i) to establish an Info_JK template for the School of Civil Engineering (PKA), UiTM Shah Alam to make it easier for staff to check the committee membership list and scores obtained for quick reference from time to time, (ii) to assist and enhance the division of staff (as a committee) for each Committee formed to secure balance and equitable distribution with the score value element found in this system, and (iii) to create a more systematic record of appointment information. This system is in line and embraces the wave of Industry Revolution 4.0 (IR4.0), where it provides a field for creating generations of innovators and cutting-edge innovations at the intersections of collaboration, creativity, and enthusiasm.

METHODOLOGY

The development of this system is intended to assist the management process of the appointment of the Committee in School of Civil Engineering (PKA), College of Engineering, Universiti Teknologi MARA (UiTM), Shah Alam. Based on the Committee Formation and Monitoring procedure manual, this system helps the Committee Formation & Monitoring

Committee coordinate the process of appointing members for each committee formed and the entire process is implemented digitally and automatically. This e-Info_JK system is also integrated on the website of the Quality Assurance Unit and will enhance the development of Formation and Monitoring Committee including the calculation of workload, formulation template, pivot chart for the division of committee appointment, and appointment letter retrieval. The e-Info_JK system require less time and able to minimize calculation error by establishing a score reference value to facilitate the division of the committee and ensure fair and equitable distribution among faculty members. The methodology framework for the e-Info_JK for School of Civil Engineering (PKA) highlighted in Figure 1.

The overall methodology for the development of e-Info_JK for the School of Civil Engineering (PKA) includes the following:

i.   Collecting staff appointment information at various levels through Google form.
This process requires the input data from all the faculty members on their appointment information at various levels, including University level, College level and others,through web-based data retrieval via Google form. All the input data will be collected, gathered, and sorted accordingly by their full name, staff ID and appointment.
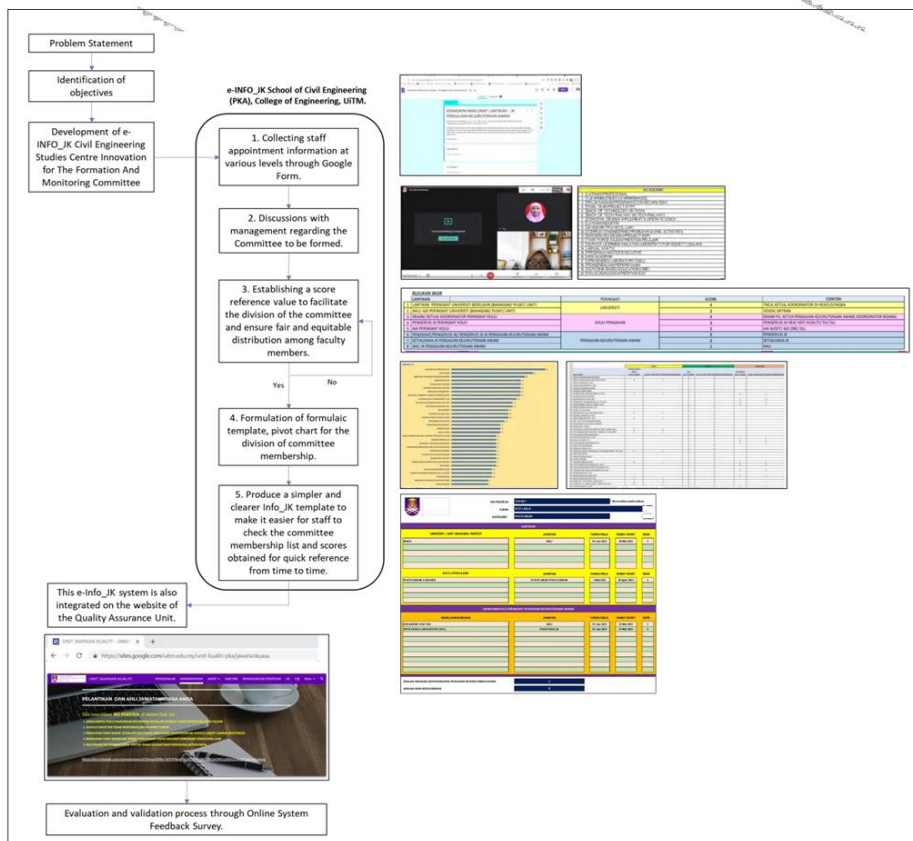
Figure 1. Methodology framework for e-Info_JK for School of Civil Engineering (PKA) UiTM.

ii.   Discussion with management regarding the Committee to be formed.

Series of discussion and meeting via online platform with the Management of School of Civil Engineering (PKA) was established at this stage to confirm the academic and non-academic committee, sub-committee, and the distribution of the faculty members according to their proposed appointment. Examples of the committee include Administration and Management Committee, Academic Committee, Quality Assurance, and Industrial, Community, Alumni and Networking (ICAN). The main committee is sub-divided into sub-committee to support the target needs of the faculty.

iii.   Establishing a score reference value to facilitate the division of the committee and ensure fair and equitable distribution among faculty members.

This stage involves the establishment of score reference value to facilitate the division of committee and to ensure fair and equitable distribution among the faculty members. The minimum threshold of committee appointment for an academic member is set as 5, which is equivalent to a score of 7. The minimum number of committee appointment for a technical, administration and management member is set as 3 with an equivalent score of 3. Each of the faculty member will be assigned to respective committee appointment, which will then calculate using the score reference value. This is to ensure an equal distribution of committee appointment among the faculty members.

iv.   Formulation of formulaic template and pivot chart for the division of committee membership.

This stage involves the development of a formulaic template and pivot chart for the division of committee membership among faculty members. The formulaic template developed using Microsoft Excel, able to automatically calculate the accumulation score for a faculty member based on the committee membership assigned. The template also will automatically produce a pivot chart to represent the number of faculty members assigned to respective committee.

v.   Produce a simpler and clearer Info_JK template to make it easier for staff to check the committee membership list and scores obtained for quick reference from time to time. This stage involves the development of a simpler Info_JK template to assist the faculty members in checking their committee membership list and the scores obtained. The information required in the template include:
a.   Staff ID;
b.   Staff Name; and
c.   Category.

The Info_JK template will display the list of the committee appointment, designation, start date and end date of appointment, and scores obtained.

vi.   Integration of e-Info_JK system to the Quality Assurance Unit website.

The completed e-Info JK template is embedded into an automatic system that consist of spreadsheet displaying the list of committee membership and score obtained. This system is linked to the Quality Assurance Unit website. The faculty member (end user) can retrieve their appointment information via the web url: https://sites.google.com/uitm.edu.my/unit-kualiti-pka/jawatankuasa.

vii.   Evaluation and validation process.

The process of evaluation is needed to obtain the feedback from the end user on the reliability of the e-Info_JK system towards creating a more systematic record of appointment information. The evaluation and validation were conducted by creating an online end user satisfaction and feedback survey via Google Form. The data analyzed in terms of thematic

findings and used to further improved the e-Info_JK system.

DISCUSSION AND CONCLUSION

The development of e-Info_JK system is intended to assist the management process of the appointment of the Committee in the School of Civil Engineering Studies (PKA), College of Engineering, Universiti Teknologi MARA (UiTM), Shah Alam. This system helps the Committee Formation and Monitoring Committee coordinate the process of appointing members for each committee formed and the entire process is implemented digitally. The results from the customer feedback highlight thematic findings from the survey such as

i.   "Very good system"
ii.   "More clearly about the administrative structure of the college of engineering studies"
iii.   "Excellent sharing of the latest organizational info"
iv.   "Very informative"

In conclusion, the system if paperless, cost and time saving, requires less human resources and signify the realization of IR4.0 in management and administration, in line with creating generations of innovators and cutting-edge innovations at the intersections of collaboration, creativity and enthusiasm.

ACKNOWLEDGEMENTS

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E-MODULE *ABRA-Maths* - EARLY MATHEMATICS LEARNING VIA MINI TENNIS

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ABSTRACT

Since play activities in the teaching and learning process in school can benefit children in terms of development, learning and motivation as well as fun to play, the researchers plan to introduce the technique of learning basic mathematics for children through a mini tennis game called *ABRA-Maths* . This technique can be a guide and guidance to instructors who will teach the basics of maths to children through tennis game practice. To ensure that *ABRA-Maths* learning techniques can be mastered among teachers through school activities, a systematic learning method is introduced. *ABRA-Maths* e-module is a digitally developed basic mathematics learning module aimed at helping teachers master basic mathematics teaching methods through tennis mini-games. The proposed e-module contains instructions and videos showing how the training process or activity should be carried out.

Keywords: ABRA-Maths, mini tennis, e-module, basic mathematics learning.

INTRODUCTION

In Datuk Dr Mohd Radzi Md Jidin's speech on 28 April 2021, the Primary School Achievement Test (UPSR) was completely abolished starting this year. With the abolition of the UPSR, the Ministry of Education Malaysia will strengthen Classroom Assessment (PBD) starting this year as a method of student assessment. Among the main reasons for the abolition of UPSR is to help teachers to focus more on students being in various fields while students will have various tendencies. In line with the decision of KPM, researchers from the

School of Quantitative Sciences, UUM took steps to participate in providing guidance to teachers based on the expertise possessed by academics in shaping the students' potential to strengthen the basics of mathematics through mini tennis training. Mathematics is often considered a difficult and boring subject for most children because its use in daily activities is not given proper emphasis. While the activity of playing through physical movement is the most preferred activity by children. Therefore, an approach should be taken to build a relationship between mathematics learning and physical activity such as games so that children can gain skills in both areas simultaneously and can save time, energy and human resource. To apply these two elements of learning to students, teachers play an important role in imparting relevant knowledge to students. Until now, there has not been a mathematics teaching module based on mini tennis training developed in Malaysia. Therefore, this study is proposed to complement the aspirations of the Ministry of Education Malaysia in promoting mathematics learning among students in the form of experiments or play activities such as STEM learning needs. The results of this study are expected to help the Ministry of Education Malaysia in applying a variety of skills to students in the early stages of their learning and act to help Malaysia in providing healthy human resources, intelligent thinking and have high mental and physical resilience.

Most researchers agree the use of games can improve the achievement of mathematics subjects among children (Radford, 2020; Reikeras, 2020; Tsamir et al., 2020). Tsamir et al. (2020) stated that games are a positive method in improving achievement. According to them, children who are given the opportunity to play have a clear purpose, use materials to solve problems and require action to achieve goals, give children opportunities to relate play materials and provide space for children to imagine. The study of Tirosh et al., (2020) use the effects of training and transfer the executive function of preschool children, they found that playing repetitive games can improve the memory of working children. Tennis is a sport that requires repetitive shot practice. Therefore, this study chooses the sport of tennis as a game related to this theory in addition to the researcher's expertise in this field of play. Now tennis has been innovated so that the children can acquire the basics of playing skills in a short period of time as early as 2-3 months. This effort was made by modifying tennis balls to be slower in movement and tennis courts for children to be smaller in size. Changes to the structure of this tennis sport to children are called mini tennis.

Figure 1. Mini Tennis for Kids

Studies involving children's learning of mathematics through play are common but studies involving children's learning of mathematics through the sport of tennis are a relatively new one. A game is a one off event while a sport is an event that involves continuous training to acquire the skills of the sport. This module applies mathematics learning along with tennis playing skills so that children are able to acquire both skills in a faster period of time. Result testing the effectiveness of the *ABRA-Maths* method were presented at the 'International Conference of Computing, Mathematics and Statistics 2021, UiTM 3-4 August 2021.

In terms of tennis playing skills, RAHIM training method introduced by Rahizam (2017) in his PhD thesis is used. The RAHIM model emphasizes the concepts of R-Repetition, A-Attitude, H-High intensity, I-Independence, M-Movement. The combination of *ABRA-Maths* and RAHIM Training method has successfully produced two junior tennis players who have won the National level tennis singles champion. The e-module developed contains both *ABRA-Maths* techniques and RAHIM Training model.

Figure 2: Subject Achievement

ABRA-Maths

Since play activities in the teaching and learning process in school can benefit children in terms of development, learning and motivation as well as fun to play, the researcher plans to introduce the technique of learning basic mathematics for children through a mini tennis game called *ABRA-Maths* . This technique can be a guide and guidance to instructors who will teach the basics of maths to children through tennis game practice. *ABRA* is the abbreviation of the name of the founder of the children's tennis game training technique, namely Encik Abdul Rahim Bin Ismail, which was founded around the 1960s in Jitra, Kedah. The techniques practiced by him have proven successful in producing human beings with high self-esteem. These techniques will be absorbed according to the suitability of the current generation, technology and education.

ABRA-Maths E-MODULE

To ensure that *ABRA-Maths* learning techniques can be mastered among teachers who act as learning guides through school activities, a systematic learning method needs to be introduced. *ABRA-Maths* e-module is a digitally developed basic mathematics learning module aimed at helping teachers master basic mathematics teaching methods through mini

tennis games. The diagrams below show a portion of the e-module pages where each page contains instructions and a video showing how the training process or activity should be carried out.
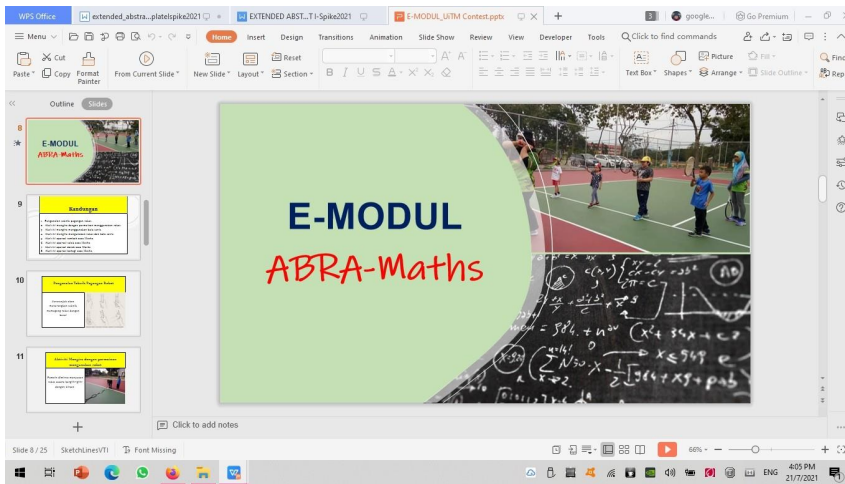
Figure 1. Front page E-Module ABRA-Maths
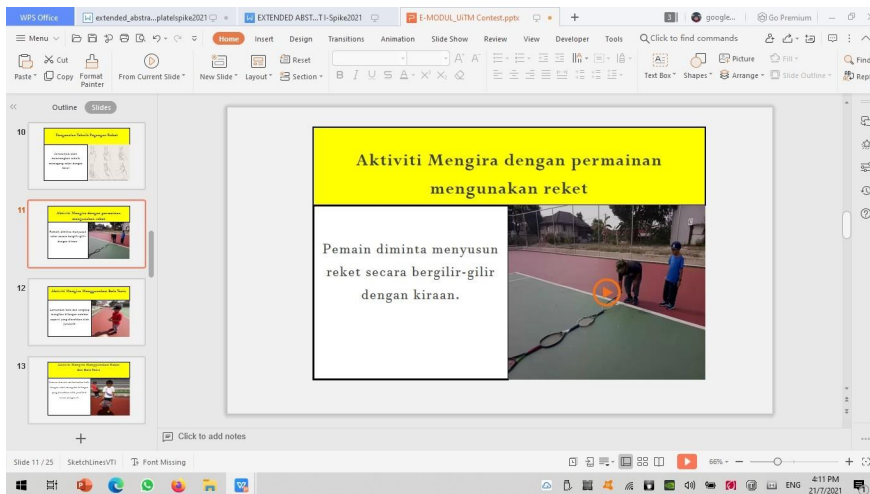
Figure 2. Page in E-Module includes instructions and video
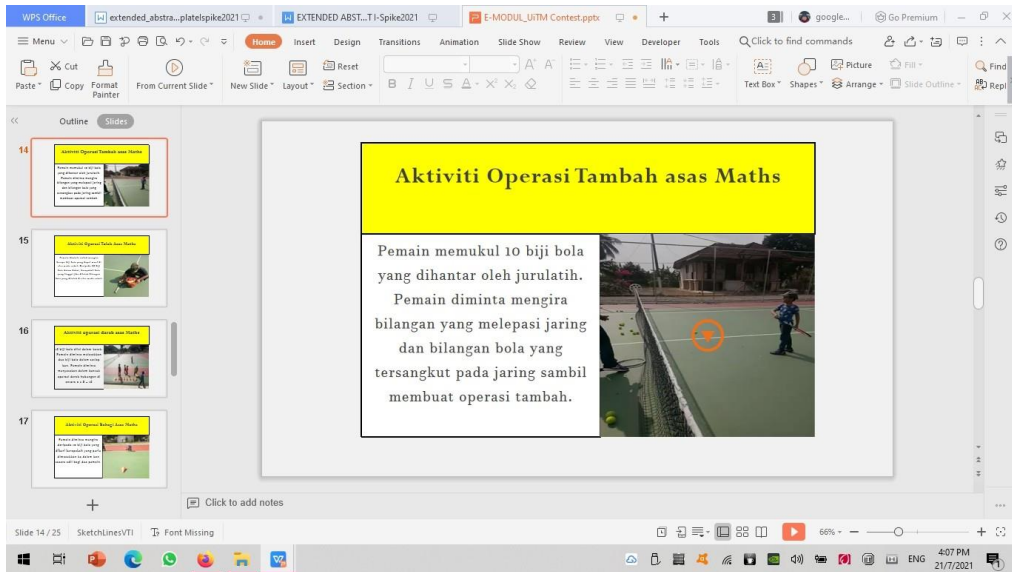
Figure 3. Page in E-Module includes instructions and video

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ENHANCED MICROWAVE HEAT SUSCEPTOR CRUCIBLE

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ABSTRACT

Microwave (MW) irradiation is an attractive technique of material processing. Reasons for the growing interest in the use of microwave energy are including rapid heating, enhanced densification rate, decreased sintering active energy and improved microstructure. MW heating also has the potential for energy and cost savings when comparing with conventional heating. The use of microwave in ceramic processing is a relatively recent development. The technique can be applied effectively and efficiently to heat and sinter ceramic object. In this study, the microwave heat susceptor crucible was formulated and enhanced to convert the microwave energy to heat at very high efficiency. The performance was surpassing the existing product in market and the invention was patented for commercialization.

Keywords: microwave heating, susceptor, advanced ceramics, sintering

INTRODUCTION

Energy consumption is vital in current manufacturing industry, and it is an ongoing attention to reduce the energy and increase the production at the same time. Heating processes in producing products is unavoidable which involve temperature from low such food manufacturing to very high in metal forming as example. This also become extremely high in ceramic processing and consume extremely high energy. In another way, controlling high heat is very difficult due to the nature of this energy type is easy to dissipate and lost the the environment. Recent heating method known as microwave heating is a promising technique due to very efficient and renewable. The microwave energy can be converted to heat energy using susceptor materials and this is like heating filament in electric heating but the efficiency of susceptor materials in microwave heating is much better. Low temperature processing such

as food products, the heating process is conducted by the products itself known as self-heating. But high temperature materials processing such as ceramic, the self-heating for synthesis of ceramics is the insufficient. This can be solved by using high and efficient crucible susceptor materials to produce additional more heat. Commercially, SiC susceptor is used but in ceramic processing, it is not enough to produce required heat to synthesis ceramic. In this research, special formulated chemical were done to produce very high heat and suitable for ceramic processing.

Synthesis of Ceramic

The enhanced susceptor crucible was used in microwave to synthesis $CaCu_3Ti_4O_{12}$ from $CaCO_3$, TiO_2, CuO precursor (Zaman et al., 2016). Figure 1 shows the XRD pattern of sintered CCTO pellets at different microwave irradiation time. All of the sintered pellets that calcined at different microwave irradiation time obtained CCTO and TiO_2 (Rutile). There is the highest peak obtained by sintered pellet calcined in 7 hours with a low residue of TiO_2 (Rutile) which is nearly forming single-phase CCTO. As the microwave irradiation time in calcination increases, the CCTO composition in the sintered pellets increase. This good trend is shown for the calcined powder from 1 to 7 hours. The trend shows that the microwave irradiation promotes the production of CCTO composition as time increases. However, there is a drop of CCTO composition in 9 hours since the pellet have already entered secondary phase as it melted, resulting the produced CCTO composition have turned into CuO (tenorite) (Hutagalung et al., 2009). To conclude, the highest percentage of CCTO composition with 98wt% is found in the sintered pellets that calcined in 7 hours. However, the CCTO produced is still not completed due to the presence of 2wt% of TiO_2 (Rutile).
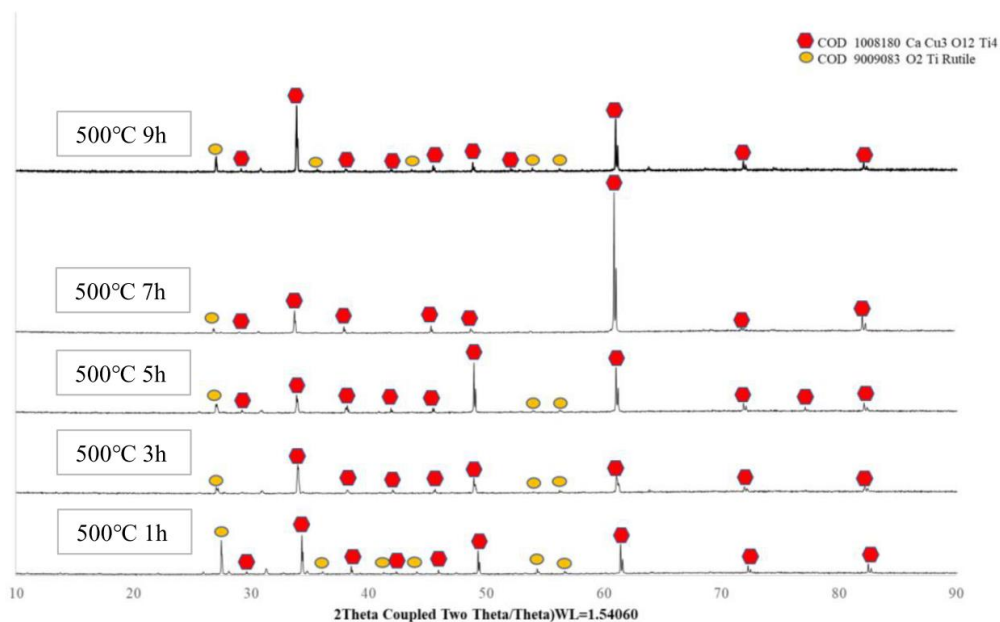
Figure 1 : XRD Pattern of sintered CCTO pellets at 1040°C for 10h of the sample cal- cined at different microwave irradiation time (1h, 3h, 5h, 7h, and 9h) in 500°C (Na et al., 2020).

Figure 2 the surface microstructure of sintered CCTO pellets at 1040°C for 10 hours from calcined powder at different irradiation time was evaluated by using SEM under 1000× magnification which operated in 10 kV. As observed, the amount and grain size of CCTO increases significantly with the increasing of calcination time. The grain growth of CCTO particles and the microstructural densification was promoted by increasing the calcination time as the diffusion process had enough time for CCTO particles to grow for joining together hence reduce the grain boundaries and reduce the porosity of CCTO pellets
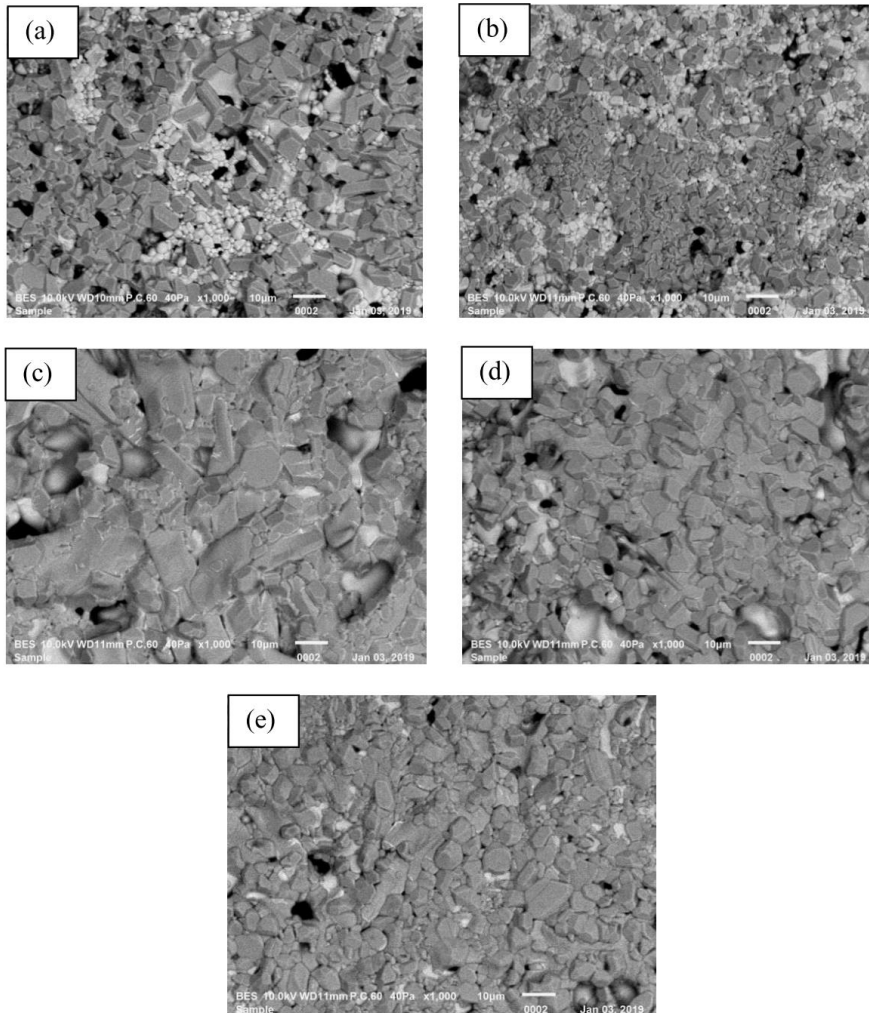
Figure 1 : Surface Morphology on sintered CCTO pellets that calcined at different microwave irradiation time which are (a) 1h, (b) 3h, (c) 5h, (d) 7h and (e) 9h (Na et al., 2020)

CONCLUSION

Enhanced microwave susceptor crucible produced is capable to generate enough heat and

produce ceramic as proven in the XRD testing. Based on the XRD analysis, the phase of CCTO was successfully with minor residue of constituent materials. The highest percentage of CCTO composition is found in the sintered pellets calcined in 7 hours, which is 98wt%. However, the CCTO is still not completed due to the presence of 2wt% of TiO_2 (Rutile). For the surface morphology of CCTO pellets, as the calcination time and temperature increased, the amount and particle size of CCTO particles also increased, resulting the diffusion process had more time duration to generate energy for grain growth and hence the grain boundaries and porosity can be reduced. The result also has proven that the enhanced SiC-based susceptor can improve the microwave processing more effectively at the same time duration compared to commercial SiC susceptor. For dielectric properties at 1 MHz, the dielectric constant and the dielectric loss increase with the increasing of the microwave irradiation time for calcination, due to the effect of the weakening of space charge polarisation.

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ENHANCEMENT OF LATENT FINGERPRINT USING DYED EGGSHELL POWDER

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ABSTRACT

Background: History has told that Chinese used the fingerprint to sign legal documents far back to three thousand years ago. An Englishman named Francis Galton has conducted an extensive research regarding fingerprint. Most importantly, he concluded that no two fingerprints are the same and the pattern remained unchanged throughout individual's life. Mainly, it is divided into two which are visible and latent fingerprint. Obviously, locating the latent fingerprint is much more difficult and requires the use of technique to make the print visible. One of the most common way to locate fingerprint in non-porous surface is fingerprint powder. Experienced examiners find that grey and black powders are adequate for most latent-print work. The examiner will select the powder which afford the best color contrast with a surface being dust. In addition, there are other types of powders are available for developing the latent prints. These include magnetic powder and fluorescent powder. However, an innovation or invention is highly valuable in science and others field. Therefore, the idea of using waste material to enhance the latent prints is studied. Eggshell is a solid waste, with production of several tons per day. Eggshell is mostly sent to the landfill with a high management cost. It is economical to transform the eggshell waste to create new values from these waste materials. Current potential of eggshell are biodiesel, absorbent, biomaterial and fertilizer. Therefore, it is highly beneficial to explore the use of this common household waste product into a material to be used in criminalistics.

Objectives: This innovation aimed to enhance the latent fingerprint using dyed eggshell powder on porous and non-porous surface.

Methods: Clean and wash the eggshells with distilled water. Dry the eggshells in the oven for overnights. Blend the dried eggshells in the dry blender until it pulverized into a granular form. Add food dyes to give a color to the eggshells powder. Store eggshells powder in tight container away from heat and moisture.

Results and Discussion: The latent fingerprint on the beaker was enhanced by using dyed eggshell powder. The ridges and minutiae can still be seen. This shows that the eggshell powder can be used instead of expensive black powder from the fingerprint kit. The usage of black powder not only involves hygiene issue, but it is also a health concern for technicians who breathe in the powders. Most black fingerprint powders contain rosin, black ferric oxide and lampblack. It also contains inorganic chemicals such as lead, mercury, cadmium, copper, silicon, titanium and bismuth which can affect human health when we are continuing

exposure with it. However, biowaste chicken eggshells contain high amounts of calcium carbonate which is non-toxic and it safe towards human and environment. It is simple and save time as it does not need many sample preparations. Furthermore, by using eggshell powder would be cheaper and most widely available.

Conclusions: In conclusion, the latent fingerprint on porous surface and non-porous surface can be enhance by using dyed eggshell powder.

Keywords: Latent fingerprint, Black powder, Dyed eggshell powder, Porous surface, Non-porous surface.

PRODUCT DEVELOPMENT - E-PERSONAL POSSESSIONS TAKAFUL (e-PPT)

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ABSTRACT
Nowadays, people are more exposed to crimes since the possibility for the act of crimes to befall onto them is anywhere regardless it is violent crimes or property crimes. In 2019, 16,489 violent crimes cases and 66,967 property crimes were reported. Thus, it is very important for people to protect themselves and their belongings. People nowadays own more valuable personal items as some of them have become necessities in life. A study is conducted to identify the solution for the damages or losses of personal possessions, hence new takaful product called e-Personal Possessions Takaful (e-PPT) that benefits contributors in terms of coverage for personal belongings, personal liability, and loss of use is introduced. Secondly, the study is keen to develop takaful coverage for personal possessions against certain risks for the e-PPT. Therefore, the closest products practices are used as a guideline. Simple mathematical calculation and Wakalah Integration Model for tabarru' fund is used to ensure the contribution amount collected per month is sufficient and the data is collected from websites articles. Lastly, the use of digitalization for e-PPT is examined by planning the outline for technology practices that can be applied to the takaful product. The result shows that e-PPT has the capability to provide protection to personal belongings at an affordable price. Plus, it can also provide wise coverages to the contributors and it is also an easy-access product due to the technology attached to it. So, it is hoped that with this product in the takaful market, people can be at ease knowing that their personal possessions are also able to be protected. It is also hoped that this takaful product can be an eye-opener for the takaful industry to produce more products that also target the youngsters.

Keywords: personal belongings, possessions, protections, technology, takaful

INTRODUCTION

Personal possessions are classified as personal items that are usually worn, used, or carried by individuals either inside or outside of their living places. According to Bacon (2015), a study by ZenithOptimedia towards 10 different countries revealed that young adults from the age of 18 to 34 years old have the tendency to be interested towards brands that help them to feel more in control about their life and can provide them with worthwhile experience compared to older generations that prefer to have more possessions. This shows that young generations have more possibility to own valuable personal possessions at an early age compared to previous generations because young generations are less cared about the quantities of the items as they are more into quality which always comes with higher prices. However, having quality items also make young generations more vulnerable towards threats compared to older generations. Hence, it is important for the individuals especially the youngsters and young adults together with their personal possessions to be protected in any way.

Problem Statement

Property losses are always reported in the media and to some extent, this phenomenon has been normalized. According to the Crime Statistics (2020), the property crimes in Malaysia in 2019 was equivalent to 67,000 cases with house break-ins and snatch with 16,497 cases and 19 cases respectively. Overseas Security Advisory Council (OSAC) also reported that Kuala Lumpur is a high-threat location for crimes involving street crimes such as petty thefts, smash-and-grab thefts, and residential burglaries (OSAC, 2020). According to Cuthbertson (2018), the percentage of people involved in poor experiences of personal and violent crimes are 62% and 73% respectively. Furthermore, the fear of crimes also impacted the individual gated residences and non-gated residences (Muslim et al., 2012). Thus, this also implies that younger people, especially students are also at high risk. Plus, due to the shortage of accommodation, about 21.6% of students need to live off-campus (Muslim et al., 2012). This capacity would increase as the total of enrolled students in higher education has increased around 7.01 thousand in 2019 (Statista, 2019). Generally, students are confronting problems to ensure their belongings are safe and free from crimes as they also are not immune to criminal activities. In Malaysia, the protection of personal possessions is not fully commercialized yet. The product offered by Takaful Malaysia only covers for the cause of common perils, not upon property crimes (Takaful myHome Content, 2021). Whereby, Takaful Ikhlas do offer the necessary coverage but is not applicable to shared accommodations. Plus, the product does not come with an application to ease the participants (Ikhlas Home Protect Takaful, 2020). Mohd Fauzi et al. (2016) mentioned that the use of technology and digitalization in takaful would increase the revenue and untapped the segments of the population specifically to the younger generation. Therefore, this study aims to develop and innovate new takaful features of personal belongings namely e-Personal Possessions Takaful to provide coverage on personal items and liabilities and to embark on takaful products without relying on insurance. Additionally, the adoption of technology to these features will optimize the return to the takaful operators.

Objectives

The objective of this study is (1) to identify the solution for the damages or losses of personal possessions of a household, (2) to develop the takaful coverages for personal possessions against certain risk and (3) to examine the use of digitalization for personal possessions takaful.

Scope of Product

This study focuses on the implementation of takaful coverage on personal property and liability protection for tenants, college students, and boarding school students. In addition, liability protection is also included in this takaful coverage for the students and tenants.

LITERATURE

Personal possessions are the materials that we own and can do anything to them without any interference. Referring to the Al-Majalah, a property is anything that is owned by a human being; specific or usufruct (Laluddin et al., 2012). Meanwhile, takaful is a contract between members of a group to donate funds and provide guarantee or protection among each other against certain risks (Mohd Fauzi et al., 2016). Ultimately, the concept of takaful differs from conventional insurance which contains usury, uncertainty, and gambling (Safder et al., 2010). All in all, the pooling method in takaful is significant to protect individuals and their dependents in a way of Shariah-compliant method. Besides that, the performance of takaful is believed to grow stronger with the penetration of digitalization. Takaful operators in Malaysia need to put some portion of the investment to drive technology capabilities so that takaful operators and customers can have more effective interactions (Md Husin, 2019). Consequently, e-Personal Possessions Takaful should be created through digitalization in terms of online application as part of the strategy to gain more customers specifically the young generation, and increase takaful revenue as well.

Methods and Overview

The contracts for the product are tabarru, wakalah, jua'alah, qard and hibah. Next, the takaful product contribution is decided by benchmarking household takaful product from Etiqa Takaful and it is tested using a simple mathematical model. The calculations are made to ensure the amount collected per month by this takaful product is sufficient and capable to provide protection to its contributors. After that, Integration Model is used and the partition of tabarru' account is tabulated. After that, the example of the interface feature is designed using PowerPoint. The overview of the product is that it has the potential to provide protection for both personal belongings and liabilities from various types of mishaps at minimal and affordable contribution amounts. Plus, the use of technology may provide easiness to the customers, thus making the product to be more user-friendly.

METHODOLOGY

This is a comprehensive takaful certificate designed to meet the needs of customers who wish to protect their personal belongings up to clothing in a specific place such as houses, rooms, college dorms, or any space accommodations that customers live or stay in. Personal belongings covered by this takaful product include personal items from household items up to clothing, portable electronic devices, valuable items, and any other additional declared items. Other than that, this takaful certificate also covers personal liability and loss of use due to the covered event mentioned unless extra coverage is applied. The certificate will run on a pay-per-stay basis where customers have the right to decide the total period that they wish to be covered by the certificate. However, it is noted that the minimum stay period for this takaful certificate is one month. For the calculation for basic mathematics, total contribution amount collected, total wakalah fee collected, total management expenses collected, the total amount collected in the tabarru' fund, the total amount paid to contributors due to claim

made, and expected excess of tabarru' fund for n=1 month, 3 months and 12 months are determined. The values used to construct the mathematical model are from various website articles. Next, Integration Model for tabarru' is conducted to ensure the contribution amount benchmarked from Etiqa Takaful is sufficient. After that, 2D interface features that describe the main essence of the product which are the application and the claim process are designed by using PowerPoint.

RESULTS AND DISCUSSIONS

The overall advantages of e-Personal Possessions Takaful (e-PPT) from other resembling products are it is less hassle to apply, limit to a number of residences accommodate in the same space covered, flexible coverage amount, easy access for the claim and changing of contributors' particulars (e.g: address, coverage), contributions of 1% to charity/waqf if no claim made and hibah for the beneficiaries due to the death of the contributor during takaful period. Besides that, the product is also able to provide optimum coverage with minimal contribution and allows the contribution to be shared among contributors that live in the same covered space. Not only that, three (3) personal items are eligible to be covered inside and outside of the covered space. In terms of liability, injuries of the contributor and third party in the covered space due to the covered event will be automatically covered and subjected to extended liability upon request. For loss of use, the product offers cleaning and laundry services, emergency personal possessions storage, and alternative accommodations whenever necessary.

In terms of product practicality, 24.5 million people are eligible to apply for the product. Besides that, the product is also set at a minimal contribution of RM6 per month. 15% and 20% (Takaful Ikhlas, 2018) from the contribution are to be deducted for the wakalah fee and management expenses respectively. Therefore, for a minimal contribution of RM6 per month, RM3.90 is for tabarru' account thus allowing the tabarru' account to collect RM 95.55 million considering all 24.5 million people apply for the product. After deducted RM 34.375 million due to approximately 1375 cases that happen in a month, there are still RM 61.175 million in the tabarru' account. Although the excess of tabarru' fund seems a lot, as it is a new product, precautions and consideration in regards to the assumption of the number of potential contributors must be taken into account. Plus, the minimum coverage is also set by only benchmarking the other market players. Next, the contribution table for Integration Model for partition of tabarru' account is constructed to ensure all the contributions in tabarru' account remain organized and able to better serve its purpose.

Since the product is named as e-Personal Possessions Takaful (e-PPT), it gives a clear vision that the product is focused on personal possessions protections. The use of 'e' in front indicates that the product is being linked with the use of technology from head to toe with the idea to serve future contributors better. Hence, the application and claim process in regards to the product was planned to show the implementation of technology with the product itself. For that, an example of 2D interfaces that shows the technology features of the products has also been created.

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E-POCKET NOTE: AN INTERACTIVE VIDEO LEARNING FOR EFFECTIVE ONLINE TEACHING AND LEARNING PROCESS

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ABSTRACT
The COVID-19 outbreak had significantly impacted our daily lives since the year 2020, forcing the Malaysian government to restructure many sectors, including the education system. As a result of the pandemic, Malaysia's education system has made a rapid transition from face-to-face to open and distance learning (ODL) classes. This situation brings greater challenges for teachers, they need to find a better method to teach students effectively, especially during online classes. Therefore, the objective of this study is aimed at creating an interactive video learning that we called an e-Pocket Note for students' use during the online learning process. This application contains a set of interactive videos together with questions and answers related to certain topics that will enhance students' understanding. A survey has been distributed among the students to know their perception regarding the use of video as one of the teaching methods. The results showed that there is a need for the use of interactive videos during the ODL classes. Thus, the use of the e-Pocket Note application is compatible with the recent educational situation. It also allows for increased student motivation to learn as well as improved student-teacher engagement, which leads to an effective teaching and learning process.

Keywords: COVID-19, education, ODL, videos, students

INTRODUCTION

The open and distance (ODL) concept in education has been widely used after the development of radio and television in the 1950s where people found the new delivery

system outside the traditional classroom. According to American Association for Distance Learning (UDSLA), ODL means "the process of acquiring knowledge through a variety of media used to transfer education and information, including all types of technology and various forms of education level for distance learning." ODL is one of the most suitable strategies that integrates virtual technology that will allow the continuation of the teaching and learning process (Md Saidi, Sharip, Abd Rahim, Zulkifli and Md Zain, 2021). In addition, Singh and Thurman (2019) defined online learning as learning experiences either in synchronous or asynchronous environments through different technologies so that students can learn and interact with teachers anywhere and share the ideas with their friends simultaneously.

The synchronous approach allows both educators and students to meet in real-time during content delivery through video conferencing such as Google Meet, Zoom, Jitsi, Microsoft Team, and Cisco Webex (Md Saide et al., 2021). While, the asynchronous environments permit the sharing of teaching materials such as pre-recorded video, PowerPoint slides and tutorial questions with the use of the Learning Management System (LMS). Chung, Subramaniam and Dass (2020) documented that majority of the students preferred pre-recorded lectures uploaded to Google Classroom and YouTube because they can replay the recorded videos many times to gain a better understanding of the content. In the absence of face-to-face contact, the chat applications such as WhatsApp, Telegram, Email, Facebook, Instagram, and Twitter are used by students to get connected with their peers and educators. Most of the students favour asynchronous over synchronous approaches because they face difficulties in terms of limited internet access, insufficient online devices and unsuitable learning environments to have virtual classes (Wei, Kuah, Liew, Lee & Koh, 2021).

The introduction of pre-recorded video enables the presentation to go smoothly. The quality of the subject presented can be controlled. The problem of internet connectivity and other distraction to viewers could be minimized. Several innovative solutions including the flipped classroom model, online practice questions, tele-conferencing in place for an in-person lecturer to facilitate the ODL environment. Nevertheless, there is none such substitute for hands-on-learnings wherein commanding more practical realistic need many scholars claim that using direct online lecturer are effectively limited only for theoretical aspects when compared to the calculation or statistical subjects (Wahyudi et. al, 2020). However, with the current pandemic environment, the education industry efforts must not sacrifice the knowledge virtues and the learners' absorb momentum. Approaches need to be redefined to keep the quality and future assessments (Noetel, Griffith, Delaney, Sanders, Parker, Cruz & Lonsdale, 2021). This has been supported by a study done by Hakkarainen (2011), using video production which supported the Program Based Learning model to be more effective and meaningful learning. In this study, the students reported their emotional involvement in learning using the video was positively toned (Kort & Reilly, 2002) which synthesis as having an enjoyable learning environment (Strobel & Van Barnevel, 2009), hence resulted to be beneficial for their motivation to learn, their learning process and outcomes (Meyer & Tuner, 2002).

METHODOLOGY AND MATERIALS

An e-survey was conducted among Diploma in Accountancy (AC110) and Diploma in Accounting Information System (AC120) students from Universiti Teknologi MARA Perak branch, Tapah Campus in getting their feedbacks on perceptions of using interactive video

during the online teaching and learning process. A total of 320 students responded to the e-survey. The questionnaire consists of 2 sections. The first section requires respondents to fill in their demographical information, while the second section asked about student's online learning experience and their perception of using interactive videos. The statements were assessed on a four-point Likert scale ranging from 1 to 4, where 1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree. A total of eleven questions were asked in the questionnaire and the results are presented in the next part of the paper.

RESULTS AND DISCUSSION
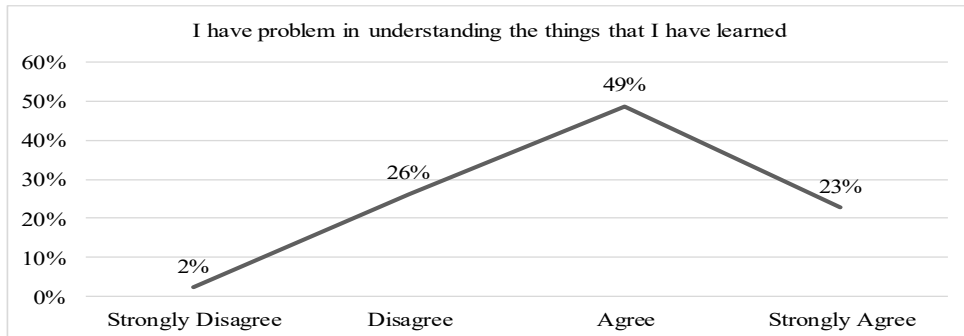
Figure 1. Students' feedback on the challenge during a study in the online class.

Figure 1 shows the feedback from students on the challenge they face during an online class. It appears that more than half of the respondents (49% agree and 23% strongly agree) had difficulty in understanding the things they have learned during an online class. The remaining 28% of respondents had no difficulty comprehending the online lecture. This is verified by research conducted by Azmi and Lai (2021), who discovered that students may feel dissatisfied with ODL since they require more time to adjust to a new learning environment.
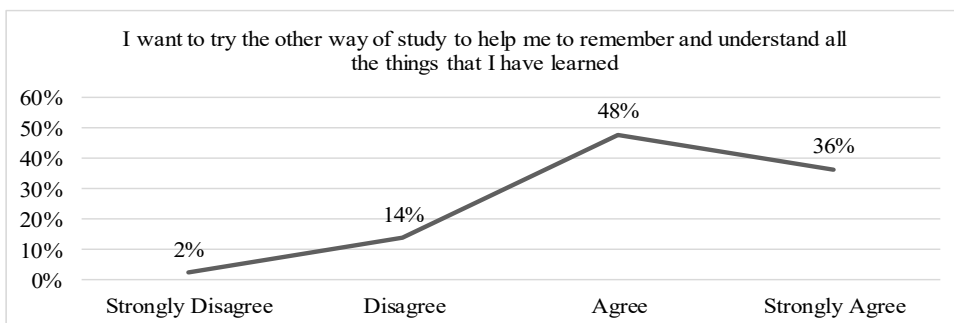
Figure 2. Students' feedback on the need to change the method of study for the online class.

In response to the question in Figure 1, another question is asked about the student's willingness to improve their current method of study. Figure 2 demonstrates that most respondents, 48% and 36%, agreed and strongly agreed to shift their way of study for the online class, respectively. They had difficulty remembering and understanding the material they had studied while using the current method of study.
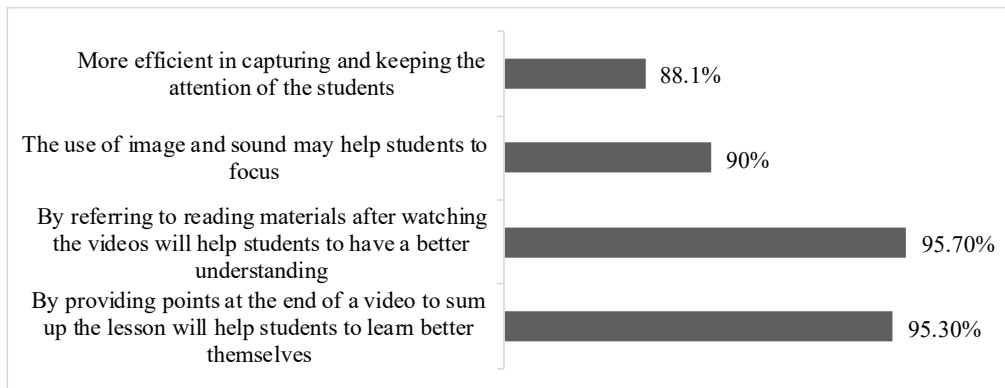
Figure 3. Students' feedback on the perception of using interactive video during the online teaching and learning process.

Following that, this study proposes that an interactive video be used as one of the alternate ways of study for the online teaching and learning process. Figure 3 illustrates the students' perceptions of using interactive video during the online teaching and learning process. The usage of interactive video just before referring to reading materials such as textbooks or lectures notes was mentioned by most respondents (96%) may help them understand better. The result is supported by Noetel, et al. (2021) when they found that rather than replacing existing teaching techniques with video-based learning, integrating video into current teaching approaches resulted in significant learning benefits. Furthermore, 95% of respondents perceived that a summary of the lesson at the end of the video would help students learn better. According to 90% of respondents who agreed that the utilization of pictures and sound may help students to focus, and the other 88% of respondents agreed that video will efficiently grab and maintain their attention during the teaching and learning process.

CONCLUSION

From the findings, it appears that most students are having difficulty in understanding what they have learnt, suggesting the need for a different technique of study to assist them in addressing the issue. Most of the respondents hold positive views on the use of interactive videos together with the reading materials that may help them to enhance their understanding. Thus, the use of the e-Pocket Note application is compatible with the recent educational situation. This application contains a set of interactive videos together with questions and answers related to certain topics that will enhance students' understanding while additionally promoting an enjoyable learning experience for them. It enables students to interact with the video elements, for example clicking on the correct answer of simple quizzes at the end of a topic, selecting a video topic to play or control the flow of the video. They are often captivating and thus increases the attention span. Besides, it also allows for increased student motivation to learn as well as improved student-teacher engagement, which leads to a more effective teaching and learning process. This explains the relevance of the development of the app which may ultimately lead to the commercialization of the product so it can reach a larger community of students.

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THE CLAUSES SMM2 AT CONSTRUCTION SITE BOARD GAME FOR (WBLFF)

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ABSTRACT
The development of the Clauses Smm2 at Construction Site Board Game for (WBLFF) is as a platform to offer the new built environment students the overview of the proses taking off quantities for construction of works. Quantities of materials are materials that are measured in accordance with the Standard Method of Measurement of Building Works (SMM). This interactive game fulfils the syllabus related to construction courses of Measurement of Construction Works. Basically this game focuses on the knowledge of the elements of Work Below Lower Floor Finishes (WBLFF) which provides the information on the processes involved in the preparation of taking off quantities for element WBLLF from excavation of topsoil until the concrete works for ground slab. Taking off is taking the dimensions from architectural or structural drawings and entering the dimension with appropriate descriptions on taking off papers. It is well known that students have difficulty with theory related understanding, especially for the period of long discussions in lectures. As a result, the students will often fail to remember the information delivered during the lecture. The Clauses Smm2 at Construction Site Board Game for (WBLFF) which is consists of sixteen (16) major clauses developed from Malaysian Standard Method of Measurement of Building Works Second Edition from Excavation and Earthwork in Section D to Waterproofing and Asphalt work in Section K. The application of this game in a classroom provides a more conducive method for the students to improve their understanding of the steps taking off quantities for element Work Below Lower Floor Finishes (WBLFF) according to Malaysian Standard Method of Measurement of Building

Works Second Edition (SMM2). This board game suitable for a tutorial session with supervision by the lecturers. Through games, students are more motivated to learn, thus, improve their attention in class. Even more, this game serves as an indicator for the lecturer to verify the level of understanding of the students on the taking off quantities in measurement of construction knowledge.
.

Keywords: Construction Industry, Measurement of Works, Taking-off Quantities, Tool Indicator, Learning Process

THE STANDARD METHOD OF MEASUREMENT OF BUİLDİNG WORKS (SMM2)

NO	CLAUSE	ITEM	UNIT
		List of Work Below Lower Floor Finishes (WBLFF)	
1	D7	Excavation of Top soil	m2
2	D.21	Deposition of top soil	m3
3	D.12.4	Excavation to reduce level	m3
4	D.22	Disposal of excavated material	m3
5	D.12.7	Excavation for trench foundation	m3
6	D.25	Filling to excavation	m3
7	D.12.2	**E.O** excavation for excavating in rock (Provisional)	m3
8	D.15	Disposal of surface water	Item
9	F.1.1 & 2	Concrete foundation	m3
10	G.1.1	Brickwall	m2
11	G.3.4	Projection to brickwall	m
12	G.28.1 & 2	Damp Proof Course (DPC) to brickwall	m/m2
13	D.26	Hardcore	m2/m3
14	K.2.1 & 3	Damp Proof Membrane (DPM)	m2
15	F.1.1 & 2	Concrete slab/bed	m3
16	D.28	Hand packing hardcore	m

THE GAME AND METHODOLOGY

The game uses a top down technique board game, which follows the Work Below Lower Floor Finishes (WBLFF) excavation technique from top to bottom area. The rules of Clauses Smm2 at Constructıon Sıte Board Game for (WBLFF) as follows:
1.	The game involves 2 - 5 players.
2.	To start the game, the player rolls the dice and only can move if the number 1 stated at the dice.
3.	During the game, the move is based on the number stated on the dice.
4.	During the game, the players need to answer several questions about the knowledge and information of element Work Below Lower Floor Finishes (WBLFF) according to Malaysian Standard Method of Measurement of Building Works Second Edition (SMM2)
5.	When the player stops at the TRIVIA❓, the player needs to pick up a card from the TRIVIA ❓ box cards and answer a question.
6.	The correct answer entitles the player to roll the dice and the player can moveaccording to the number stated at the dice.

7. If the player fails to provide the correct answer, the player needs to back a few steps according to the number stated at the dice.

8. If the player stops at the ![under construction symbol] box, the player will be sent to the UNDER CONSTRUCTION and miss one (1) turn.

9. After one (1) turn, to continue playing, the player can choose either to roll the dice and get 6 or answer a question from the TRIVIA ? box cards.

10. Along the game, when the player stop at the box with symbol ![info symbol], the player can read the knowledge and information of element Work Below Lower Floor Finishes (WBLFF) according to (SMM2)

11. The first player that arrives at the flag ![flag symbol] is the winner of the game.

THE CLAUSES SMM2 AT CONSTRUCTION SITE BOARD GAME
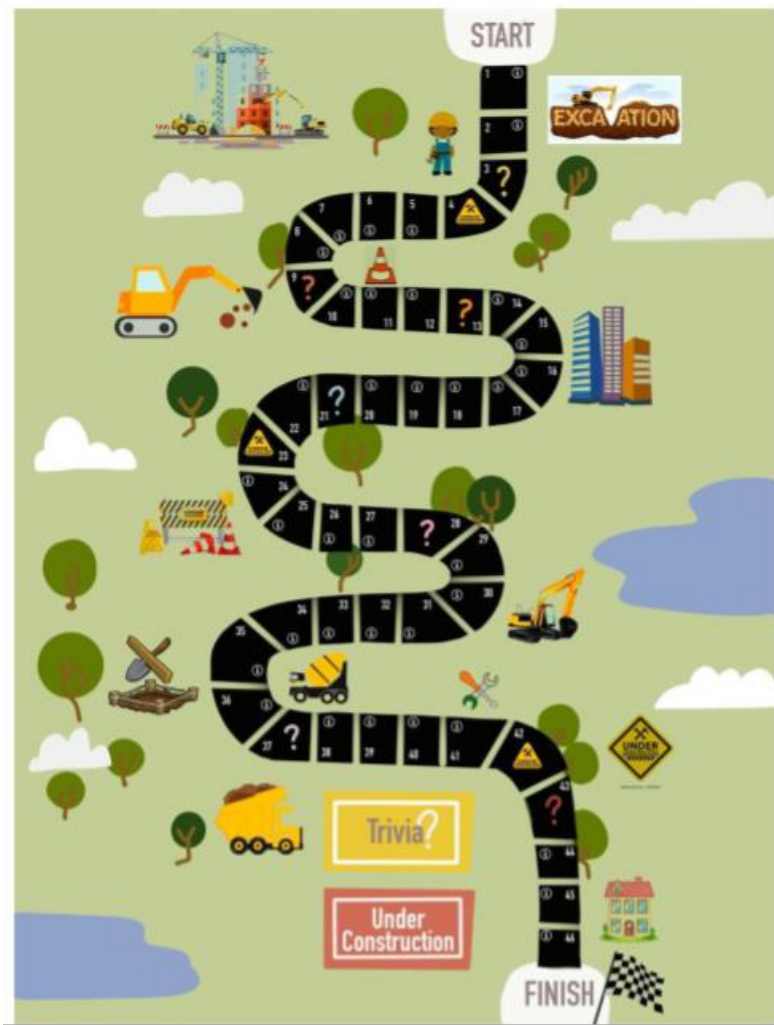
PROBLEM STATEMENT

Students normally having difficulties in understand theories by reading materials (printed or digital). This one-way method of learning requires the students to depends on books or reading materials for the information regarding the subjects. In the measurement of works subjects, the students are required to have high imagination to better understanding the subjects. Interactive learning is known for better knowledge transfer while providing an attractive learning experience by allowing the students to interact, argue, justify and able to compromise the information. Therefore, the incorporation of an interactive learning method for knowledge enhancement can be beneficial to build environment students.

NOVELTY

The number of game-based learning materials that can be used in the tertiary education level (focusing on a measurement subject) in Malaysia is limited. The WBLFF Game is designed to provide the theoretical information of the work below lower floor finish construction process interactively. This game has a higher potential to be used as an alternative to the typical teaching and learning experience – combining several subjects related to the built environment in a single platform, connecting the ideas and knowledge between subjects.

COMMERCIALISATION/IP/COPYRIGHT

The WBLFF Game has strong potential to be widely used by the lecturer as an indicator to verify the level of understanding of the students on the construction knowledge. It also serves as an alternative way of knowledge transfer for a tutorial session. This game can be potentially improved from time to time in line with the current syllabus. The board game has been in process registered with an IP from MyIPO.

FINDINGS

Research has shown that applying game-based learning method in the classroom has helped students to have a better understanding of the subjects (Holmes & Jamie, 2009). To make the learning process more interesting, the lecturers can incorporate at least one game a day into the key learning methods – teaching tool, learning tool, assessment strategy or classroom motivator. The integration of games in the classroom can increase the overall motivation of the students – students are more motivated to learn, pay attention and participate in the given tasks. Games also provide the students with an opportunity to become part of a team and take responsibility for their learning. Games can also be a great classroom management tool and helping to motivate the class.

CONCLUSIONS

By applying a variety of strategies in a game, students are capable to use their active memory

to resolve problems and increase their intellectual cognition. The stimulation of the brain due to strategies in a game can be a comprehensive brain training. The game also will educate the students about goals, adaptation, rules, interaction and problem-solving in a fun way, creative and full of passion.

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e-VOTING: VOTEHERE4U 2.0

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ABSTRACT

e-Voting, an Electronic Electoral Online System, or named as VoteHere4U 2.0 is developed over two years to aid voters in their voting processes, to ensure the safety of the ballot and to accelerate the process of results. It is created using web-based platform, and it can be accessed online as long as there is internet connectivity. Voters can vote multiple candidates from the same post (committee members) and contested positions, and they can view the time allocated for voting. The main issues of the existing traditional voting are time-consuming procedure (a lot of time to cast a vote and count the ballots), not cost effective (printing and ballots distributions) and involve too many personnel to assist in voting stations. Besides, it can also give results of fake voting or inaccurate data. VoteHere4U 2.0 increases the voters' participation, reduce the number of election officers, lower the costs of running elections and improve the accuracy of the results (can be calculated automatically). The system enables the organisation to conduct voting via online to cater to any organisation's needs, without the worry of changing the coding or databases. Results are produced at real time and the setup for the voting event can be prepared within short period of time. As for the commercialisation value, it is adaptable to any other event or organisation that requires voting, where the election process can be conducted in an efficient and effective manner. Based on the responses of the voters who had used this system, they claimed that the usability criteria of the system's interface were between good to excellent scales (navigation, graphic, user friendliness and consistency, content, relevance and transparency).

Keywords: e-Voting, Internet, Efficient Voting, System's Interface and Usability

INTRODUCTION

The way people vote has changed over the years, where electronic voting has been deployed in many different types of election (Gibson et al, 2016). e-Voting or also known as electronic voting, is a term which incorporates several types of voting, including both electronic means of casting a vote and electronic means of counting votes, such as punched cards, optical scan voting systems, and specialised voting kiosks (Elewa et al., 2015). Electronic voting (e- Voting) is generally seen as a support tool for making the election process be more efficient and effective. VoteHere4U 2.0 (e-Voting) is developed to aid two of the electoral procedures in an organisation, where the elections were conducted to choose the new committee members of a woman's organisation and a social club. With the utilisation of this system, the voting processes have become easier for the voters, the security and safety of the ballot are ensured, and the process of results is smoother. Using the web-based platform, the system can be accessed online and is only accessible by the registered voters by keying in their staff ID to login.

PROBLEM STATEMENT

There are several issues when using traditional and manual voting system, the ones that involve pen and paper. Two of the main issues of the existing manual voting such as paper-based are time-consuming and not cost effective, where it takes a lot of time for a voter to cast a vote and involves higher budget to print the ballots. Moreover, manual voting also involves a lot of election personnel, who will have to monitor the electoral process; before, during and after voting. Besides, manual voting can also give results of fake voting, which is unreliable, and therefore, the need to shift from the manual voting system to a more sophisticated digitalised voting platform should be initiated. Munisami (2018) points out that fake voting which relates to the issue of intelligibility, such as a paper-based polling system (based on pen, stamps, punch cards or ballot) can produce ambiguous results. Habibu et al. (2017) further suggested that e-Voting utilises electronic ballots, thus, there are no rejected, mismarked, or invalid votes, as the results are automatically calculated, eliminating the need for manual tabulation or dreaded recounts. As a result, VoteHere4U 2.0 is developed to tackle these issues so that the electoral process in any organisation will be more efficient and effective.

OBJECTIVE

VoteHere4U 2.0 enables any organisation to conduct voting via online using the internet, in which will be able to cater to any organisation's needs, without the worry of changing the coding or databases.

SYSTEM ARCHITECTURE AND INTERFACE

Figure 1 below indicates the system's architecture based on the module and the flow of the processes involved in the system. Generally, the voter will directly interact with the online voting module and the voting result module can be accessed by the administrators and the election committee. In addition, this e-Voting comprises of the voters' and candidates' information in the database, while the votes, calculation of the total number of votes and the results will also be stored in the database.
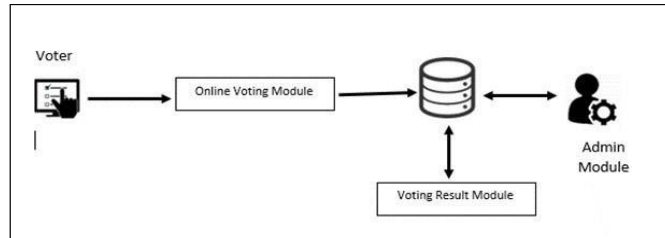
Figure 1. The System's Architecture

Figure 2 illustrates several interfaces of the system in which the voters acknowledged its usability and simplicity. These have increased the voters' satisfactions when using the system as it is quite easy to navigate and cast their votes within the stipulated time given.
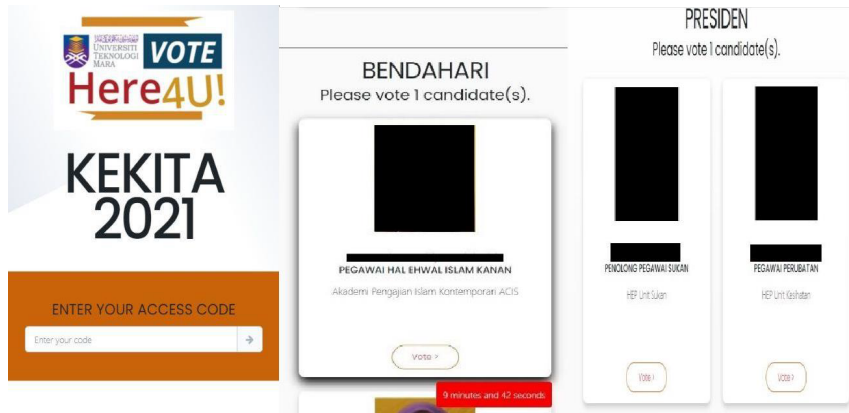
Figure 2. The System's Interfaces

NOVELTY

Several novelties are discovered from this developed system where the system can generate accurate real time results (can be checked from time to time if required), easy to set up, allow voters to vote multiple candidates from the same post and contested positions (five committee members are selected from ten candidates), and the voters themselves are able to view the time allocated when voting each candidate (to avoid time consumption and lengthy hesitation).

USEFULNESS

VoteHere4U 2.0 is useful and practical as the voters who had used the system acknowledged its usefulness and effectiveness. The time taken to vote was quick and the process to click the chosen candidates was also effective. According to the survey results,

nearly 90% of the voters claimed that the 'system is relevant to be used in the future and they also mentioned that the 'real-time results of the voting process' and 'the verification process are simple and efficient'; specially to mark a candidate of their choice. Most importantly, the administrative personnel can monitor the voting progress and can generate real time accurate results and the setup for the voting event can be prepared within a short period of time. According to Wang, Mondal, Chan and Xie (2017), the fundamental requirements for a voting system are usability, correctness (completeness and reliability), privacy, verifiable and additional requirements like fairness, efficiency and practicality which play very important roles in determining the success of a system.

COMMERSIALISATION POTENTIAL

The system is adaptable to any other event or organisation that requires voting, where the election process can be conducted in an efficient and effective manner. In addition, the system enables the organisation to conduct voting via online to cater to any organisation's needs, without the worry of changing the coding or databases.

CONCLUSION

To conclude, this e-Voting system indicates its capability to automate the election process and making it flexible, which might aid in reducing the unwanted human errors, showing scalability to outreach the voters, and making easy interpretation of the results. Most of the voters who had used this system gave positive perceptions towards the system in terms of its usability and satisfaction.

In addition, VoteHere4U 2.0 also fulfils the user's need as the result significantly shows positive acceptance towards the e-Voting platform, where the voters were mostly satisfied with the system by admitting that that 'the system is important and relevant' to be used in future voting. Generally, they also claimed that 'the system is effective' in terms of its clear graphic features and simplicity, as well as the system is reliable and accountable. As a result, highly efficient and ease of use of such system will lead to effective voting system and increase vote casting percentages drastically.

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IO2TX

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ABSTRACT

Hospital condition is synonymous with a busy environment where there are many patients that nurses should give the services to. The busy schedule makes the nurses not aware to refill the items in the treatment cupboard. Besides, the items in the treatment room are always out of stock when nurses need to use it and have to find the item first. This situation will delay the treatment time and patients should wait for a long time for nurses to prepare for the equipment that they need for a certain procedure. Items out of stock in the treatment room will take a long time to be refilled. Our project, named IO2TX, has been invented to solve this problem. IO2TX is using sensors to detect the quantity of the items such as syringes, needles, alcohol swabs and other items in the treatment cupboard. IO2TX acts as a reminder for nurses when the items in the treatment cupboard went out of stock by action of light-emitting diode (LED) light will blink and display items that are out of stock in the liquid crystal display (LCD) at the cupboard door. Without a device to remind the nurses when the item in the treatment room is near to out of stock, this can lead to hectic conditions when nurses just realize it when they want to provide treatment for the patient. Therefore, the innovation that we created can help nurses be more aware before the items in the treatment room are out of stock. In addition, this will facilitate the work of nurses while having a systematic and manageable system in the hospital. The cost for development of the product is RM 100.

Keywords: IO2TX, LED light, LCD, items

PROBLEM STATEMENT

The problems that influenced us to design this innovation called IO2TX is because when we went to hospital for practicals, the problem that we faced was items in the treatment room were always out of stock. The nurses were not alerted to refill the items as they have a busy schedule especially during this pandemic Covid-19. The case rises day by day, making the nurses must

deal with hectic days and difficult to be aware of this condition without any reminders. The items that are always out of stock during this pandemic are usually personal protective equipment (PPE). When this condition happens, then we have to delay the treatment and make the patients wait for a long time to finish the procedure. During the practical, we had one case where we had to delay the procedure because the alcohol swab in the treatment room was out of stock. So, we made the patient waited for us to find the items in other wards to perform the procedure. This is where we get an idea to develop this kind of innovation. The target group of this product is for the nurses and other health care providers. The creation of this product will also influence the hospital management system and further improve the quality services of nurses and other healthcare providers. Besides, it also can improve nurses' work and provide better services to the patients. Therefore, this innovation can help in reminding the nurses to be more alert in refilling the items in the treatment room before they are out of stock.

EXPLANATION ABOUT THE PRODUCT

IO2TX is a special type of product with the ability to detect items through sensors. The software that we use to conduct this project is Arduino and Bliynk. Arduino usage is for coding and Bliynk's purpose is to send the notification to LCD and computer. Hardware items that we use are LCD, LED, Arduino breadboard and ultrasonic sensor. LCD function is to visualize the notification when the item is running out of stock while LED will blink if the item is near out of stock. Next, an Arduino breadboard is used to connect all the wire through it and an ultrasonic sensor will detect the quantity of items in the box. IO2TX continues to connect to the IOT cloud and transmit data to the cloud. Using the BLYNK application allows users to visualize data (have items or not) and provide notifications when the items such as syringes are running out. In addition, the LED will blink and the cupboard will display the current items using the LCD when the items are near to run out. The main objective of the project is to help nurses and other health care providers to solve problems in keeping track of items in the treatment room. With the help of this product, nurses will notice if the items ran out in the treatment cupboard as BLIYNK application will send notification to them via computer.

The ultrasonic sensor usage depends on how many types of items to detect. For example, we use 3 ultrasonic sensors to detect three different types of items such as syringes, needles and alcohol swabs. When one of the items runs out as an example of syringes runs out, BLYNK application will send notification that syringe runs out. In addition, the LED will blink and the LCD and computer will display an ascending count to calculate the time of the absence of the item. Same as other items, BLYNK application will send notification, the LED will blink and the LCD and computer will display an ascending count to calculate the time of the absence of the items if items run out of stock.
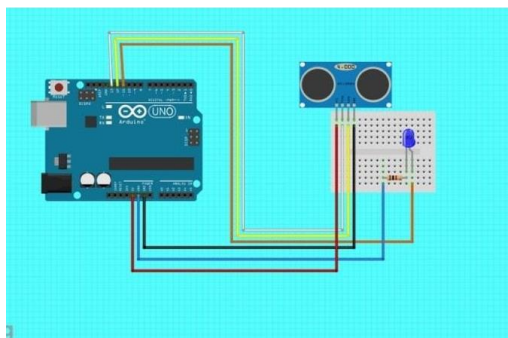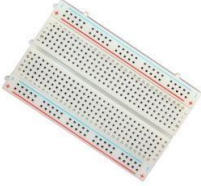
BENEFITS OF THE PRODUCT AND COMMERCIAL PRICE

The significance of the product is for nurses and other health care providers especially during this hectic condition which is pandemic Covid-19. This product will make it easier for nurses to be more alert to the items available in the treatment room. Therefore, the case for refilling items that are out of stock will not be disrupted and not delayed anymore. This will make the procedure for the patients can be done quickly without any delays. The estimated price for commercialization is about RM 120 – RM 150 for each product. This estimated commercial price is based on the capital price we have used for us to complete this product. Even the product is under prototype but the quality to be commercialized is highly recommended as the product can be a reminder for nurses and the needs in the ward.

COMPONENTS IN IO2TX

Components that we use in this project include software and hardware. Software that we use are Arduino and Blynk. Arduino is used for coding and Blynk to transmit data from sensor to LCD and computer. Hardware that we use are LED, LCD, ultrasonic sensor, resistors, jumper and breadboard.

HARDWARE

Figure 1. Light-emitting diode (LED)	**Figure 2.** Liquid crystal display (LCD)	**Figure 3.** Resistors
Figure 4. Jumper	**Figure 5. Breadboard**	**Figure 6. Ultrasonic sensor**

SOFTWARE

Figure 7. Arduino	**Figure 8.** lynk

Figure 9. IO2TX

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WASTE SEGREGATION THROUGH RECYCLE AND COMPOSTING ACTIVITIES AMONG THE COMMUNITY IN URBAN AND SUBURBAN AREAS

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ABSTRACT

The number of wastes generated in Malaysia is increasing every year. Eighty per cent of solid waste in landfills comes from recycled material, and food waste production increases 15 000 tons per day. Recyclable waste and food waste are the highest waste that produces in the landfill. Recycling and food composting are two solutions that can reduce waste and slow down the rate of waste received at the landfill. This research aims to determine the level of knowledge and awareness on waste segregation through recycling and composting. It identifies the top reason for not applying waste segregation and encouraging the community in urban and suburban areas. An online questionnaire has been distributed to the community in urban and suburban areas in Selangor and Johor. A total of 125 respondents participated in this study. The survey analysis found no significant difference in the level of knowledge in waste segregation through recycling and composting between urban and suburban areas. Generally, the respondent has a basic understanding and awareness of waste segregation, although only a few respondents have not practiced recycling due to several highlighted constraints. Therefore, installing reverse vending machines (RVM), organizing campaigns, and providing more information on waste segregation are the top choices to encourage waste segregation among the community. Moreover, further study needs to be extended to the household group in other states and assessing the effectiveness of RVM will visualize the segregation behaviours among the community.

Keywords: composting, recycling, waste management method, waste segregation.

INTRODUCTION

Malaysia is one of the countries that undergo rapid economic development. The rising of technology and population growth can lead to the increment of waste produces daily. The quantity of waste generates daily is very rapidly compared to the time taken for the waste to decompose itself. In 2020 the total number of populations in Malaysia was 32.6 million, and it is estimated to increase up to 38.8 million in 2040 (UN World Population Prospects, 2019). Solid wastes management has become a significant challenge in urbanized areas, especially in the high rate of growing cities of developing countries (Noor, 2016). Waste that has been thrown away into one dustbin and become comingle is a big challenge to the government in minimizing the waste-related issues. Most of the waste at the landfill is recyclable and has high organic waste content, such as food waste. Malaysian still lack practice in waste reduction at source by waste segregation. In solving the problem of reducing the capacity of landfills, this research is focused on determining the level of knowledge and awareness on recycling and composting activities. This study aims to determine the possible reason for

communities that resist applying wastes segregation in recycling and composting activities and the methods to encourage participation among the community.

LITERATURE REVIEW

Waste Management

There is much action which has been imposed to increase the efficiency of disposal sites. In Malaysia, landfilling and incineration are the most common way to dispose of waste, but only 2% of waste can be recycled and composted (Kadir & Sani, 2016). It is due to the organic waste and recyclable waste, which has been combined as one. Thus, it is hard to separate the materials. A landfill is the most used method in Malaysia for disposing of municipal solid waste (MSW) due to its low cost compared to the incineration method that needs high energy usage and robust technology (Zainal & Hassan, 2019). The solid waste generated 3,108.9 thousand tons in 2019 compared to 2018, which was 3,098.7 thousand tons of solid wastes in the states of Malaysia (Mahidin, 2020). Overall, waste composition in Malaysia is dominated by municipal solid waste (Moh & Manaf, 2014).

Recycling and Composting

Recycling is the third level in the waste management hierarchy to reduce the waste material at the landfill. According to the Department of Statistics Malaysia, the recycling rate in 2018 was 24.6%, while in 2019, it increases 3.5% more, and it became 28.1% (Mahidin, 2020). The recycling collection is increased; hence, it shows that everyone acknowledged the recycling of material. Even though it is improving, the recycling rate in Malaysia is still low compared to other countries. Then, based on National Solid Waste Department, the biggest component in waste composition is food waste (JPSPN, 2013). Consequently, it is shown that people do not do composting from food waste.

RESEARCH METHODOLOGY

The investigation has been done by online survey using Google Form in collecting and evaluating the data obtained. Therefore, the questionnaire has been distributed via links in WhatsApp and other social media. The questionnaire consists of three sections where the demographic question was incorporated in section A, the level of knowledge and awareness was embedded in section B and section C. The Likert's Scale has been used to evaluate the reason of community on the choices of not apply waste segregation which adopted from the previous researcher (Yusof et al., 2019). Moreover, the selection of choices for the method in encouraging the community to do the waste segregations in their daily lives. The sample size for this research is based on a cluster sampling technique (Acharya et al., 2013). The sample is randomly selected from the population-based on non-zero probability. The minimumsample size is 119 respondents where it was calculated by using equation that adopted from (Enshassi & Al Swaity, 2015). The questionnaire was collected from April 2021 until June 2021, and the final sample size obtained was 125 respondents. The result has been analyzed using descriptive statistics (Cing, 2012).

RESULT AND DISCUSSION

The Level of Knowledge and Awareness on Recycling and Composting

A total of 125 respondents took part in the survey. The respondent has been asked the question of "Do you aware of 3R?". It showed that almost all the respondent knows the 3R (Reduce, Reuse and Recycle) concept. About 42% and 47% of the suburban and urban respondents state "Yes" for the answer.   From the previous research, the hurdle on doing 3R is the lack of policy in promoting the 3R concept. Many mechanisms have been created and implemented in other countries to encourage the recycling of major recyclables materials. Later, the questionnaire has been asked three questions on their behaviour in recycling paper, plastic, and aluminium can. Most of the respondents from urban have done an activity on recycling paper (30%), while the suburban majority have also imposed activity on recycling plastic (26%). The recycling of aluminium cans is the lowest activity that has been participated by the respondent (18%). Even though the respondent is aware and knows the concept of 3R, only a small amount is practised on the concept. This result is similar to the inquiry obtained in Johor Bahru, whereas only a few respondents practised recycling frequently (Halim et al., 2018).

There is not much difference between urban (29%) and suburban (30%) respondents who did recycling activity at home while only 10% of the respondents did the recycling action at the office. It is shown that low participation in 3R implementation among the community. It is one of the most serious issues impeding the success of a recycling program in Malaysia. However, the Minister of Housing has supported the action collaborate with the local government, but only 2% of the increment on recycling of waste being achieved (Zaipul & Ahmad, 2017). Nevertheless, the level of knowledge and awareness in food waste that can be used as materials for composting is higher in urban (50%) than suburban (35%). Though only a small amount has been practising the composting activity in their home, 27% in suburban ad 24% in urban, respectively. Low participation in composting was additionally observed in a previous study (Anwar et al., 2020), where it reveals that 60% of citizens consider composting is not a beneficial and dirty job.

Reason Do Not Apply Waste Segregation

Initially, the recycling facility is far from the residential area has a mean of 4.06 and a standard deviation of 1.095. There are insufficient or no convenient recycling facilities, which hinders the recycling behaviour. The result showed that most respondents strongly agreed that the recycling facility was far from their residential areas. The outcome is similar in others research (Noor, 2016), which is limited to drop-off and buy-back centres, which is one of the obstacles in recycling the solid waste in Johor Bahru. The longer time is needed to go to the recycling centre, which reduced people's interest in participating in the recycling action. Next, the mean on limited space to do recycling or composting activities was 3.99, while the standard deviation was 1.004. The result indicates that major respondents agreed that limited space is one of the justifications for the respondents on refusing to apply waste segregation. The outcome for this research is quite identical to the previous study in Melaka, where limited space, material, time, and recycling centre is far from the residential areas (Malik et al., 2015). Limited space has been detected as the major constrain to carry out waste segregation. It is usually occurring to those who live in apartments, flats, or condominiums

as they do not have a backyard instead of the landed house.

Other than that, the mean of limited time to segregate the waste was 3.62, while the standard deviation was 1.021. Most of the respondents agreed that limited time was the cause of not applying the waste segregation. Most people tend to mix the trash in one container as it is easier for them than segregating the waste in separate bins (Malik et al., 2015). Hence, they would throw the garbage by combining the organic waste and inorganic waste into one dustbin. Later, the mean lack of knowledge about what and how to segregate waste was 3.35, and the standard deviation was 1.24. The result reveals that the respondents are neutral on the reason for lack of knowledge. It is contradicted with the prior research that claims one of the obstacles in waste separation among households was identified as a lack of understanding of the procedures for waste separation (Razali et al., 2019). The cause for limited waste material to be recycled and compost has a mean of 3.22 and a standard deviation of 1.133. Most of the respondents were neutral on limited waste material. It is due to the respondent has only basic knowledge of recyclable material that can be segregated. Before the survey, it is found that the limited of recyclables materials in homes tend to reduce the segregation in the household (Noor, 2016).

Method to Encourage Waste Segregation

This method has the maximum number of respondents who strongly agreed on the method of choices compared to other techniques. A reverse vending machine (RVM) is a machine where people can return empty containers, and in return, the end-user will get money or otherforms of incentive. Based on the previous study, the incentives approach, defined by cash payback for recyclables collection, is one of the most accessible mechanisms for changing the behaviour toward sustainable waste management (Zen et al., 2016). A reverse vending machine for recycling bottles should be installed near the residential area, which has the highest mean compared to others, which was 0.34 and a standard deviation of 0.834. Then, providing more information on waste segregation through recycling and composting has a mean value of 4.32 and a standard deviation of 0.736. It means that the majority of the respondent strongly agreed with the statement. It is crucial to know the type of waste before the segregate process. It has been noticed that the most successful strategy to encourage recycling participation is to provide sufficient information (Noor, 2016). Hence, it can increase full participation from the community.

Next, the method to encourage waste segregation is a campaign by local government, private agencies, and influential people. It has a mean of 4.26 and a standard deviation of 0.764. The majority of respondents agreed that campaigns by local government, private agencies, and influential person. The campaign can help to encourage waste segregation activities among the community. The supporting mediums such as posters, pamphlets, advertisements on television, radio, websites, and billboards do not greatly impact public waste segregation behaviour (Razali et al., 2019). Ultimately, issuing compound fines for those who have not yet separate their waste has the least mean of 3.52 while the standard deviation was 0.912. The majority of the respondents agreed that issuing fines to those who have not done separation of their waste could persuade them to do it. However, penalties to those who fail toabide by the rules were considered an excellent extrinsic motivator (Jereme et al., 2015).

CONCLUSION

It can be deduced that the community in urban and suburban areas has no significant difference in knowledge and awareness in waste segregation through recycling and composting. From the result, most of the respondents agreed on the obstacles of practising the recycling activity, which was the far distance of the recycling activity centre, limited time and space in doing the segregation of waste. Therefore, the government should increase the recycling centre and improve the facility. The approaches that the majority of respondents agreed were installing RVM, a campaign by local government, private sector and influential person on providing more information on waste segregation to the community.

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EZ-CRUTCHES 2.0: AN INNOVATION OF ASSISTIVE DEVICE FOR DISABLED PERSON

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ABSTRACT

Successful management of disabled person including those with medical conditions especially at lower limbs (legs) is a critical and long term process that can be compromised by many factors such as late ambulation and rehabilitation. Though the usage of assistive devices is established for any types of limbs-related condition, such as a wheelchair, walking frame and elbow crutches; the use of axillary crutches is the most common and convenient one. These axillary crutches are assistive devices that help the disabled person in the process of early ambulation, which can provide support to the weak, injured, fractured or post-operated leg. Thus, this project aims to innovate the axillary crutches into the most client-friendly to support the disabled person in the recovery process, which is named Ez-Crutches 2.0. This innovation provides an enhancement in handling axillary crutches without hustle. Imagine if the disabled persons are using the common axillary crutches, when they want to reach something above the head, they need to uplift hands and leave the crutches to fall down. It is difficult for them to pick up the laid crutches from the floor, and it may lead them to fall and cause further injuries. In clinical settings, early ambulation process supported with assistive devices would contribute to faster recovery process, improve the person's quality of life, have a sense of independence, and improve management outcomes. Therefore, the Ez-Crutches 2.0 will offer a new potential device that contributes in the enhancement of therapeutic intervention in the medical field especially for those disabled persons.

Keywords: crutches, medical, assistive devices, ambulation, disabled person

INTRODUCTION

Crutches are medical instruments intended to help with ambulation by moving body weight to the chest and arms from the legs (Nagasaki et al., 2014). These crutches help person in

early ambulation to support the weak, injured, fractured, or post-operated leg. The objectives of this project are to innovate the standard axillary crutches into the most client-friendly assistive device for disabled person and to introduce the usage of Ez-Crutches 2.0 to public. The Ez-Crutches 2.0 is the combination of standard crutches with an elastic Velcro strap to enhance the handling of the standard axillary crutches without hustle.

MATERIAL AND METHOD

This innovative product is ideated from standard axillary crutches, enhanced with an elastic Velcro strap. The Ez-Crutches 2.0 prototype is designed with 80cm length x 2.5cm width, adjustable according to the user's shoulder circumference size as it is sewed with a durable elastic band as shown in Figure 1. This elastic Velcro strap is attached to the axillary crutch pad. The user needs to put the strap on, and this unique design can hold the crutch in place when the user lifts hands. Without it, the crutches would drop, making it difficult for the user to pick them up and cause further injury.

Figure 1: Elastic Velcro Strap Attached to Axillary Crutch Pad
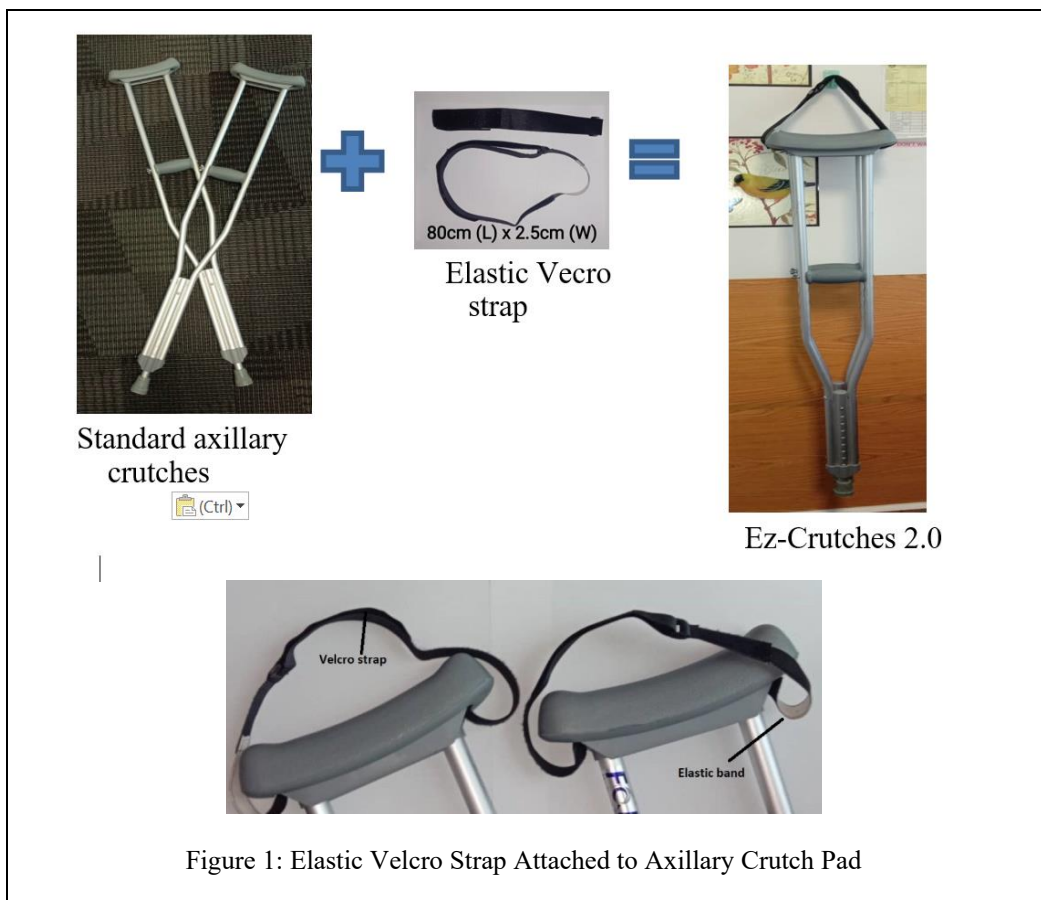
NOVELTY AND UNIQUENESS

The Ez-Crutches 2.0 has its uniqueness especially the elastic Velcro strap which is inspired from Velcro book band and rubber waistband used by tailors to make skirt which is cheaper material but durable. The novelty of this strap can give new insight of ambulation tool for disabled persons.

WHAT IS NEW?

This Ez-Crutches 2.0 is the continuation project from Ez-Crutches 1.0. This time we introduce new pattern and attractive colors of elastic Velcro strap specially designed for children. However, the function and the durability of the item is not compromised.

FINDINGS

To testify the feasibility and usage of the Ez-Crutches 2.0, a market survey was conducted among 5 clients with orthopedic related problems, and 5 registered nurses. They were given a set of standard axillary crutches and let them try to use them and right after that, the Ez-Crutches 2.0 was introduced. Then they were asked to answer questions regarding this innovation via a google form. About 70% of them gave *very positive reactions* to the prototype. Eighty per cent of participants rated that this is *something needed* and 100% said that this is a *high quality* of the prototype. This innovation focuses on facilitating orthopedics clients with the simple, feasible, and affordable prototype. Contrary with previous product innovation which aimed to correct common issues associated with the use of the axillary (underarm) crutch such as pinched nerves, poor posture, and exhaustion with the use (Stencler, 2019). Other study proposed an alternative design for an enhanced crutch shoe, designed to increase the versatility of the crutch while keeping it affordable and compatible with existing crutch frames (Brown, Vairis, Masoumifar & Petousis, 2020). Extensive search found out a limited study related to crutches found in Malaysia, thus, the Ez-Crutches 2.0 provides a different view of innovation in enhancing client management care. Therefore, to protect the copyright of this innovation, Intellectual Property Right (IPR) has been applied from iRMIs on 30 September 2020 with IP code CR002017.

BENEFIT TO MANKIND

The Ez-Crutches 2.0 is practical and easy to be used among patients who need assistance for ambulation especially disabled persons with medical conditions, orthopedic problems, post-operative or persons who have legs problem. This innovation provides patients hands-free mobility and secures the crutches during ambulation.

Simple:
The elastic Velcro strap is adjustable and stretchable, provides comfort and easy to the user. Easy to be stored and easy to be applied.

Feasible:
It keeps the crutches in place, prevents the crutches from drop when the user lifts up hands. Just apply the strap on the standard axillary crutch pad.

Affordable:
This product is cost effective as the Elastic Velcro strap costs less than RM10 and not cause much difference in standard crutches' cost.

POTENTIAL FOR COMMERCIALIZATION

Even though the Ez-Crutches 2.0 is still under the prototype version, but the potential to be commercialized is huge due to its convenience and purpose in assisting disabled people with ambulation. It also plays an important role for health care providers in the medical, surgical, and orthopedic field, educators, and students in the medical and health sciences study. With the Velcro strap cost is less than RM 10 per pax, it will be affordable for all because it does not incur a huge additional amount for standard crutches.

The Ez-Crutches 2.0 prototype version has the potential to be commercialized in the medical devices market. The idea of this innovation could be proposed to the Malaysian Orthopedics Association for support and endorsement. We could also approach the crutches' manufacturers in Malaysia such as GNT MediXcel Sdn. Bhd. for business collaboration. Thus, the Ez-Crutches 2.0 will be offering a new potential device that enhances the therapeutic intervention in patient management.

CONCLUSION AND FUTURE PLAN

The Ez-Crutches 2.0 will be offering a new potential assistive device that enhances the therapeutic intervention for disabled people and in the medical industry. This project's extension would be proposed to the Malaysian Orthopedic Association for an endorsement of the Ez-Crutches 2.0 usage and crutches' manufacturers in Malaysia such as GNT MediXcel Sdn. Bhd. for business collaboration.

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AWARDS

1. Golden award: Penang Invention, Innovation and Research Design 2021 (PIID 2021)
2. Silver award: International Innovation, Invention and Design Competition (INDES2020)

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FACILE-FABRICATED FOAMED GEOPOLYMER SPHERE FOR HEAVY METAL REMOVAL FROM WASTEWATER

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ABSTRACT

Due to the high discharging of untreated wastewater into the environment, heavy metal pollution has been at scrutiny, and the impacts are tremendous to the environment and living organism. Therefore, it is vital to decontaminate the wastewater to prevent further ill impacts. In this work, a facile-fabricated foamed geopolymer sphere has been investigated for its heavy metal removal performance. Four different heavy metals had been selected, which were lead (Pb), cadmium (Cd), copper (Cu) and nickel (Ni). The foamed geopolymer sphere was synthesized via a simple direct-moulding method . After foaming, the density and strength of the foamed geopolymer sphere was reduced from 1810 kg/m^3 to 980 kg/m^3, and from 2.2 MPa to 0.7 MPa, respectively. The foamed geopolymer sphere was able to maintain its integrity after the adsorption testing, proving that 0.7 MPa strength was sufficient. On the other hand, the heavy metal removal performance of foamed geopolymer sphere was increased substantially compared to the non-foamed geopolymer sphere. Results demonstrate that the Pb(II), Cd(II), Ni(II), and Cu(II) removal capacity of foamed geopolymer sphere was 26.77 mg/g, 26.14 mg/g, 24.69 mg/g, and 21.46, respectively, which was approximately 3-6 times increment compared to non-foamed geopolymer sphere. This improvement is attributed to the enhancement of the specific surface area and porosity of the geopolymer sphere after foaming, which subsequently improve the adsorption capacity. Furthermore, the foamed geopolymer sphere can be retrieved easily upon exhausted, which simplifies the adsorption process.

Keywords: Geopolymer, Foaming, Heavy metal, Adsorption, Direct-moulding

INTRODUCTION

Due to the rapid modernization worldwide, contamination of water resources by heavy metals,

including lead (Pb), mercury (Hg), copper (Cu), nickel (Ni), cadmium (Cd), zinc (Zn), have been under scrutiny (Liu et al., 2019). The primary source of heavy metals is from the untreated wastewater. According to Sustainable Development Report 2021 (Sachs, 2021), there are about 2/3 countries in the world perform poorly in treating the wastewater, especially in the Asian countries. It is reported that in 2018, up to 87.6 % of anthropogenic wastewater in Malaysia has not received treatment.

The non-biodegradable characteristics, high toxicity level and the ability of heavy metal to bio-accumulate in living organisms and food chains results in the negative impacts fostered to the environment and human being cannot be ignored. The effects of heavy metal contamination on human are reported to be cancerogenic, teratogenic and mutagenic (Ge et al., 2014). Therefore, decontamination of heavy metals from wastewater is at utmost importance. Wastewater remediation can be done physically, chemically, or biologically, including but not limited to, adsorption, membrane filtration, advanced oxidation, precipitation (Madadrang et al., 2012; Rungrodnimitchai, 2014). Among these common approaches, adsorption method is more widespread due to its effectiveness, low cost and protocol simple (Cheng et al., 2012; Gupta et al., 2012).

Recently, the potential of geopolymer as an adsorbent has been discovered (Siyal et al., 2018). Powder size geopolymer adsorbent has been commonly investigated in the related area as adsorption is dependent on the specific surface area. Nonetheless, the difficulty in retrieval and the need for supporting medium making the process complicated. Therefore, to resolve such limitations, bulk type geopolymer adsorbent is gaining interest, such as sphere, granular, and monolith (Ge et al., 2015; Siyal et al., 2018). However, bulk type adsorbent is usually accompanied with a low specific surface area that is believed to reduce the heavy metal removal effectiveness, attributed to its larger size. Therefore, in order not to compromise the removal performance of bulk type geopolymer adsorbent to a larger extent, one feasible way is to produce porous bulk type geopolymer adsorbent. By inducing porosity into the geopolymer, the specific surface area can be increased, and so will the removal performance. Therefore, this research is intended to investigate the Pb(II), Cu(II), Ni(II) and Cd(II) removal capacity of foamed geopolymer sphere that is produced via a facile method, direct-moulding instead of the suspension and solidification method.

MATERIALS AND METHODS

Materials

Fly ash and calcined kaolin were selected as the starting material to fabricate the geopolymer sphere. For the alkaline activator, it was a mixture comprised of sodium silicate solution and 10M sodium hydroxide solution. Hydrogen peroxide (30 wt.%) was used as the foaming agent.

Geopolymer sphere preparation

The foamed geopolymer sphere was synthesized via direct moulding method. The fabrication process of foamed geopolymer spheres is shown in Figure 1. Firstly, the raw materials (fly ash and calcined kaolin) were mixed with the alkaline activator. Then, H_2O_2 was added into the slurry for the purpose of foaming. Upon completion of mixing, the spheres were cured in an oven at 60°C for 24 hours. After demolded, the geopolymer spheres were stored in a sealed

bag at room temperature until the respective testing ages. Non-foamed geopolymer sphere was prepared in the same manner, except the addition of H_2O_2.
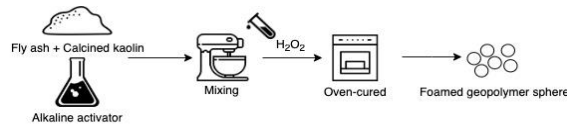
Figure 1. Schematic diagram of the production of foamed geopolymer sphere

Density and crushing strength

The bulk density of geopolymer spheres was measured by referring to BS EN 12390-7 (British Standards Institution, 2009). The equation was expressed in Eq. (1).

$$D = \frac{m}{V} \tag{1}$$

where.
D = Bulk density of geopolymer sphere, in kg/m^3
m = mass of geopolymer sphere, in kg
V = volume of geopolymer sphere, in m^3.

The crushing strength of foamed geopolymer sphere was measured by adopting the single aggregate crushing strength (Shi et al., 2019). The crushing strength of the geopolymer spheres was calculated using Eq. (2).

$$\sigma_c = \frac{2.8F_c}{\pi d_m{}^2} \tag{2}$$

where.
σ_c = crushing strength of geopolymer sphere, in MPa
F_c = maximum failure load, in N
d_m = average diameter of geopolymer sphere, in mm^2

Batch adsorption test

The batch adsorption test was performed using the non-foamed and foamed geopolymer sphere. Firstly, the geopolymer sphere was immersed into a solution contained single type of heavy metal, which was Pb(II), Cd(II), Cu(II) and Ni(II). The concentration of heavy metal was fixed at 200 mg/L. Then, it was shaken for 48 hours at room temperature. Lastly, the geopolymer sphere was removed and the final concentration of the heavy metal was determined using an inductively coupled plasma - optical emission spectrometry (ICP-OES). The removal capacity of the geopolymer sphere can be calculated using Eq. (3).

$$q = \frac{(C_o - C_{eq})}{m} \times V \tag{3}$$

where.
q = the amount of heavy metal adsorbed, in mg/g
V = the volume of synthetic solution, in L
m = the mass of foamed geopolymer adsorbent, in g

C_o = the initial concentration of heavy metal, in mg/L
C_{eq} = the final or equilibrium concentration of heavy metal, in mg/L.

RESULTS AND DISCUSSION

Bulk density and crushing strength

Table 1 tabulates the bulk density and crushing strength of non-foamed and foamed geopolymer sphere. It is observed that the bulk density and crushing strength of geopolymer sphere were significantly reduced after foaming. The reduction is attributed to the formation of pores within the sphere after foaming. Similar outcomes had been reported by Novais et al. (2016). The bulk density of foamed geopolymer sphere was found to be 980 kg/m^3, which was approximately 45.9 % lower than the non-foamed geopolymer sphere, 1810 kg/m^3. On the other hand, the crushing strength of foamed geopolymer sphere was 0.7 MPa, which was 68.2% compared to the non-foamed geopolymer sphere (2.2 MPa). The strength of a sintered ceramic water treatment filter was reported to be 0.9 – 1.7 MPa (Luukkonen et al., 2020). Nonetheless, the foamed geopolymer sphere was able to maintain its integrity after the batch adsorption testing, suggesting that 0.7 MPa strength was sufficient.

Table 1. Bulk density and crushing strength

Geopolymer sphere	Bulk density (kg/m^3)	Crushing strength (MPa)
Non-foamed	1810	2.2
Foamed	980	0.7

Heavy metal uptake

The Pb(II), Cd(II), Cu(II) and Ni(II) removal capacity of geopolymer spheres are illustrated in Figure 2. It is observed that regardless the type of heavy metals, the removal capacity of foamed geopolymer sphere was significantly higher compared to non-foamed geopolymer sphere. The Pb(II), Cd(II), Cu(II), and Ni(II) removal capacity of non-foamed geopolymer sphere was 8.60 mg/g, 8.57 mg/g, 4.09 mg/g, and 4.89 respectively. On the contrary, the Pb(II), Cd(II), Cu(II), and Ni(II) removal capacity of foamed geopolymer sphere was 26.77 mg/g, 26.14 mg/g, 24.69 mg/g, and 21.46 mg/g, respectively. The improvement in the uptake capacity was about 3 times for Pb(II) and Cd(II), 6 times for Cu(II) and 4 times for Ni(II). The increment is attributed to the more binding sites were provided after foaming. Furthermore, the mass of the foamed geopolymer sphere was reduced. This verifies that foaming can improve the heavy metal removal performance of the geopolymer sphere, and direct-moulding method was feasible approach to produce foamed geopolymer sphere. In addition, the complexity of the process was reduced as post-separation of the foamed geopolymer sphere from the solution can done effortlessly.
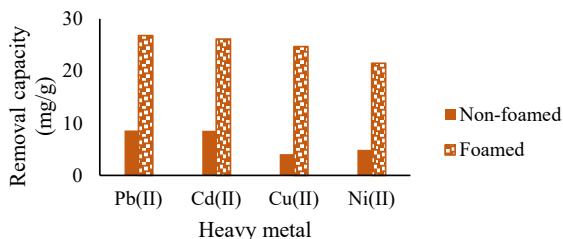
Figure 2. Heavy metal removal capacity of geopolymer sphere

CONCLUSION

Through the investigation, it is observed that the removal capacity of geopolymer sphere on Pb(II), Cd(II), Cu(II), and Ni(II) was significantly enhanced after foaming, proving that foaming can improve the specific surface area of an bulk type adsorbent. On the other hand, although the crushing strength of foamed geopolymer sphere dropped to 0.7 MPa, it was sufficient as it was able to maintain its integrity after the adsorption process. In addition, the foamed geopolymer sphere can be synthesized using waste streams or industrial by-products, and the direct-moulding method reduces the usage of additional chemicals as in the suspension and solidification method, making it more environmentally friendly. Therefore, it is concluded that this facile-fabricated foamed geopolymer sphere is a potential alternative adsorbent material.

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FINANCE AND ME (*FinME*) – A DIGITAL LEARNING TOOL

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ABSTRACT
Creating an engaging learning environment is challenging when it comes to online learning. Teaching the Fundamentals of Finance via an online platform to finance and non-finance students can be a challenging task as they are distanced from their peers and lecturers. This increases the chance of being disengaged and demotivated from the lesson. The lecturers' factual presentations are frequently dull and boring. Therefore, with the help of technology, *FinME*, a digitalized educational finance game was invented to address the issue. Students are more motivated by the added game element, as well as the excitement of thinking that they are playing instead of learning. This game can be used as a support tool in teaching the Fundamentals of Finance course and helps to boost the student's financial knowledge for better understanding and application. Students are given the opportunity to play the game on their gadgets (phones or laptops). In this game, the students are given a mission to complete and along the way they need to solve several tasks that are related to the course, as well as encounter an unexpected event that will deviate them from completing their mission. Although games cannot replace the entire teaching process, they can be integrated into the delivery of the Fundamentals of Finance course to enhance the overall learning experience.

Keywords: Finance, Digitalized Educational Game, Undergraduates

INTRODUCTION

The integration of technology into course delivery in schools and tertiary institutions is not a new trend in Malaysia. However, it has become a subject of interest among educators since the Covid-19 pandemic where teaching and learning is conducted online. Educators are forced to think and strategize their teaching in a more interactive way to create an engaging learning environment as well as to keep the students motivated. Creating an engaging learning environment is challenging when it comes to online learning.

One of the strategies that can be considered in creating an engaging learning environment is by integrating educational games into course delivery. Educational games, according to Michel (2016), are games that incorporate curriculum content or other educational materials. A study by Dorfner and Zakerzadeh (2021) found that integrating games into teaching and learning activities can increase students' engagement, participation, and increase their motivation level. Students are more motivated by the added game element, as well as the excitement of thinking they are playing instead of learning. Gamification combined with traditional learning methods can improve students' learning motivation and outcomes (Cheung and Ng, 2021). Apart from that, the use of games in education can help students become more engaged by encouraging a hands-on approach. (Zirawaga et. al., 2017). The invention of the *FinME* game could be beneficial to both parties (students and lecturers).

Therefore, the objective of this invention is to develop a digitalized learning tool that can be used as a support tool for educators in teaching the Fundamentals of Finance course. This educational finance game is also designed to help students boost their financial knowledge for better understanding and application.

METHODOLOGY

The methodology used was product testing, which allowed the inventor to collect quantitative information about user perceptions about the product. The product testing and feedback form were handed out to 33 participants, all the students taking the Fundamentals of Finance course in the current semester March-August 2021 at Universiti Teknologi Mara, Sarawak Branch, Mukah campus. Figure 1 below shows the milestone for inventing the *FinME* game.

Figure 1. Project Milestone for *FinME* game development.
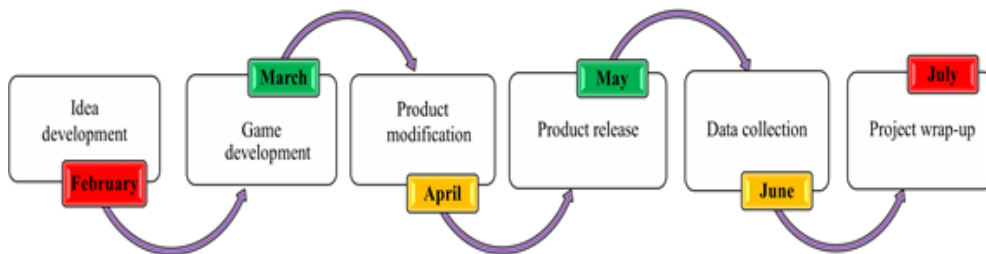
In this educational game, the students are given a mission to complete, and, along the way, they need to solve several tasks that are related to the course. Apart from that, there will also be several events that will deviate them from completing their mission. Then, the students' perceptions of the game will be further discussed.

The 15-minute briefing session was conducted to introduce the *FinME* game as a digitalized educational finance game to a group of 33 participants who are taking the Fundamentals of Finance course in current semester March-August 2021 at Universiti Teknologi Mara, Sarawak Branch, Mukah campus. After the briefing session, the students were required to download and install the game on their phone or laptop and start playing the game. The

survey form for the *FinME* game project was then distributed via Google form at the end of the session. The survey questions were adapted from Dorfner and Zakerzadeh (2021) and Cheung and Ng (2021) studies. This is intended to obtain feedback from the students on their perception of using this game as a learning tool in the Fundamentals of Finance course.

FINDINGS

The feedback from 33 participants (students) on their perceptions of this game was gathered and presented in table 1 below:

Table 1. Results in percentage (%).

	Strongly agreed	Agreed	Neutral	Disagreed	Strongly disagreed
This game was easy to follow and did not distract from the course material.	39.4	45.5	12.1	3	3
I had fun playing the *FinME* game.	54.5	27.3	15.2	0	3
This game stimulated my thinking and helped me to focus on class materials.	54.5	39.4	6.1	0	3
I am more likely to participate in class when a game is played.	45.5	39.4	18.2	3	0
In my opinion, the use of this game enables me to understand learning contents.	54.5	33.3	6.1	3	3
In my opinion, the use of this game allows me to apply my knowledge in finance.	39.4	48.5	9.1	0	3

Based on feedback, 93.9% of the students either agreed or strongly agreed that this game stimulated their thinking and helped them to focus on class materials. This shows that games can indeed increase students' engagement in online learning. Apart from that, 84.9% of the students agreed that this game was easy to follow and did not distract from the course material. Meanwhile, 81.8% of students agreed and strongly agreed that they had fun playing the *FinME* game. This game also allows students to apply their knowledge of finance (87.9%) and improve their understanding of learning content (87.8%). Furthermore, 84.9% of students are more likely to participate in class when the game is played.

CONCLUSION

Currently, lecturers are actively searching for a digitalized learning tool to improve their online course delivery. The invention of the *FinME* game for teaching the Fundamentals of Finance course could be one of the options. The feedback obtained from 33 students that had experience playing the game could shed light on how integrating this game into course

delivery can create an engaging learning environment. This is the first version of this game therefore; limited topics were considered. For the future version, the content can be updated. Although games can't replace the whole process of teaching, it is hoped that this invention (the *FinME* game) can be integrated into the delivery of the Fundamentals of Finance course to enhance the overall learning experience. Besides that, non-finance students and the public can also benefit from it for self-improvement.

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FUN WITH MATHEMATIC AND ORIGAMI: WATER LILY ORIGAMI

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ABSTRACT

Ethnomathematics is related between culture and mathematics. Generally, culture affect mathematics, as does mathematics affect culture. In this paper, to show the relations between culture and mathematics, the origami of water lily model and the basic concept of geometric such as symmetrical line and angle is discussed. Origami is an art originally from Japan that represent an interesting geometric construction due to their simplicity and technique by using properties of origami. For origami making methods, the basic folding method needs to be known. Manually, design of origami begins with a square paper, but by using different version, origami's properties and basic making of origami will be discussed graphically. To shape the base of water lily origami, the maker needs to satisfy all the properties to show that the origami model can be constructed just like constructingusing straight-edge and compass. The aim of this study is to create a base for water lily origami by using Treemaker and Reference Finder software. At the same time, symmetrical line and angle of origami must be ensured exactly so that the model formed is balance and real. Generally, for this model of origami, two properties of origami have been determined that is involving four basic symmetrical line and two basic angle that is 45º and 90º. Clearly mathematical knowledge is extensive, there are no limits.

Keywords: Origami, Water Lily Model, Angle, Symmetrical Lines

INTRODUCTION

Ethnomathematics defined by the study of mathematics which takes into consideration the culture in which mathematics arises. It also can be defined by a research discipline where it explores the relationship between mathematics and culture as we can see from the research or study that have been done. These studies teach us that mathematics is not a culture free and all those mathematical ideas are incorporated and culturally embedded in the games, the music, and all activities of all cultured are studied. Malaysia is famous with the variety of culture because of the multiracial. One of Japanese culture that exist in Malaysia was origami, the most recreational art of Japanese for centuries. Origami is known as paper folding is from Japanese word where "Ori" means folding and "Kami" means paper. But "Kami" has been

changed to "Gami" due to rendaku (Merali, 2011). Design of origami begin with a square paper. Figure 1 show the way how origami of water lily model is made manually, but to make it graphically and to check the relations of this model with basic concept of geometry, Treemaker and Reference Finder is applied.
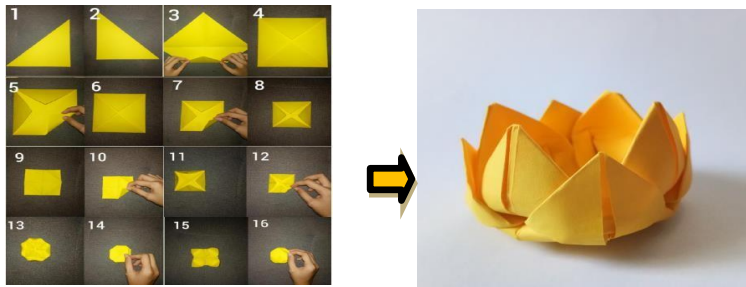
Figure 1. Manual Technique to Make Origami of Water Lily by Using a Paper

METHODOLOGY

There are two main steps apply to this project.

1.   Identify the properties of water lily origami

There are many types of origami. The classification of origami is depending on the model such as flora and fauna. The difficulty of the origami makes it interesting to studied. For this research, water lily is chosen. To understand the origami's construction, the understanding about some basic folds are required. Manually, to create an origami, all the properties must satisfy to show that the origami model can be construct just like constructing using straight-edge and compass. So, to build it graphically, the same properties must be fulfilled. Same properties are applied to create the base of origami for water lily origami model by using TreeMaker and Reference Finder.

2.   Application of Treemaker and Reference Finder Software

To form a base for water lily origami model, two types of software is applied which are TreeMaker and Reference Finder. This two software is applied to produce the crease pattern of base of the model and to find the number of symmetry line and angle of the water lily model. Treemaker software is used to design the base of the origami, while Reference Finder will help to generate the origami model for water lily. Specific value of angle for the model of origami must be set and the existence of symmetrical line is recorded. This process has steps that must be followed in detailed.

RESULTS AND DISCUSSION

To construct the origami manually and graphically, there are five (5) properties that are implanted.
a)   The point of intersection of any two non-parallel lines in L is a point in P.

b)   Given any two distinct points in P, there is a line L going through them.
c)   Given any two distinct points in P, the perpendicular bisector of the line segment with given end points is a line in L.
d)   If L1 and L2 are lines in L, then the line which is equidistant from L1 and L2 is in L.
e)   If L1 and L2 are lines in L, then there exists a line L3 in L such that L3 is the mirror reflection of L2 about L1.

A line L is draw on a square paper and one edge was picked and labelled as P. The others two edges are labelled as P1 and P2 which is on the line L. From property (b) lines L1 and L2 are constructed where it touches a point P1 to P and P to P2 respectively. By using property (e), L1 and L2 are reflected across L and L3 and L4 were obtained. The intersection of L3 and L4 are constructed by using property (a) and line L5 that goes between that point and P has been found by property (b). In addition, the line L5 intersect L at point P3, according to property (a). Next, perpendicular bisector are constructed to $\overline{PP3}$ by using property (c). The result is shown in Figure 2.
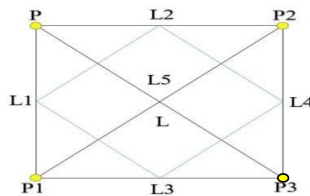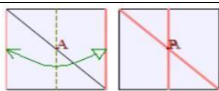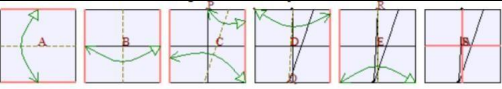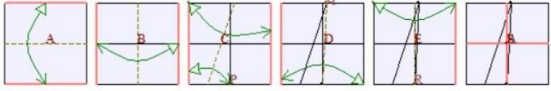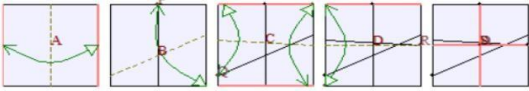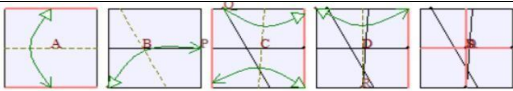
Figure 2. Construction of Line and Points Using Origami Properties for Water Lily Base

To form a base for origami of water lily graphically, two types of software are applied, that is TreeMaker and Reference Finder. Treemaker software is used to design the base of the origami while Reference Finder helped generating the origami model for water lily.

To obtain an accurate way of folding the base, folding tests using Reference Finder were made. Reference Finder software reports the absolute error in distance (accurate way of folding the base), rank that is stand for the number of folds, and the sequence of actions needed to construct the desired reference mark. After a few times of test applied, result is obtained and recorded as Table 1.

Table 1. Result from Reference Finder by using Different Coordinates

Way of folding by Reference Finder	Coordinate of Target Point	Error
Solution (0.5000,0.5000): err = 0.0000 (rank 2) Fold the right edge to the left edge, making line A. The intersection of the downward diagonal with line A is point P. Number of folds: 2	(0.5,0.5)	0.0000
Solution (0.5008,0.5000): err = 0.0008 (rank 5) Fold the top edge to the bottom edge, making line A. Fold the right edge to the left edge, making line B. The intersection of the top edge with line B is point P. Bring the bottom right corner to the left edge and the right edge to point P, making line C. The intersection of the bottom edge with line C is point Q. Bring the top left corner to the right edge, making line D. The intersection of the top edge with line D is point R. Bring the bottom right corner to the left edge, making line E. The intersection of line A with line E is point S. Number of folds: 5	(0.5008,0.5000)	0.0008

	(0.4992,0.5000)	0.0008
Solution (0.4992,0.5000): err = 0.0008 (rank 5) Fold the top edge to the bottom edge, making line A. Fold the right edge to the left edge, making line B. The intersection of the bottom edge with line B is point P. Bring the top left corner to the right edge and the left edge to point P, making line C. The intersection of the top edge with line C is point Q. Bring the bottom right corner to the left edge, making line D. The intersection of the bottom edge with line D is point R. Bring the top left corner to the right edge, making line E. The intersection of line A with line E is point S. Number of folds: 5		
Solution (0.5000,0.4989): err = 0.0011 (rank 5) Fold the right edge to the left edge, making line A. The intersection of the top edge with line A is point P. Bring the bottom right corner to point P, making line B. The intersection of the left edge with line B is point Q. Bring the top right corner to the bottom edge and the top edge to point Q, making line C. The intersection of the right edge with line C is point R. Bring the bottom left corner to the top edge, making line D. The intersection of line A with line D is point S. Number of folds: 5	(0.5000,0.4989)	0.0011
Solution (0.4989,0.5000): err = 0.0011 (rank 5) Fold the top edge to the bottom edge, making line A. The intersection of the right edge with line A is point P. Bring the bottom left corner to point P, making line B. The intersection of the top edge with line B is point Q. Bring the bottom right corner to the left edge and the right edge to point Q, making line C. The intersection of the bottom edge with line C is point R. Bring the top left corner to the right edge, making line D. The intersection of line A with line D is point S. Number of folds: 5	(0.4989,0.5000)	0.0011

For this base of origami model, only two folds are needed. Different ways shown by Reference Finder are using different coordinates. It changes the point of line x and keep the original point for line y and vice versa. Therefore, the first ways of folding are chosen because it has the smallest value of error. The target point of the fold satisfied the base of water lily model that had been constructed manually and by using Treemaker software.

After ensuring the correct way of folding, an origami model can be formed. At the same time, lines of symmetry and folds angles can be identified. The results that obtained after going through several steps by using Treemaker is shown in Figure 3.
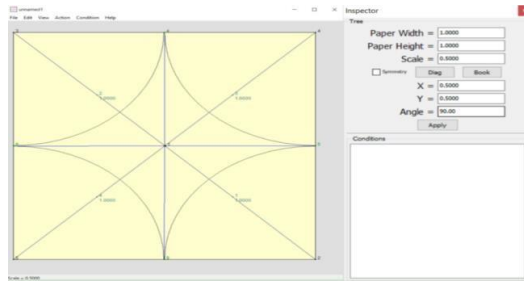
Figure 3. Full Crease Pattern of Base for Water Lily by Treemaker

These results form from four different terminal nodes with four different coordinates and different scale of lines. All this characteristic is built up based on the properties of origami as Figure 2. At the same time, number of symmetrical lines also can be observed from Figure 3.
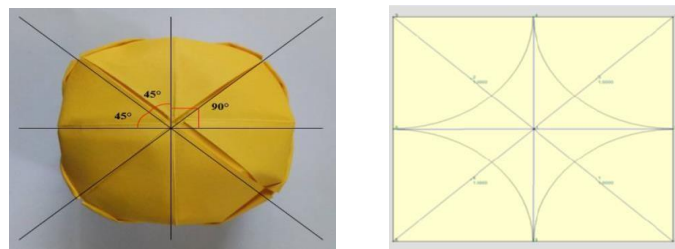
Figure 4. Position of Symmetrical Line and Angle of Water Lily Origami

Generally, for this model of origami, two properties of origami have been determined that is involving four basic symmetrical line and two basic angle that is acute angle and right angle, 45º and 90º respectively. Clearly mathematical knowledge is extensive, there is no limits, no boundaries in understanding and apply all knowledge in our daily routine. As the conclusion, origami is an art and it is one of the cultures that show the relations between an art and mathematical knowledge. Origami is not only a piece of paper that can be folded, but every single step to make an origami are related to mathematics.

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FUND FOR FOOD: A CAMPUS FOOD PANTRY TOOLKIT TO HELP FIGHT HUNGER ON CAMPUS

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ABSTRACT

Inadequate financial resources have led to food insecurity among students at higher institutions due to the increase in study fees, house rental costs, and food prices. As such, the increased living standards and price of goods are among the factors influencing food insecurity among university students. In fact, hunger and food insecurity are evident in this day and age, even on college campuses. Since college meal plan for students is especially too expensive for low-income students to bear, some students are forced to engage in part-time jobs to earn extra income for food and other expenses. This also includes living on a shoestring budget as college education becomes less affordable for university students. In view of these problems, campuses have recently established food pantries to help students. However, running a campus food pantry requires careful planning and a dedicated team of leaders and volunteers; hence, this study aims to provide a food pantry toolkit as a guideline to solve hunger and food insecurity among university students by setting up food pantries on campus to provide food and other essentials to the students in need. Depending on the campus, this program is run by the student government, other student organizations, or administrative departments such as the Office of Student Affairs. The food pantry toolkit should comprise the following facets: i) demonstrating the need for food pantries on campus by surveying the university students, faculty, and staff members; ii) community partnership through a fiscal sponsor and potential groups or companies as community partners; iii) setting up of space, equipment, and storage depending on the type of food to be distributed; and iv) food safety procedures via training and safe food handling provided to the volunteers. Considering the new-developed toolkit to fight hunger on campus as the innovation novelty of this study, universities in Malaysia are, therefore, expected to become a driving force in improving food insecurity by implementing the On-Campus Food Pantry Program to help ease student hunger.

Keywords: food pantry, toolkit, student hunger, campus, university student

INTRODUCTION

An increase in the standard of living and price of goods is one of the factors that influence insecurity food among university students. Collage meal plans for students are often too expensive, especially for low income students. Hunger and food insecurity are realities everywhere even on college campuses. As a college education becomes less and less affordable, more students are forces to live on a shoestring budget. In recent years, this problem has prompted many campuses to established food pantries to help students in need.

Problem Statement

Students are difficult to support themselves while they were also paying for college. The literature suggests that the rate of food insecurity among college students is 1.5-4 times greater than the national average. Four out of five students work part-time jobs, averaging 19 hours per week while attending college.

Research Objective

The purpose of this study is to produce the toolkit that provides the resources that the student government needs in order to create and operate a successful food pantry on campus.

FOOD PANTRY TOOL KIT CONTENT

Innovation novelty: New toolkit and practice to fight hunger on campus

Advantage:
- Provide nourishment to people in need and it really does help.
- Help students enhance their leadership skills, social and soft skills through student enterprise program
- Free up funds to be spent for other purposes.
- Students from low-income families are provided food, they have additional money to meet other basic needs.

Table 1. Description of Food Pantry Toolkit

NO	TOOLKIT CONTENTS	DESCRIPTION
1.	FORM A STUDENT ENTREPRISES	- Student enterprise/company will help students to manage this food pantry efficiently
2.	COMMUNITY PARTNERSHIP	- Establish a relationship with the sponsor to have fundraising, donations, or discounted products.
3.	SETTING UP SPACE	- equipment and storage supplies - waiting is - secure storage - sample floor plan
4.	FOOD SAFETY PROCEDURES	- basic hygiene - food storage - food packing - cleaning

FOOD PANTRY TOOLKIT:

Figure 1. Food Pantry Toolkit

MODEL FOOD PANTRY:
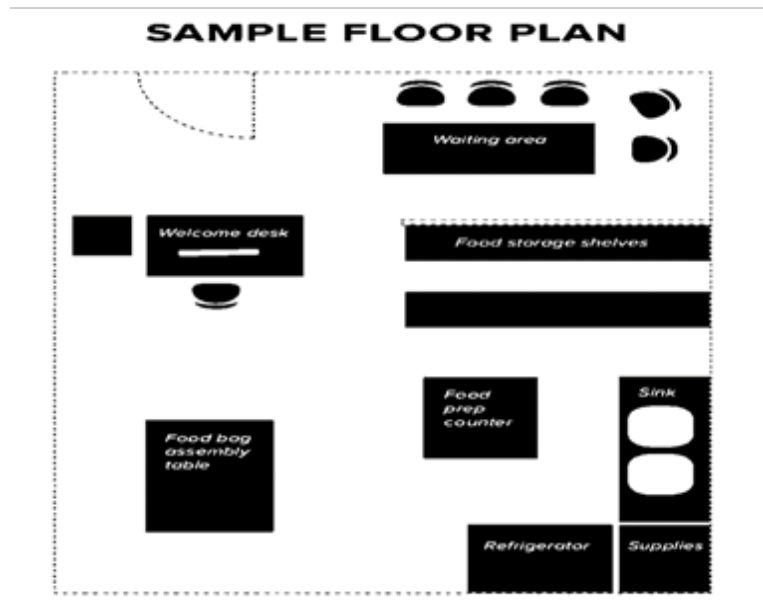
Figure 2. Sample Floor Plan

COMMERCIALIZATION:

Figure 5. UMK Food Pantry

STUDENT COMPANY:

A student enterprise will help students to manage all the programs efficiently.

Commercial Value

- Fund for Food is a complete guideline to guide implementation activity for universities/ College to start their food pantry program.
- This project can be a great opportunity for UMK to offer consultation projects on a food pantry in campus or other agency.

Importance to Education

- Fund for Food: Complete Guide to Fight Hunger on Campus is important to our education system to help B40 students to survive in their campus life.
- By providing enough food for students in need, it can help to enhance their academic performance
- The concept of "Student help Student" was one of the initiatives to guide the student to enhance their personal value and soft skill, as well as to produce first class students with good manners and performance.

CONCLUSION & RECOMMENDATION

In conclusion, universities in Malaysia are expected to become a driving force in improving the Food Bank Program by implementing On-Campus Food Pantry Program to help ease student hunger. The Fund for Food: Complete Guide to Fight Hunger on Campus could be

the best guide to start an on-campus food pantry.

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EDIBLE COOKIE CUP: CUPPA COOKIE

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ABSTRACT

Based on the research that we have conducted, the article concludes that plastic cup consumption is increasing in our daily lives. Many Malaysians enjoy drinking Starbucks coffee or any other sort of coffee brand on a daily basis. This will result in an increase in plastic waste generated by Malaysian consumers. As a result of this problem, we decided to create Cuppa Cookies, often known as edible cookie cups. Following that, Cuppa Cookies is an alternative effort to reduce disposable cup usage in Malaysia. This edible cookie cup is a one-of-a-kind way to present beverages and sweet treats together. We noticed that our product can provide benefits to the consumer and also can give a positive impact on the environment. Additionally, our product, which is Cuppa Cookies, is made with premium quality cookie dough and comes in two flavors: premium classic cookie and premium dark chocolate cookie. Next, our product is safe for people of all ages to consume because we do not use any harmful ingredients. Besides, Cuppa Cookies are excellent for people who wish to maintain a healthy lifestyle because they offer dark chocolate flavors. Furthermore, the consumer could enjoy any beverage in Cuppa Cookies, then they could eat the cup once they finished their drinks. Next, we also create a cup lid out of cookies to prevent water spillage and we also provide a biodegradable cup sleeve at the bottom of the Cuppa Cookies to maintain the hygiene of our product. Lastly, the most important part is Cuppa Cookies does not alter the flavor of beverages due to the fact that we use premium quality cookie dough.

NOVELTY AND ORIGINALITY

Our product is called Cuppa Cookies which is known as edible cookies cup. We came up with this idea after observing that Malaysian citizens enjoy drinking Starbucks coffee, or any other coffee brand, at any time and anywhere, to boost their energy levels during the day. As a consequence, many plastic wastes have been generated from this issue. As a result, we decided to launch this product which is Cuppa Cookies, in order to help Malaysia reduce its reliance on plastic consumption. Additionally, our product novelty is essentially made from a premium quality cookie dough that is less brittle. This cookie cup is designed in such a way that the customer can easily eat it after they have finished their beverages. Besides, cuppa cookies also can be consumed by all ages because we do not use any harmful ingredients and it is ideal for those who are concerned about their health. This is because we provide two types of flavors such as premium dark chocolate cookies and premium classic cookies. Additionally, we create a cup lid out of cookies to prevent water spillage. Additionally, our product does not alter the flavor of beverages due to the fact that we use premium quality cookie dough. Lastly, Cuppa Cookies come with a biodegradable cup sleeve at the bottom of the cup. This is to ensure the hygiene of our product.

USEFULNESS

Malaysia is ranked eighth worst in the world by Academic Journal Science for its plastic waste issue. Malaysia produced about one million tonnes of plastic waste in 2010, with an estimated 370,000 tonnes washing into the ocean. Plastic usage is considered normal since we use it on a daily basis for items such as plastic cups, straws, water bottles, and bags. However, plastic waste poses a significant environmental threat due to its high concentration of toxic chemicals, which wreak havoc on the ecosystem through air, water, and land pollution (Abdullah, 2018).

In Malaysia, our love for coffee and other takeaway products results in a massive use of plastic packaging, particularly disposable cups. Most cafes, stalls and restaurants provide disposable cups as a takeout packaging option. For instance, Starbucks, the most popular coffee chain in the world, uses more than 8,000 coffee cups per minute, which adds up to four billion a year (Perry, 2021). The majority of disposable cups are not biodegradable due to their polyethylene lining, which renders them unrecyclable and most likely to end up in landfills. Therefore, we created Cuppa Cookies as an alternative effort to reduce disposable cup usage in Malaysia. This edible cookie cup is a one-of-a-kind way to present beverages and sweet treats together. These delectable decorations are both practical and innovative and will be loved by children and adults worldwide. It is the future of sustainability through the medium of food.

APPLICATION TO ALL LEVEL

Benefit to the environment

Cuppa Cookie is an edible cup that can be composted which removes the traditional waste cycle and does not require recycling. This alternative contributes to pollution prevention by

reducing the amount of new raw materials used and the amount of waste that must be recycled or transported to landfills and incinerators which contributes on keeping the environment cleaner and healthier. It is completely biodegradable and will not clog landfills or recycling facilities, nor will it degrade into microplastics in our soil.

Benefit to the community

Cuppa Cookie has created a ready to go edible cup that can be eaten while drinking coffee. This cup not only enhances the flavour of the beverage, but also provides nutritional benefits, particularly the Dark Chocolate Cookies flavour, which is high in antioxidants and minerals. This alternative will substantially benefit the community, as the chemicals and processes used to create plastic cups expose customers to various health concerns and diseases. Although the cost of manufacturing this edible cup is relatively high, it will be highly beneficial to the consumer's health and enhance them with new experiences. (Kumar et el., 2021)

COMMERCIALIZATION VALUE

Product

Cuppa Cookies is an edible cookie cup that comes in two flavours, which are Classic Cookies and Dark Chocolate Cookies, providing a healthy way to enjoy the cookie cup. Cuppa Cookies are constructed of premium quality cookie dough that acts as an insulator, keeping the cup waterproof and less likely to shatter. We topped the Cuppa Cookies with a cookie lid to prevent spillage. Furthermore, because we utilize premium quality cookie dough, our product does not change the flavour of beverages. A biodegradable cup sleeve is also included with Cuppa Cookies. This is to verify that our product is clean. Cuppa cookies come in a standard cup size of 12 ounces (355 ml). For both kids and adults, these delightful tiny snacks make fantastic party food!

Price

Cuppa Cookies employs a cost-based pricing approach, which is the process of calculating pricing based on the cost of the products or services being sold. The cost of an item is increased by a profit percentage or a set profit number, resulting in the price at which it will be sold (Cost-based pricing definition — AccountingTools, 2021). Cuppa Cookies are RM15 a roll at cost, but they are marked up by up to 50%. Cuppa Cookies are sold by the roll, whichcontains 5 pieces of cup, for RM30.00, but we also sell by box for our customers who want tobuy in high volume. Each box contains ten rolls. Both flavours of Cuppa Cookies are at the same price.

Place

Cuppa Cookies are a business to business (B2B) product or service that one company offers

to another company. Because we are targeting beverage firms, we distribute Cuppa Cookies at cafés, restaurants, and stalls similar to coffee shops. These terms refer to the positioning of a product in certain stores, as well as the placement of the product on a specific store's display.

Promotion

The term "promotion" refers to the act of connecting with clients. Cuppa Cookies uses a variety of promotional tactics, including internet advertising and e-commerce sites like Shopee and Lazada. Furthermore, sales promotions are short-term incentives used to persuade people to buy or sell a product or service. We also have a special offer for customerswho purchase more than 10 rolls of Cuppa Cookies and receive a discount.

STATUS OF INVENTION / INNOVATION

As indicated by the World Bank, in 2016, 242 million tons of plastic waste was produced worldwide, which is 12% of all city strong waste. In the event that the removal of plastic waste is not controlled, it will bring about the arrival of synthetic compounds that will cause contamination and illness. Synthetic compounds delivered from consuming plastic will harm human interior organs. Woodland biological systems, waterways, and sea water, just as creatures, get hurt because of plastic garbage removal and unmanaged squander.

We came up with the idea of Cuppa Cookies after observing that Malaysians who enjoy drinking Starbucks coffee, or any other coffee brand, at any time, anywhere, commonly will just throw away the plastic and paper cup after finishing the drink. With Cuppa Cookies, we stressed on drinking your coffee, and then eating your cup. That is the furthest down the line endeavour to change current take-out culture, which typically accompanies an accidental side request of junk. The Cuppa Cookies is made of premium quality cookie dough that works as an insulator making the cup waterproof and less prone to breaking. We set the Cuppa Cookieswith a cookie lid to make sure that no spillage occurs where the lid can also be eaten. Our future users do not have to worry in terms of taste because the use of these cookies will not change the taste of the coffee or beverages ordered. Cuppa Cookies provide biodegradable cup-sleeves to guarantee neatness is kept up with. As a result, clients won't have to worry because cleanliness will be improved with this biodegradable cup sleeve.

Since the cup is not yet on the market, we believe that our new innovation idea can create advantages and contribute to the good of the environment. Milk and cookie cups are the best way to enjoy both cookies and milk together in one recipe. This is a charming and tempting meal that is also enjoyable and kid-friendly.

Figure 1: Cuppa Cookie

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GTNLARM21

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ABSTRACT

The name of our project is GTNLARM21. Based on the name itself, it is a combination of Glyceryl Trinitrate (GTN) medication and alarm technologies. GTN is a common medication that is used to relieve the pain from a heart attack. In this project, we used some technologies that consist of ESP32 TTGO Microcontroller, buzzer, resistor, jumper wires, breadboard, LED, HC-05 Bluetooth module, and LILYGO®TTGO T-Watch-2020 ESP32. These technologies will be set up on GTN bottles and will deliver a beep sound when it detects a spike of the heartbeat (more than 100 beats per minute) which indicates a heart attack to be happening. Patients with heart attacks must always bring their GTN medication no matter where they are going because heart attacks can happen anytime and anywhere. The main purpose why we came out with this project is to provide early prevention of heart attack as the beeping alarm will make the user or person around the user be more alert and immediately can take the medication. This action can decrease the chances of the user getting a cardiac arrest or sudden death. Therefore, the GTNLARM21 is one of the solutions that are expected to prevent this incident from happening. The cost of our project is in the range of RM350.

Keywords: GTNLARM21, Glyceryl Trinitrate, heart attack, ESP32 TTGO Microcontroller, LILYGO®TTGO T-Watch-2020 ESP32

INTRODUCTION

According to the World Health Organization (WHO), In 2016 an estimated 17.9 million people died from Chronic Vascular Disease (CVD) which represents 31% of all global deaths while 85% of these deaths are due to heart attack and stroke. This shows that a heart attack is very dangerous because it is unexpected and can happen anytime and anywhere. The mechanism of the heart attack is when the coronary arteries were blocked by the plaque and eventually rupture, which can cause the lumen of the coronary arteries to become fully occluded and poor blood supply to the affected myocardium (heart muscle). In this stage, the patient will develop

severe pain as the myocardium is suffering from ischemia and necrosis of tissues (death tissues). (Lemone et al, 2011). Glyceryl Trinitrate or GTN is the common medication that helps to relieve pain from a heart attack. If the GTN is taken late or not taken at all while patients are having a heart attack, the patient will develop a cardiac arrest and if left untreated they could die. The GTNLARM21 is a product that helps patients receive their medication faster and on time as it makes an alarm (beeping sound) when detecting a patient's abnormal heart rate (more than 100 beats per minute) by the link from the smartwatch. The smartwatch will detect the abnormal heart rate and send a signal to the sensor located at the bottom of the GTN cap bottle to beep. This alarm will alert the patient or people surrounding the patient about the immediate time to consume the GTN table. This product has a significant impact on the medical health context as this product has the potential to improve patients' heart conditions as well as their quality of life.

PROBLEM STATEMENT
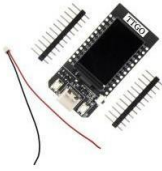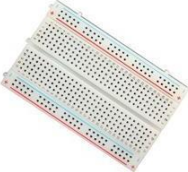
WHO stated that many people die due to chronic vascular disease (CVD). One of the common Chronic Vascular Diseases is heart attack. Heart attack is a very dangerous disease because it can happen anytime and anywhere. As we know, one of the treatments or management of heart attack is by taking Glyceryl Trinitrate (GTN). However, when a heart attack happens, the patient may be in a very painful and panic situation which can cause slow action for the patient, and they may collapse without even getting to take his or her medication. Thus, we are called to design this product called GTNLARM21 which can provide early precaution when a heart attack is about to happen not only to the patient itself, but it will also alert the people surrounding the patient at that time. This product which is a combination of the latest technologies has the ability to reduce the mortality and morbidity rate resulting from heart disease. This product targets people who are on GTN medication, especially elderly or disable patients with a history of heart attacks.

EXPLANATION OF PRODUCT

This product consists of a combination of Glyceryl Trinitrate (GTN) and an alarm with the purpose of alerting people when heart attacks are about to happen. The alarm will be connected to the smartwatch by Bluetooth and whenever the smartwatch detects an abnormal heart rate that indicates a heart attack, the GTN bottle will beep an alarm. GTN is one of the medications that can help relieve the pain from the heart attack as well as prevent further complications resulting from the heart attack. If a person is about to have a heart attack, his/her heart rate will gradually increase accompanied with chest pain, when the person starts to experience this event, they are encouraged to take the GTN immediately. Failure to consume the GTN on time and correctly will cause a patient to become unconscious and can lead to serious complications including death. Elderly or disabled persons with a history of heart attack might have the possibility to delay in consuming their GTN hence, increase the chances for severe complications including death. Therefore, to prevent this event from happening, GTNLARM21 is designed to alert the patient, and people around the patient to be more ready at an immediate time to consume the table GTN.

The technologies used in this product are ESP32 TTGO Microcontroller, buzzer, resistor, jumper wires, breadboard, LED, HC-05 Bluetooth module, and LILYGO®TTGO T-Watch-2020 ESP32. Firstly, a patient is required to have the LILYGO smartwatch ready (need to set

up the smartwatch and GTN bottle to make sure they are connected). The smartwatch will detect the abnormal heart rate (more than 100 beats per minute) and send a signal to the sensor located at the bottom of the GTN cap bottle to beep.

Figure 1.1 ESP32 TTGO Microcontroller	Figure 1.2 Buzzer	Figure 1.3 Resistor	Figure 1.4 Jumper Wires
Figure 1.5 Bread board	Figure 1.6 LED	Figure 1.7 HC-05 Bluetooth module	Figure 1.8 LILYGO®TTGO T- Watch-2020 ESP32
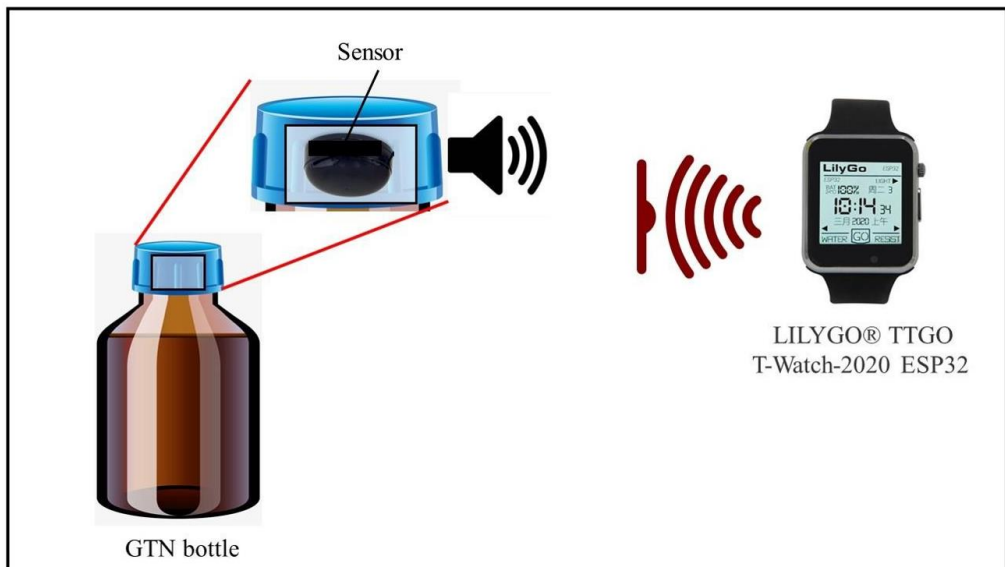
Figure 1.9

BENEFITS OF THE PRODUCT & COMMERCIAL PRICE

The benefit of our product is to alarm and alert those who are diagnosed with a heart attack. This product acts as an early precaution for those who are diagnosed with a heart attack to become alert of the coming heart attack. They can consume their GTN medication right away when a heart attack happens. This can avoid any harm to themselves such as an incident of dying on the scene immediately. We do not know whether if we call the ambulance, they will arrive right away. Sometimes, it will take more time because of other factors such as traffic jams or something else. Therefore, our group makes innovations such as GTNLARM21. The cost for the development of this product is about RM 350. This includes the cost of total items or components in GTNLARM21, the cost of electrics, and the cost for commercial purposes. The proposed commercialized price is RM45 per item and the price is still subject to change and needs careful consideration in many aspects.

The following table is the total cost of items or components needed in making GTNLARM2:

Item	Cost
ESP32 TTGO Microcontroller	RM 65.90
Buzzer	RM 1.00
Resistor	RM 1.00
Jumper Wire	RM 4.60
Bread board	RM 2.50
LED	RM 1.00
Bluetooth Module	RM 14.00
LILYGO® TTGO T-Watch-2020 ESP32	RM 191.60
Total Cost	RM 281.60

ACKNOWLEDGEMENTS

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GULALI PANDAN

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ABSTRACT

Gulali Pandan is a product innovated from a candy known as *tepung seman* in Malaysia. The product is a small, bite-sized candy infused with *pandan* leaf in order to extract its flavour, colour and aromatic properties. The objective of this product is to enhance the original plain candy with *pandan* flavour, use a natural colourant for the appeal, providing a non-messy eating experience while also enlightening the value of *tepung seman* in other states and expressing cultural identity to outsiders. The product is a combination of *pandan* flavoured candy, tuile and crushed peanuts with salted caramel granules. The candy is stretched repeatedly by hand to form thin strands, the tuile cookie is baked and formed into a cup shape while the salted caramel is melted, harden and crushed together with peanuts. All of the components are assembled and the finished product is produced. The sensory properties of Gulali Pandan were tested on 30 panels and measured using the Hedonic Test. The evaluation is based on appearance, aroma, colour, sweetness, flavour, aftertaste and overall acceptability. Three variations were presented; (A) natural *pandan* colour and flavour, (B) artificial green colour and *pandan* flavour, and (C) natural *pandan* colour with artificial *pandan* flavour. The result has shown that sample A is favoured by most repondents. The target market is children, family and tourists. Itis unique for its attractive appearance, convenient eating, natural flavouring and suitability as gift or souvenir.

Keywords: *Gula Tarik, Semang, pandan* flavour, candy, sweet treat, Southeast Asia.

INTRODUCTION

Gula Tarik is well known especially in the east coast region of Malaysia. Originally, it is called *Tepung Seman* but because of the differences in dialect, they are called as *Semang* in Terengganu, *Seme* in Kelantan and *Sema* in Pahang. *Gula Tarik* is more of a modern name

given to this sweet delightful candy. Not to mention, this sweet treat is very popular all around the world and called by many different names. In Malaysia, this candy is usually given as a gift for tourists as it is popular for its eye-catching appearance [7]. It mainly consists of only four ingredients which is sugar, corn syrup, water and rice flour [8]. Food colouring is usually added to make the candy more appealing. The candy is either eaten on itsown or with added filling such as crushed peanuts and coconut flakes. Both children and adults enjoy this candy as the thin strand of sugar melts in the mouth when it is bite through [4]. The innovation of this product is developed to give the candy a different identity from therest of the other ones made in other countries. The innovators intend to enhance the original candy using *pandan* flavour. The colour of the candy will be derived from the *pandan* leaf itself instead of using food colouring. At the same time, the candy will enhance the real taste of *pandan* as it is more flavourful and aromatic compared to the artificial ones. Moreover, thecandy produced will be able to showcase the element of Malay culture using the *pandan* flavour which is a common flavouring ingredient fondly used in Malaysia and other Southeast Asia countries [3]. Furthermore, eating the candy can be a bit messy but with the addition of tuile cup holding the candy, it can be easily eaten without leaving crumbs all over.Even though *Gula Tarik* is a popular sweet treat in the east coast region of the country, they are still undervalued and sometimes unknown in other states [5]. Therefore, the innovators also aim to elevate this candy as one of the commonly known sweets made by *pandan* such as*kuih putri salju pandan* and *semprit pandan*.

MATERIAL AND METHODOLOGY

Material

The ingredients needed in producing Gulali Pandan are all obtained from the local market. Each part is made from scratch. Table 1 shows the percentage of the ingredients used in making the product.

Table 1. Percentage of ingredients

INGREDIENT	PERCENTAGE (%)
Rice flour	36.8
Sugar	20.3
Glucose syrup	5.5
Pandan	4.6
Water	3.7
Egg whites	4.0
Salted butter	9.2
All-purpose flour	11.8
Vanilla extract	0.2
Peanut	3.7
Salt	0.2

Methodology

a. Preparation of candy
Sugar, glucose syrup and *pandan* water (*pandan* leaves blended with water and filtered) are boiled together in low heat until it forms into the desired texture. Mixture is cooled and formed into a donut ring. The ring is stretched repeatedly and folded until it turns into thin hair-like strands [2].

b. Preparation of filling

Sugar is stirred constantly in a saucepan with medium heat. Once melted, salted butter is combined and added with salt [6]. Mixture is cooled and crushed to turn it into granules. Then, crushed peanuts are added to the granule mixture.

c. Preparation of tuile cup

In a bowl, sugar and egg whites are whisked together. Then, flour and vanilla extract is addedinto the mixture. Refrigerate for 4 hours. The batter is spooned and spread onto a non-stick baking mat. The batter is baked in the oven to 165cº for 10 minutes. Lastly, the cookies are taken out quickly and pushed into a small muffin mould, turning it into a cup-shaped cookie [1].

d. Assemble

The filling is placed into the cup and added candy on top.

Sensory Analysis

The sensory properties of Gulali Pandan were measured using the Hedonic Test. Evaluationof customers' acceptance are identified based on the appearance, aroma, colour, sweetness, flavour, aftertaste and overall acceptability. Three variations were made. Sample A contains natural *pandan* colour and flavour, sample B contains synthetic green colour and synthetic *pandan* flavour and sample C contains natural *pandan* colour with synthetic *pandan* flavour. The 30 panels involved are each presented with three coded samples and a score card. The score card displays a 9-point hedonic scale, anchored from "dislike extremely" to "like extremely". The sensory evaluation procedures were explained to the panels beforehand. They are also asked to read the instruction and details to get a clear perspective of the test. Once done, the results are keyed-in the Microsoft Excel to calculate the average mean score and shows the most preferred sample among the panels.

RESULT AND DISCUSSION

Product Characteristic

Figure 1. Individual pack

Figure 2. Family pack

Figure 3. The product

Figure 4. Content in individual pack

Figure 5. Content in family pack

CONSUMER ACCEPTANCE

Sensory Evaluation Result
The table and figure below show the overall result of the sensory evaluation test.

Table 2. Mean score of the three variations of Gulali Pandan

	Sample A	Sample B	Sample C
Appearance	7.03	7.36	6.76
Aroma	6.9	6.83	6.83
Colour	6.76	7.1	6.66
Sweetness	7.5	7.06	7.16
Flavour	7.23	6.83	6.9
Aftertaste	7.13	6.9	6.6
Overall acceptability	7.43	7.13	6.96
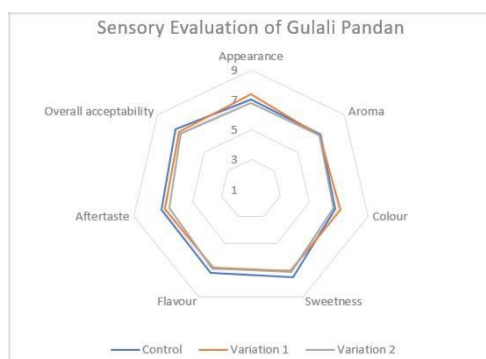
Figure 6. Radar chart of the three variations of Gulali Pandan

Discussion

Based on the result, the differences between the three variations were obtained to find out which sample was the most preferable among consumers. For the appearance and colour, sample B had the highest level of preference because using food colourant, the green colour is more vibrant which made it stands out compared to the other two. For the aroma, sample A was the highest while sample B and C had the same mean score. This is because sample A uses *pandan* leaves which gave out a more natural aromatic *pandan* smell. For the sweetness, it showed that sample A was most preferable, followed by sample C and sample B in the last place. For the flavour and aftertaste, sample A had won again because using the *pandan* leaves, it brought out the authentic *pandan* flavour which sample B and C did not have with their artificial flavouring as it gave out a slight chemical-like taste. Taking everything into account, the overall acceptability had shown that sample A was the most favoured by respondents.

CONCLUSION

To conclude, the most preferred variation is the one utilizing *pandan* leaf for both flavouring and colouring. The test held had proved our point that the natural *pandan* is enough to

enhance the taste and appearance of the candy. Gulali Pandan is convenient to eat as it is bite-sized and leaves no mess while eating. This product has a more attractive appearance as it set out a different look from the other candy on the market and it is suitable for souvenirs as the family box exhibits a premium look. Not to mention, the natural colour and flavour extracted from the *pandan* leaf will give customers the full experience of enjoying the taste of authentic*pandan*. The product will also be good at expressing our cultural identity to the international tourists as *pandan* is a unique plant that is well-known and mostly found in Malaysia and other Southeast Asia country. However, continuous research and development (R&D) has to be taken to ensure a more refined product will be produced and the improved ways will be successfully implemented in the future.

ACKNOWLEDGEMENT

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HILL PADDY PLOUGH

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ABSTRACT

Hill paddy is widely grown small-scale by farmers mostly in Sabah and Sarawak. Hill paddy has special characteristics in terms of smell, colour, size and shape. The agronomic practices of hill paddy are not the same as those done to paddy fields. This is due to geographical factors when the location of cultivation of hill slope paddy seeds makes it difficult for residents to use machinery compared to flat border areas such as paddy field. It is a major requirement for farmers to acquire practical tool that make holes in the soil to insert paddy into the soil and to plant paddy. So, we introduce an innovative tool called the Hill Paddy Plough to lower labour consumption. It can assist farmers to complete the task at the hilly areas with lesser time. In the future, improvements will be made and brought significant efficiency involving time and energy usage of all farmers.

Keywords: geographical factors, lowering labour consumption

INTRODUCTION

Consumption of rice for nutrition is increasing every year due to lifestyle and population growth in Malaysia. This caused the country to import rice from outside to meet public demand. There are two types of paddy grown in Malaysia which is paddy field widely grown while hill paddy is widely grown small-scale by farmers mostly in Sabah and Sarawak. Hill paddy has special characteristics in terms of smell, colour, size and shape. Paddy hill or called as PADI HUMA (Padi bukit) is a type of paddy that is grown in mineral soils or soils without air stagnation in hillside areas. The agronomic practices of hill paddy are not the same as those done to paddy fields. Currently, many paddy cultivation industries in our country are of the type of paddy (Wet Paddy). Hill paddy is mostly only grown in rural areas by the Orang Asli community in Peninsular Malaysia and also the indigenous people in the interior of Sarawak and Sabah. This

paddy crop is still an important crop by the locals as one of the crops cultivated in the past to cover their food supply apart from cassava, corn and yams.

PROBLEM STATEMENT

Nowadays, most farmers in Malaysia work twice while making holes and sowing paddy to be planted specifically for paddy hill. Most of the time, it takes extra farmers to do the job because hill paddy planting activities in this modern era still require the cooperation or communal spirit (gotong-royong) of the residents. The main reason for that extra manpower because big machinery and technology are impossible to be placed at hilly slopes. So, during the paddy planting and harvesting on the hill are heavily on manpower compared to flat border areas such as paddy fields. Due this problem, the farmers need a practical tool that can be useful for them.

OBJECTIVES

1. To create tools to help farmers ploughing paddy on the hilly farm.

NOVELTY

It is difficult for farmers to do farming on unbalanced landscape such as the hill paddy cultivation. Farmers previously only used conventional materials, such as ordinary wood or iron, to create holes in the soil to make it easier to insert paddy into the soil. This system is obsolete and has been used by farmers since the time of our forefathers. Thus, our team has made improvements and created a special tool called Hill Paddy Plough. This special tool will improve time paddy planting and reduce energy usage of all farmers.

SPECIAL CRITERIA

This new tool has several special criteria such as it is lighter and easier to go anywhere if there is a communal spirit (gotong-royong) among farmers to plant paddy. Farmers will do less work in filling rice seeds into rice planting holes. In addition, farmers do not need to go back and forth sharpening the tip of the paddy planter.

IMPACT/ USEFULNESS

This Paddy Pen technology will help the farmer to finish their work without consuming more time. Not only that, this product also will be reducing the labour consumption. As an example, like the farmer will finish to planting paddy with less time even with a small number of workers. So, we can see that this paddy pen will really useful in helping the farmer to planting paddy even with the landscape of the land is uneven and hilly.

PROCESS OF CONSUMING THE PRODUCT SPECIFICATION
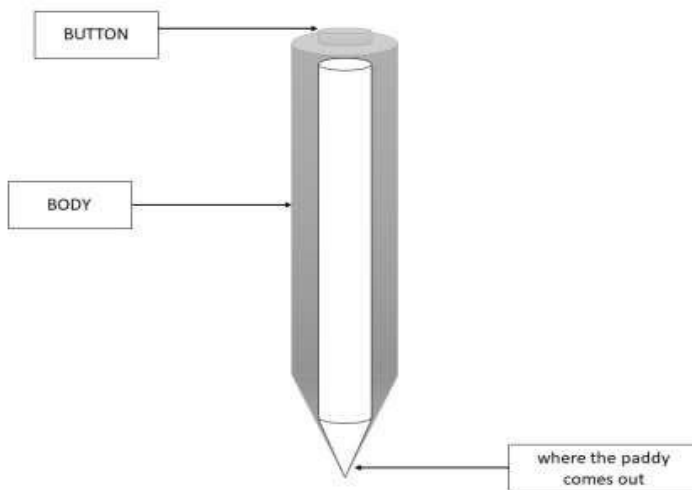
Figure 1. Illustration of Hill Paddy Plough

How to use:
1. Put the paddy seeds in the tool by opening/ unlocking the button of the product.
2. Prick the ground using the product.
3. Then, press the button on the top of the tool, then the paddy seeds will drop into the soil that has been pricked.

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HISTORIC INTERIOR SCHEME (HIS) CONSERVATION FRAMEWORK FOR HERITAGE MUSEUM BUILDING IN MALAYSIA

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ABSTRACT

The heritage museum building has seen rapid growth in the past few decades in Malaysia. It is an important national heritage asset where it needs to be preserved. This heritage asset has its own attractiveness and their historical significance not only the exterior but the interior of the museum building. It carries a different uniqueness of historic interior scheme where each of the museum building filled with different interior features, room function, spatial design, variety of historic material, and finishes and has its own historic event inside. Unfortunately, these historic interior scheme significances have disappeared due to the exhibition purpose and museum needs. For that reason, the historic interior scheme conservation framework for heritage museum building is needed. Hence, this framework's aims to give guidance in preserving the historic interior scheme of the heritage museum building. The objectives to be achieved by proposed this framework are to authenticate the level of change (LoC) on the historic interior scheme which influences the authenticity of heritage building conservation and to verify the degree of acceptance (DoC) of heritage exhibition interpretation practice according to the heritage building museum standard of the historic interior scheme. The method that has been applied in earned this framework is by evaluating 4 gazetted heritage museum buildings: Penang Malay Gallery, George Town Penang, National Education Museum, UPSI, Tanjung Malim Perak, History and Ethnography Museum, Malacca, and Kelantan Royal Custom and Tradition Museum, Kelantan. The evaluation approach is used by using the evaluation form to obtain the data. Two evaluations that involved in this research; Historic Interior Scheme (HIS) Evaluation and Heritage Exhibition Scheme (HES) Evaluation. This evaluation was carried out with the support of observation on-site, measured drawings, documents study, site tour and

referred to curators and museum experts. The photographic mapping technique using the historic photograph, sketches, drawings, books, and journals was applied to investigate the origin of the museum's building interior space. The findings indicated that this conservation framework is certified important for acquiring appropriate historic interior schemes with the right historic interpretation for the convince heritage museum building's exhibition in the future.

Keywords: Historic, Interior Scheme, Conservation, Framework, Heritage Museum Building

INTRODUCTION

Malaysia is blessed with many heritage buildings that have made a significant impact through their architectural, craftsmanship, interior, and historical values. Most of the buildings have long been protected by the authorities who took steps to transform the facilities into heritage museums. However, challenges remain as to the need to balance the museums' preservation needs and their authentic interior character. The setting of the preventive conservation priorities in the museums is complicated by the need to preserve both the historic features structure and the artefacts collection within. So that, the expertise in leading the exhibition in heritage museum building according to the guidelines are very much needed.

A historic interior scheme (HIS) is the historical character of an interior space that evokes the identity of an interior era. The cultural significance of an interior space enriches people's lives, often providing a deep and inspirational connection to the community and surrounding, to the past and lived experiences. A HIS is also an important historical record that are the tangible expressions of a century identity and experience. a HIS reflects a building culture and the diversity of our communities. It tells us about who we are and the past that has formed us and the interior space living. Heritage buildings are irreplaceable and precious. Figure 1. describes the meaning of the HIS as intended.

(a)   (b)   (c)   (d)
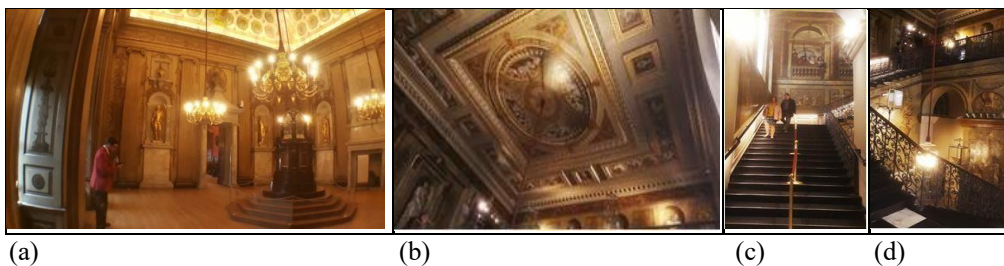
Figure 1. (a) Kensington Palace in London which has been transformed into a museum (b) Grand Ceiling (c) Grand Staircase (d) Grand column in the heritage building museum of Kensington Palace London

Heritage building museums have their own character. They represent their own historic interior character (Bushati & Nepravishta, 2018). A palace would reflect an interior character of a palace, and a mansion house would reflect its grandeur in its living area, bedroom, kitchen, balcony, and maid room, among others. Here, the historic interior character means the details on the ceiling, floor, wall, and other interior features of each of the spaces in the building (ICOM DEMHIST, 2014). Grimmer, A. E. (2017), note that doors, windows, columns, and a grand staircase are also the important detailings that strengthen the character of a historic interior scheme in a heritage building. **Figure 1.** illustrates this feature.

LITERATURE REVIEW AND INDICATORS FINDING FOR EVALUATION HIS & HES IN HERITAGE MUSEUM BUILDING

Literature Review Finding

A literature review was conducted on several topics such as historic integrity criteria, authenticity, heritage interpretation, heritage building museum conservation, and historic interior scheme. Analysis of past studies indicate that the two dominant parts in heritage building museum conservation are Historic Interior Scheme (HIS) and Heritage Exhibition Scheme (HES). These two parts are closely interrelated in the historic interior scheme for a heritage museum building conservation work. Some of the findings are *Finding 1*: Interpretation for heritage building museum refers to the historic integrity of space, historic feeling, historic setting and successfulness of heritage building museum operation. Good interpretation will reveal the good historic scheme of museums. Good interpretation also respects the historic integrity and historic character of a heritage building museum conservation work. *Finding 2*: Historic interior scheme for heritage building museum refers to the integrity in the authenticity of spaces. A good historical interior scheme fulfils the authenticity criteria as applied by the international standards of heritage building authenticity. *Finding 3*: Heritage exhibition in heritage building museum refers to the historic story of the heritage building. In other words, the museum building itself is a priority to give sense for the museum exhibition.

From the findings, it can be concluded that the two (2) main parts involved for a heritage building museum conservation scheme are the HIS and the HES. There are seven indicators in HIS; location, design, material, workmanship, association, feeling and setting and four indicators in HES; medium interpretation, story of history, display art and program/activity for measuring the compatible historic scheme of a heritage museum building. The combination of the HIS indicators and HES indicators leads to the proposal of the conservation framework for historic interior scheme for heritage museum building.

Theoretical Framework: Historic Interior Scheme (HIS) Conservation for Heritage Museum Building

Those two main criteria would be a new knowledge contribution to this research field. The criteria of indicators are illustrated in a theoretical framework as shown in **Figure 2.**
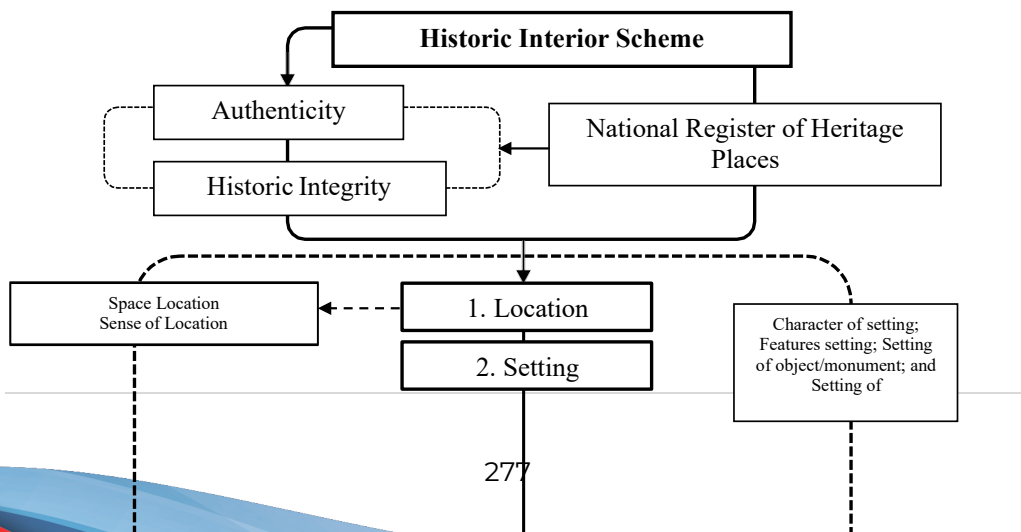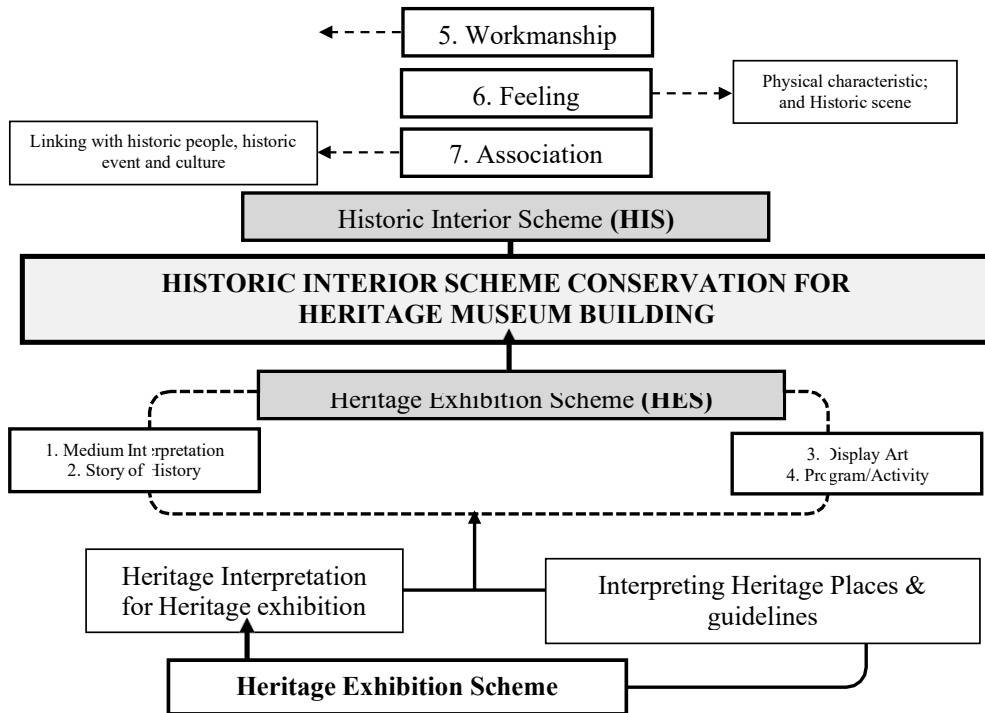
Figure 2. The Theoretical Framework for Historic Interior Scheme Conservation for Heritage Museum Building

METHODOLOGY

Literature Review Analysis

The literature review was carried out to provide information relating to the general background and context of the study. The international literature sought was the literature available in the United States, the United Kingdom, Canada, Australia, Japan, Hong Kong and Singapore. The guidelines practice in these countries were also reviewed. Nevertheless, the literature on the preservation of historic interior scheme for heritage building museum in Malaysia was found to be minimal. Analysis of the literature review indicates that there are seven historic character criteria that have been confirmed by experts (National Park Services, 1997; Wyatt, 2002; Jokilehto, 2006; Alho et al., 2010). These criteria were noted to serve as an integrity unit for identifying the historic integrity of a historic building. The unit analysis of evaluation HIS form was adopted from the seven historic integrity criteria suggested by Jokilehto and Stovel (1994). The criteria are also called 'National Register for Historic Place' by National Park Service (1993). The criteria also known as HIS indicators to evaluate level of change (LoC) historic interior scheme (HIS), there are design, material, workmanship, association, location, feeling and setting. These criteria were also approved by National Park

Service, (1997) and other scholar, including Wyatt (2002); Jokilehto (2006); ICOM DEMHIST-ARRE (2014); The Georgia State University World Heritage Initiative, (2017); Alho et al. (2010); Grignolo, (2014); Duncan, (2011); Little et al., (2000); USA Parks (1994); Jokilehto (2009). The same method has been applied, the four degrees of acceptance (DoA) units were summarized to measure heritage exhibition scheme (HES). The selection of units as based on the process of analysis of literature and on average meaning. The four units also known as HES indicators are medium interpretation; story of history; display art; and program/activity. This units are also supported and approved by heritage interpretation scholars; Tilden (1977), Harun (2018), Beck & Cables (2011); Knudson, Beck & Cables (2003). The units can therefore be said to be the dominant units in heritage interpretation, particularly in the museum exhibition.

HIS and HES Evaluation

Those 2 criteria of indicators has been applied in earned this framework is by evaluating 4 gazetted heritage museum buildings: Penang Malay Gallery, George Town Penang, National Education Museum, UPSI, Tanjung Malim Perak, History and Ethnography Museum, Malacca, and Kelantan Royal Custom and Tradition Museum, Kelantan. The evaluation approach is used by using the evaluation form to obtain the data. Two evaluations that involved in this research; Historic Interior Scheme (HIS) Evaluation and Heritage Exhibition Scheme (HES) Evaluation. This evaluation was carried out with the support of observation on-site, measured drawings, documents study, site tour and referred to curators and museum experts. The photographic mapping technique using the historic photograph, sketches, drawings, books, and journals was applied to investigate the origin of the museum's building interior space.

FINDING

The framework has been proposed to apply in the maintenance process of HIS for the heritage museum building interior spaces. In each phase, there are work procedures, components, and requirements to be prepared. The historic interior scheme and procedures should be followed for each phase that contains the principles of conservation. The proposed maintenance process of HIS for the proposed heritage museum building spaces is shown in **Figure 3.**

Heritage building museum historic interior scheme conservation

PHASE 1 – UNDERSTAND THE MUSEUM'S BUILDING AND INTERIOR SPACES SIGNIFICANCE

Conducting Research

Historical Research

Oral History

Fabric Research

Define and investigate:
-The space's original and it extend
-The space's history and historic event
-The space's use
-The space's association

-The space's structure, features and interior fabric

Investigation sources:

Historical Research

Written records, newspapers, journals, maps, photographic and illustration.

Oral History Research

Involved community consultation, interview the present (past users, any groups or persons having an interest in the building.

Fabric Research

Requires a through examination of the place for evidence of earlier structures; physical changes; previous uses, intachness, etc; the context and sitting.

Research Report

PHASE 2 – ASSESS CULTURAL SIGNIFICANCE FOR INTERIOR MUSEUM'S BUILDING

Conducting evaluation on physical changes

Identify the character of the place of interior space and evaluate the significance of the heritage building museum based on the historic integrity/authenticity criteria; *Location, Design, Material, Workmanship, Association, Feeling and Setting.*

Authenticity/ Historic Integrity Criteria
LOCATION
-Space location
-Sense of location
SETTING
-Character of setting
-Features setting
-Setting of object/monument
-Setting of furniture/masterpiece
DESIGN
-Design
-Material
-Technology
-Space organization
-Space proportion
-Space structure
-Space scale/size
-Ornamentation
MATERIAL
-Color
-Pattern
-Texture
-Sense of period/time
-Sense of space
WORKMANSHIP
-Construction skill
-Traditions technique
-Ornamental details
-Technique of making object/monuments, finishes and craft of people
FEELING
-Physical characteristic
-Historic scene
ASSOCIATION
-Linking with historic people, historic event and culture

Analysis of historic interior scheme (HIS) significance

PHASE 3 – ESTABLISH THE SPECIAL SIGNIFICANCE FOR INTERIOR MUSEUM'S BUILDING

The analysis of historic interior scheme significance was made to establish if the place has a special significance, either *Historically, Aesthetically, Socially or Scientifically.*
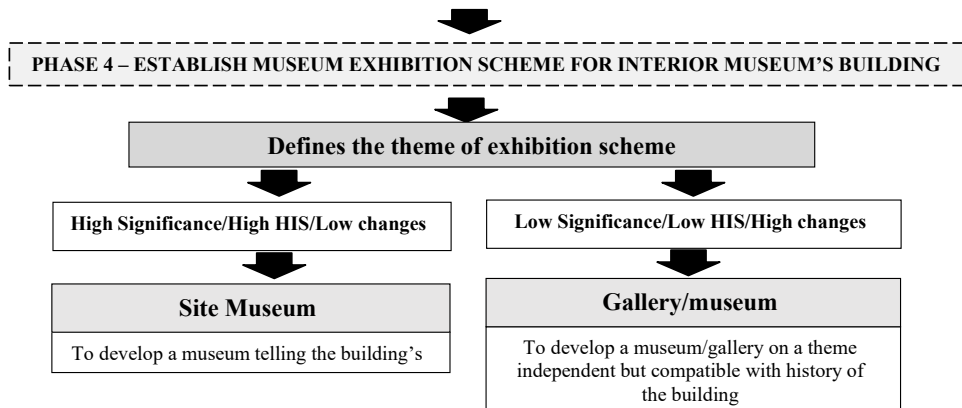
Figure 3. Historic interior scheme conservation process for heritage museum building

The framework above suggests the historic interior scheme (HIS) that needs to be considered in a conservation process. In the meantime, all this historic interior scheme (HIS) consideration should be concurrently and compatible with the selection of the heritage exhibition scheme (HES). The suitable acceptance approaches of the heritage interpretation should be considered according to the heritage building significance. More importantly, it should be in accordance with the principles in heritage building conservation. As a conlusion, the success of a heritage building museum's historic interior scheme hinges on the interpretation of the seven criteria of historic interior scheme, as described by UNESCO La Habana (2012). The heritage building itself is priority to display, and the seven historic scheme integrity criteria represent the priority.

CONCLUSION AND RECOMMENDATION

As conclusion, it is clear here that the proposed conservation framework are indispensable in countering the lack of guidelines for the conservation of the existing heritage buildings in Malaysia. Improvements of these guideline framework include additional elements that are more focused and specific to 'interior space' and the new function of the 'museum.' The improvement of this new element is felt necessary as a result of the efforts and steps towards the conservation of heritage buildings in Malaysia. The setting of these more specific guidelines is also a step towards exposing the 'knowledge' and sharing of the findings with museum experts and heritage building conservators in Malaysia. The concept of designing the HIS guidelines can also be applied not only to the establishment of museum scheme but also to the establishment of other schemes such as cafes, restaurants, hospitals, offices and school

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i-POKET PERUMAHAN: PANDUAN KEPADA NEWBIE

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ABSTRAK

Akses kepada perumahan, samada melalui pemilikan ataupun sewaan adalah penting kepada semua individu. Namun begitu, didapati pelbagai kesukaran yang dihadapi terutamanya oleh golongan muda untuk mendapatkan akses ke perumahan yang mencukupi dan berkualiti, samada melalui pemilikan rumah atau menyewa. Oleh yang demikian, inovasi i-Poket Perumahan ini dibangunkan bagi membantu mereka yang ingin mendapatkan maklumat dan informasi berkenaan dengan perumahan. Dengan memberi penekanan terhadap pelbagai aspek termasuk dari sudut kewangan, alternatif kepada penyewaan, sumber rujukan untuk mencari rumah sewa serta skim yang terdapat di pasaran, inovasi i-Poket Perumahan dapat membantu bakal penyewa rumah terutamanya golongan muda di dalam membuat keputusan yang terbaik mengenai aspek perumahan serta mengelakkan dari dieksploitasi oleh mana-mana pihak. Kelebihan inovasi ini ialah ianya ringkas dan padat serta boleh diakses dengan mudah menjadikan ia sebagai satu inovasi yang praktikal dan sesuai dengan keadaan semasa.

Kata kunci: golongan muda, panduan perumahan, sewa rumah, skim perumahan,

PENGENALAN

Perumahan merupakan satu elemen yang penting dan merupakan hak asasi manusia. Akses kepada perumahan, samada melalui pemilikan ataupun sewaan adalah penting kepada semua individu. Namun begitu, terdapat pelbagai kesukaran yang dihadapi terutamanya oleh golongan muda untuk mendapatkan akses ke perumahan yang mencukupi dan berkualiti, samada melalui pemilikan rumah atau menyewa. Walaupun terdapat pelbagai inisiatif

perumahan seperti skim sewa untuk dimiliki dan peruntukan rumah sewa untuk golongan muda, namun pengetahuan berkenaan dengan aspek perumahan baik dari sudut informasi skim-skim yang sedia ada, undang-undang yang berkaitan perumahan dan hal lain masih dilihat terbatas kepada golongan ini. Kurangnya pendedahan dan promosi dilihat menjadi benteng utama kepada keterbatasan pengetahuan mereka dalam hal perumahan. Dapatan kajian oleh Mahazril 'Aini (2018) mendedahkan bahawa orang muda yang baru memasuki alam pekerjaan dan dalam proses membina keluarga biasanya berhadapan dengan kekurangan pengetahuan perumahan yang berkaitan dengan pembiayaan gadai janji, pasaran hartanah dan perkara lain yang berkaitan dengan perumahan. Sebilangan besar dari mereka tidak menyedari mengenai skim perumahan yang sedia ada. Walaupun terdapat maklumat mengenai program perumahan atau skim yang ditawarkan, tidak banyak yang diketahui mereka mengenainya, dan ada juga yang memilih untuk tidak mencerna maklumat yang diberikan. Justeru, mereka seringkali melakukan kesilapan ketika mencari pilihan tempat tinggal yang dapat memenuhi keperluan perumahan mereka. Kajian di kalangan golongan muda di negara luar juga mendapati bahawa ketidakupayaan orang muda untuk mengakses perumahan adalah disebabkan oleh kurangnya pengetahuan tentang pasaran perumahan tempatan (Hochstenbach & Boterman, 2014; Rugg & Quilgars, 2015). Oleh itu, keperluan untuk mendidik dan memberi kesedaran kepada mereka dengan memberikan nasihat dan maklumat mengenai proses pembelian rumah, aspek undang-undang dan hal-hal kewangan berkaitan perumahan dilihat signifikan dalam membantu mereka lebih memahami aspek perumahan terutamanya yang baru mula membina kerjaya dan keluarga. Berpaksikan kepada dapatan tersebut, satu initiatif diwujudkan untuk memberi panduan ringkas kepada mereka yang ingin mengetahui informasi berkaitan hal perumahan terutamanya aspek penyewaan yang dinamakan i-Poket Perumahan: Panduan kepada newbie sebagai satu idea inovasi.

OBJEKTIF

i-Poket Perumahan: Panduan kepada newbie merupakan satu idea inovasi bagi membantu mereka yang ingin mendapatkan maklumat dan informasi berkenaan dengan perumahan. Walaupun terdapat informasi berkaitan dengan skim perumahan yang dikeluarkan oleh agensi tertentu di laman web mereka, namun, ianya masih dilihat masih kurang dan kurang disedari oleh orang ramai, terutamanya dalam bentuk panduan ringkas dan mudah difahami oleh semua individu. i-Poket perumahan mengandungi maklumat ringkas yang dibahagikan kepada 6 aspek utama iaitu siapakah housing newbie, kedua, apakah yang perlu diketahui sebagai potensi penyewa, ketiga, anggaran pendapatan bulanan dan bayaran kadar sewa rumah, keempat, alternatif lain kepada sewaan, kelima, sumber yang boleh dirujuk dalam proses pencarian rumah sewa dan keenam, skim yang ditawarkan bagi membantu hasrat penyewa untuk memiliki rumah.

KEUNIKAN

Inovasi ini dibangunkan hasil daripada kajian yang dijalankan di bawah geran *Fundamental Research Grant (FRGS) bertajuk 'Developing comprehensive rental policy framework for better housing opportunities of the young people'*. Kajian ini mendapati bahawa responden iaitu golongan muda masing kurang jelas akan maklumat berkaitan perumahan dan ada juga berpendapat bahawa kurangnya promosi dan publisiti menyebabkan mereka tidak peka dan jahil akan hal berkaitan perumahan. Penemuan kajian juga mendapati majoriti responden

menyatakan yang mereka kurang mengetahui mengenai perjanjian sewa kerana kurangnya publisiti dan promosi berkenaan hal ini. Kajian ini juga mencadangkan kerajaan dan agensi perumahan lain memperhebatkan publisiti dan promosi mengenai skim perumahan dan inisiatif untuk meningkatkan kesedaran masyarakat dan pengetahuan mereka tentang hal ini. Oleh itu, ianya mendorong i-poket perumahan ini dibangunkan bagi membantu usaha untuk meningkatkan kesedaran dan pengetahuan berkenaan dengan perumahan terutamanya aspek sewaan kepada orang ramai.

Memandangkan inititatif begini tidak banyak di pasaran dan kebanyakannya adalah melalui laman web agensi seperti Kementerian Perumahan Negara, badan bukan kerajaan berkaitan perumahan dan agensi seperti PR1MA, maka i-poket perumahan: panduan kepada newbie dilihat sebagai satu idea baru bagi membantu menyalurkan maklumat penting kepada orang awam. Inovasi ini diwujudkan khusus dalam Bahasa Malaysia kerana kami menyasarkan kepada semua golongan secara menyeluruh. Panduan ringkas dalam Bahasa Malaysia dapat diakses dan mudah difahami oleh semua golongan baik dari golongan B40, M40 ataupun T20.

Rajah 1. Sampel i-Poket perumahan:Panduan kepada newbie

Figure 1 di atas menunjukkan sampel i-poket perumahan yang menjadi inovasi dalam memberi panduan ringkas kepada orang ramai mengenai informasi berkaitan penyewaan sewa rumah. i-Poket ini merupakan initiatif yang pertama kali diwujudkan oleh sekumpulan akademia bagi membantu pihak kerajaan dalam usahasama memberi mendidik dan mempromosikan aspek perumahan kepada orang awam. Hasil penyelidikan yang dizahirkan dalam bentuk inovasi ini juga boleh dikategorikan sebagai usaha *'knowledge tranfer'* kepada orang ramai di luar sana dalam bentuk yang interaktif, mudah dan ringkas.

POTENSI KOMERSILAN

Memandangkan hasil kajian yang dijalankan mendapati golongan muda masih kurang jelas mengenai maklumat berkaitan perumahan terutamanya dalam aspek penyewaan, golongan muda dijangka akan berminat untuk menjadikan i-Poket Perumahan ini sebagai panduan dan rujukan utama di dalam membuat keputusan berkaitan penyewaan rumah. Selain itu, memandangkan sehingga kini, tiada lagi satu informasi berbentuk i-poket ini, maka pihak Jabatan Perumahan Negara, Jabatan Belia serta Kementerian Perumahan dan Kerajaan

Tempatan juga boleh menggunakan inovasi i-Poket Perumahan ini sebagai medium untuk menyampaikan maklumat dan panduan kepada bakal-bakal penyewa rumah kerana isinya yang ringkas dan padat serta boleh diakses dengan mudah menjadikan inovasi ini sangat praktikal untuk digunakan sebagai rujukan.

KESIMPULAN

Inovasi i-Poket Perumahan ini dibangunkan untuk memberi pendedahan dan panduan kepada golongan muda di dalam aspek perumahan terutamanya mengenai penyewaan rumah bagi memastikan mereka mempunyai maklumat yang cukup sebelum membuat keputusan untuk menyewa sesebuah rumah. Kelebihan inovasi ini ialah ianya ringkas dan padat serta boleh diakses dengan mudah menjadikan ia sebagai satu inovasi yang praktikal dan sesuai dengan keadaan semasa. Ini secara tidak langsung dapat membantu bakal penyewa terutamanya golongan muda di dalam membuat keputusan yang terbaik berkaitan aspek perumahan serta mengelakkan mereka daripada dieksploitasi oleh mana-mana pihak.

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DEVELOPMENT OF HVAC VIRTUAL LABORATORY (HV-LAB VERSION 1.0)

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ABSTRACT

Laboratory-based assessment is one of the crucial assessments in the institution of higher learning especially the engineering technology programme. Simulated laboratories are changing the nature of laboratory activities, and there is a long-running debate about the value of hands-on versus simulated laboratories. Hands-on advocates emphasise design skills, while simulated laboratories advocates focus on conceptual understanding. Interest in simulated laboratories versus hands-on has increased based on two factors: advancement in technology and cost pressure. Educational goals of hands-on laboratories activities focus on conceptual understanding, professional skills, design skills and social skills, but not all the equipment provide professional skill to the students. Most equipment are designed and built to explain the conceptual understanding only. Due to this, this paper presents the Development of HVAC Virtual Laboratory (HV-Lab); Recirculation Air Conditioning System Training Unit (RACSTU) using MATLAB/Simulink. RACSTU is located at the Fundamental HVAC Laboratories, Department of Mechanical Engineering Technology, Universiti Teknikal Malaysia Melaka (UTeM). The HV-Lab system was designed as the laboratory experimental setup. General equations were defined separately for each state of air property in RACSTU then experiments were conducted based on fifteen (15) different cases. Using these equations and experimental data MATLAB/Simulink models for every state of air property were created. The MATLAB/Simulink models were combined and verified with experimental results. The simulation results show that the experimental results are compatible with the experimental results for each state.

Keywords: HVAC, laboratories, hands-on, MATLAB and virtual.

INTRODUCTION

Laboratories are the necessary part of any engineering course. From the laboratories, there is equipment or training unit that is provided for the students to learn and study that are related to their course (Ibrahim, 2011). Laboratories are important components of education to enable students to gain experience (Tuysuz, 2015). Laboratories have distinctive roles especially in engineering education as recommended by science educators that there are

benefits gained from laboratory education. However, despite the advantages of laboratories there are also disadvantages such as the cost of setting-up the equipment, maintenance cost, and the limited in class student ratio in using the equipment (Ibrahim, 2011). Regarding to this problem, the use of MATLAB/Simulink software is increasing in these fields (Scientifique & Jaurès, 2005). An issue related to thermal systems modelling, such as HVAC systems is the use of an appropriate simulation tool (Simulink, Novak, Mendes, & Oliveira, 2005). Therefore, by defining simplified models of each HVAC component, a group of mathematical equations can be generated using the MATLAB/Simulink software (SystemAir, 2007). MATLAB is a tool of mathematical programming that is suitable in creating the air properties mathematical model for RACSTU. An interesting application such as Graphical User Interface (GUI) can be used to design the interface model of the software which is easy to handle by clicking and dragging the mouse. From the combination of mathematical model and user interface model, the software can be created to simulate the air properties of RACSTU and get the data output. The aim of the study is to validate the air properties of the mathematical model against the experimental data.

MATLAB/Simulink and Graphical User Interface (GUI)

MATLAB is the high-level language and interactive programme utilised by a lot of engineers and scientists around the world. It is a capable tool of mathematical programming that can perform many programming applications. MATLAB makes it easier to use built GUI by providing them with a consistent appearance and with intuitive controls like pushbuttons, list boxes, sliders, menus, and so forth (Andreatos, Force, Zagorianos, Air, & Academy, 2018). The GUI should behave in an understandable and predictable manner, so that a user knows what to expect when performing an action (Tibor, Fedák, & František, 2011). In HVAC, there is a tool in MATLAB to study IAQ (Indoor Air Quality), comfort, energy consumption as well for the air flow (Scientifique & Jaurès, 2005) .This software also provided the tool of dynamic simulation which is Simulink. The usage of Simulink is for the control and automation application which will help this software to become a powerful tool (Scientifique & Jaurès, 2005). There is also a modelling toolkit in MATLAB known as HAMLab (Heat, Air and Moisture). SIMBAD is also one of the tools from MATLAB that provides HVAC models and simulation on HVAC plants. One of the latest technology developments in simulation using Simulink is HAMBase. This improvement numerical model has a continuous part and solved with a variable time step and a discrete part (Van Schijndel & Hensen, 2005). This shows that in HVAC field, the usage of simulation helps in the improvements of the systems or for study purposes.

Definition of Recirculation Air Conditioning System Training Unit (RACSTU)

There are many heating, ventilating, and air-conditioning (HVAC) systems, but only a few of them are appropriate for undergraduate education (Abu-mulaweh, n.d.) The RACSTU in this study is used for the teaching and learning of undergraduate students. It can perform cooling, heating, humidifying, sensible and latent heat. The picture of the RACSTU is shown in Fig.1. The RACSTU consists of 5 states. Each state is defined by general equations, related with energy and mass balance. Simulation of the system is created with MATLAB/Simulink, using these equations. The RACSTU discussed a mixture of gases that are usually above critical temperatures and not concerned about any of the gases condensing during the whole process. Not having to deal with two phases greatly simplified the calculation analysis. Dealing with

gas-vapour mixture however, the vapour may condense out of the mixture during a process, forming a two-phase mixture. This may complicate the calculation analysis considerably. The laboratory equipment used a ventilating system that consists of parts such as evaporator (cooling coil), heater, humidifier, and fan. The cycle of the air started from the outdoor (fresh air) and supplied through the cooling coil and performed the cooling and dehumidifying process. The air also is passed through the humidifier to humidify the air before it went through the heater for the reheating process. Through the usage of fan, the air can be blown to the outdoor or by closing the damper in the system, it can recirculate. As mentioned before, in this laboratory equipment, basically the process involved is the psychrometric process which are cooling, heating, humidifying and dehumidifying processes (Koçyiğit & Şahin, 2017).

(a)   (b)
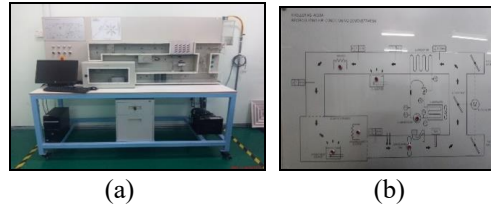
Fig.1 (a) Recirculation Air Conditioning Training Unit
(b) RACSTU Simplified Diagram

SIMULATION DEVELOPMENT

In this phase, data from fifteen (15) cases are taken to generate the result performance by using Simulink. In the Simulink development interface, the first step is to launch the command window as shown in Fig.3a.

(a)   (b)
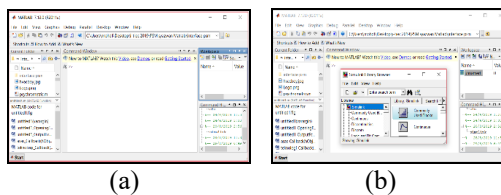
Fig.3(a) MATLAB Command Window
(b) Open Simulink Library Browser

From the command window, the Simulink browser is opened by clicking the simulation library link as shown in Fig.3b. Next, generally the step creates the sub-block diagramme in Simulink, simplified by the parent block diagramme shown in Fig.4a and Fig.4b.

(a)   (b)
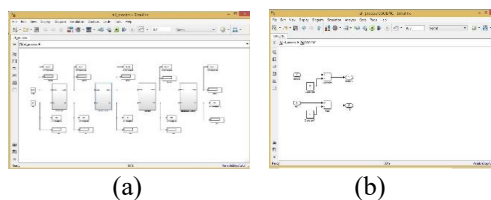
Fig.4(a) Simulink Parent Block Diagram
(b) Simulink Sub-Block Diagram

The last is to connect and synchronise between Simulink and GUI where the HV-Lab

interface is shownin Fig.5. Fig.5a shows the main frame of HV-Lab by using GUI which consists of selection of laboratory. Fig.5b shows the second interface which is for choosing the equipment in the laboratory selection.

(a)　　　　　　　　　　(b)
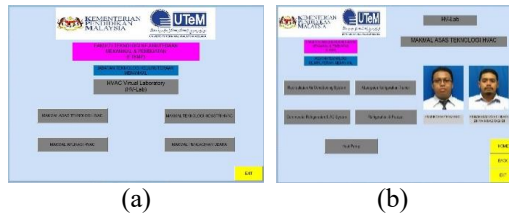
Fig.5(a) Main Frame of HV-Lab Using GUI,
(b) Second Interface in Choosing Equipment

Fig.6a shows the interface of RACSTU that consists of the image of the training unit and the selection of psychrometric processes such as cooling, humidifying, heating, sensible heat, and latent heat. Fig.6b shows the diagramme of RACSTU and the inputs and outputs are identified, and the operations to be performed on inputs to generate the outputs are specified (Ferrero & Piuri, 1999). The detailed demonstration will be displayed during the presentation day.

(a)　　　　　　　　　　(b)
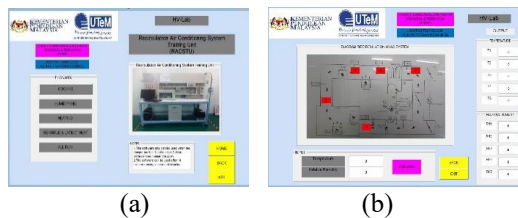
Fig.6 (a) Third Interface in Choosing Process,
(b) Input Interface

SIMULATION RESULT

The analysis of the described air properties is done by implementing the model equations in a Simulink model structure and by linking it to the HV-Lab toolkit. The overall system simulation studies of the input and output relationships are discussed. Small variations of the parameters are omitted. The data of the experimental results are examined with the simulation results. Fig.7 shows the line between the obtained experimental data and simulation data. This value does not change over time. The error should be less than 5% between the experimental data and simulation data.

(a)　　　　　　　　　　(b)
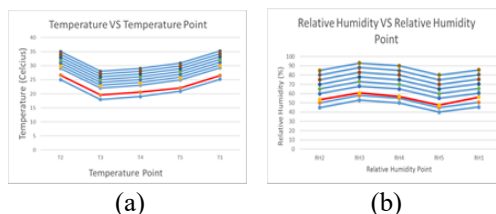
Fig.7 (a) Graph of Temperature During Recirculation,
(b) Graph of Relative Humidity During Recirculation
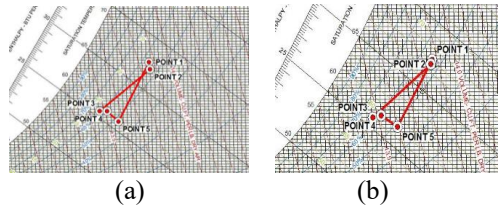
Fig.8 (a) Experimental Psychrometric Chart
(b) Simulation Psychrometric Chart

Fig.8 shows that the psychrometric chart between the simulation and experimental data for complete cycle involved in RACSTU. From the starting point to the end of cycle it was proven that the simulation software had a slight error which is less than 5%. From the psychrometric chart, the psychrometric process can determine whether the simulation toolkit follows the standard of training unit in the laboratories or not.

CONCLUSION

The development of HVAC-Lab has met all the main objectives that were initially set. The objectives met are followed to develop HV-Lab of RACSTU from the experimental results. The experiment was conducted on 15 cases covering cooling, heating, humidifying, sensible and latent heat operations. General equations for RACSTU were defined separately for each state of the system. Every state was designed using the MATLAB/Simulink model. The MATLAB/Simulink models were combined and verified the experimental results. The simulation results showed that the experimental results are compatible with the simulation results. It is also user friendly where it is easier for users to see the air property in every case. This development and simulation will be used in future studies for comparison of real system results with simulations results. In addition, the simulation development process will continue with other equipment, thus completing the smart laboratory development. Compilation of the equipment simulation will be implemented in other laboratories with other equipment. It has been shown that, recently, the number of studies using MATLAB/Simulink environment has grown rapidly. More and more papers have been presented on conferences or in scientific journals. But due to the less exposure in HVAC system, the usage of tools in this field is not much known to the public. In fact, the new generation in engineering must be familiar with this due to the transformation in industrial revolution from I.R 3.0 to I.R 4.0. In millennials generation, students prefer a virtual study compared to hands-on activities since is more interactive and easier.

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i-CARE2U: EASY-TO-USE APPLICATION SOFTWARE TO ENHANCE KNOWLEDGE AND AWARENESS OF MALAYSIANS TOWARDS THE RIGHTS OF PERSONS WITH DISABILITIES

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ABSTRACT
Persons with disabilities (PwDs) and children with disabilities in Malaysia have been treated negatively by Malaysian citizens. This negative treatment can be seen in terms of social interaction, education and employment. About 48% of Malaysian citizens avoid having interaction with them due to negative perceptions towards disability. Children with disabilities are not given equal educational rights as other normal children to access education due to some requirements imposed by the Ministry of Education and school administrators. Besides, employers are reluctant to employ PwDs due to the negative perception that they are less productive than other employees. Because of the negative perceptions and attitudes towards Pwds and children with disabilities, they cannot enjoy their life as other normal people. This application is developed to assist Malaysian citizens to understand the status and nature of the disability, the rights that the law has conferred toward PwDs and children with disabilities and laws relating to disabled people. Therefore, Malaysian citizens can improve their knowledge on disabilities. Thus, the negative perceptions and attitudes towards disabled people can be eliminated through this application. There are a few categories of disabled people. Under the Department of Social Welfare, seven categories of PwDs can be considered for registration. In Malaysia, there are a few rights that have been conferred on the PwDs and children with disabilities, such as the right to access public facilities, amenities, services and buildings, right to the access and use of public transport facilities, right to access equal education opportunities, and right to access employment as provided under the Persons with Disabilities Act 2008. This application is easy to use and user-friendly, efficient and informative to be used by all Malaysian citizens.

Keywords: Persons with Disabilities, Children with Disabilities, Special Education, Laws relating to

INTRODUCTION

About 600,000 PwDs including children with disabilities were registered with the Department of Social Welfare as of April 2021 in Malaysia (Bernama, 2021). The numbers are expected to increase every year due to the increased world population, road and industrial accidents and life expectancy. Section 2 of the Persons with Disabilities Act 2008 defines PwDs as "those who have long-term physical, mental, intellectual, or sensory impairments, which in interaction with various barriers may hinder their full and effective participation in society". Besides, children with disabilities have been regarded as children with developmental problems such as visual impairment, hearing impairment, autism spectrum conditions, behavioural disorders, and learning difficulties (Maciver et al., 2019).

Due to the increased numbers of PwDs, the Malaysian government has enacted several laws and policies to protect their rights and wellbeing. The Persons with Disabilities Act 2008 provides rights for PwDs, including the right to access public facilities, amenities, services and buildings, right to the access and use of public transport facilities, right to access equal education opportunities, and right to the access of employment. However, even though the law has provided their rights, they cannot fully enjoy their rights. PwDs and children with disabilities in Malaysia have been treated negatively by Malaysian citizens. Children with disabilities are given low opportunities to enrol in schools and universities. Nearly 40% of PwDs have been discriminated against by their employers and are less likely to be employed due to their disability status. In addition, about 48% of Malaysian citizens avoid having interaction with PwDs (Chai Chun Jing, 2019). Children with disabilities have often been neglected by society and are at higher risk of abuse and abandonment (United Nations High Commissioner for Refugees, 2015).

PwDs and children with disabilities have been treated negatively because of the negative perceptions of society towards them. Lack of understanding and knowledge of the society regarding disability leads to negative perceptions and attitudes towards PwDs and children with disabilities (Thompson et al., 2011). Hence, to eliminate society's negative perceptions and attitudes towards them, Malaysian citizens must have basic knowledge regarding PwDs and children with disabilities, their rights and laws that govern their rights.

According to Department of Social Welfare, there are seven categories of PwDs in Malaysia, namely hearing disability, visual disability, speech disability, physical disability, learning disability, mental disability and multiple disabilities. Once they have registered with the Department of Social Welfare, the OKU card will be issued. This allows PwDs and children with disabilities to receive appropriate services that the government has provided based on their disabilities. There are several laws and policies in Malaysia that are related to PwDs and children with disabilities, such as the Federal Constitution, the Persons with Disabilities Act 2008, the Education Act 1996, the Education (Special Education) Regulations 2013, the National Plan of Action for People with Disabilities 2016-2022 and the Zero Reject Policy (Muhammad Fikri & Nur Ezan Rahmat, 2020).

METHODOLOGY

The methodology of this research is based on library-based research. The researchers will examine the laws available such as the Federal Constitution, the Persons with Disabilities Act, the Education Act 1996, the Education (Special Education) Regulations 2013 and Uniform Building By-Law 34A of the Street, Drainage and Building Act 1991. Besides, journal articles and government websites will be analysed to obtain data and information regarding PwDs and children with disabilities. The data and information obtained through library-based research are important to assess the nature of the disability, the rights of disabled people, and the laws that are available to them.

FINDINGS

The laws and policies related to PwDs and children with disabilities that have been enacted and introduced by the Malaysian government are scattered and very general in nature; hence it causes uncertainty in terms of jurisdictions, authority involved and enforcement. Besides, due to the lack of knowledge and understanding of the Malaysian citizens regarding the disabilities, PwDs and children with disabilities are often treated negatively. Therefore, the creation of this application will provide basic knowledge and understanding for Malaysian citizens toward PwDs and children with disabilities, their rights and laws related to them. Hence, the negative perceptions and attitudes towards them can be eliminated.

As of today, no application in Malaysia provides similar features as our invention in educating the Malaysian citizens to understand and care towards PwDs and children with disabilities. With its easy to use and user-friendly interface, this application is suitable to be used by all Malaysian citizens. Besides, the language used in this application is simple, and the design is modern, hence making it enjoyable to be used.

COMMERCIALISATION POTENTIAL

This application has great potential to educate and enhance the awareness of Malaysian citizens towards disabled people, their needs, and laws related to them. Hence, it will show that Malaysian citizens care about disabled people by understanding them and eliminating the negative perceptions and attitudes they have towards disabled people. This application targets the Malaysian citizens at large and will be beneficial to everyone, including the society and disabled people themselves, in educating and creating awareness of the rights of PwDs and the nature of their disability. Besides, this application is very convenient to be used by everyone since it is user-friendly and easy to be used by all Malaysian citizens. Not to mention, this application implements green elements in the product and eco-friendly since there is no paper used. All the information regarding disabled people can be accessed through this application.

CONCLUSION

The negative perceptions and attitudes of Malaysian citizens towards PwDs and children with disabilities lead to discrimination towards them, and they cannot fully enjoy their life. Thus, these negative perceptions and attitudes must be eliminated to allow PwDs and

children with disabilities to live like other normal people. This can be done by educating Malaysian citizens and improve their knowledge regarding disabilities. Hence, this application is very useful to educate and improve the knowledge of Malaysian citizens on this matter.

This application has its benefits, which is to help Malaysian citizens understand the various terms and categories of disabilities, the rights and laws related to PwDs and children with disabilities, and basic knowledge on interacting with certain types of disabilities. Therefore, the negative perceptions and attitudes towards them can be eliminated and finally prove that the Malaysian citizens care towards PwDs and children with disabilities.

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IMMERSIVE LEARNER'S USABILITY AND EXPERIENCE THROUGH VMMBG DURING COVID-19 PANDEMIC: AN EVIDENCE OF A HIGHER EDUCATIONAL INSTITUTION

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ABSTRACT

In Malaysian Higher Education Institutions (HEIs), digital educational game-based learning is still in its infancy. Educators are urged to use digital games to build and develop educational innovation in order to accomplish learning goals while also boosting learners' motivation, enjoyment, engagement, and experience during the Covid-19 pandemic. This study, therefore measured learners' usability and experience through Virtual Money Mine Board Game (VMMBG) in the Personal Financial Planning (PFP) course at the Faculty of Business and Management, UiTM Melaka Branch, Melaka City Campus. The VMMBG was played via the Google Meet platform, and nine groups were formed. The MEEGA+ Model elements were used to assess the usability and player experience with VMMBG. The data from the 55 undergraduate students participating in the PFP course was analysed using SPSS. According to the findings, operability was the most essential factor for game players, while aesthetics, learnability, and accessibility piqued their interest and motivated them to complete the difficult tasks on the digital platform. Players found VMMBG, as well as the game's rules, characteristics, and features, to be entertaining and enjoyable. To conclude, VMMBG has proven to be a versatile learning tool for students seeking particular information, engagement, and academic success in the PFP course. Educational games in higher education institutions should be linked to learning objectives to assist learners' knowledge acquisition, cognitive and and soft skill development.

Keywords: educational online games, digital, usability, player experience, learning, virtual, higher educational institutions (HEIs)

INTRODUCTION

The growth of digital technology has had an impact on the traditional education system at higher education institutions (HEIs) transforming face-to-face classes into virtual platforms (Bordoloi, Das & Das, 2020; Bisht, Jasola & Bisht, 2020). Due to Covid-19 outbreak, online learning is becoming a feasible option for learners obtaining specific knowledge and participating in the educational process (Basuony, EmadEldeen, Farghaly, El-Bassiouny & Mohamed, 2021; Chen, Landa, Padilla & Austin, 2021). In Malaysia, delivering contemporary technology-based education among HEIs has been a challenge during the pandemic crisis. When shifting completely to online learning, educators and learners are having difficulty to learn due to diverse learning styles, a lack of self-confidence, poor internet access, and an undeveloped instructional design.

To achieve the course learning outcomes, Malaysian education systems have started to re-design and re-assess learning activities in response to these new learning challenges (Sia & Adamu, 2020). In this regards, all educators are urged to develop educational innovations in order to create positive learning environment by merging with digital technologies in order to motivate and encourage learners to achieve better learning outcomes and experiences (Basuony et al., 2021). Motivation, entertainment, engagement and experience are the crucial learning outcomes for educational innovation of the HEIs (Bawa, Watson & Watson, 2018; Sia & Adamu, 2020).

Education innovation encompasses a wide range of instructional techniques and delivery systems, particularly online board games (Bawa et al., 2018; Chen et al., 2021). Online board game focuses on learners' interests and it is a novel learning method that emphasises the impact of engagement and learning outcomes in a virtual context (Ahmed & Sutton, 2017; Fjaellingsdal & Klockner, 2020; Johnson & Kim, 2021; Kapralos, Fisher, Clarkson & van Oostveen, 2015). Notably, online board games can manage large groups of new-generation learners at the same time, individually or groups, transforming each learner into a proactive, collaborative, reflective, critical, creative, and inventive problem solver (Ahmed & Sutton, 2017; Johnson & Kim, 2021).

Previous research has found that online board games improved players' literacy skills and knowledge in a variety of areas, including engineering, computer science, education, architecture, and graphic design (Ahmed & Sutton, 2017; Bawa et al., 2018; Johnson & Kim, 2021; Kapralos et al., 2015). These studies concluded that online board games and a variety of perceptual, cognitive, behavioural, emotional, learning motivation, entertainment, enjoyment and experiences are inextricably linked. Although there is a growing interest and value in online board games, there is no indication that the learners' usability and experience, in particular from the Malaysian HEIs setting, can be derived from the experience of the learning. Therefore, this study reports learners' usability and experience when virtual money mine board game (VMMBG) was introduced in a Personal Financial Planning course among undergraduate students.

LEANERS' USABILITY AND EXPERIENCE THROUGH VMMBG

Educational games involve enjoyment, playing, engagement and serious learning (Ahmed & Sutton, 2017). In the field of education online games supports players and teams in improving academic performance, engagement and responsibility for learning, information and learning

acquirements, engagement and sustainability, and creative thinking and innovation development (Gibson & Douglas, 2013; Wong, 2018). To evaluate these outcomes, MEEGA+ Model (Model for the Evaluation of Educational Games), a well-known evaluation model is adopted for assessing game quality in terms of learner usability and experience after playing educational games (Petri, Van Wangenheim & Borgatto, 2016). According to this model, usability is a degree to which a product (educational game) can be utilised by specific users (students) to achieve specific goals with effectiveness and efficiency in a certain context such as aesthetics, learnability, operability, and accessibility (Petri et al., 2016).

The player experience is a quality element that encompasses the student's profound participation in the gaming activity, including its sense of learning, sensations, joys, and interactions with the game, surroundings, and other players. In this study, we measured learners' confidence, challenges, satisfaction, and social interaction, fun, focused attention, relevance and perceived learning. To our knowledge, the MEEGA+ Model has been extensively studied in the field of software engineering and computer education games, with a focus on learners' usability and experience (Petri et al., 2016; Petri, Von Wangenheim & Borgatto, 2017). Therefore, this current study extends to a new knowledge by assessing the usability and experience of learners in a Personal Financial Planning course through VMMBG.

The Virtual Money Mine Board Game (VMMBG) is an educational game-based learning tool that is an expansion of the conventional Money Mine Board Game. VMMBG was designed to facilitate the knowledge acquisition of undergraduate students enrolled for Personal Financial Planning (PFP) course. This project was created by faculty members from the Faculty of Business and Management at the UiTM Melaka Branch, Melaka City Campus. PFP provides a framework for financial planning by concentrating on managing and organising personal financial resources. This course assists students in long-term financial resource protection, investment planning for growing resources, and financial future survival. At the completion of this course, students must be able to analyse existing and future financial plans for individuals and families, as well as conduct self-directed learning skills linked to decision-making on personal financial concerns and planning. This course fosters students' collaboration abilities in activities linked to personal financial planning throughout the learning process.

To support Education5.0's flexible and meaningful learning experience, VMMBG discovered substantial educational innovation to address students' poor PFP assessment scores, as well as low attention and interest in calculating topics. More significantly, VMMBG is designed to increase new learners' enjoyment and engagement in a competitive learning environment, as well as to supplement virtual instruction delivery during the Covid-19 pandemic. All items in the PFP, such as annual car insurance, bonus, cash in hand, clothing (current value), computer (current value), family vacation per year, income tax monthly payment, zakat, monthly electricity bill, car monthly instalment, investment, housing loan payment monthly, and life insurance were virtually transferred through VMMBG. Figure 1 illustrates the features and development of VMMBG.

Figure 1. Product Development of VMMBG

MATERIALS AND METHODS

VMMBG was held via Google Meet and involved 55 students who had registered for Personal Financial Planning in Semester October 2020-February 2021. They represented a Bachelor of Business Administration in Finance and a Bachelor of Business Administration in Human Resource Management. We opted to run the game entirely using the Google Meet platform due to the Covid-19 pandemic. Nine groups were formed, each including four to five players as well as a coordinator. A coordinator was selected to oversee the game and help participants in addressing any issues that arose. The project leader conducted a briefing session to kick off this activity. Starting with any player, each player tosses the dice in turn (by clicking the 3D Dice app). The player with the highest number is the starter, and the HOST advances the player's token the number of spaces indicated by the dice. If the token lands on a "DECISION" card spot, the player will activate the Wheel Spinner app, and the HOST will read the "DECISION" on the card depending on the spinner number. Following the end of the game, each player was requested to complete a questionnaire in order to collect user input on usability and player experience.

To measure players' feedbacks after playing VMMBG, this study adopted the items developed by Petri et al. (2016) using MEEGA+ Model items: a) players' usability (aesthetics-2 items; learnability-three items; operability-2 items; accessibility-2 items); b) player experience (confidence-1 item; challenge-3 items; satisfaction-4 items; social interaction-3 items; fun-2 items; focused attention-3 items; relevance-4 items; perceived learning-4 items). Students' reactions were rated on a five-point Likert scale ranging from one (strongly disagree) to five (strongly agree). The levels of usability and experience of players have been analysed using the Social Sciences Statistical Package (SPSS) 26.0. The results have been based on descriptive analysis of demographics and items used to measure player usability and experience (percentage, mean and standard deviation-SD). This survey was developed using Google docs, and the students were reacted online.

RESULTS AND DISCUSSION

The sample involved of 33 females (60.0 percent) and 22 males (40.0 percent), with the majority respondents were from Finance (35 respondents, 63.64 percent) and Human Resource Management represented 20 respondents (36.36 percent). Table 1 show the findings for the means and SD values of each component. The operability of VMMBG had the most influence on their ability of players to play rapidly, followed by aesthetics (board graphics, text type, and colour), learnability, and accessibility, with mean scores ranging from 3.80 to 4.40. The mean player experience scores, which ranged from 3.70 to 4.50, are shown in Table 2. It suggests that participants were pleased with the VMMBG after they realised it was connected to their learning activity. It also implies that VMMBG, as well as the game's rules, characteristics, and features, were enjoyable and entertaining. Overall, total SD for usability components was between 0.5 and 0.7, while the total SD for player experience components was between 0.6 and 0.7. Figure 2 shows the activities of VMMBG.

Table 1. Mean and Standard Deviation (SD) Values for Usability and Player Experience

Usability	Mean	SD	Experience	Mean	SD	Experience	Mean	SD
AES	4.3545	0.69836	CON	4.4909	0.69048	FUN	4.5273	0.64131
LE	4.2636	0.54309	CHA	3.6727	0.66818	FOC	4.1394	0.66261

| OP | 4.5000 | 0.68718 | SAT | 4.3364 | 0.60900 | REL | 4.4667 | 0.59257 |
| ACC | 3.8455 | 0.73202 | SOC | 4.4242 | 0.60673 | PER | 4.4667 | 0.63376 |

Total Mean (Usability-4.2409; Player Experience-4.315538); Total SD (Usability-0.665163; Player Experience-0.63808)
AES-Aesthetics; LE-Learnability; OP-Operability; ACC-Accessibility
CON-Confidence; CHA-Challenge; SAT-Satisfaction; SOC-Social Interaction; FOC-Focus Attention; REL-Relevance; PER-Perceived Learning

Figure 2. VMMBG Activities

CONCLUSION

The need for digital literacy among today's learners is increasing and Malaysian HEIs have responded by developing new curricula to teach students digital literacy abilities (Bordoloi et al., 2020; Bisht et al., 2020). Digital games are another way of helping students to understand things too hard in a traditional classroom by having visual, auditory, physics and learning difficulty. VMMBG can serve as an accessible learning tool for students obtaining knowledge, engagement and performance on Personal Financial Planning learning objectives during the Covid-19 pandemic. The findings show that usability components (aesthetics, learnability, operability, and accessibility) and experience (confidence, challenge, satisfaction, and social interaction, fun, and focused attention, relevance, perceived learning) satisfied learners' behaviours, competencies, cognitive, and social demands, such as teamwork, intellectual skills, problem solving, leadership, and communicative abilities. VMMBG, on the other hand, appears to be a more successful learning approach, validating the goals of enhancing academic achievement, sustaining engagement, encouraging transformative mindsets, and developing creative thinking and innovation in learners (Ahmed & Sutton, 2017; Fjaellingsdal & Klockner, 2020; Johnson & Kim, 2021; Kapralos et al., 2015). Educational games at HEIs, therefore, must be aligned with learning goals and clearly demonstrate that learning can be assessed and completed through experiential, project-based, competency-based learning techniques.

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VCDT: THE VIRTUAL CLASSROOM DEBATE TUTORIAL APPROACH

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ABSTRACT

Debate has been commonly used as a medium of learning in the classroom at the secondary and tertiary levels. A lot has changed in the past years, causing learning approaches to shift from conventional face-to-face practices to a more modern and virtual medium of learning. Virtual learning can be dull, unexciting, and monotonous if not managed well by the instructors. Therefore, the VCDT Approach is introduced to foster two-way participation in online tutorial sessions. The practice of virtual classroom debate develops self-confidence, critical thinking, analytical capabilities, communication skills, and teamwork, even in the new norms. Although various studies involving debate have been done in the context of learning the second language, psychology, philosophy, and pure science, studies that focus on the impact of classroom debate are still scarce. The VCDT Approach promotes a brilliant way of online discussion in which students are encouraged to speak spontaneously on chosen subject matters. A properly executed debate exercise can allow students to exert fresh ideas and develop reasoning skills that can improve their communication skills, which could impact their academic performance. Debate activities encourage the development of various abilities needed by students such as effective written and oral communication, critical thinking, working in a collaborative environment, civic awareness, and active class participation. Nature of debate activities helps sharpen rhetorical skills in a fast-paced virtual environment, enriching their ability to solve problems and engage in autonomous learning. Therefore, in VCDT exercises, students can practice generating ideas under pressure while learning key ideas in a given time.

Keywords: classroom debate, tutorial, virtual debate, online learning.

INTRODUCTION

The current situation involving a global pandemic and restricted movements has forced students and their educators to be creative in learning processes. Many online methods in learning have emerged and learners have begun to be very responsive towards their virtual learning environments. In fostering creativity in online learning, there need to be methods that exceed conventional ideas, systems, patterns, associations, or the like, and these new evolving methods must be able to create meaningful new ideas and knowledge using users' senses and their ability to judge. Creativity is the art of being out of the ordinary, using both intuition and intelligence and producing an outcome the best that can be. In education, being creative is a 'must have' trait to educators. So much of teaching is now driven by data (i.e., test scores) and dictated by "best practices" that teachers are losing confidence in their creativity. Breaking the barrier between educators and learners could be the first step in indulging creativity into education, particularly online education. Teaching online at the tertiary level forces lecturers to be more creative with the learners rather than just giving a one-way lecture (Collard & Looney, 2014). Educators must be flexible in accepting ideas and enhancing the subjects to talk and convey opinions. In the context of online learning, this means that the learning sessions are to be engaging and interactive.

One of the methods that can be used to foster creativity in learning is through classroom debates. Debating has a rich history; it encourages students' advocacy and expression through interscholastic debate. Debate is a part of a rivalry that comprises two teams, the affirmative team upholding the resolutions and the negative team standing in opposition (Noonan, 2011). In virtual learning, debate sessions can be done via online platforms such as Google Meet or Zoom application. Debate is a formal technique of argument in which it directly allows interaction and representation. The debate exercise includes a sense of manipulation and in each argument; there is a form of persuasion injected into it. Persuasion often appeals to the audience's emotional responses and will determine how they will react and interact with the motion. Debate has been viewed as a form of teaching-learning strategy that presumes an established position, for or against, on a matter or an issue, or solution to a problem. Debate imposes active learning surroundings and it stimulates team collaboration through persuasive evidence (Doody & Condon, 2012).

OBJECTIVES OF VCDT APPROACH

1. To promote creativity in online learning.
2. To encourage students' argument and expression.
3. To enhance a formal technique of argument that allows online interaction and virtual presentation.

NOVELTY OF VCDT APPROACH

This project test students' capability to apply online classroom debate exercise during tutorial sessions. Students were given time to prepare and execute the VCDT Approach and after the exercise, they were given a set of assessment scales to rate the effectiveness of the debate exercise.

ORIGINALITY OF VCDT APPROACH

This activity can be applied in any reading or theory-related subject to encourage 'fun learning' and avoid monotonous discussion in class. The VCDT Approach is active, fun, and witty.

IMPACT OF VCDT APPROACH

1.   To diversify online learning techniques.
2.   To promote students' confidence and communication skills.
3.   To encourage students to make arguments using the right technique.
4.   To develop a competitive online classroom environment.

POTENTIAL FOR COMMERCIALIZATION

This method has the potential to be marketed and applied in courses that practice presentation skills as a medium of assessment. Using the VCDT Approach, students will become more excited and eager to think fast and active as they need to comply with the time given and to suit the virtual environment. This will make the tutorial class more entertaining and fun. The VCDT Approach also assists in measuring students' critical thinking and presentation skills. The practice of this exercise will increase students' confidence level, encourage creative online learning and enhance students' argument techniques.

CONCLUSION

Debate exercises help develop students' confidence and creativity. Virtual Classroom Debate Tutorial Approach is a good technique to cultivate creativity in learning, particularly in tutorial sessions. It brings out competence and confidence in students especially using their interpretation skills, analytical skills, and inferential skills. All these skills are also beneficial to students as they go into the working environment once they graduated.

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INDIKATOR TEKNIK PENGAJARAN BAHASA ARAB DI UiTM MENERUSI TEKNOLOGI

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ABSTRAK

Kajian ini memberi tumpuan kepada teknik pengajaran bahasa Arab semasa pelaksanaan Pembelajaran Jarak Jauh dalam Talian (ODL) di UiTM pada fasa Perintah Kawalan Pergerakan (PKP) kerana Pandemik Covid-19. Kajian ini dijalankan untuk mengenal pasti bagaimana teknik pengajaran dapat mempengaruhi motivasi pelajar. Sebanyak 341 pelajar yang mengambil kursus bahasa Arab tahap tiga (TAC501) dari semua kampus di UiTM merangkumi semenanjung, Sabah dan Sarawak mengambil bahagian dalam soal selidik ini. Kajian ini berbentuk deskriptif dan analitik yang menggunakan kaedah kuantitatif menggunakan analisis SPSS dan PLS-SEM untuk menganalisis hubungan antara motivasi pelajar dan teknik pengajaran. Hasil kajian menunjukkan bahawa, teknik pengajaran yang sesuai melalui teknologi dapat mempengaruhi pemahaman dan motivasi pelajar secara positif mengenai kandungan aktiviti pembelajaran yang telah diberikan oleh pensyarah mereka semasa sesi ODL. Hasil kajian memaparkan, pensyarah bahasa Arab di UiTM mahir membangunkan *quiz online* menerusi Kahoot dan Quizziz (0.9). Dapat disimpulkan bahawa semakin banyak pelajar menerima dan memahami bagaimana menggunakan teknologi, semakin mereka dapat memahami tentang isi pembelajaran semasa sesi ODL.

Kata kunci: Arabic language, Arabic teaching, teaching platform, Covid-19 Pandemic.

PENGENALAN

Konsep pembelajaran terbuka dan sistem pendidikan jarak jauh menjadikan sistem pendidikan lebih terbuka dan pelajar bebas dari kekangan masa dan tempat di samping menawarkan peluang pembelajaran yang fleksibel. ODL dilaporkan salah satu bidang pendidikan yang paling pesat berkembang sejak bertahun-tahun yang lalu, bahkan pada masa

kini, ia memberi impak besar pada semua kaedah dalam menyampaikan pengajaran (Bates, 1995; Bosch, 1997 dan Bradley & Yates, 2000).

Walau bagaimanapun implimentasi ODL sepenuhnya secara drastik merupakan cabaran besar bagi semua pensyarah di UiTM terutamanya pensyarah bahasa Arab dalam mengetengahkan strategi menerusi kaedah dan teknik pengajaran berkesan supaya pelajar dapat memahami dan menguasai kemahiran bahasa Arab sepertimana mereka belajar di dalam kuliah. Sehubungan itu, kebijaksanaan pensyarah dalam menangani isu ini wajar diambil perhatian.

PERNYATAAN MASALAH

Pelbagai platform pengajaran dalam talian semakin bertambah dari semasa ke semasa. Namun, pemilihan platform sesuai untuk diimplimentasikan agar sesuai dengan konsep bahasa Arab amat wajar diperhalusi. Mohd Jasmy et. al (2020) berpandangan, aplikasi WhatsApp dan Telegram harus disorot dan disyorkan kerana penggunaan data mereka yang rendah, gambar dan video yang boleh dimuat turun serta fungsi rakaman suara. Malah, kedua-dua aplikasi ini mesra pengguna, mudah diakses, sesuai untuk pelajar yang tinggal di luar bandar kawasan dan mempunyai sambungan internet yang lemah dan juga sesuai dengan proses pengajaran yang ingin disampaikan.

William (2018) menjelaskan, penggunaan Kahoot, Quizziz dan Pawtoon sebagai platform pembelajaran dalam talian adalah tindakan tepat kepada pensyarah bahasa di samping membangunkan video mudah kerana pelajar dapat mengakses berulang kali pada bila-bila masa dan tidak terhad pada waktu pengajaran dan pembelajaran. Malah, Willian & Chew (2020) menambah, Google Classroom, Facebook dan Youtube menjadi platform yang diminati pensyarah dan pelajar semasa pendidikan fasa pandemik Covid-19. Buktinya, sebanyak 80% pengguna melayari video-video pendidikan dan memuat naik aktiviti-aktiviti pengajaran mahupun pembelajaran mereka menerusi platform ini.

OBJEKTIF

1. Untuk mengenal pasti indikator-indikator pengajaran bahasa Arab sepanjang sesi ODL
2. Untuk mengkaji platform terbaik yang digunakan oleh pensyarah bahasa Arab di UiTM semasa ODL

KEASLIAN

Indicator ini dibangunkan setelah semua institusi di Malaysia bertindak meneruskan pengajian ODL semasa fasa pandemic Covid-19. Setelah setahun berlalu, pensyarah bahasa Arab di UiTM semakin mahir menggunakan ICT sepenuhnya untuk menyampaikan pengajaran mereka dengan lebih kreatif. Buktinya, sebanyak 10 item soal selidik telah dibina untuk mengenal pasti penggunaan teknologi dalam kalangan pensyarah bahasa Arab dan outer loading setiap item menunjukkan 0.6 dan ke atas.

Jadual 1. Indikator Platform Pengajaran Bahasa Arab di UiTM semasa ODL

No.	Indicators	Outer Loading
1	Pensyarah memberikan tugasan bahasa Arab melalui platform Ufuture	0.763
2	Pensyarah menggunakan sistem pengurusan pembelajaran selain UiTM seperti Google Classroom	0.732
3	Pensyarah menggalakkan pelajar menjawab kuiz bahasa Arab online melalui Kahoot dan quizziz	0.90
4	Pensyarah membangunkan video pengajaran melalui screencast o matic atau pawtoon	0.887
5	Pensyarah menggunakan *'live' meeting technology* seperti Google Meet, Zoom atau Cisco Webex	0.885
6	Pensyarah menggalakkan pelajar menonton cartoon/filem/drama berbahasa Arab untuk mengasah kemahiran bahasa arab	0.848
7	Pensyarah menggalakkan pelajar mempamerkan kemahiran bertutur melalui Facebook dan Youtube	0.727
8	Pensyarah Bahasa Arab menyampaikan dialog menerusi augmented reality	0.5
9	Pensyarah selalu berkongsi konsep penting bahasa Arab secara visual (seperti infografik, carta dan graf, pembentangan, peta minda, anotasi dan video)	0.844
10	Secara keseluruhannya, minat saya dalam pembelajaran bahasa arab semakin bertambah setelah pensyarah menggunakan teknologi dalam pengajaran	0.857

Menerusi jadual 1 di atas, majoriti pensyarah bahasa Arab di UiTM membangunkan quiz online menerusi Kahoot dan Quizziz berada pada tahap paling tinggi iaitu 0.9 diikuti dengan membangunkan video pengajaran mudah menerusi Screencast-o-matic atau Pawtoon (0.887) dan penggunaan 'live meeting technology' seperti Google Meet Google Meet, Zoom atau Cisco Webex (0.885). Bukan itu sahaja, pensyarah turut menggalakkan pelajar bahasa Arab menonton animasi karton, drama atau filem pendek berbahasa Arab untuk meningkatkan kefahaman dan kemahiran berbahasa mereka. Dalam masa sama, pensyarah selalu berkongsi info-info penting secara visual seperti infografik, carta dan graf, slide pembentangan, peta minda anotasi mahupun video-video pengajaran dari universiti lain yang seri dengan modul bahasa Arab di UiTM.

Selepas pensyarah bersungguh-sungguh menggunakan apa jua kaedah pengajaran untuk memberi kefahaman kepada pelajar, mereka akan memberikan tugasan menerusi platform Ufuture ataupun Google Classroom. Tugasan-tugasan ini bukan terhenti setakat ini sahaja, malah pensyarah turut menggalakkan pelajar memuat naik video kemahiran bertutur mereka di media sosial seperti Facebook dan Yotube. Pemilihan kedua-dua platform ini bertujuan untuk menyingkirkan perasaan malu dan segan pelajar dengan mencungkil bakat pelajar agar mereka sentiasa terkehadapan di samping membuktikan kepada institusi lain bahawa pelajar bahasa Arab di UiTM mahir berkomunikasi bahasa dalam bahasa ini.

Walaupun pensyarah bahasa Arab kurang mahir menggunakan aplikasi pembelajaran terimbuh (augmented reality) dalam menyampaikan diolog, kajian ini melihat pensyarah telah mengukir kejayaan cemerlang dalam penggunaan platform-platform lain. Buktinya, dalam masa tiga semester ODL ini, banyak inovasi yang telah dibuat sehinggakan minat pelajar dalam pembelajaran bahasa arab semakin bertambah setelah pensyarah menggunakan teknologi dalam pengajaran iaitu 0.857.

KELEBIHAN

Indikator ini ternyata berjaya diimplimentasikan oleh pensyarah bahasa Arab di UiTM. Sehubungan itu, pensyarah-pensyarah di institusi seluruh Malaysia juga boleh diimplimentasikan kepada pensyarah-pensyarah lain dari semua university dan tidak terhad kepada pensyarah bahasa Arab di UiTM.

PENGHARGAAN

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INQUIRY-BASED RECIPROCAL TEACHING MODULE

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ABSTRACT

Inquiry-Based Reciprocal Teaching (I-RT) Module was developed to provide Malaysian ESL educators with appropriate reading comprehension lessons to enhance the reading comprehension skills of Malaysian upper secondary ESL learners. With systematic guidance through embedded ADDIE instructional framework in Design and Development Research (DDR), and close reference to the Standard-Based English Language Curriculum for Secondary Schools (SBELC), this module weaved the four reciprocal teaching strategies: predicting, clarifying, questioning and summarizing, into the five cycles of inquiry-based reading: engagement, exploration, explanation, elaboration and evaluation. Designed to complement and ease the implementation of reading comprehension instruction, suggested reading lessons in this module were organized around classroom settings and can be applied to suit the differing needs of the learners. Adhering to the four language domains in SBELC namely personal, public, educational and occupational, this eight-unit module bases its reading activities on the four themes in SBELC: people and culture, health and environment, science and technology, and consumerism and financial awareness. The suggested lesson plans, teaching notes, worksheets and self-assessments allow the educators and learners to scaffold and construct meaning in a social setting through modelling, think-aloud and discussion, thus resulting in active learner engagement in the process of reading comprehension. With three recent publications and good content validity, this module serves as an authentic well-presented reading supplementary module which features well-thought strategies and activities to enhance learners' reading comprehension.

Keywords: reading comprehension, module, reciprocal teaching, inquiry-based reading, ESL learners

INTRODUCTION

Designed to complement the revised curriculum and Common European Framework of Reference for Languages (CEFR), Inquiry-Based Reciprocal Teaching (I-RT) Module includes the content standards, learning standards and performance standards for Form Four reading syllabus in the Standard-Based English Language Curriculum for Secondary Schools (SBELC). Weaving Palincsar and Brown's (1984) Reciprocal Teaching into Bybee et al.'s (2006) BSCS 5E model, this module integrates four reading comprehension strategies namely, predicting, clarifying, questioning and summarizing into the five stages of inquiry-based learning cycle: engagement, exploration, explanation, elaboration and evaluation. The embedded ADDIE instructional framework in Design and Development Research (DDR) guided the process of module development systematically.

PROBLEM STATEMENT

In the fast-moving global era of the 21st century, the current Malaysian ESL learners need to equip themselves not only with diverse knowledge and competencies but also language proficiency in line with international standards as proficient English language users have better opportunities over the others, thus the great emphasis on the English language. However, despite the given concern to this transformation, the problems with reading comprehension continue to plague our students (Hazita, 2016; UNESCO, 2017) and schools. Teachers are concerned about their students' lack of reading comprehension skills as many students are able to decode the text fluently but fail to comprehend it (Hiew, 2012; Raihana et al., 2018). This impedes the production of independent and proficient readers (Wanzek et al., 2018).

In recent years, with mean reading scores of Malaysian 15 years-old learners in Program for International Students Assessment (PISA) at 398 in 2012 (OECD, 2012) and 415 in 2019 (OECD, 2019), this alarming low reading proficiency placed Malaysian ESL learners below the Organization for Economic Cooperation and Development (OECD) average reading scores. The low reading proficiency of Malaysian learners were also evident in the results of the 2017 Assessment of Literacy Competence in Reading. It was revealed that the mean score for reading literacy was at 416.4. in 2017, out of the total of 406,311 students from 2,046 schools in Malaysia, 36.6% or 148,751 students were low achievers in English Language Reading. Table 1.1 shows the detailed results of the assessment.

Table 1.1: Results of the Assessment on Literacy Competence in Reading,

High (X≥500)	Medium (400≤ X <500)	Low (X<400)	Total Students
78,517 (19.3%)	179,043 (44.1%)	148,751 (36.6%)	406,311

Source: Annual Report, Ministry of Education Malaysia, 2017.

A valid starting point to rectify these predicaments would be to ensure that teachers be exposed to specifically target explicit comprehension instruction and modelling as well as to receive supports in implementing it. Hence, this module aims to provide ideas for teachers to incorporate rich and varied scaffolds and to actively engage students in employing reciprocal teaching strategies into their inquiry-based reading activities.

MODULE CONTENT

Inquiry-Based Reciprocal Teaching Module aims to provide foundational ideas of reciprocal teaching strategies and BSCS 5E model by outlining the implementation of reciprocal teaching strategies in inquiry-based reading activities. It allows teachers and students to scaffold and construct meaning in a social setting through modelling, think-aloud and discussion, thus resulting in active engagement of the students in the process of reading comprehension.

The objectives of this module are to:
- improve students' reading comprehension using four comprehension strategies (predicting, clarifying, questioning and summarizing)
- guide students to become critical and reflective in their strategy use through the use of five stages of learning cycle (engagement, exploration, explanation, elaboration and evaluation)

- scaffold the four comprehension strategies by modelling, guiding and applying the strategies in a variety of texts
- provide opportunities to the students to use the social nature of learning and encourage collaborative efforts to improve and scaffold reading comprehension

This module contains eight units, each of which includes strategies and activities based on the four themes in SBELC: (i) People and Culture, (ii) Health and Environment, (iii) Science and Technology, and (iv) Consumerism and Financial Awareness. Suggested reading activities in this module also provide the content for language use in adherence to the four domains in SBELC: Personal, Public, Educational and Occupational.

The ten units in this module are divided in the following manner:
- Getting Started: Introduction to Reciprocal Teaching and BSCS 5E model
- Unit 1 – 4: Reciprocal Teaching Strategies – Predicting, Clarifying, Questioning and Summarizing
- Unit 5 – 8: Modelling Reciprocal Teaching Strategies in different types of text - narrative, expository, descriptive, and argumentative.

Getting Started sets the foundational ideas to help teachers begin using reciprocal teaching and BSCS 5E model in their reading classes. It covers the rationale and essential understanding central to the merging of reciprocal teaching and BSCS 5E model. It also provides the staggering results that reciprocal teaching and BSCS 5E model can deliver.

Unit One to Four discuss in detail each of the four strategies: predicting, clarifying, questioning and summarizing. Suggestions for reading activities that incorporate reciprocal teaching into inquiry-based reading classes that incorporates the five stages of learning cycle are outlined. However, it should be highlighted that the strategies in reciprocal teaching should be taught in concert with one another. The focus on only one strategy in these four units is just a preparation for the students to know how the strategy fits back into the larger framework.

Unit Five to Eight offer detailed accounts of the incorporation of reciprocal teaching lessons in inquiry-based reading classes. The lesson plans outline the modelling and scaffolding of the use of the four strategies in different genres. Interesting and challenging activities through a variety of texts assist students in remembering and internalizing reciprocal teaching strategies for eventual independent use.

Each unit in Inquiry-Based Reciprocal Teaching Module comprises:
- Unit Preview: This section serves as an introduction to the unit. It includes the objectives and overall features of the unit.
- Teaching Manual: This section incorporates suggested lesson plans for the modelling and scaffolding of each strategy follow a similar format:

Background	➢ Brief description on the lessons
Content Standards: Learning Standards:	➢ Specific statements of educational goals ➢ Concise educational objectives
Learning Outcomes	➢ Behavioral outcomes
Procedures	➢ 5E: Engage, Explore, Explain, Elaborate, Evaluate
Activities	➢ Focuses on the 21st century learning activities
Other Elements	➢ Language and Grammar Focus

	➢ Cross-Curricular Elements
	➢ Differentiation Strategies
	➢ Moral Values
Materials / Reference	➢ Supplies needed for the lesson
Reflection	➢ Post-lesson reflection of understanding

- Reading Activities and Worksheets: This section enables the practice of various techniques for the suggested reading comprehension strategy.
- Self-Assessment: This section provides evaluation and feedback on the strategies learned.

This module is therefore suitable for students of English as a second language working at Common European Framework of Reference (CEFR) level A1 and A2 (Basic User) towards B1 and B2 (Independent User). They will benefit from this module as cognitive and metacognitive reading activities in this module will guide them on the strategies that efficient and fluent readers use to comprehend different types of texts. The activities in this module are organized around classroom settings and can be applied in any order to suit the needs of the students and teaching style. It is therefore advisable to use this module in a progressive manner.

IMPACTS

This module contributes to the body of knowledge through the employment of the meticulous steps in creating a module content that adheres to the curriculum specification and the learners' needs. The vast content of reading texts is parallel with the CEFR levels stipulated in the curriculum, hence, facilitated their learning. The elaborated and illustrated details in the module served as a guideline for future researchers to develop a similar module on reading strategies and reading activities.

The process of establishing the validity and reliability of Inquiry-Based Reciprocal Teaching Module for the quasi-experimental procedure also indicated that this module can be utilized as teaching guideline by ESL teachers, thus eliminating the time and resource constraints faced by the teachers in preparing lesson plans for their students. This is due to the reason that some of the reading texts in this module were taken from the designated Form Four textbook. Therefore, Form Four ESL educators can use this module at ease with the lesson plans, notes and worksheets prepared for them.

The self-assessments at the end of each unit in the Inquiry-Based Reciprocal Teaching Module can serve as self-evaluation to evaluate learners' reading comprehension performance. The retrieved evaluation from the self-assessment provides the ESL teachers with accurate information in the identification of potential and struggling readers, thus assists the teachers in planning for future lessons.

Furthermore, the merging of reciprocal teaching strategies and 5E model for the purpose of comprehension-fostering and comprehension-monitoring activities in classroom resulted in the disclosure of reading outcomes and perceptual change in the ESL students. This module could therefore assist the teachers in gaining some insights on how to retain learners' attentiveness in reading comprehension classrooms. The teachers then can strategize and make informed decisions on the appropriate instructional strategies to be practiced during their reading comprehension lessons.

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ABSTRACT

The food industry is familiar with an instant cream-based soup such as chicken soup, mushroom soup, and tomato soup. For this type of food range, it is commonly consumed by those who desire fast and simple meal that can fulfill their hunger immediately. This product represents simplicity and instantaneous as it can fulfill consumer's desire to consume savory food in less than 5 minutes. Cream-based soup is basic; therefore, this instant beef stew is the new highlight to the range. It is rich with flavor and nutrients as the stew was made with vegetables and beef that high in vitamins, carbohydrates, and protein that can make the consumer felt satisfied just by consuming a clean meal. This instant beef stew can be used as a base for various meals for example as a mash potato gravy and seasoning to your stir-fried vegetable. Because it is produced in the form of powder, it can last at room temperature for more than three months. For those who love traveling and adventure, the instant beef stew is suitable for this type of consumer as it is practical, easy to make, and consumes less space in the backpack. To conclude, this new product is simple, convenient and travel friendly. It is suitable to be consumed by everyone regardless of age, race, and gender.

Keywords: beef stew, instant product, Ready-to-eat (RTE), Maillard reaction, dehydration.

INTRODUCTION

The product development of instant beef stew was done to create a new player in the market for instant and ready-to-eat soup products. This type of product is still considering rare and unavailable in the market. In the process of producing this product, it went through chemical changes in food that is called Millard reaction and for the most part dehydration process to convert liquid to solid powder. These two components are an essential step in product creation. The end goals of this study are to create an instant beef stew that is multipurpose and travel friendly to benefits all kinds of consumer's needs and wants.

OBJECTIVES

There are three objectives in this study:

i.   To study the difference between paste to powder process and direct powder process towards the texture and consistency of the product.
ii.   To experiment on the effects of different food structures towards dehydrating process involving fresh ingredients with paste mixture.
iii.   To investigate the effects of different cooking methods on the taste of the product.

LITERATURE REVIEW

1.   Instant product

In this fast-growing era, people are now more conscious of time and quality as the technology is everywhere. The need to have a convenient meal instead of traditionallyprepared food is higher this day with the mushrooming number of fast-food establishments. Based on research made by Swamy, Kumar, & Rao (2012) although amajority of food consumption happens at home, there is an increase in demand for convenient and out-of-home food. This is a result of the urbanization and changes in lifestyle that happened in society.

2.   Ready-to-eat

Ready-to-eat (RTE) refers to a food product that requires no further process of preparation by the consumers. It can be created from traditional or industrial processesand packaging, but it is focusing on food that can last long and easy to be made for theconsumers. There is a variety of RTE food product out in the market that was made forthe different target market (Makinde, Ayeni, & et al, 2020).

3.   Millard Reaction

To produce the best quality of food, it needs to go through the Maillard reaction as it can help in preserving the food and enhance its flavor. This type of process involves a particular heating process that results in the browning of food. Along the cooking process, there is a significant effect on the food including changes in nutrient value (Boekel, 2006).

4.   Dehydration

When it comes to nutrient content, fruits and vegetable is the main contributor to this set of human need. Most of the cooking processes used in traditional or industrial cooking can eliminate the essential nutrient that this resource has. This method is proven as one of the most effective methods in preserving fruits and vegetables and it is a simple process that involves extracting moisture in the ingredient with air (Chavan& Amarowicz, 2012).

EXPERIMENTATION

This product development involves an experimental process to create a standard ingredientstructure.

INGREDIENTS

No.	Wet Ingredient
1.	Yellow Capsicum
2.	Red Capsicum
3.	Green Capsicum
4.	Carrot
5.	Celery
6.	Fresh Potato
7.	Tomato
8.	Onion
9.	Garlic
10.	Green Chili
11.	Beef cube
12.	Fresh Thyme
13.	Fresh Rosemary
14.	Water

Table 1. Raw Ingredients

No.	Dry Ingredient
1.	Salt
2.	Seasoning
3.	Sugar
4.	Dry Oregano
5.	White Paper (powder)
6.	Black Paper (powder)
7.	Dry Potato Flakes

Table 2. Dry Ingredients

Based on the ingredient listed in the table, this production of the product can result in 300 g to450 g of end product depending on the dehydration process. The end product is a dry powderthat is full of flavor as it went through multiple processes of cooking and preparation. Step in food preparation include searing, boiling, blending, straining, re-cooking, dehydration, blending, packaging, and sealing. There are two types of experimental processes that happen to result in the best instant beef stew mixture and that is the direct dry method and paste to powder method. The direct dry method includes a process of the ingredient separately for eachitem and with the paste to powder method, it went through a cooking process that combines allthe elements then turns the paste into a powder.

RESULT: DESCRIPTIVE SENSORY ANALYSIS OF INSTANT BEEF STEW ATDIFFERENT PREPARATION PARAMETERS.

DISCUSSION

NO.	ELEMENT	DIRECT DRY METHOD	PASTE TO POWDER METHOD
1.	TASTE	• For direct dry method, the taste of the final mixture is acceptable but lacking in terms of meatiness.	• The paste to powder creates the best mixture for the instant stew as it provides a meatier flavor to the mix.
2.	CONSISTENCY	• Each method requires additional thickener. • In this mixture, there is an added thickener used and that is dry potato flakes. • Because the raw mixture did not add any thickness to the stew, it is essential to add the dry potato powder.	• Each method requires additional thickener. • In this mixture, there is an added thickener used and that is dry potato flakes. • Because the raw mixture did not add any thickness to the stew, it is essential to add the dry potato powder.
3.	COLOUR	• The end mixture for this method results with a light brown colour of powder.	• Paste to powder proses result with a deeper dark brown colour for the mixture.
4.	TEXTURE	• Because all the ingredients were dry separately, the texture is powderier compared to paste to powder method.	• Paste to powder method create a moister mixture of the product.

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INTEGRATED SOLAR-IoT MONITORING AND PREDICTIVE MAINTENANCE SYSTEMS FOR IRRIGATION (S-IoTP)

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ABSTRACT

S-IoTP is an integrated prototype system of Internet-of-Things (IoT) with auto-tracking solar panel for irrigation. It consists of an auto-track-developed solar panel to power water pump with IoT hardware and software and mobile user interface. The solar panel moves based on the sunlight direction to harvest maximum solar output. With IoT software, real-time data of the solar power output was monitored. The predictive analysis for forecasting solar power output based on model-based algorithm using Python to ensure sustainable power for electricity, optimise the irrigation process and water consumption. **S-IoTP** provides a consumer-oriented solar system with affordable cost and energy saving device that fits consumer needs. With **S-IoTP**, the irrigation cost can be reduced to ±93%, which, the total cost per year for this whole system is RM 1020 only, compared to the traditional process of irrigation which costs RM 16200 per year. To date, the technology readiness level of the S-IoTP is TRL 5, which is in the stage of development and it is validated in relevant environment.

Keywords: solar energy, auto-track, internet-of-things, irrigation, ARIMA model, prediction

INTRODUCTION

The context of this innovation is based on the digitalisation of agriculture, from Industry 4.0 (IR4.0) to Agriculture 4.0. IR4.0 is based on Internet of Things (IoT) technology which has transformed the production infrastructures such as connected farms, connected tractors and machines. It enables an increase in productivity, quality, and environmental protection. Agriculture 4.0 is about connectivity which is the ability to remotely collect, use, exchange data and publish information on the production processes. Sensor deployments and connectivity enable the users to track the operation, detect early a loss of performance and offer preventive maintenance operations. Additionally, the collected data helps the users to better understand the needs and usages to improve its line of process. A wave of IR4.0 will change global production in the near future. Future workers need to be highly trained in these emerging technologies. Hence, the current education system needs to adapt to the demands of IR4.0 in preparing the students for the future careers. Tomorrow's industry leaders and managers must possess new skill sets to adapt, manage, and take advantage of Industry 4.0. They must be able to see beyond what the technology can offer and the implications for the society. Business leaders, educators and governments all need to be proactive in up-skilling and retraining people so everyone can benefit from the Fourth Industrial Revolution (Alex Gray, 2016).

PROBLEM STATEMENT & OBJECTIVE

The conventional farmer uses electricity to power the water pump for irrigation. It is indeed costly, and the farm is usually located very far from the source of electricity. The restrictions on the movement during COVID-19 pandemic also halt the farm operation since the workers are unable to go and monitor the farm. For the case of manual monitoring, after growth of crops, water reaches the basins in disproportionate quantity that thereby causing wastage of water. Besides, it is labour and time intensive operation. There is a complete IoT system for irrigation that is available in the market, but the price is still considerably expensive for most modern farmers. Although the system may provide an automatic control operation for 24/7 like other IoT monitoring systems however, it is unable to provide the solar power output prediction. Without the prediction on the energy performance, it is impossible to manage the back-up electricity especially during the rainy season. There are 2 main objectives of the project which are, to design, build and test smart auto-tracking solar panels equipped with Internet-of-Thing (IoT) system for irrigation at very low operation cost. Secondly, to forecast the solar power generation based on previous data in order to ensure the back-up electricity during the rainy season.

PRODUCT DEVELOPMENT

Based on Figure 1, **S-IoTP** consists of auto-track-developed solar panel (1) to power pump for irrigation with IoT hardware (sensors) (2), software (3) and user interface via mobile (4). With IoT sensors, the solar panel moves following the sunlight direction in order to harvest maximum solar energy output. While, with IoT software, real-time (vpv) and current (ipv) data of the panel voltage of the solar panel was monitored. The predictive analysis was conducted to predict solar energy generation based on specific model-based algorithm using the Python tool.

PRODUCT DESCRIPTION

1. AUTO-TRACKING SOLAR PANEL
2. IOT HARDWARE (SENSORS)
5. DATA PREDICTIVE (ALGORITHMS VIA PYTHON)
3. CONNECTIVITY & SOFTWARE (ADAFRUIT)
4. USER INTERFACE (VIA MOBILE)

S–IoTP

Figure 1. S-IoTP system

SYSTEM PERFORMANCE

The highest solar output was recorded at 12.00–2.00 pm (61% performance efficiency) (Figure 2) and it can reach up to 309W (±45.6% p.e) at ±30.9 ⁰C. The obtained solar power output was used to power 2V water pump for the irrigation twice daily and for energy backup for 3 days. Higher power generation of auto-tracking solar panel (125.6W, 45.9%) was found compared to fitted-solar panel (104.1W, 37.9%); an increase of 8%. ARIMA (4, 2, 8) model was used for prediction analysis (Figure 3) and the results was found with ±68% accuracy.
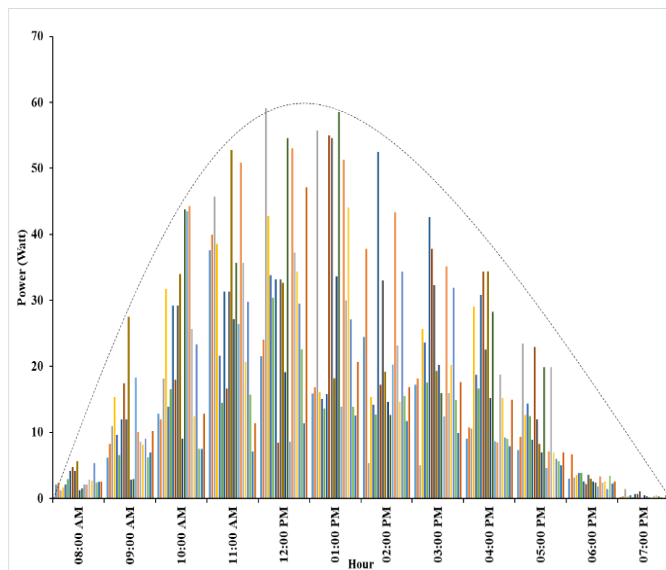
Figure 2. The solar power generated daily from 0800 hours until 1900 hours.
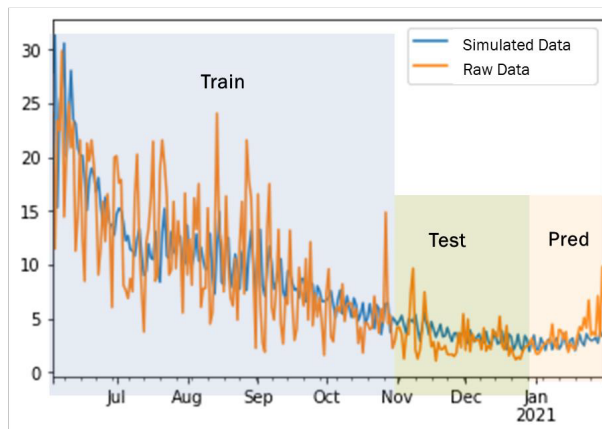
Figure 3. Around 32% of Mean Absolute Percentage Error (MAPE) implies the model is about 68% in predicting the next month from actual data (p-value: 5.3 e-11).

ADVANTAGES

S-IoTP has an integrated system of solar energy as green energy to replace fossil fuels that are now facing depletion. With an auto-track solar panel, high efficiency of solar energy can be captured with improved monitoring performance and maintenance of solar farm via IoT system (Ku Hussin et al., 2021). With **S-IoTP** concept, students can be exposed to prototype-level of IoT-based technology with the usage of various sensors that fits any application. From there, the students can explore other IoT-based applications to be able to see beyond when the concept turns to prototype that can benefit humankind. As the COVID-19 pandemic has triggered an unprecedented crisis in almost every sector globally, current technologies play a crucial role in keeping the society functional during lockdowns and quarantines. With **S-IoTP**, the users can monitor the farm remotely 24/7, keep the farm under surveillance and reduce the need for human workers. Whilst, with data predictive, it can ensure sustainable power for electricity, optimise the irrigation process and water consumption. **S-IoTP** provides consumer-oriented solar system with affordable cost and energy saving device that fit consumer needs. With **S-IoTP**, the irrigation cost can be reduced to ±93%, where the total cost per year for this whole system is RM 1020 only (from custom solar system design, IoT systems and water bill for RM 60, 120 and 840 respectively), compared to the traditional process of irrigation which costs RM 16200 per year (from electricity cost, worker wage and water bill for RM 300, 900 and 150 respectively).

NOVELTY/INVENTIVENESS

S-IoTP may highlight on the novelty of following points, such as the auto-tracking solar panel which integrated with IoT monitoring system to access real-time data 24/7 and the user can acquire fast alert if something is wrong with the irrigation. Besides, the system is a consumer-oriented solar system where 93% of the cost is reduced compared to the cost of manual irrigation. The element of predictive analysis also highlights the novelty of the system which is important for continuous operation (energy sustain), back-up electricity and early-detection if it is the rainy season or cloudy weather that causes a drop of solar power output.

With the prediction, back-up energy can be ensured upon the event occurance.

COMMERCIALISATION

To date, the technology readiness level of the S-IoTP is TRL 5, which is in the stage of development and it is validated in relevant environment. **S-IoTP** has a great potential to be commercialised in future from TRL 5 to TRL 7.

ACHIEVEMENT

To date, the finding based on this prototype was published at international level (scopus) and another 2 papers are under review.

Ku Hussin, K.A., Mohd Adenam, N., Mat Yunin, Y.A., Wan Salihin Wong, K.N.S, Mohd Hashim, S.Z. & Adli, H.K. (2021). Monitoring and optimizing solar power generation of flat-fixed and auto-tracking solar panels with IoT system. IOP Conference Series: Materials Science and Engineering, 1-8. https://doi.org/10.1088/1757-899X/1062/1/012011 (Scopus)

The previous version of **S-IoTP** received the Silver Award from the Carnival of Research and Innovation 2020 (CRI 2020 UMK). There are 3 industries which have shown interest in **S-IoTP** which are:
1) Kampus Satelit CIAST – Institut Latihan Perindustrian (ILP) Kota Bharu
2) Oriejelly Food & Agro Industries (003271859-P)
3) Kuwa Trading (KT0259174-P)

ACKNOWLEDGEMENTS

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IOT BASED MONITORING SYSTEM FOR OYSTER MUSHROOM FARMING PONDOK SERI PERMAI PASIR PUTIH KELANTAN

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ABSTRACT

In Malaysia, many farmers depend upon the traditional agricultural practices. Adapting modern agricultural technology plays an important role in improving overall efficiency as well as yield production. In modern agriculture, the Internet of Things (IoT) connects farmers to their farm via the sensors so that they can easily monitor the real-time conditions of their farm from anywhere. Oyster Mushroom is a widely cultivated crop among Malaysian farmers. Although being the most consumed and cultivated crop, it is still overshadowed by the traditional cultivation approach which results in low productivity, high manpower efficiency, more effort and cost. This work aims to develop a monitoring system to monitor the environmental conditions of a mushroom farm. It enables users to monitor crucial factors such as temperature, humidity, moisture, light intensity on a mushroom farm through the end devices. Oyster Mushrooms require optimum temperature between 26°C to 29°C and humidity between 85% to 95% and carbon dioxide level not more than 600 ppm. Sensors are placed on fixed locations and spots of the farm. The sensors measure the parameter status which is transmitted to the remote monitoring station via a low power Node MCU. Obtained data is stored in a cloud platform. The codes for the controller are written in the Arduino programming language, debugged, compiled, and burnt into the microcontroller using the Arduino integrated development environment. The result shows successful monitoring of environmental conditions accessing the internet from anywhere. It minimizes human efforts and automates production, which could be beneficial to Malaysian farmers.

Keywords: : IoT, end devices, sensors, monitoring station, Node MCU, Arduino

INTRODUCTION

This project is conducted to create a system to monitor the environmental conditions such as temperature, humidity, carbon dioxide level, and lighting conditions of the oyster mushroom farm located at Pondok Seri Permai, Pasir Puteh, Kelantan by using IoT. Internet of Things (IOT) is defined as a network of physical devices embedded with physics, software, sensors, actuators, and property that allow these objects to attach and exchange knowledge. As these kinds of structures need refinement, a scientifically designed mushroom farm needs heavy investment and hence is out of reach from small & marginal mushroom farmers. Not only that, mushroom units need to keep their air-conditioning plants running almost all year round. For a large cultivation of oyster mushrooms, we consider the temperature, humidity, light, and carbon dioxide levels as part of the parameters that need to be observed . As the main focus is to reduce human labor and to enhance the yield, this system will provide a novel method to monitor the farm. The need for food and limitation of space or land for agro-economic activity make urban farming technology becoming popular and has become one of promising solutions for securing food supply. Apart from that, according to Jesús Martín Talavera (2017), extreme weather changes and climates affect the production of crops, causing price increase and lower quality of crops produced. Putting this idea in mid, this paper presents an internet of things (IoT) based monitoring and environment control for indoor cultivation oyster mushroom, which is a smart urban farming system that requires less maintenance, less manpower, and saves a lot of space as discussed in prior papers (A Mustafa Alper Akka, 2017), (Jiang Zhaohui,2010). Furthermore, this project is dedicated to improving and enhancing the conventional plantation system in general. Using the IoT platform, this will enhance the capability of current equipment for remote monitoring purposes and at the same time log the data for analysis and references (Fernando Terroso,2017), (C. Cambra,2017).

METHODOLOGY

The room studied for this project is 30 m in length, 15 m in width and 3 m in height inside a concrete building as seen in Figure 1. The wall was made of bricks and the roof of the room built under the main concrete. The room was installed with four rows of rack; each rack contained around 1000 blocks of mushroom. Ventilation system is specified at 3500 cubic meters per hour (CMH) for each exhaust fan, lights with 50 watts for 3000 lumens, and cooling pad installation at the front building to bring air from outside to inside. All the devices were installed at positions outside the cultivation room and were fixed by an electrical and electronic device to monitor temperature, humidity, light intensity, and CO2 level during the experimental procedure as seen in Figure 2. The optimal value of temperature, light intensity, CO2, and humidity for oyster mushroom planting is at 26 – 29 deg C, 200 – 500 lux level, 85 – 95 % humidity and 600 particles per minute (PPM) CO2. The humidity and temperature created are by exhaust fan and cooling pad system as shown in Figure 3. Light intensity is provided by fluorescent lamps. The range of normal conditions for oyster mushrooms indoor plantation is given by Table 1.

Figure 1. Inside the building

Figure 2. Installation of watering and drain system

Figure 3. Cooling Pad

Table 1. Main parameters for Oyster mushroom grow

Parameter	Range	Unit	Controlled equipment
Temperature	26 - 29	^{o}C	Exhaust Fan
Humidity	85 -95	RH %	Cooling PAD
CO2	600 <	ppm	Exhaust Fan
Light	200 – 500	lux	Lamp

Software Implementation

In this project, ESP32 Controller was used as the main controller. It is a microcontroller with an integrated Wi-Fi module. It was programmed using C++ language with Arduino IDE software. All sensor readings are captured by the ESP32 Controller and displayed on the TFT Display on the device and sent to the server. The controller itself has a Wi-Fi capability and is programmed to act as a Wi-Fi client, thus enabling a direct connection to the available Wi-Fi Router with internet connection. An app called Blynk is used as an IoT for this platform. The sensor data captured by the controller are sent to Blynk Server, and users can use the Blynk App to display the readings on Android or IOS Phone. Figure 4 a) and b) show the algorithm data transfer by the ESP32 to Blynk server and from Blynk server to Blynk App, respectively. The data can be displayed in various types such as sensor value, graph, virtual meters and so on. The working block diagram of the whole system is displayed in Figure 5.
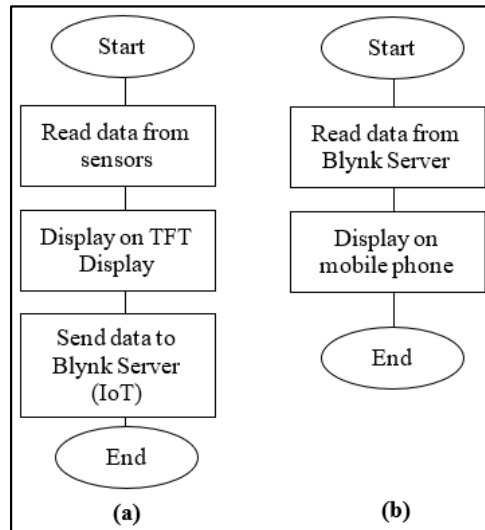
Figure 4. a) and b): Algorithm data transfer by the ESP32 to Blynk server and from Blynk server to Blynk App
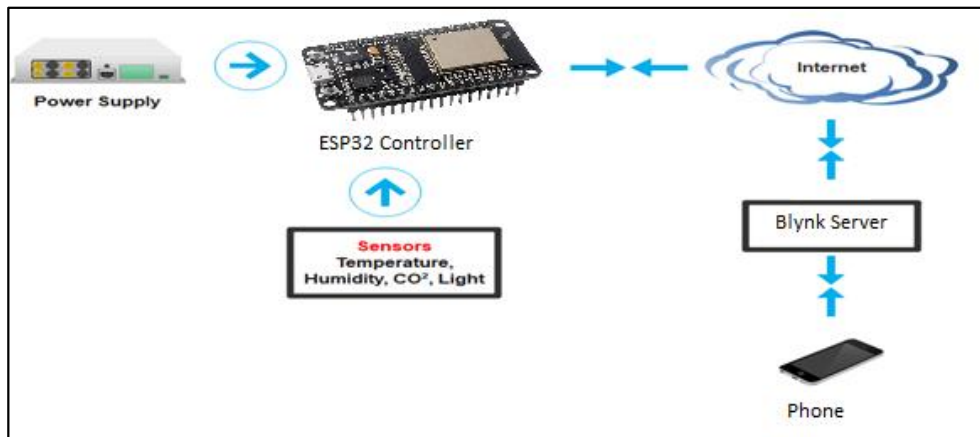
Figure 5. Working block diagrams of the system

Hardware Implementation

All the main components are shown in Table 2. The supply used in this project are 5V and 3.3V. The system can get an actual time from the internet for the timestamp but DS3231 RTC is also used as a backup. TFT display uses a graphical method, therefore its display is limitless compared to Characteristic LCD. The illustrated diagram for the project is as shown in Figure 6 while Figure 7 shows the display of sensor readings and the controller unit.

Table 2. Main Component

Function	Component name	Description
Main Controller Board & Wi-Fi	ESP32 DOIT DEVKIT V1	32-bit LX6 Microprocessor with clock frequency up to 240 MHz
Sensor	DHT 22	Humidity & Temperature
Sensor	MH-Z14A Infrared Gas Module	CO2 sensor
Sensor	VEML7700 Ambient Light Sensor	Light sensor
Thin Film Transistor	4" TFT LCD	Display
Real Time Clock	DS3231	Manage the program functions
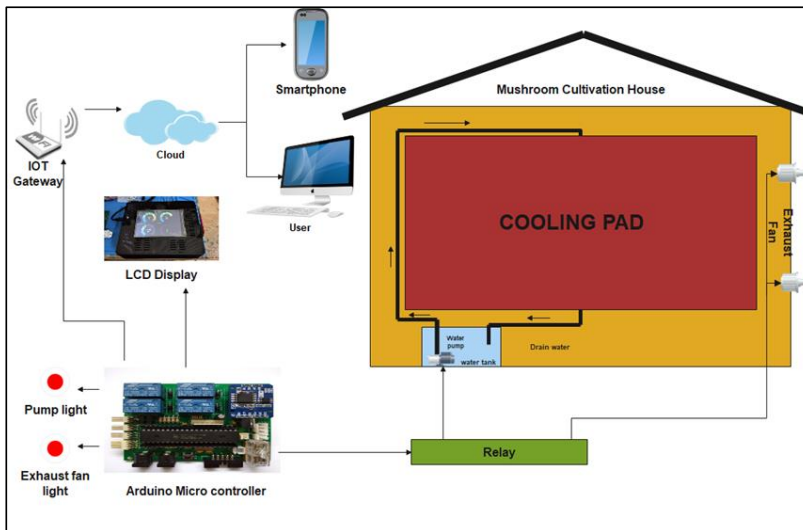
Figure 6: An illustrated schematic diagram of greenhouse integrated with IoT
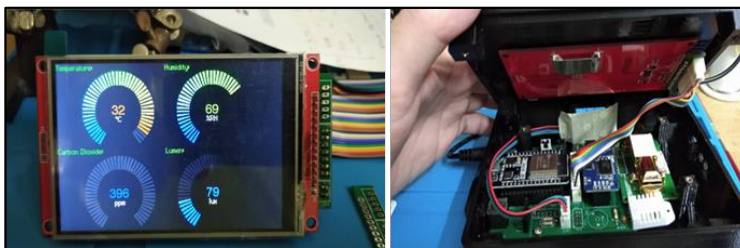
Figure 7: The LCD display and controller and socket outlet for IoT Monitoring and environment control system for indoor cultivation of oyster mushrooms

RESULTS

System monitoring Function Test

Figure 8 shows examples of dashboard apps that have been used in the system. In this system, there are four parameters that are monitored at a 10-minute sampling rate: room temperature, relative humidity, carbon dioxide and light intensity. Figure 8 shows data with a function of time that was obtained from the IoT server platform. Besides using browsers, the data can be duplicated and can be monitored by the user via third party apps on android. This method gives flexibility to users to monitor their system. After implementing this system, the result shown the mushroom growing is better than conversional method in term of productivity and duration of growing.
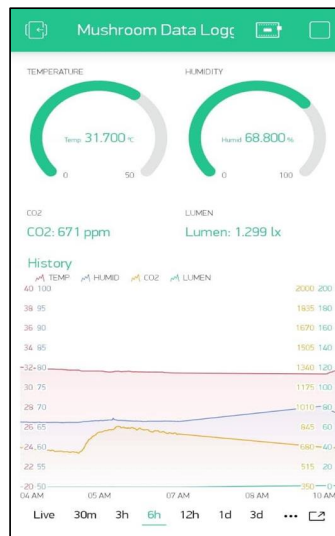
Figure 8. Graphical user interface Apps user

Figure 9. Oyster mushroom

CONCLUSION

This project redefines farming among farms and agronomists alike. Applying IoT has brought revolutionary change in the monitoring, management, data analysis and costing in improving farming. Temperature and humidity sensors were tested, and the data were sent to IOT platforms for accessing and monitoring. As mushroom farming requires continuous monitoring of environmental parameters, the proposed system plays an important role in innovating new methods of monitoring and improving mushroom farming and to deliver more productivity of mushroom.

ACKNOWLEDGEMENTS

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APPENDICES

memorandum of understanding

MEMORANDUM OF UNDERSTANDING

BETWEEN

UNIVERSITI TEKNOLOGI MARA

AND

KOPERASI USAHAWAN CENDAWAN KELANTAN BERHAD

ON FRIENDSHIP AND COOPERATION, PROMOTION OF MUTUAL
UNDERSTANDING, ACADEMIC, CULTURAL AND SCIENTIFIC THOUGHT
AND PERSONNEL EXCHANGE

IOT BASED WATER LEAKAGE MONITORING SYSTEM

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ABSTRACT

Nowadays, water leakage has become one of the major issues in the water distribution system and it can cause a lot of water loss through water pipelines. Hence, it will give a financial loss if it cannot be identified at an early stage. The concept of real-time water leakage monitoring using the Internet of Things is presented in this project. The internet of things (IoT) is a key component of smart tracking, which uses wireless sensor technologies to link people and systems. The parameter used to analyse the water leakage in the pipeline is the water flow sensor. In this study, a water flow sensor is used to determine the rate of water flow via a pipeline in order to resolve any water-related concerns such as leakage and usage. The proposed system would concentrate on common housing pipes and would display collected data through a smartphone. Additionally, this project will build the case for the water flow sensor, as well as the full circuitry for all electronics needed. As a result, it shows that the system can function stably and give water flow rate readings with 98% accuracy. The system can also send real-time data to smartphones via the Blynk application and alert the users when leaks are identified using threshold data.

Keywords: IoT, water leakage, flow rate, Blynk, flow sensor.

INTRODUCTION

In recent years, Malaysia's water industry is plagued with ineffective water management. According to the World Bank, water management inefficiency has resulted in water losses of up to 50% in Pahang due to pipe leaks, while the national average is now at 35%, nearly three times that of developing nations. Additionally, the government intends to cut non-revenue water (NRW) to 25% by 2020 (*The Malaysian Leaky Pipe Story*, n.d.). This illustrates that pipe leakage is a significant concern in the water management system. Leaks that have remained undetected for a long period are one of the causes leading to the high NRW.

Recently, the development of IoT water leakage systems has been extensively studied by researchers (Mehta & Misra, 2019) presented a Leak Monitoring Device in 2019 that builds a nodal network of systems that continuously monitor the flow of water and may deliver timely alerts. The study used two water flow sensors to monitor the water flow rate and it will be located at both ends of the pipe. According to the research, if there is a changein flow rate at the pipe's ends, this might indicate that the pipe is leaking. Also, (Arya Vijayan& Mr. Raju Narwade, 2017) created a system that can detect pipe leakage by obtaining the inflow and outflow values. The study shows that If the differential between the two sensors exceeds 60 L/hr, a leak in the pipe has occurred. However, none of these researches discussesthe degree to which their various systems are accurate.

In this study, the proposed system will be monitoring the flow rate of water using TTGO Lora

Esp32 as the microcontroller and Wi-Fi as the communication protocol in the Internet of things (IoT). Therefore, it is predicted that this improvement will save time, costand most importantly it can monitor the flow rate at any places through the Blynk application on the smartphone (F Asra Noorain et al., 2020). The sensor used in this system is the water flow sensor and the overall system will be powered by a rechargeable battery and USB charging module. By focusing on the problem of water in the house, the system will be applied to standard housing PVC pipes ½ inches in diameter. Besides, all components will be placed in a compact casing that will be easy to install on-site.

METHODOLOGY

System Configuration

In this proposed system, Arduino IDE was used as a programming software to communicate with the microcontroller, sensor and IoT platform. In order to communicatewith the board, some libraries are required to be installed, such as ESP-32 and Adafruit SSD1306 library. The Adafruit SSD1306 library will enable the board to connect with the integrated 0.96-inch OLED screen for site monitoring purposes. Apart from that, the code for the water flow sensor will use an external interrupt function on signal pin 32. This is used to read the flow sensor's pulses. When the TTGO board detects a pulse, the pulse counter function is triggered to count the number of pulses. The water flow rates will be calculated using the equation (1) above, where the flow rate is pulse per minute divided by the calibration factor.

Then, the same flow rate will be delivered in real-time to the Blynk Server utilisingthe Wi-Fi protocol that is in the TTGO Lora board. A database will be established synchronously in the Blynk application for the purpose of monitoring the water flow rate on asmartphone. Lastly, when a leak is detected, the system will notify the user by sending a notification to their smartphone. The possible water leakage for this option is obtainedthrough the threshold method. The method classifies anything under a certain level of threshold flow rate as possible water leakage.

System Integration

After the IoT components were programmed, all components were integrated into onecomplete circuit to secure the connection during field testing. The schematic design of the hardware is illustrated in Figure 1.
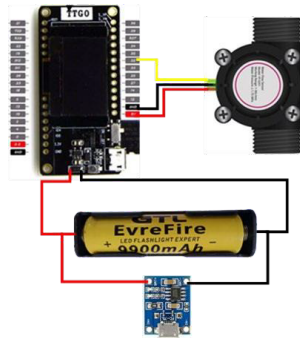
Figure 1. A schematic design for hardware

Next, the IoT-WLMS case was developed to integrate all components used as one compact device by using Autodesk Fusion 360. This ensures that all electrical componentsare shielded from any possible water spills and easy to install for site monitoring. Finally, the casing will fabricate by using 3D printing technology.
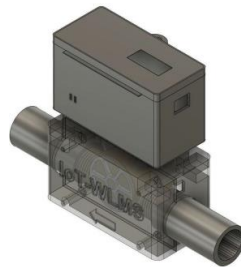
Figure 2. Designed casing using Autodesk Fusion 360

Experimental Setup

Sensor Calibration

During sensor calibration, the water flow rate produced by the sensor was comparedto the maximum flow rate offered by the water pump specification. A submersible aquarium pump with a power of 20W and a maximum flow rate of 15L/min was used to flow the water into the pipe and pass through the water flow sensor. The calibration factor was set to 3,4 and 5. This value will be entered in the coding respectively before the experiment is run. Finally, the data will be tabulated to illustrate differences and percentages of inaccuracy for various calibration factor values.

System Performance Testing

System performance testing is conducted to determine the performance in monitoring the water flow rate in the pipeline. A prototype is designed to test the system performance by using PVC pipe ½" and connected to the existing pipe with 4 faucets. In this test, the developed system will monitor various water flow rates in order to determine the present condition of water flow at the site. Furthermore, the system's reliability will be validated via data transmission between the hardware and the IoT platform. Finally, leakage simulations will be conducted to determine the values for the threshold data that will be included in the final coding. The design of the prototype is shown in Figure 3.
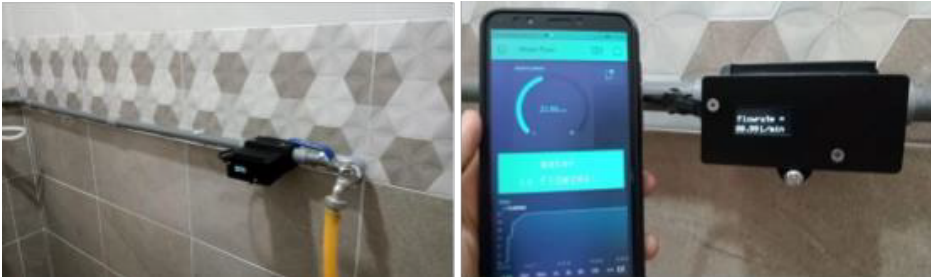
Figure 3. Water Flow Monitoring

RESULT AND DISCUSSION

Sensor Calibration

Table 1 shows the water flow sensor's percentage error at various calibration factors when the pump flow rate is kept at a maximum constant of 15 L/min.

Table 1: Percentage error at various calibration factors

Calibration factor,c	Water flow rate, Q (L/min)	Percentage error (%)
3	22.22	48.13
4	16.67	11.13
5	13.33	11.13

The table above shows that the most accurate value for 15 L/min of flow rate is between calibration factors of 4 and 5. Therefore, the interpolation formula can be used in order to get the value between two points, where;

$$c = 4 + (15 - 16.67)\frac{(5-4)}{(13.33 - 16.67)} = 4.5$$

Hence, the calibration factor of 4.5 was inserted in coding and the result shows that the sensor flow rate was 14.81 L/min. The error percentage, in this case, is 1.26% and has an accuracy of 98.74 % from the actual value. This finding was in agreement with (Rajurkar et

al., 2017) findings, who also used a 4.5 of calibration factor for this flow sensor. The error might have been due to pump error and losses in the pipeline

System Performance Testing

Next, the prototype is tested at various conditions of water flow. Figure 4 shows the graph for flow rate conditions during a given interval.
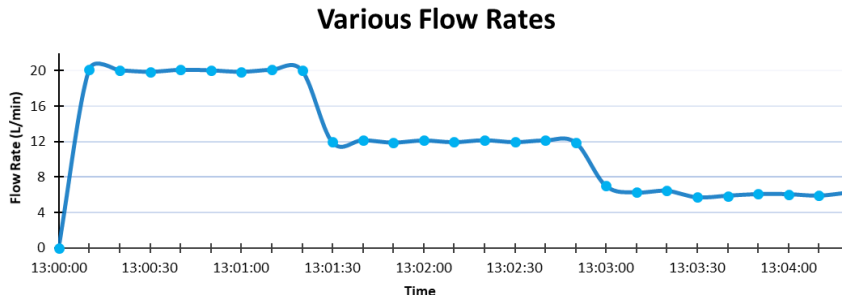
Figure 4. Graph of water flow rate at various conditions

The figure above shows that when no water is flowing, the flow rate is zero, and whenthe water is free to flow, the flow rate steadily rises to a constant value. The maximum flow rate during the testing is about 20.99 L/min, and at this stage, only one faucet was open. Then, the flow rate starts to decrease about half of the maximum point when two faucets were opened simultaneously. Meanwhile, when the opening faucets were increased to 3-4, the minimum flow rate was between 6.5 to 5.5 L/min. This shows that when the opening faucets are increasing, water pressure starts to drop. Hence the flow rate will also be decreasing.

From the minimum value of the flowrate, a 2 mm hole was made to consider that the pipe was leaking. As a result, the threshold data were obtained between $0< Q \leq 5$ L/min. The possible water leakage only shows a pulse when the flow rate is between threshold values for more than 5 seconds. The system will alert the users by sending a notification when leakageis detected. The possible leakage value of 5 L/min is acceptable, as the research from(Marinoski et al., 2014) stated that the average flow rate for one water fixture in low-income households is about 6 L/min.

Next, testing is done by placing the transmitters (device) and receivers (Blynk apps) ata certain distance. The experimental results show that transmitting data from transmitter to receiver rarely experiences delays in the range of 0.1km to 14km. This indicates that the sensor data was successfully sent to the receiver so that the Blynk dashboard could display it in real-time.

CONCLUSION

In this study, the development of an IoT Based Water Leakage Monitoring System was conducted and investigated at ½ inch PVC pipe. As a result, the system can communicate successfully between microcontroller, sensor and IoT Platform that utilises the Arduino IDE software and the Blynk application. Experimental testing of the sensor in measuring the flow rate of water shows that this system provides performance accuracy of more than 98% from

the actual water flow rate. The results also show that the developed system is very reliable in real-time monitoring, since the data transmission between receiver and transmitter does not show any delay during the testing session. In addition, the findings show that the pipeline's possible water leakage might occur if the flow rate is below 5 L/min. Finally, the implementation of the Internet of things (IoT) is necessary as water flow through pipelines can be observed at any time from anywhere, which can save money and time.

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i-TABUNG

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ABSTRACT

i-Tabung is a brand new service which provides an integrated fundraising box and a web-based application system. The main objective of i-Tabung is to overcome the current limitation of the conventional fundraising box that being used by non-profit institution especially mosques. The additional feature of the product is to provide a better performance and experiences to the organizations while conducting fundraising activities. With the usage Internet of Things (IoT) technology, the product enables users to know the accumulated amount of money gathered in the fundraising box through automated sensor in the box that identify each notes according to their colors and different sizes for coin. The product is equipped with a sensor for it to be able to detect the currency and to transfer the data over the network by using a micro-controller. Person in charge of fundraising may view the amount of money inside the box through the web-based application at any time and place as long as the user has an internet access. The data in the website can only be accessed by authorized user as the system need credential login information such as username and password in order to view the account. It also may reduce the thievery rates since i-Tabung using non-see-through or opaque design as the structure of the fundraising box which people are prohibit seeing the amount of money inside the box that makes it more secure and relevant to be used for a long term. Not only

that, the product operate via wireless network architecture. Therefore, no electrical or network cables will be installed inside the building that can cause people to trip over or electrocute.

Keywords:　　　　Internet of Things (IoT), opaque design, micro-controller, web-based application

INTRODUCTION

Money donation or fundraising is an act of money collection handled by a certain organization or institution meant to help other people, organizations or even nations that encounter misfortunes. Fundraising activity is an important pro-social behavior that usually driven by emotional encouragement from advertising (Urbonavisius, Adomaviciute, Urbutyte & Cherian, 2019).

Non-profit organization such as mosque uses fundraising as the source of the income in supporting their expenditures and other usage. Fundraising in mosque often being done by placing the donation boxes in some part of the building such as at the men and women sections, and even at the main entrance. Ideally, the mosque management committees hold the accountability in managing the donation boxes by keeping track from time to time.

Traditionally, the fundraising boxes in mosques come in various sized and design. There are some mosques that uses a wooden type of box, while others used box that made up from steels and as well a clearly visible and see-through kind of boxes. Thus, the conventional fundraising boxed are so vulnerable that makes it become an easy target for crimes like theft and vandalism.

Other than that, it is time consuming to calculate the accumulated amount of money since it was done manually and the process involved people which may lead to human error while doing the counting and record keeping. According to Zakariyah (2016), the accumulated money were counted in private by dedicated person in charge which usually are the Chairman, Secretary and the Treasurer before deposit the money into banks. Problem arise with the situation when it takes a long time to count them and mistakes such as human error may happen while counting the money. In addition, the data of all transaction are kept manually by using a logbook that stored within the mosque's area. The record keeping is not well-secured as anyone can break into the the room any time or the possibility to misplaced the book are high. Hence, a new type of fundraising box which used the technology of Internet of Things (IoT) was introduced to place the conventional system.

PURPOSE OF THE INNOVATION

The main purpose of this innovation is to overcome the limitation of existing fundraising system that practices in non-profit organization which normally used conventional boxed to collect funds. In the product development, the technology that is being used in the architecture is Internet of Things (IoT). It is a new technology paradigm which is visualized the capability of interact of various devices with one another across the network (Lee & Lee, 2015). IoT is an extension of Internet connectivity into physical devices or objects, where no physical manpower is needed in order to connect the application to the network. A type of sensor used to detect the currency value whenever a donor inserted a money into the fundraising box. For example, the sensor will detect the blue color for RM1 notes and green

color for RM5 notes. The box will then generate the calculation before sending the data over the network which it can be accessed through a web-based system from anywhere at any time.

IDEA GENERATION OF i-TABUNG

An idea of web-system or mobile application that can be stored a real-time total collected money inside the i-Tabung was generated due to current technology that was rapidly expand. Before users view the data collected from the fundraising box, users must first register their account in the web system by entering the required information such as username and password that had been registered in the system. Then, users will be directed to the dashboard page and the users can see the display of the page. The page has features such as instance transaction history and staff information or person in charge (PIC) that operates the system. Through appropriate system, all data either current or previous one may be easily track down. It is believed that the life expectancy of i-Tabung can last up to few years if it is being used wisely by the users.
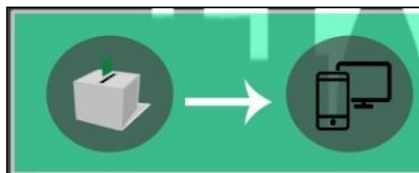
Figure 1. The Framework for i-Tabung

In Figure 1, it explained the main feature of i-Tabung which uses a website system that notifies users the total amount received instantly when person in charge (PIC) opens the website. With this method, it may ease to detect the thievery rates since the website may store data and have ledger recorded history.

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KAEDAH PENGAJARAN CHM510: DARI SUDUT PANDANG PELAJAR

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ABSTRAK

Subjek CHM510 (Kaedah Pemisahan Analitik) merupakan subjek yang terpenting dan dan ilmu berkaitan dengan subjek ini banyak diaplikasikan di agensi-agensi sains kerajaan, di sektor swasta serta sektor kerajaan. Namun begitu kaedah pengajaran subjek ini didapati tidak seiring dengan kaedah yang terkini. Untuk itu satu kajian telah dilakukan untuk menilai tahap penerimaan serta pengajaran yang boleh diterima oleh para pelajar yang mengambil kod ini. Senarai 128 orang pelajar telah menjalani kajian secara soal selidik ini di 4 buah kampus iaitu UiTM Kampus Selangor, UiTM Negeri Sembilan Kampus Kuala Pilah, UiTM Cawangan Perlis dan UiTM Cawangan Pahang Kampus Jengka. Secara amya, pelajar perlu ditukar corak pengajaran dari pengajaran berlandaskan penulisan teks kepada pengajaran yang lebih banyak berbentuk gambar atau visual.

Kata kunci: kaedah pemisahan analitikal, statistik diskriptif, Kruskal Wallis, kromatografi gas, kromatografi cecair berprestasi tinggi

PENGENALAN

Salah satu kursus sains gunaan yang ditawarkan di Universiti Teknologi MARA adalah Kaedah Pemisahan Analitik (Analytical Separation Method) dengan kod subjeknya adalah CHM510 merupakan kursus yang ditawarkan kepada pelajar yang mengikuti pengajian Sarjana Muda Sains (Kepujian) Kimia, AS202 dan Sarjana Muda Sains (Kepujian) Kimia dengan pengurusan, AS222. Kursus ini menekankan prinsip asas kaedah pemisahan analitik yang diaplikasikan untuk kromatografi berasaskan pemisahan semasa penyelidikan dalam projek tahun akhir dan latihan industri. Selain dari CHM510, kursus tersebut juga ditawarkan untuk Diploma Mikrobiologi (AS114), Analisis Instrumental Asas (CHM260) yang menjelaskan asas-asas pemisahan, dimana asas pemisahan ini terbahagi kepada dua bab yang merangkumi Kromatografi Gas (GC) dan Kromatografi Cecair Berprestasi Tinggi (HPLC). Ini menunjukkan pentingnya prinsip pemisahan analitik untuk pelajar jurusan sains tanpa mengira tahap pengajian. Kewujudan pelbagai teori adalah cabaran pembelajaran yang mesti diperoleh didalam kursus ini. Sesi makmal adalah pendekatan biasa untuk membantu dan meningkatkan pemahaman pelajar melalui visualisasi. Walau bagaimanapun, terdapat beberapa kelemahan sesi makmal antaranya adalah masa yang terhad dan kurangnya peralatan kromatografi yang tersedia untuk pelajar kerana kosnya yang mahal dan penyelenggaraan yang membosankan. Pengetahuan mengenai kaedah pemisahan telah berjaya diterapkan dalam banyak kajian penyelidikan terkemuka seperti makanan (Janelle et al. 2015; Peng et al. 2020), antioksidan (Ma et al. 2020), dan didalam bidang farmasi (Ruz et al. 2004 ; Tekkeli & Kiziltas 2016). Selain itu, peluang pekerjaan yang berpotensi juga tersedia di badan penyelidikan terkemuka seperti Institut Penyelidikan dan Pembangunan Pertanian Malaysia (MARDI), Institut Bioteknologi Nasional Malaysia (NIBM), SIRIM Berhad, dan Sime Darby Berhad yang dilengkapi dengan kromatografi lengkap makmal. Oleh kerana factor tersebut diatas, adalah penting untuk mengembangkan alat pengajaran interaktif untuk memastikan bahawa pelajar dapat menguasai kursus ini melalui asas sebelum penerokaan dan analisis pada tahap yang lebih tinggi. Untuk memahami kaedah pemisahan, pelajar mesti mahir mengenal pasti prinsip asas yang melibatkan banyak istilah didalam kursus ini. Ia merangkumi fasa bergerak, fasa pegun, kekutuban, analit, masa pengekalan, dan interaksi. Cabaran besar dapat dilihat ketika kursus ini merangkumi banyak teori yang mesti difahami sebelum menyelesaikan soalan yang berkaitan dengan analisis kritikal. Dalam proses pembelajaran apa pun, halangan mungkin timbul jika penghafalan dilakukan tanpa pemahaman seperti yang dibincangkan oleh Klemm pada tahun 2007. Pendekatan yang umum dan tersedia didalam pengajaran seperti penyediaan nota dan power point yang penuh dengan perkataan membuatkan pelajar kurang selesa dengan teknik yang digunpakai selama ini .. Oleh itu, artikel ini bertujuan untuk mengenal pasti keadah pembelajaran yang bersesuaian serta diminati oleh para pelajar yang mengambil kursus ini. Selanjutnya, perbandingan terhadap tahap pemahaman pelajar mengenai terminologi dan analogi di seluruh kampus telah dilakukan. Selain itu, kesediaan pelajar untuk menggunakan bahan pengajaran interaktif juga dibincangkan. Analisis diukur secara kuantitatif menggunakan perisian SPSS dan R-Plus melalui sampel 128 pelajar dari empat kampus di Universiti Teknologi MARA.

METODOLOGI

Satu kajian bersifat analitikal telah dilakukan diantara Oktober 2020 hingga November 2020. Soal selidik yang dirancang telah diberikan kepada para pelajar untuk memperoleh maklumat yang diperlukan. Dalam kajian ini, data primer diperoleh dengan melakukan soal selidik dalam talian tertutup untuk memastikan bahawa ketepatan, konsistensi data selaras dengan objektif

kajian. Skala pengukuran yang digunakan adalah skala Likert lima pada kontinum dari sangat tidak setuju hingga sangat setuju untuk mengukur sama ada tindak balas positif atau negatif dengan pernyataan tertentu. Empat buah kampus Universiti Teknologi MARA yang terdiri daripada kampus, Shah Alam, Kuala Pilah, Arau, dan Jengka telah diambil sampel dan hasilannya dikumpulkan dimana ianya melibatkan pelajar yang mendaftar bagi kursus kaedah pemisahan analitik CHM510. Berdasarkan jawapan yang diperoleh, 128 pelajar mengambil bahagian dari populasi sasaraan sampel sebanyak 158 pelajar, yang merangkumi kadar respons 81%. Kajian ini menggunakan pensampelan bukan kebarangkalian yang dikenali sebagai teknik persampelan kemudahan kerana kelebihannya adalah lebih mudah dan penggunaan masa yang tidak terlalu lama (Sekaran dan Bougie, 2016). Dalam teknik persampelan ini, unit yang menjadi sampel dikumpulkan tanpa sebarang struktur kebarangkalian tertentu dan kaedah analisis yang digunakan dalam kajian ini merangkumi analisis deskriptif untuk mencapai objektif kajian ini.

HASILAN DAN PERBINCANGAN

Profil demografi kajian

Rajah 1 menunjukkan taburan pelajar lelaki dan perempuan yang terlibat dalam kajian ini serta kampus yang terlibat. Berdasarkan jantina, pelajar perempuan menyumbang 87.5%, sementara pelajar lelaki menyumbang 12.5%. Kampus Arau merangkumi jumlah pelajar tertinggi dengan 50.8 diikuti dengan kampus Kuala Pilah,Negeri Sembilan, kampus Shah Alam,Selangor dan Kampus Jengka,Pahang, dimana peratusan pelajar yang terlibat adalah sama iaitu 16.4% atau 21 orang pelajar mewakili setiap kampus yang dinyatakan di atas.

Analisis deskriptif

Dalam kajian ini, 5 skala Likert digunakan dengan urutan peringkat (1: sangat tidak setuju; 2: tidak setuju; 3: neutral; 4: setuju dan 5: sangat setuju) dan analisis carta palang telah digunakan bagi kajian ini (Jamieson, 2004). Rajah 2 menunjukkan pandangan pelajar berkenaan kaedah pengajaran yang menggunakan istilah saintifik semasa pengajaran didalam kelas membuatkan pelajar berasa tertekan didalam kelas. Ini dibuktikan apabila 56.1% pelajar bersetuju dengan soal selidik yang dijalankan disamping 29.8% bersikap berkecuali dan 14.0% memilih tidak bersetuju berkenaan soal selidik berkenaan. Rajah 3 merupakan soal selidik berkenaan dengan pendapat pelajar berkenaan dengan cara pengajaran yang berbentuk gambaran yang lebih menaraik minat pelajar berbanding dengan perkataan. Ini terbukti apabila labih dari separuh responden iaitu 66% bersetuju dengan soalan yang dinyatakan. Rajah 4 pula dapat disimpulkan bahawasanya pelajar lebih kurang meminati pendekatan pengajaran berasaskan kepada nota dan power point serta penggunaan bahan pengajaran yang lebih kepada penulisan teks berbanding gambaran secara visual lebih diminati oleh pelajar yang mengambil kod CHM520 ini.
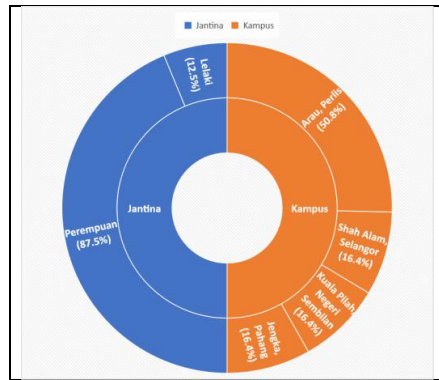
Rajah 1. Taburan pelajar mengikut jantina dan kampus
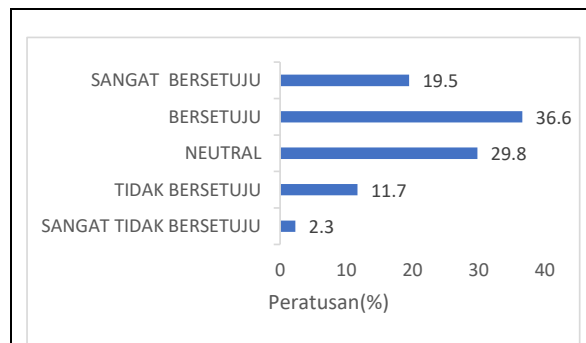
Rajah 2. Pandangan pelajar berkenaan keadah pengajaran menggunakan istilah saintifik yang membawa kesan stress kepada diri pelajar
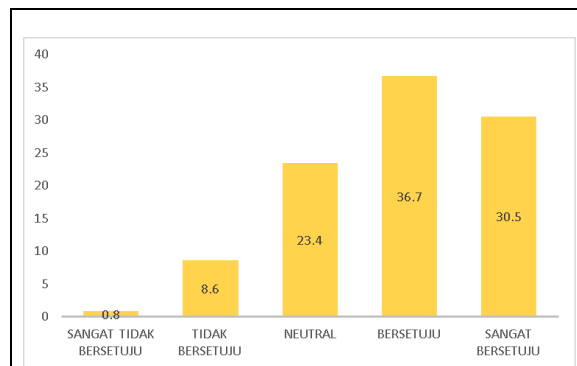
Rajah 3. Perbandingan pengajaran bersifat gambaran
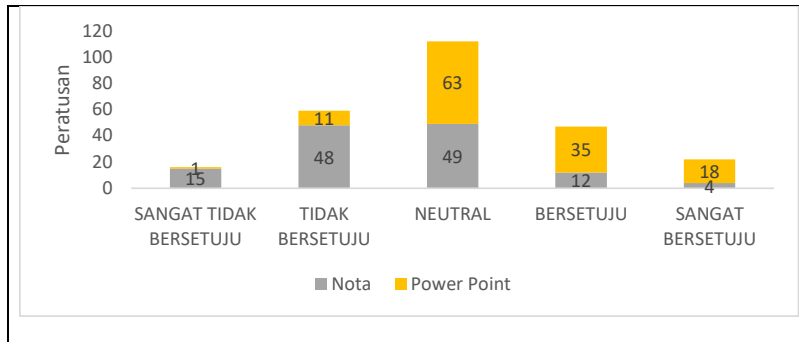
Rajah 4. Tahap responden berkenaan kaedah pengajaran dan pembelajaran konvensional

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KE ARAH KELESTARIAN KEBUN KOMUNITI DALAM USAHA MENYANTUNI GOLONGAN B40

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ABSTRAK

Dikala semua negara berlumba-lumba untuk mendapatkan nilai yang terbaik dalam produk domestik kasar mereka menerusi kemajuan dan peningkatan teknologi, mereka alpa bahawa pertanian juga boleh menyumbang ke arah kemajuan dan peningkatan dalam produk domestik kasar negara. Kepentingan pertanian bukan sahaja membantu daripada segi pertumbuhan ekonomi, tetapi ianya turut dapat mengatasi isu kemiskinan, menawarkan peluang pekerjaan, memelihara sumber makanan dan meningkatkan kualiti hidup masyarakat. Rata-rata penduduk akan memperuntukkan sekitar 50% daripada pendapatan mereka untuk perbelanjaan makanan. Bertepatan dengan dasar pertanian bandar, ianya merupakan aktiviti yang dijalankan oleh penduduk yang mendiami kawasan bandar bagi mengatasi isu kekurangan bekalan makanan dan menjamin keselamatan makanan. Setelah mengenalpasti kaedah pertanian dan konsep pemasaran yang dijalankan di Kebuniti Pertanian Bandar Seksyen U12, satu kajian telah diadakan bagi menganalisa kepentingan perlaksanaan konsep pertanian yang telah diaplikasikan di kebun komuniti ini. Kajian ini bertujuan untuk mendapatkan hasil dapatan penduduk dan masyarakat setempat tentang sejauh mana kesedaran dan penerimaan mereka dalam kelestarian pertanian bandar yang sedang dijalankan di Kebuniti Pertanian Bandar Seksyen U12 dan sejauh mana keselamatan makanan dapat melestarikan pertanian bandar. Kajian ini juga bertujuan untuk mengenalpasti kelestarian pertanian bandar pada masa hadapan. Kajian

kuantitatif telah dijalankan terhadap 150 orang responden di dalam kawasan Lembah Klang manakala kajian kualitatif telah dijalankan terhadap 16 orang informan yang terdiri daripada pengerusi kebun komuniti. Hasil dapatan melalui kaedah kuantitatif mendapati bahawa tahap kesedaran, penerimaan, pandangan terhadap jaminan keselamatan makanan dan kelestarian berada pada tahap sederhana. Manakala hasil dapatan melaui kaedah kualitatif mendapati bahawa tahap kesedaran, penerimaan, pandangan terhadap jaminan keselamatan makanan dan kelestarian berada pada tahap yang tinggi.

Kata kunci: pertanian, pertanian bandar, kesedaran, penerimaan, keselamatan makanan

PENGENALAN

Salah satu indikator untuk menjadikan sesebuah negara itu maju adalah bergantung kepada produk domestik kasar yang didapati dalam sesebuah negara. Dengan adanya sektor pertanian ini dapat membangunkan kawasan pedalaman dan luar bandar ke arah kawasan yang mempunyai ekonomi yang membangun dan berkembang. Mewujudkan aktiviti pemprosesan berasaskan pertanian akan dapat membantu meningkatkan kepentingan industri ini seterusnya menjadi peneraju penjanaan pertumbuhan ekonomi. (Ariff & Mamat 2012).

Menurut Abidin, Anuar & Abdullah (2015) bidang pertanian komersial merujuk kepada kegiatan pertanian yang diusahakan dalam bentuk perladangan dengan hasil produktiviti dalam skala besar, jumlah keluasan tanah yang diusahakan luas, berdaya maju dan dimajukan dengan tanaman yang berpotensi untuk jualan bagi meningkatkan pendapatan, dan menambah nilai guna tanah untuk pulangan yang bersifat komersial. Sektor pertanian adalah amat berbeza di antara sebuah negara dengan negara yang lain. Thailand merupakan salah satu negara pengeksport beras terbesar dunia selain Vietnam dan India, selain turut menjadi pengeksport hasil gula, sayuran, jagung dan buah-buahan. (Dabukke & Iqbal 2016). Malaysia dan Indonesia dikenali sebagai pengeluar minyak sawit dan getah sementara Vietnam sebagai pengeluar koko dan kopi. (Zamora. et.al 2013)

Pertanian bandar

Konsep pertanian bandar menyerupai dengan konsep menghijaukan bandar. Tanaman akan ditanam di kawasan terbuka atau di kawasan kediaman. Pertanian Bandar dilaksanakan bagi memenuhi Dasar Agromakanan Negara (2011 – 2020) di mana sektor pertanian telah diberi perhatian yang khusus terutamanya aktiviti-aktiviti pengeluaran hasil tanaman yang boleh meningkatkan pertumbuhan ekonomi negara.

Menurut Haliza (2018), Di Malaysia, dianggarkan pada tahun 2020, sekitar 40 hingga 45 peratus rakyat miskin akan tertumpu di bandar dan kota raya utama negara.Penduduk bandar akan menghadapi kesukaran menampung perbelanjaan bulanan mereka dengan kadar harga makanan yang sentiasa meningkat. Pertanian bandar menjadi medium penting untuk bekalan makanan tempatan secara berterusan bagi mengurangkan kadar kemiskinan bandar dan meningkatkan pengurusan persekitaran bandar. (Mat & Abdul Majid, 2015). Pertanian bandar juga membolehkan masyarakat setempat menjana pendapatan sampingan di samping menjalankan aktiviti kemasyarakatan melalui kaedah kerjasama dan gotong royong sesama penduduk. Merujuk kepada kenyataan daripada Berita Harian (2016) berbekalkan kreativiti dan usaha, seorang belia generasi kedua FELDA mampu meraih pendapatan RM4,000 sebulan hasil jualan sayur-sayuran organik yang ditanam di sekeliling rumah keluarganya dekat FELDA Jengka 12 di sini.

Latarbelakang

Kebuniti Pertanian Bandar Seksyen U12 merupakan model kebun komuniti yang dibangunkan hasil daripada inisiatif Koperasi Kebuniti Selangor Berhad. Bertepatan dengan objektif Kebuniti Pertanian Bandar Seksyen U12 diwujudkan adalah untuk membantu golongan sasar B40 bandar bagi meningkatkan pendapatan bulanan mereka melalui aktiviti pertanian dan pemasaran sayur-sayuran dan buah-buahan yang terdapat di kebuniti ini.

Pembaharuan

Sebuah kedai yang berkonsepkan kiosk telah dibina bertujuan untuk menjual hasil tanaman sayur-sayuran dan buah-buahan yang telah dikeluarkan melalui kaedah fertigasi dan kaedah hidroponik ini. Kiosk yang berkeluasan 20 kaki ini dapat menampung untuk penyimpanan dan paparan hasil tanaman yang dikeluarkan. Ianya diselenggara oleh golongan sasar B40 yang akan memastikan hasil keluaran sentiasa ada dan mencukupi bagi menampung keperluan penduduk setempat dan kawasan berhampiran Seksyen U12. Persekitaran Kebuniti Mart ini juga telah ditanam petola, terung dan bunga-bunga hiasan. Kebuniti Mart ini juga berfungsi sebagai pusat sehenti untuk para peserta daripada kebuniti yang berhampiran di sekitar Shah Alam bagi memasarkan dan menjual hasil tanaman mereka pada setiap minggu.

Rajah 1. Kebuniti Mart

Rajah 2. Fertigasi Tanaman Petola

Pengkomersilan

Berlandaskan kepada objektif yang sedia ada, konsep pertanian bandar yang dijalankan di kebun komuniti ini adalah menggunakan konsep Rumah Hijau Lindungan Hujan. Dengan wujudnya konsep pertanian berasaskan Rumah Hijau Lindungan Hujan di Kebuniti Pertanian Bandar Seksyen U12 dapat mempergiat dan menggalakkan aktiviti pertanian, perladangan, tanaman dan ternakan moden, pemasaran produk perladangan, pertanian dan ternakan serta Agrotourism di kawasan Negeri Selangor. Kaedah pertanian yang dijalankan secara fertigasi dan hidroponik di dalam Rumah Hijau Lindungan Hujan perlu dicontohi oleh kebun komuniti pertanian bandar lain bagi menjana hasil maksima dalam pengeluaran pertanian dalam meningkatkan pendapatan sampingan para peserta kebun komuniti.

METODOLOGI

Dua kaedah pengumpulan data telah dijalankan bagi mendapatkan hasil dapatan daripada kajian ini. Pengumpulan data yang pertama menggunakan kaedah kuantitatif yang dilaksanakan melalui edaran soal selidik. Merujuk kepada Jadual 1, seramai 150 borang soal selidik telah diedarkan kepada penduduk komuniti setempat dan pengunjung daripada luar kawasan yang datang melawat tapak kebun di Kebuniti Pertanian Bandar Seksyen U12. Pengumpulan data yang kedua adalah menggunakan kaedah kualitatif. Ia dilaksanakan melalui sesi temuramah secara bersemuka dan melalui perbualan telefon ke atas 16 orang informan yang terdiri daripada pengerusi kebun komuniti terletak di sekitar kawasan Shah Alam, Subang Jaya dan Petaling Jaya.

Kajian soal selidik yang dijalankan mendapati bahawa tahap kesedaran, penerimaan, pandangan terhadap jaminan keselamatan makanan dan kelestarian berada pada tahap sederhana. Ini menunjukkan bahawa, walaupun inisiatif ini baharu sahaja dijalankan (September 2020) komuniti setempat telah sedar dan boleh menerima konsep pertanian dalam bandar. Mereka juga bersetuju bahawa inisiatif yang dijalankan oleh pihak Koperasi Kebuniti Selangor dapat memberikan nilai tambah dan impak yang baik dari segi jaminan keselamatan makanan dan juga menjamin kelestarian kepada komuniti setempat.

Dapatan daripada kaedah temuramah pula amat berbeza hasilnya berbanding dengan dapatan kaedah kajian soal selidik. Kajian menunjukkan tahap kesedaran, penerimaan, pandangan terhadap jaminan keselamatan makanan dan kelestarian berada pada tahap yang tinggi. Ini dapat dilihat melalui dapatan bahawa mereka sebulat suara sedar dan ambil maklum tentang konsep pertanian bandar yang diwar-warkan oleh kerajaan dalam membantu ekonomi individu khususnya dan ekonomi negara secara keseluruhan. Mereka juga amat menerima dengan jayanya semua aktiviti yang dijalankan dalam kebuniti pertanian bandar. Mereka juga amat percaya bahawa sumber makanan yang berasal daripada bahan organik dapat menjamin kelangsungan tahap kesihatan mereka berada dalam tahap yang baik.

Jadual 1. Profil Responden

Kaedah Pengumpulan Data	Jumlah
Kuantitatif	150 responden
Kualitatif	16 informan

KESIMPULAN

Tidak dinafikan kewujudan konsep pertanian bandar yang di sasarkan ke kawasan kediaman dan komuniti setempat dapat menyumbang ke arah penawaran sumber bekalan makanan yang mencukupi. Selain dapat membantu golongan sasar B40 untuk menjana pendapatan sampingan, konsep ini juga membantu keselamatan makanan terjamin dengan memberikan pilihan kepada penduduk setempat untuk memilih bekalan makanan yang organik dan segar.

Penerimaan masyarakat tentang konsep pertanian bandar ini perlu diluaskan dengan mengadakan promosi secara besar-besaran melalui semua jenis alat promosi seperti penggunaan media sosial, pengiklanan, tajaan acara dan penyiaran melalui radio dan televisyen.

Dengan adanya khidmat nasihat daripada agensi berkaitan, penyelenggaraan secara efektif, berkesan dan tersusun daripada golongan sasar B40 untuk menjalankan aktiviti pertanian, bekalan hasil sumber makanan yang sentiasa ada, nescaya konsep pertanian bandar ini dapat menjamin kelestarian pertanian bandar untuk masyarakat bandar.

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UNIQUECARE TAKAFUL

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ABSTRACT

The Islamic finance industry has seen tremendous growth around the world, one of the markets is takaful market. Takaful is an alternative to conventional insurance because conventional insurance contains interest, uncertainty, and gambling that is forbidden in Islamic practice. Nowadays, takaful has implemented various products offered to public in order to strengthen its position in the industry and increase its market share over the conventional insurance industry. However, takaful plan focuses only on normal children. There is no takaful product that is offered to physically disabled children. Hence,this study aims to give some knowledge and awareness as well as creating new product development related to physically disabled children. This study has applied quantitative and qualitative methods in which about 50 questionnaires have been distributed to parents with disabled children through online survey because of Covid-19 pandemic. By using descriptive analysis, the results indicate that all respondents have knowledge, aware and will participate if any takaful product is offered to protect their physically disabled children. Therefore, the product to be created is named UniqueCare Takaful that provides financial protection to children with physical disabilities.

Keywords: uniquecare takaful, knowledge, awareness, acceptance

INTRODUCTION

There are prohibited features in conventional insurance along with non-shariah principles nature that has prompted Muslim scholars to recommend Takaful as a conventional replacement insurance. Takaful aims to meet the needs of people, including non-Muslims. The importance and impact of Takaful has attracted the attention of the Muslim community in these modern times (Saleh, 2016). Takaful is seen as a substitute for conventional insurance because of its strong foundation of the Islamic code, which is based on the concepts of unity, mutual support, and harmony. It has become rapidly improving and developing an

industry with tremendous prospects and has progressed positively be a comprehensive system that reduces Shariah non-compliant features including *riba* (interest), *gharar* (uncertainty) and *maysir* (gambling) inherent in traditional insurance (Maryam, 2014).

According to UNICEF (2021), it is estimated that 10% of the world's population have some form of disability. Of that number, 150 to 250 million children involved. In Malaysia, between 10% to 16% of the total number of children are those with disabilities, and the rate differs according to the data source (Amar, 2008). Without counting the source, statistics currently show an increase in the number of newly registered children with disabilities. Looking after children with disabilities is a massive challenge to parents as they need to balance their life priorities (Salman et al., 2017). The parents often require extraordinary physical, emotional, social, and financial support in taking care of the children with disabilities. This product development focuses on Physically Disabled Children as a part of children with disabilities. In general, physical disabilities may affect, either temporarily or permanently, a person's physical capacity and/or mobility. There are many causes of physical disabilities but they can include inherited or genetic disorders, serious illnesses, and injury.

Problem statement

Common takaful plan focuses only on normal children. How about the physically disabled children in which the number is increasing every year? This group of children also needs special attention and protection in the national system because they also have their right. 73% of people with disabilities are children and they need protection just like everyone. On the other hand, Malaysians are still incompetent about physical disabled subject field (Ismail Ibrahim et al., 2019).

Objective

The objective of this product is to create parents' awareness among the participants on physically disabled child and secure them with any financial protection for their betterment life in future. Other than that, it aims to detect at early stage so that the society can be more fairly minded about the subject field.

LITERATURE REVIEW

Based on Islamic principle, only takaful operating system is accepted to be applied and implemented by Muslims. Scholars of Islamic economics have ruled conventional insurance as illegal (*haram*) (Maryam, 2014). To be Shariah-compliant Takaful operators, they need to consider not only conventional aspects like conventional insurance, but also must take into account the Shariah requirements. The reason was due to the existence of interest (*riba*), uncertainty (*gharar*) and gambling (*maysir*) in the transaction, saving and investment (Nor & Kamil, 2014). Following the fact, with the awareness of Muslims obligation, parents of child should participate in family takaful plan instead of participating in conventional insurance.

Children with disabilities have different needs when compared to their normal peers, such as special education, therapeutic treatment, and special diet (Smith, 2015). Regular physical activity (PA) in children with physical disabilities (PD) is important for their current and future

health and well-being. Current health guidelines recommend that children use 60minutes or more of PA per day (World Health Organization, 2003). The existence of takaful education plans shows the importance of providing funds so that children can obtain acomplete education. Financial constraints are one of the reasons for dropping out or incomplete school years (Lehr et al., 2004). The researchers found that existing takaful plans do not have special coverage for children with physical disabilities (Ismail et al., 2016).

METHODOLOGY

This study implements qualitative and quantitative methods based on a theory test, measured by numbers and analyzed using statistical techniques and it mainly emphasizes the objectives and reproductive. This research design enables to interpret the data by frequency and percentages as shown in the description. Primary data collection is used to obtain the data for this study by distributing 50 questionnaires to the respondents.

FINDING AND DISCUSSION

Table 1. Perceptions of Respondents Related to Takaful for Disabled Children

	Yes		No
Knowledge Takaful is the only Islamic insurance product in Malaysiaand encourages the spirit of mutual assistance as well ascooperation between members for mutual benefit	50	100%	-
Awareness I am happy if there is existence of special Takaful that gives opportunity and kindness to my children with disabilities	50	100%	-
Acceptance I will participate in Takaful for benefit and well-being of my children with disabilities	50	100%	-

Based on respondents' Knowledge, it indicates that all the respondents agreed that Takaful is the only Islamic instrument for a protection as well as being operated based on Shariah principle and agreed to jointly guarantee or protect each other if any loss and damage that inflict upon them. Awareness of respondents illustrates that most of the respondents areconsent and feeling good if Takaful operators consider offering a unique Takaful product for protection of their disabled children. Product Acceptance's result shows that the respondents are willing to participate in Takaful for their disabled children.

UNIQUECARE TAKAFUL

Novelty and originality

The product has novelty in which it offers special protection for children with physical disabilities. The takaful structure for this takaful plan is different where surplus from participant fund are not shared with takaful operators while 100% goes to participants' fund.

Usefulness and application to specific group

This product is offered for specific group which is for children with physical disabilities. The usefulness and application of this product focus in providing financial protection to physically disabled children for their better life in future.

Commercialization value

The commercial value of this product is where a market and customers are willing to pay for product offered that meets a need and obtain a wider choice of takaful products. It also allows companies to generate more revenue, increase efficiency, and also reduce costs.

Features of the UniqueCare Takaful

This product is offered to individuals (children) with physical disabilities who are registered with Jabatan Kebajikan Masyarakat (JKM) and are issued with or hold an OKU card or verified or certified by the Medical Officer or Government Hospital or Psychiatric Private Specialist. We offer three plans under this product which cover different amount of coverage.

Table 2. Benefit and Option

	Benefit	Plan 1	Plan 2	Plan 2
Person Covered (Children)	Death due to any causes	25,000	50,000	100,000
	Lump sum benefit	2,500	5,000	10,000
Certificate Owner (Parents or Guardian)	100% of Sum Covered for Natural Death or Natural TPD	25,000	50,000	100,000
	150% of Sum Covered for Accidental Death or Accidental TPD	37,500	75,000	150,000
	Waiver of Contribution Benefit	Upon payment of Death or TPD benefit, Takaful operator waive all future regular contributions on the base plan from the date of death or date of commencement of TPD until the certificate expiry date.		
UniqueCare Compassionate Rider	Funeral Benefit — payable upon death of the Person Covered.	10,000	10,000	10,000

For the person covered which is the disabled children, the benefits include death due to any causes and also lump sum benefit. Takaful operator will pay the lump sum benefit upon the person covered attaining age 18 and it is not payable if there are any outstanding contributions. For benefits to certificate owner, it also provides three plans with different amount of coverage. The benefits include 100% of sum covered for natural death or natural total permanent disability, 150% of sum covered for accidental death or accidental total permanent disability and waiver of contribution benefit. Our product is fully shariah compliant as it applies the concept or tabarru' (donation), wakalah (agency), ju'alah (reward) and qard (interest-free loan). The price will be based on the plan chosen by the clients that suit their needs.
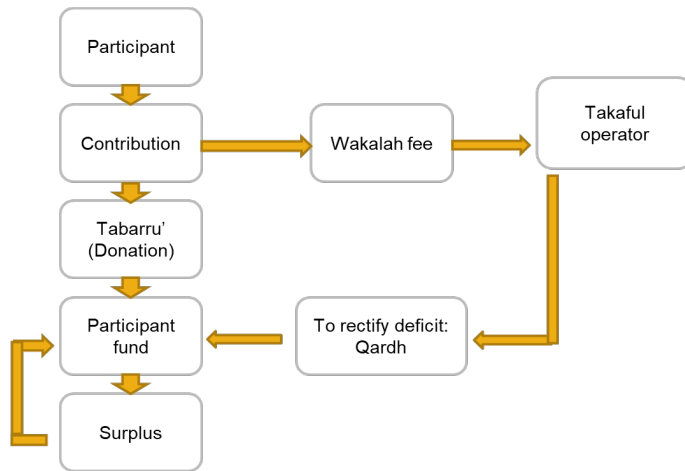
Firuge 1. Takaful Structure

CONCLUSION

Children diagnosed with physical disabilities face challenges in getting protection plans for their future. Therefore, this product will create the opportunity by giving them access to an affordable online protection plan which provides meaningful benefits for both children and parents or the legal guardians of the children.

ACKNOWLEDGEMENTS

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#KITAJAGAKITA: THE MANIFESTATION OF MODERN JEWELLERY DESIGN

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ABSTRACT

As far as the title is concerned, the researcher has developed three objectives. The first objective is to manifest current issues related to the global pandemic COVID-19 into modern jewellery design. The secondary objectives are to fostering awareness of the relationship between subject matter and product design especially jewellery designs and the third objective is to initiate the appreciation initiative towards our frontliners through modern jewellery design. This design research is based on the ideation process that is related directly to the message of appreciation through our frontliners. The ideation begins with developing a figure related to the global pandemic COVID-19. All subject matter was simplified throughout the ideation process and developed into jewellery design. A survey has been carried out to choose the best design as a symbol to show the appreciation towards our frontliners that already risking their lives to protect the citizen from the terror of Coronavirus. The researcher has to produce a jewellery design that synchronized with current issues which are global pandemic COVID-19. The jewellery design that has been produced is the potential to create awareness about the understanding of subject matter in product design among jewellery consumers. Based on that awareness, it is easier for the consumer to become interested in sophisticated jewellery designs that purposely initiate appreciation towards our frontliners.

Keywords: Pandemic, design manifestation, modern jewellery.

INTRODUCTION

The COVID-19 pandemic has caused massive hardships in life, especially in the economy, mental and physical health. The terror of the COVID-19 pandemic has forced our frontliners to risk their lives for the benefit of the nation. Frontliners are responsible to contain the spreading of Coronavirus through our daily life [1][2][10]. The new normal has been introduced as a new way of life. Based on that issue the researcher has taken advantage of producing a piece of jewellery design that also functions as a symbol of appreciation to our frontliners. Jewellery practitioners or designers always focused on a variety range of principles in their

work. For example, the principles that refer to designing and making process, subject matter identification, development of the idea, and exploring and the manifestation of the idea [6]. As far as the title is concern the researcher has developed three objectives. The first objective is to manifest current issues related to the global pandemic COVID-19 into modern jewellery design. The secondary objectives are to fostering awareness of the relationship between subject matter and product design especially jewellery designs and the third objective is to initiate the appreciation initiative towards our frontliners through modern jewellery design. The appreciation of our frontliners through artwork, not a new method. Appreciation for our frontliners has become a hot topic that is often talked about. For example, there is a massive beautiful public mural that has been drawing by Malaysian mural artists for the purpose to show appreciation to our frontliners [4]. The researcher has taken the initiative to choose another type of artwork that is more private and exclusive such as jewellery. Many jewellery companies have their specific subject matter or theme during a particular period. Some jewellery companies like Poh Kong had introduced a series of 12 animals during the 2018 Chinese New Year celebration.

METHODOLOGY

This design research is based on the ideation process that is related directly with the purpose of appreciation to our frontliners. The process is a series that substitute any findings or data into any type of results [5]. For example, the physical process such as cooking rice that transforms a paddy into rice through the cooking process. A product development process is an arrangement of data that a developer or designer needs to achieve from a design into something marketable or functional [5]. A survey method was used to assess the marketability, necessity of the research, demand, and analyzing findings [3]. A particular survey had been carried out among jewellery designers and practitioners. That survey includes the knowledge about '#kitajagakita', the responsibility of our frontliners during the pandemic COVID-19, the necessity to show gratitude to our frontliners, jewellery products, awareness about jewellery motif or subject matter, and the marketability potential.

After the necessity and the potential of marketability had been identified, the researcher begins the ideation process to get the best jewellery design based on the related subject matter. The ideation begins with identifying the suitable type of jewellery. The researcher had chosen necklace as jewellery to develop and consolidated with the subject matter. There are a variety of types of necklaces such as bib necklaces, collar necklaces, the princess necklace, and many more [9]. The researcher has chosen the bib necklace because of the large size characteristics and suitable to be worn with a simple modern outfit [9]. The next process is developing the object or figure that is related to global pandemic COVID-19 such as a figure of frontliners, facemask, or personal protective equipment (PPE), the shape of Coronavirus, and shield image that symbolized as protection item. All subject matter was simplified throughout the ideation process and developed into a new shape that can be consolidated into jewellery design. After the new simplified shape of that subject matter had been produced, the suitable and attractive design arrangement has been carried out to arranging it into a necklace design. A survey on the best design that related to the main title has been carried out. The best design that had been choosing had the most outstanding characteristic of gratitude to frontliners as a subject matter. The chosen design also functions as a symbol to show appreciation towards our frontliners that already risking their lives to protect the citizen from the danger of Coronavirus.

FINDINGS

The researcher must produce a jewellery design that synchronized with current issues which are pandemic COVID-19. The jewellery design that has been produced is the potential to create awareness about the understanding of subject matter in product design among jewellery consumers. Based on that awareness, it is easier for the consumer to become interested in sophisticated jewellery designs that purposely initiate appreciation towards our frontliners. The researcher has produced neckwear called the bib necklace. Bib necklace is a large size of the necklace but simple in design [9]. Even though it was simple and less detailing, the bib necklace that had been produced consist of shapes from idea development based on Coronavirus shape, frontliners figure, and face mask as personal protective equipment (PPE). Coronavirus shape has been developed into organic shape and the frontliners figure has been developing into a geometric shape. Both of these shapes were combined and arranged to become components in a bib necklace. Many sets of bib necklace arrangements have been made based on that geometric shape. The best arrangement had been chosen by using the survey method and the respondent is among jewellery practitioners. The final bib necklace design that had been chosen was transformed into a virtual 3-dimensional (3D) prototype by using computer-aided design (CAD) software called Solidworks. By using this software, the virtual prototype can be produced with less cost, saves time and more different arrangements and materials can be personalized before the actual product being manufactured.

CONCLUSIONS

The researcher has concluded that jewellery design is one of the best methods to show gratitude to our frontliners. The exclusive characteristics of jewellery products make the gratitude elements applied effectively through the systematic design ideation and appropriate selection of subject matter. A person that owns that unique jewellery will wear it with confidence and pride because of the good purpose to show gratitude for our frontliners. Finally, this research shows that people that work or study in the jewellery area also have the empathy to join the society to show appreciation to our frontliners that already risking their lives for the benefit of the nation.

RECOMMENDATION

As far as jewellery is concerned, the affordable context must not be ignored. This jewellery can be developed more into a smaller type of jewellery like a pendant, ring, or earring. Other than using precious metal, this jewellery can also develop more by using cheaper materials like pewter, brass, wood, glass, ceramic, and stainless steel. The material of that jewellery can also be adjusted to fit the targeted market area so that more people can show their gratitude to our frontliners through the manifestation of modern jewellery design.

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KOMBU-FEED: A NUTRITIVE & PROPHYLACTIC ALTERNATIVE FOR FISH PRODUCTION

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ABSTRACT

Out of all the commercially cultured freshwater species, catfish accounts for 45.19% which is the highest of the freshwater aquaculture production with African catfish becoming one of the topmost cultured freshwater fish. The need for improved feed efficiency, growth performance and disease resistance of cultured organism become substantial as the costs of production are likely to be reduced in a commercial setting. One of the options is feed additives which have been available for years to improve the growth performance of fish. Therefore, this study was conducted to investigate the potential of kombucha tea used as a feed supplement for African catfish, *Clarias gariepinus*, specifically to increase weight gain, specific growth rate and feed conversion ratio. Treatment diet containing kombucha tea culture was prepared and given to the treatment group while the control group was given diet without any kombucha culture twice daily for thirty-five days. The results showed a significant increase in growth performance where the weight gain, specific growth rate and feed conversion efficacy increased by two-folds in the treatment group compared to the control group. This study proved that there was evidence of growth promoter property of kombucha tea in terms of weight gain, specific growth rate and feed conversion efficacy in African catfish.

Keywords: African catfish, kombucha, feed additive, feed supplement, specific growth rate, feed conversion ratio.

INTRODUCTION

The fisheries sector plays a significant role in the national economy of Malaysia and considered an essential sub-sector of food production. Thus, to improve the overall fish well-being and increase the production quality, many natural resources are being sought after. The

success of kombucha tea in the poultry industry as a natural, highly beneficial and inexpensive source of feed supplement has yet to be studied in the aquaculture industry.

Feed additives are materials which are incorporated into animal feeds in little amounts to serve the functions other than the supply of nutrients (Manaf et al., 2016). Such additives are known to ameliorate growth performance through enhanced feed utilisation, reduction of pathogenic bacteria within the gastrointestinal tract and production of metabolites that increase animal metabolism. They have been used in aquaculture for enhanced growth performance and reduced fish mortality (Zilberg et al., 2010).

Fermentation of sugared tea with a symbiotic culture of acetic acid bacteria and yeasts produces kombucha tea or tea fungus that is consumed worldwide for its refreshing and beneficial properties on human health. The success of kombucha in the poultry industry and suggestions that it can be used in the broiler's diet as an alternative to antibiotic growth promoters should be enough evidence for kombucha tea to be applied and manipulated directly as a feed supplement in the aquaculture industry. The use of kombucha tea as a feed supplement would not only provide beneficial effects, but they can also be obtained at a lower cost compared to synthetic growth promoters.

Based on the evidence conducted on human and poultry, kombucha tea has been proven to increase overall health, weight gain and increase feed conversion efficacy (Jalali et al., 2016). Therefore, this study was conducted to investigate the potential of kombucha tea used as a feed supplement for African catfish, Clarias gariepinus, specifically to increase weight gain, specific growth rate and feed conversion ratio.

Kombucha tea preparation

Five gram of tea leaves and 50 g of sucrose were added into boiling water. The solution was cooled to room temperature and 24 g of tea fungus was inoculated into the solution. Then, 0.2 L of previously fermented kombucha was added to lower the pH and inhibit the growth of undesirable microorganisms. The culture was incubated at room temperature (28°C) for 14 days. The remaining solution was filtered and was stored in a sealed bottle at 4°C.

Experimental diets preparation

The fermented kombucha tea and distilled water were mixed at a ratio of 1:2. Under sterile conditions, the treatment diet was prepared by spraying the kombucha tea to the dry pellets (Star Feed 9910 commercial diet). The pellets were dried in the oven at a temperature of 35°C for 24 h, packed in air-tight bags, labelled, and stored until use. The control diet was prepared by substituting kombucha tea with distilled water.

Experimental design

Sixty fingerlings African catfish, measuring approximately three to four cm were chosen for two weeks of adaptation period. After that, the fishes were allocated randomly into three treatment groups and three control groups in which each tank consists of 10 fishes. The fishes were fed for a period of 35 days with the experimental diet at 6% of body weight with two divided portions daily. The feed consumption in each aquarium was recorded daily.

Growth performance analysis

The fishes were weighed on Day 1 (initial), Day 7, Day 14, Day 21, Day 28 and Day 35 (final). The growth performance was assessed based on the weight gain (WG), Specific Growth Rate (SGR) and Feed Conversion Ratio (FCR) with the formula (Dadgar et al., 2010).

RESULTS & DISCUSSIONS

In the present study, better performance in terms of weight gain (WG), Specific Growth Rate (SGR) and Feed Conversion Ratio (FCR) were obtained in the treatment group whereby fishes were fed with supplemented feed with kombucha tea. Table 1 showed that fishes in the treatment group had a significant increase in weight gain in which the total weight gain after 35 days was 32.50±0.53 g compared to the total weight gain of the fishes in the control group was only 21.03±1.34 g.

Table 1. Comparison of growth performance parameters of treatment and control groups

Parameters	Control	Treatment	Statistical significance
Weight gain	21.03±1.34 g	32.5±0.53 g	p=0.01
Specific growth rate	60.1%	96.8%	p=0.01
Feed conversion ratio	0.003±0.002	0.002±0.000	p=0.016

The same results were also reflected in specific growth rate whereby SGR of the fishes in the treatment group was 96.86% while only 60.10% in the control group (p-value = 0.01). As for the feed conversion ratio, feed supplemented with kombucha tea had a significantly lower conversion ratio indicated less feed is being required to obtain a required weight gain (p = 0.02).

Based on the results obtained, the dietary feed supplement consisting of kombucha tea promoted the growth of African catfish fingerlings. These results showed that kombucha improves nutrient utilisation. Kombucha tea is known to regulate gastric functions, mainly intestinal activities. Kombucha tea treatment has been proven to increase the height of villous within the small intestine (Jalali et al., 2016). The increase in height of the villous can increase the available surface for nutrient absorption. This can then improve the efficiency of gastrointestinal system in nutrient absorption. The positive effects of kombucha can also be associated with the increase in feed, protein, and energy consumption. The increase of dietary protein absorption may lead to an improvement in the appetite of the fishes, which results in increased feed consumption (Arani et al., 2014).

Figure 1. Kombu-feed for starter stage.

Figure 2. Kombu-feed for grower stage.

Kombucha tea-infused diet improves weight gain, specific growth rate and feed conversion efficacy of African catfish. The cocktail effect due to the presence of tea polyphenols, ascorbic acid, and DSL within kombucha are the important factors that are correlated with its many beneficial effects such as growth improvement, antioxidant properties, immunity enhancement and alleviation of inflammation.

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KRIGING INTERPOLATED RAINFALL DATA IN ArcGIS FOR A SUSTAINABLE FLOOD MODELLING PREDICTION

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ABSTRACT
Rainfall data is the most important input for a hydrological modelling especially for a flood prediction. Conventionally, the most common rainfall measurement using ground based data namely rain gauges networking from a certain catchment. Although rain gauge data measurement are relatively accurate, the estimated rainfall value were prone to errors. Alternatively, kriging has become a widely used interpolation method to estimate the spatial distribution of climate variables including rainfall value. The objective of this study is to evaluate the application of geostatistical (ordinary kriging) method for rainfall value improvement for Upper Klang River Basin (UKRB), Malaysia. Th historical rainfall record from existing rain-gauge stations of UKRB in a Monthly basis (January 2019) was selected and be as an input to the kriging method. Ordinary Kriging with the gaussian variogram model produces the lowest prediction error for rainfall estimation. Thus, it is found to be the most accurate interpolator for estimating the monthly rainfalls over Upper Klang River Basin. This improved data is essential to be used as an input for sustainable flood prediction in the future to reduce the flood risk experience especially in the UKRB Catchment and other catchment that have a similar characteristic with this catchment. In addition, it could reduce the losses of property due to flood impacts and as one of the option for the sustainable flood planning, protection plan or rehabilitation work in the future.

Keywords: Error reduction, ordinary kriging, semivariogram model, rain gauge, flood prediction.

INTRODUCTION

Accurate rainfall measurement is the key components of hydrological simulations because inaccurate measurement leading to inadequate design of hydraulic structures such as flood control structure. Error in rainfall input data are one of the most important sources of uncertainty in urban hydrological model because urban hydrology is characterized by fast runoff and short response time. The errors in the rainfall data applied in the calibration of hydrological models may cause poor simulations and erroneous flood forecasting results (Liu et al., 2018). However, rain gauges are associated with errors namely instrumentation error (systematic errors and random errors) and data collection errors (missing data). The presence

of these errors contributes to the uncertainties in rainfall estimation mainly during extreme event like a flash flood. Uncertainties related to rainfall measurement error are high.

Rainfall values can be interpolated into deterministic interpolation methods (thiessen-polygon, inverse distance method and spline method) and geo-spatial method (kriging method). Ordinary kriging interpolation produces smooth surfaces and can evaluate the uncertainties by kriging variance providing a starting point to estimate rainfall uncertainty. It is also recommended in estimating areal mean rainfall on small catchment as the estimations are accurate. There are various factors in determining the best interpolation of rainfall data to accurately estimate rainfall. The characteristic of catchment area is the major factor. Understanding on data usage and on error reliability is important to rainfall estimation processing for a proper prediction and preparation of flash flood event for current and in the future. Furthermore, it is important as gauged precipitation data remain the basic reference to evaluate the performance of hydrological models with different precipitation inputs after from satellite or radar estimation so that the accuracy of rainfall data can be evaluated.

MATERIALS AND METHOD

This study involves field based and computer based studies as mentioned in the following section.

Rainfall Data Collection

Field based study involve rainfall data collection. Rainfall data of Upper Klang River Basin (UKRB) rain gauge stations were collected from Department of Irrigation and Drainage (DID), Ampang, Selangor. The collection involved monthly and hourly rainfall data for rain gauge namely January 2009. The chosen station comprised of eleven rain gauge stations to serves as a benchmark and ground truth of rainfall estimation. **Figure 1.** shows the Klang River Basin (KRB) and Upper Klang River Basin (UKRB). **Table 1.** shows the number of stations and name of the stations.
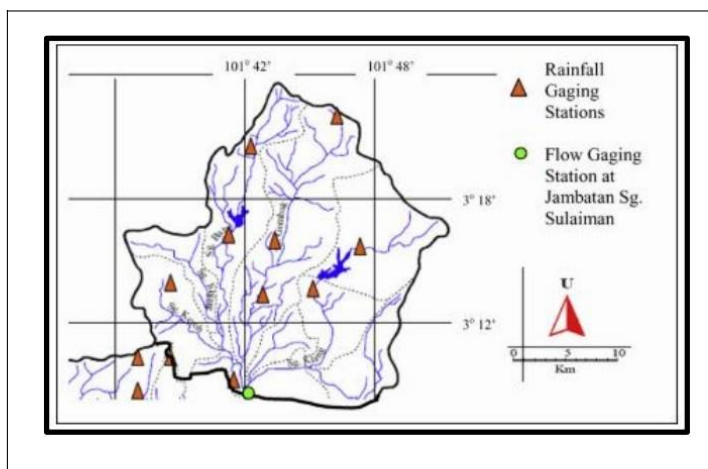
Figure 1. Upper Klang River Basin [Tahir et. al., 2009]

Station Number	Name of Stations
3114113	Segambut
3116003	JPS Wilayah Persekutuan
3116006	Ldg. Edinburgh Site 2
3216001	Kg. Sg. Tua
3217001	Ibu Bekalan Km. 16, Gombak
3217002	Empangan Genting Kelang
3217003	Ibu Bekalan Km. 11, Gombak
3217004	Kg.Kuala Seleh
3217005	Kg. Kerdas(This station shifted from Gombak Dam site)
3317001	Air Terjun Sg. Batu
3317004	Genting Sempah

Research Methodology

The methodological framework for spatial interpolation of rainfall using kriging based geostatistical (Ordinary Kriging) interpolation method. This study involved the running of spatial analysis tool (kriging interpolation) with selected observed rain gauge data as an input into ArcGIS 10.8 software. Maximum monthly rainfall value were selected as an input in simulation of ArcGIS 10.8 using geostatistical wizard extension.. The monthly rainfall value was tested in kriging geostatistical method with three different variogram namely Spherical, Exponential and Gaussian model. The models performance were validated with Root Mean Square Error (RMSE).

The obtained results from the simulation were shown in **Table 2.**

Table 2. Ordinary kriging method for January 2013.
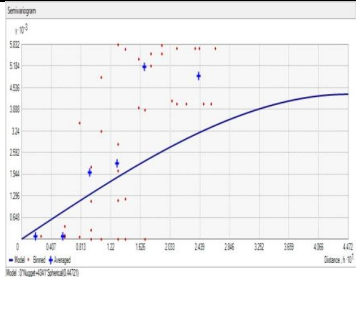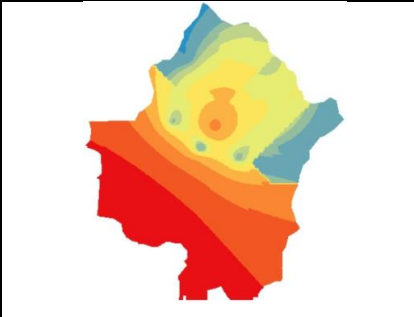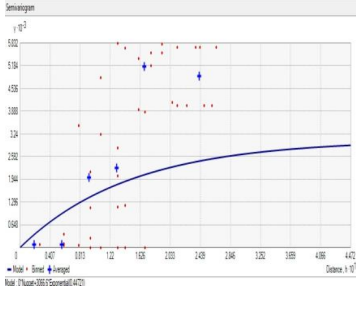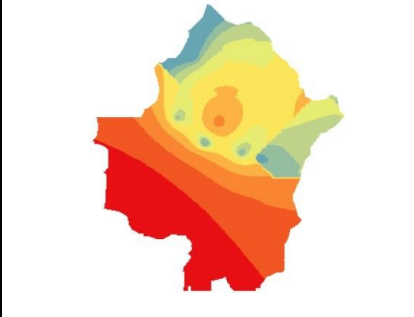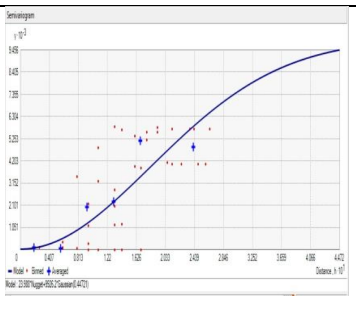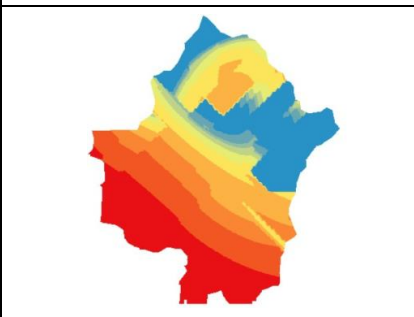
Models	Variograms	Kriging Interpolated Maps	Root Mean Square Error
Spherical			21.97
Exponential			19.83
Gaussian			17.16

Table 1. demostrates the results of ordinary kriging application using geostatistical analyst tool extension from ArcGIS 10.8 software. The variogram model tested for the month January 2013 are Spherical, Exponential and Gaussian variogram. Ordinary kriging with Gaussian variogram has the best estimation producing the lowest prediction error with root mean square error of 17.16.

In this study, the aim is to apply for a two kriging-based stochastic interpolation methods for the estimation of monthly rainfall distribution in the Upper Klang River Basin (UKRB), Malaysia. Among the application, ordinary kriging with the gaussian variogram model produces the lowest prediction error for rainfall estimation. Thus, it is found to be the most accurate interpolator for estimating the monthly rainfalls over Upper Klang River Basin. In a nutshell, the kriging interpolated rainfall can be an alternative data in terms of reliable sustainable flood prediction in the future.

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KUASAI RINTAS: PENULISAN RINGKASAN BAHASA MELAYU YANG LENGKAP

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ABSTRACT
Kuasai Rintas is an additional exercise book to master the method of writing shorthand in Malay Language. It is a method of writing system by means of abbreviations to common words, used especially for taking dictation. Kuasai Rintas is created as a supplementary of the available textbook entitled Rintas. Rintas shorthand skills were introduced by Rufiah Rafiee and Mornizan Yahya (2001). Both authors are Senior Lecturers from the Faculty of Office Management and Technology, Universiti Teknologi Mara (UiTM) Malaysia. Kuasai Rintas is innovated with more attractive features with variety of colorful images, simple words and articles which means it can be of interest for a person to learn Rintas shorthand skills. Nowadays, learning Rintas shorthand skills are relevant parallel with the advancement in technology in which these skills often used in writing and sending short messages via mobile phone, taking minutes and phone messages in the office and others daily use to help the executives and the secretaries to work conveniently. In a nutshell, Kuasai Rintas is suitable for everyone who is wishing to improve their shorthand skills. This is because Kuasai Rintas provides specific of learning guidelines and the basic principles or commands that are easier to understand. Furthermore, Kuasai Rintas also provides numerous commands using colors and images that match the words with the pictures whereby these methods will help to improve memory and speed up the process of understanding Rintas. In line with the working system that requires a short time, efficiency and quality, Rintas shorthand skills are very useful to the executives and secretaries from either in the government or private sectors. Lastly, in order to reinforce these shorthand skills, Kuasai Rintas could become an additional academic materials and references for the University and

Vocational School where it can be learned and practiced comprehensively.

INTRODUCTION

Kuasai Rintas is innovated as a supplementary material of the available textbook entitled RINTAS: Satu Kaedah Penulisan Rumi yang Ringkas dan Pantas by Rufiah Rafiee and Mornizan Yahya [3]. Kuasai Rintas exercise book is suitable for an individual, who is wishing to improve their Malay shorthand skills. Kuasai Rintas provides specific of learning guidelines and the basic principles or commands that are easier to understand. Kuasai Rintas exercise book can be practiced by all levels of individuals who are interested in mastering a simpler and faster writing skills. It is believed that by having Kuasai Rintas exercise book, it can meet the goals of all individuals who want to further improve their writing skills. This skill is needed by students to take notes during lecturing and for the people at work especially for those who are working in an office who deal with correspondence, keep records, make arrangement and appointment and any other related tasks which involved accuracy of the notes.

BACKGROUND STUDY

Rintas shorthand skills is designed specifically as a method of short writing that more systematic and consistent based on Malay grammar for general use in organization. In order to further strengthen the learning of Rintas shorthand skills in UiTM, the Kuasai Rintas exercise book has been introduced and it is in more interesting, attractive and easy to understand. Apart from that, Kuasai Rintas exercise book also gives various examples of words and sentences that commonly used in the organization such as business letters, phone messages and minutes of meeting.

PROBLEM STATEMENT

The practice of short writing or short forms among mobile phone users in texting or making brief notes during meetings, receiving instructions from employers and so on has become routine. This short writing is based on individual's understanding or common sense without using specific methods [1]. In order to complete the tasks in a short time, the executive or secretary might choose to write a short writing or short forms but somehow, they could not understand what that been written. Shorthand allows accurate notes to be taken effortlessly over a long period of time and enables the minute-taking secretary to feel more confident that they are getting everything down and not missing anything. Shorthand is used for recording instructions and to-do's from the boss [2]. It shows that everyone needs to learn short writing to ensure the vital information is accurately recorded. Besides that, the learning process which only takes about 3 months of learning Rintas shorthand skills in University is insufficient for the students to fully master these skills and to practicing it in the workplace [3 - 7].

BENEFIT TO MANKIND

Kuasai Rintas exercise book is relevant with the advancement in technology in which these skills often used in writing and sending short messages via mobile phone, taking minutes and phone messages at the office and others routine tasks which help executives and the secretaries to work conveniently.

NOVELTY AND UNIQUENESS

Kuasai Rintas exercise book is innovated with more attractive features such as colorful images, simple words and articles which it can be of interest a person to learn Rintas shorthand skills. In line with the working system that requires a short time, efficiency and quality, Rintas shorthand skills are very useful to the executives and secretaries from either in the government or private sectors. It is also provides numerous commands using colors and images that match the words with the pictures. It is believed that by using these methods, it will help to improve memory and speed up the process of understanding Rintas. The content of Kuasai Rintas exercise book is illustrated in **Figure 1** is more attractive compared to Rintas textbook in **Figure 2** which is printed in black and white except for special word that printed in red fonts.

POTENTIAL COMMERCIALISATION

Kuasai Rintas exercise book are very useful not only to the executives and secretaries from either in the government or private sector but it also become an additional academic materials, references and resources for the University and Vocational School where it can be learned and practiced more comprehensively. Align with technology practicality; the authors of Kuasai Rintas are in a process of converting this exercise book into e-book or in application version, in which it is more compatible and easy access to anyone who is interested to learn it.

CONCLUSION

It can be concluded that Kuasai Rintas is an exercise book that used to be an additional supplementary material or teaching resources to help executives, secretaries, lecturers, students or to any individual who wish to learn and mastered Rintas Malay Shorthand skills. Kuasai Rintas exercise book provides new features, such as numerous commands using colors, images that match the words and variety of colorful images. Therefore, it is believed that Kuasai Rintas could help to improve memory and speed up the process of learning and mastering Rintas.

ACKNOWLEDGEMENT

Figure 1. Attractive features and innovated contents in Kuasai Rintas, exercise book
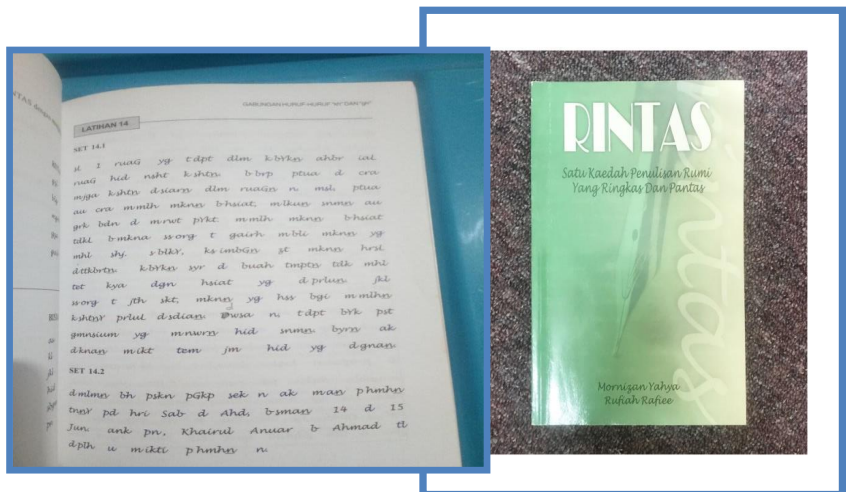
Figure 2. Rintas Textbook currently used for Teaching and Learning in UiTM (Rufiah Rafiee & Mornizan Yahya, 2013)

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LANDSCAPE ARCHITECTURE DESIGN STUDIO-BASED USING PROCESS-EVALUATION MODEL IN OPEN DISTANCE LEARNING

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ABSTRACT

This study addresses landscape architecture design studio-based challenges during open distance learning (ODL) amid the COVID-19 pandemic. The research is being conducted at Universiti Teknologi MARA (UiTM), Selangor, Malaysia. Landscape Architecture Studio-based Process Evaluation Model (LASP) is generated primarily for online learning while sustaining the traditional/conventional methods and implementing it using available data-networking systems. This study shows the importance of the model for decision-making to support studios of landscape architecture design courses. This process-evaluation model was developed to help landscape architecture studio-based design and planning processes, especially in the macro-scale study of landscape planning. Moreover, it is designed to facilitate lecturers worldwide to structure their teaching in studio-based learning, simplify the work process, and maximize collaborations among students in the online design learning process. Students from a landscape planning studio used the model to track their workflows. According to students' self-evaluation and reflection, this LASP model significantly impacted their approaches to the design process and increased their awareness of individual progress while collaborating in micro-scale projects. This study also suggests that the right choice of available online mediums and platforms of big data contributes to improving students' desire, ability to work independently and with group members in the current pandemic COVID-19 education situation worldwide. However, while some might view existing online platforms as stagnant, the long-standing culture of creativity and innovative design in Landscape architecture design studios and professional online offices is almost certainly going to involve emerging new technologies. Furthermore, their possible future necessity will creatively use various technologically advanced design tools and data to impact the studio-based design, teaching and learning, and practices.

Keywords: landscape architecture, studio-based, design, landscape planning, process-evaluation model

INTRODUCTION

The landscape architecture profession and practice face the fact that almost everything this profession does to change the landscape requires collaborations. In most landscape architecture studies, the scale of landscape planning deals with big data and cooperation from many expert's views such as soil, hydrology, ecology, vegetation, geology, climate, history, perception and so on (Antrop, 2001). The focus is on managing the resources for future planning by considering analysis suitable on a large scale. Other design specifications such as urban, cultural, and community design occur with a detailed plan on a smaller scale (Brown & Jennings, 2003). As the method works at different scales and processes, it is crucial to understand the scale in every project to ensure smooth management and foresee the outcome. However, this understanding may differ for every school of thought. Students were exposed to different project scales for undergraduate Landscape Architecture and applied separate analyses to achieve their objectives. Traditionally, the format and structure of studio-based education start with a problem statement, and students work as individuals and teams to solve complex problems (Smith & Boyer, 2015). For studio-based courses, managing the process through blended learning poses challenges, such as critique sessions with lecturers and collaboration among students. There are various methods for academicians to structure their online studio-based learning strategy. These significantly involve the use of information technology. There is no legal framework that they must adhere to in establishing studio-based course learning. One example of a framework in the landscape planning process is the geo-design framework that uses diagrams to manage large-scale projects Steinitz (2020). The framework is believed helpful in organizing related courses using different model types in the traditional learning process. However, many higher institutions in Malaysia have already conducted and implemented online learning. Therefore, this research will innovate the process model to help students run, manage, and organize their studies online with supervision from the lecturers. This study focuses on developing an evaluation model to prepare digital content and teaching structures for better teaching and learning experience online. The evaluation model serves as a process essential for them to follow to ensure the final output of the design master plan is achieved. By following the LASP evaluation-process model, the lecturers and students could systematically manage their design work and know the expectation for the result, involving implementable design, such as plans, proposals, investments, and regulations through online medium platforms.

Objectives

LASP Evaluation Model aims to assist lecturers and students in managing and recording their landscape studio landscape planning and design from macro-scale to site-specific scale through a simplified and understandable recording process, including critique and discussion sessions through the online medium platform available within the institution.

Novelty

LASP Evaluation Model (Figure 1) is developed especially for online learning while sustaining the traditional methods and implementing them using data-networking systems. It is designed

to facilitate lecturers worldwide to structure their teaching and studio-based learning, simplify the work process, and maximize collaborations among students in the online learning process.
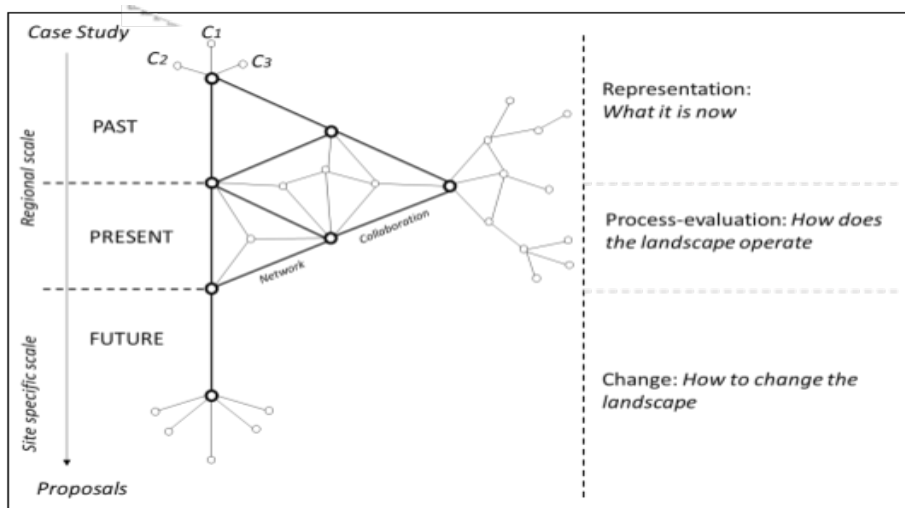
Figure 1. The diagram illustrates the components of the Landscape Architecture studio process-evaluation model (LASP) in open distance learning (ODL)

Figure 1 shows three essential elements in investigating the site case study in a studio-based class. Landscape planning starts with macro-scale scale, typically within 1: 10 000 and above, while site-specific scale in 1: 1000 and below. Three contexts need to be investigated to solve the site problem, which are the past (history), present (current condition) and the future (policy/guidelines/ design proposals). In online learning, the most important thing is communication and networking through all available devices. The line in the model represents a process relationship, while each intersection represents the connectivity of all data. Students need to study the past, what the landscape means from history, and know the existing elements in each sector in the present, which is crucial in understanding the site condition. This phase needs full collaboration between lecturers, students, outside data providers, and vice versa. Participation and teamwork are essential in landscape planning for gathering information on landscape elements such as abiotic, biotic, and cultural elements (Tress, 2006). Without expert guidance and instructions, and proper processes and platforms, no single person can complete this task alone. Thus, students are trained to be well-versed in each sector, and they need to discuss and collaborate among classmates. Students werecommonly divided into small groups, depending on the number of site studies or issues. Lastly, they need to suggest what kind of changes to the landscape in the future through their design proposals. Aside from the policy and guidelines, students may come up with specific designs based on the results of the proposals and achieve the learning outcome for the semester's studio-based learning.

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process. We also acknowledge the Faculty of Architecture, Planning and Surveying for awarding the Undergraduate Design Based OER to the team leader in *Majlis Anugerah Kecemerlangan Fakulti* (MAKEF) 2020 exhibition.

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LiBCO

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ABSTRACT
LiBCO stands for Library Portal for Community Outreach. It is an integrated online platform for Malaysian libraries to disseminate and deliver their outreach program activities to public at home. This system was developed in 2019 by a group of researchers in the fields of Information Management, Computer Science, Industrial Design, and the English Language in collaboration with a librarian from Perbadanan Perpustakaan Awam Negeri Kedah. This system was awarded a gold medal at the INDELIB competition in 2019. This system is also copyrighted by MYIPO. For this competition, we bring the LiBCO 2.0 with the new improved features to meet a new target audience which is B40 students with special needs from Sekolah Menengah Pendidikan Khas Vokasional (SMPKV) Merbok to receive outreach program activities that has been customized for them through LiBCO especially during the Covid-19 pandemic and MCO. In terms of novelty, it is a unique system that is not yet available on the market. Therefore, it has the potential to be commercialized. The marketing developer team is ready to assist, design and develop the system if there is a request from any stakeholder interested in purchasing the system. A consultancy service will also be provided which may trigger marketing potential. As for the usability of the system, the content of the system is useful and is developed based on the STIE national niche domain for education which focuses on personalized and experiential learning, micro credentials, and global online learning: promoting local content. The effects of the implementation of the system were mapped on a national STIE niche area that is expected to improve social well-being, the dual impact enabler (economic and societal) and the economic booster.

Keywords: LiBCO, malaysian libraries outreach program, student with special needs, integrated system

for outreach program

INTRODUCTION TO LiBCO

Initially, LiBCO was developed to integrate all Malaysian libraries to promote the events of their outreach program organized by their library through LiBCO. Malaysian libraries will update their activities in LiBCO. Therefore, the public can view the upcoming events organized by Malaysian libraries and register via LiBCO for any interested events they wish to attend. Malaysian libraries will receive registration information and eventually crowds for their events. On the other hand, third parties who wish to sponsor the Malaysian libraries events can also register with LiBCO. The LiBCO administrator will match the request to any suitable event. By providing these modules, it helps Malaysian Libraries Outreach Program activities to reach all audiences regardless of the state of Malaysia. In 2021, the system has been upgraded and extended to a new target audience, namely students with special needs from Sekolah Menengah Pendidikan Khas Vokasional (SMPKV) Merbok. New features are embedded in the online platform called the online learning section. This online learning section offers edutainment material in the form of videos, podcasts, and eBooks. In addition to this, a series of online information literacy courses will be taught to students by the librarians via this platform. The developers have also released a special service for special needs students called "Talian Kasih". The Talian kasih section allows the students to contact the librarians to share their problems related to their information needs and to get a counseling session should they need it. This special service was introduced to implement the concept of the human library in Malaysia, which was adopted from the library in Denmark.

Features of LiBCO

Below are the characteristics of LiBCO.

Features 1
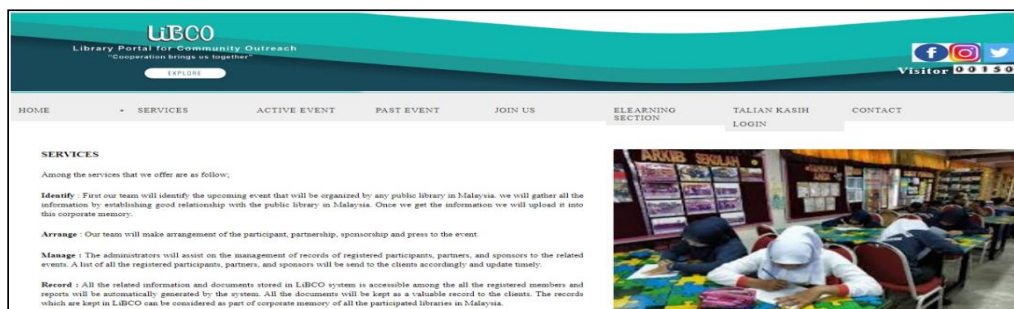
Figure 1. Services provided by LiBCO.

In this section, the developers explain the services that LiBCO provides to its stakeholders. It includes vital processes such as identification, organization, management and registration. In the identification phase, the LiBCO team will identify the upcoming event which will be hosted by any public library in Malaysia. The team will gather all the information and establish a good relationship with the Malaysian Public Library. Once agreed, the upcoming event will be uploaded to LiBCO as a corporate memory. The next phase is organization. In

this phase, the team will make the necessary arrangements for the participants, partnerships, sponsorships and press for the event. This can be done when the team announces the upcoming event on LiBCO and allows other interested parties such as attendees, partnerships, sponsorships and the press to see the upcoming event. If they are interested, they can register to participate in the event, become a sponsor of the event, or do media coverage of the event. Thus, LiBCO here plays an important role in accelerating the event management process for any public library in Malaysia. After the organization phase, we move on to the management phase. In this phase, the admin will assist in managing the participant registry records, partners and sponsors. This information is then sent to the client (public library) accordingly and updated in a timely manner. The last phase is registration. All information and related documents stored in the LiBCO system are accessible to all registered members and the report is automatically generated by the system. All documents are kept as valuable documents for the customer. Records that are held in LiBCO can be considered part of the corporate memory of the entire participating libraries in Malaysia.

Features 2
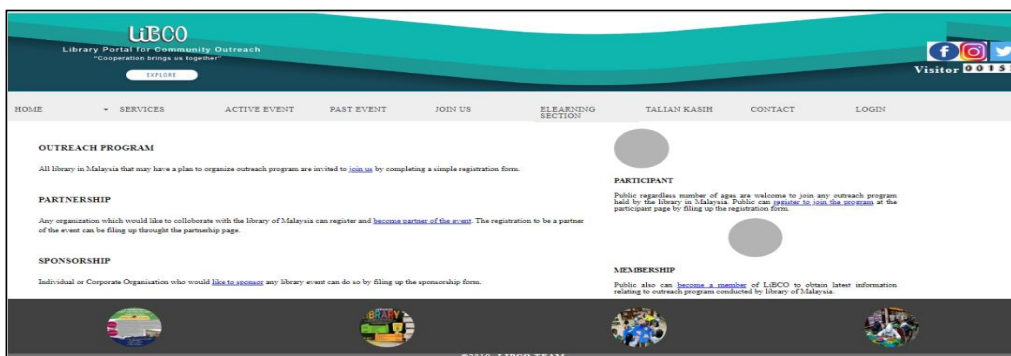
Figure 2. Stakeholders of LiBCO.

This section offers stakeholders the opportunity to participate in the upcoming event organized by any public library in Malaysia that uses LiBCO as a platform to advertise their event by identifying relevant stakeholders who wish to participate, provide sponsors and media coverage of the event. Stakeholders can register for any interested event in this section e.g. to become an event partner, to become an event sponsor, to become an event participant, to become a LIBCO member or to become a member of the press who wishes to do media coverage for the event. This can be done with a single click on this page.

Features 3
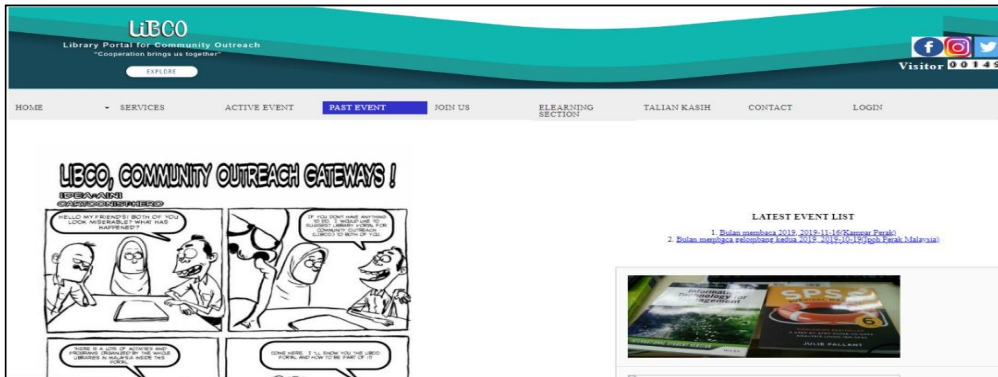
Figure 3. Latest Event List in LiBCO

This section provides detailed information on the list of events organized by the Public Library in Malaysia. From the list, it will pique the interest of all stakeholders who want to participate and contribute to the event.

Features 4
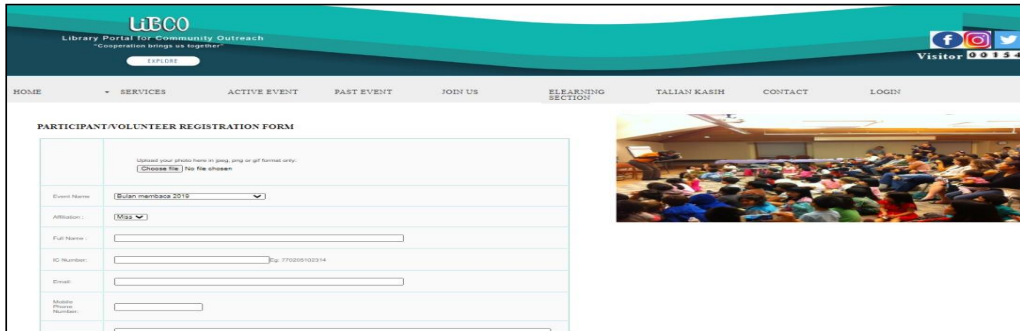
Figure 4. Participant registration form via LiBCO.

This is the sample form for the participant or volunteer who wants to participate in any event organized by the Public Library in Malaysia.

Novelty & Uniqueness
- Provide a tool for an ideal library and community engagement.
- Promote library outreach programs across a wider range of coverage.
- Embedded with a special database system for library and community outreach programs.
- Develop centralized and strategic benchmarking on library performance in Malaysia.
- Enhance the visibility of Malaysian libraries as a strong partnership in community development.

Commercialization Potential
- Special subscription between libraries in Malaysia.

- It can be promoted to Perpustakaan Negara Malaysia (PNM) and Persatuan Pustakawan Malaysia (PPM) as a tool for a collaborative community strategic planning initiative and library partnership in Malaysia.

LiBCO and its impact to National STIE Niche Area

Mapping of Library Outreach Program with National STIE Niche Areas and its impacts.

Library Outreach Programme Activities	National STIE Niche Areas for Education	Impact on the National STIE Niche Area		Project Sustainability Plan
1. Edutainment series online - Information literacy classes - Origami	Personalized and experiential learning Micro credentials	People well-being Dual impact enabler: Economic and People	1.	Local content will be supplied by the librarian and programs will be continued for the outreach program activities.
2. Video - Storytelling Series	Global online learning: promoting local content	Economic Booster	2.	Local content will be supplied by the librarian and programs will be continued for the outreach program activities.
			3.	The video will be remained and stored in the LIBCO access system. Continuous access will be given to the students.
			4.	Video will be added from time to time as well as looking for sponsorships from local and overseas holders (libraries)
			5.	Materials will be added to the system via Loans between libraries
3. Podcasts - Podcast series	Global online learning: promoting local content	Economic Booster	6.	Local content will be supplied by the librarian and programs will be continued for the outreach program activities.
			7.	Podcasts will be remained and stored in the LIBCO access system. Continuous access will be given to the students.
			8.	Podcasts will be supplemented by finding sponsorships from local and overseas holders (libraries)
			9.	Materials will be added to the system via Loans between libraries
4. eBook - eBook series	Global online learning: promoting local content	Economic Booster	10.	Local content will be supplied by the librarian and programs will be continued for the outreach program activities.
			11.	eBooks will be remained and stored in the LIBCO access system. Continuous access will be given to the students.
			12.	eBooks from time to time as well as looking for sponsorships from local and overseas holders (libraries)
			13.	Materials will be added to the system via Loans between libraries
5. Online Counseling - Talian Kasih			14.	The programme will continue to be carried out by the library as one of the elements of reviving the human library concept in Malaysia as well as promoting the career of librarian
6. Aids - Braille Reading Material Supplies - Device Supplies			15.	The concept of braille material loan will be applied, after students have finished their schooling sessions, they will have to return the materials supplied and given to other qualified new students.
			16.	New purchases Braille materials will be supplemented by seeking sponsorship from local and overseas stake holders (libraries)
			17.	Materials will be added to the system via Loans between libraries

Table 1. Mapping of Library Outreach Program with National STIE Niche Area

LiBCO programs align with the STIE National Niche Area for Education, including personalized experiential learning, micro credentials and global learning that promotes local content. LiBCO's impact on STIE's national niche area includes the well-being of people, a dual impact catalyst, the economic and economic booster.

LiBCO securing for MySI FUND

Recently, LiBCO has applied to insure the MySI funds and went to the pre-assessment stage and its status will be updated later by the MySI funds team. This indicates that LiBCO has the potential to be commercialized and used to serve communities and the general public.

ACKNOWLEDGEMENTS

We would like to thank the team members for their enthusiastic efforts to make LiBCO a reality. We have done so much to make LiBCO the best platform to serve communities and the public. We would also like to thank the i-SPiKE community for giving us the opportunity to take LiBCO to the next level of international competition. May LiBCO win in this competition.

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LIMIT OF ACCEPTABLE CHANGE AND RECREATION OPPORTUNITY SPECTRUM AS A TOOL IN DEVELOPING A MANAGEMENT PLAN. A STUDY IN TEMPLER FOREST ECO PARK & TEMPLER FOREST RESERVE

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ABSTRACT

The Management Plan of Templer Forest Eco Park and Templer Forest Reserved is constructed within the subject of managerial, social, and physical elements. Templer Forest Eco Park is managed by Majlis Perbandaran Selayang, meanwhile Templer Forest Reserved is owned and managed by Jabatan Perhutanan Negeri Selangor. The aim of this plan is to establish healthy and sustainable eco-forest and forest reserves that are well managed and cared which eventually will bring benefit to visitors and community. To do so, on site information was collected during technical visits, interview session, assessment of relevant documents and guideline as well as webinar sessions with major stakeholder have been conducted. In addition, this study employs theoretical and analytical approaches as its methodology. A total of 30 visitors, several representative from local community and local busines were reached out where their opinions were recorded and considered in the development of this Management Plan. A set of Issues, Concerns and Opportunities (ICO) were identified soon after. This plan is continued by the adaptation of Limit Acceptable Change (LAC) and Recreation Opportunity Spectrum (ROS) as approach to solve the issues, hence, the provision of two alternatives in Chapter 6 to identify the opportunities and limits. If an area did not manage to fulfil certain standards, then, the management must take actions to improve the situation. Apart from that, this Management Plan also reflects the new norms of Pandemic Covid-19 that the whole world has begun experiencing since early of 2020 by implementing the Standard Operating Procedure (SOP). To sum up everything, this Management Plan will serve as a roadmap for relevant stakeholders, particularly Majlis Perbandaran Selayang and Jabatan Perhutanan Negeri Selangor during the implementation of proposed actions. This management plan is hoped to bring changes to the future eco-tourism industry, as well as guide for future references.

Keywords: templer forest eco park, templer forest reserve, limit acceptable change, management plan, managerial, physical, social, recreation opportunity spectrum

BACKGROUND OF THE STUDY

The Management Plan of Templer Forest Eco Park and Templer Forest Reserved is constructed within the managerial, social, and physical elements. Each aspect is highly interrelated with each other, as it will affect visitor experience and determine the chance of revisitation. Besides that, the findings show that most of the visitors are either accompanied by friends and family. This indicates the potential of this forest park for more improvement in serving the needs and wants of visitors. However, environmental aspects should not be overlooked considering the forest is reserved area, which requires high protection. Therefore, this study will explore the management actions that can be proposed according to their distinctive characteristics of 6 classes in the Recreation Opportunity Spectrum (ROS). As a result, the proposed Management Zone in this study is divided into three. The first management zone is named as Chill Out Zone which emphasize the accessibility to this park, with the provision of a drop off point, and an information center. The second Management Zone is named Lay Park Zone; which name is inspired from Malay word "lepak". This zone offers a space for visitors to enjoy recreational activities with provided facilities such as a picnic area and swimming pool. Meanwhile, the third management zone is categorized as Semi Primitive Non-Motorized, due to the existing conditions that are unsuitable for motorized uses. This zone will be focusing on instilling educational elements through interpretive trails and signage; hence the name of Edu Tourism Zone is proposed. Each zone will require certain renovation and adjustment of existing conditions to provide sustainable usage of available resources.

STUDY AREA

Templer Forest Eco Park is managed by Majlis Perbandaran Selayang, which offers semi-active recreational activities alongside the provided facilities such as picnic area and swimming pool. In addition, a space for small business is available to support economic growth of Templer Forest Eco Park. Meanwhile Templer Forest Reserve is owned and managed by Jabatan Perhutanan Negeri Selangor. This forest reserve consists of a 45 minute's worth of hiking experience which is suitable for hikers at beginner level. At the end of the trail, visitors can enjoy the beautiful scenery of Templer's Waterfall.

PROBLEM STATEMENT

The increasing growth in the eco-tourism sector has created boundaries in planning and managing the environment and landscapes to cater to the visitors' unending demands. In addition, the need to deliver the best service of an eco-tourism destination especially through accessibility and facilities conditions is quite challenging especially when there is a lack of involvement from stakeholders. Not only that, social issues such as vandalism and pollution leave quite an impact on the image and identity of not only the area, but for the surrounding area as well. One way to solve this problem is through awareness, because without it, one would not have the urge to initiate the efforts to care for protected natural areas. Therefore, any proposed actions should highly consider the results of many aspects so that it will receive future benefits.

ORIGINALITY/NOVELTY

1. New theory on management plan for Templer Forest Eco Park and Templer Forest Reserve utilization based on observation (data inventory on natural and physical resources in Templer Forest Eco Park and Templer Forest Reserve), questionnaire surveys (demographic profile, recreational activities), interviews (recreational use, activities, visitors, visitors'satisfaction, conservation).

2. Knowledge on management plan by the administrator namely Majlis Perbandaran Selayang, Jabatan Perhutanan Negeri Selangor and other stakeholders.

The outcomes can assist the respected Local Authority Government in developing management plan for developing socially responsive sustainable and conservation areas especially in forested areas such as Templer Forest Eco Park and Templer Forest Reserve as specific and in Malaysia as general.

RESEARCH AIM AND OBJECTIVES

The aim of this management plan is to establish healthy and sustainable eco - forest and forest reserves that are well managed and cared for which eventually will bring benefit to visitors and community. In conjunction to that, three objectives were constructed which are: -
   i.   To analyze the resources, legislative and demographic factors.
   ii. To propose sustainable actions in managing eco parks and forest reserves.
   iii. To enhance visitor experience while doing recreational and leisure activities.

LITERATURE REVIEW

Limit Acceptable Changes (LAC) is a framework developed for managing protected landscapes by determining what environmental impacts from "desirable" social activities are acceptable, and then determining management actions to ensure that the activities remain constrained within the LAC. It will determine where and to what extent varying degree of change is suitable and appropriate as it shifts the focus from the 'level of use and impact' idea to the more proactive approach of identifying desirable conditions for visitor activity to occur in the first place, followed by management actions needed to protect or achieve the conditions (George et. al, 1985). In conjunction with the Limit Acceptable Change (LAC) framework, has led to the use of The Recreation Opportunity Spectrum (ROS). It is a system for classifying and managing recreation opportunities based on the physical setting, social setting, and managerial setting. The combination of the three settings along with their indicators resulted in six different ROS classes. Each of the stated classes differ from each other where the opportunities for level of access, management and social encounter are very minimal on lower class, yet maximum on higher class. This is highly related to the level of use and remoteness of each class. Therefore, it is important to recognize which ROS class existed in one recreational area (Aukeman R. 2004). With proper understanding, the proposed actions and future planning can run smoothly. In addition, this system has been widely used, as it gives a clear understanding to an organization in managing a protected recreational area.

METHODOLOGY

This research contains both primary data and secondary data. Preliminary data involves firsthand information that was collected during technical visits such as records of existing conditions, and interviews. The interview was done through questionnaires, which cater to three types which are visitors' questionnaires, local community questionnaires and local business interviews. The respondents were all picked through simple random sampling techniques. In addition to that, two webinar sessions were conducted with Majlis Perbandaran Selayang, and Jabatan Perhutanan Negeri Selangor respectively. Meanwhile, secondary data involves utilizing related resources including previous research, Rancangan Struktur Negeri Selangor 2035, Rancangan Tempatan Daerah Selayang 2030, Selangor Planning Guideline, current Standard Operating Procedure and several related Acts by Malaysia Government.

SIGNIFICANCE OF THE RESEARCH

The significance of this research is important for future development of Templer Forest Eco Park and Templer Forest Reserve as a recreational area in Selangor. This is because the data gained throughout the preparation of this management plan are precisely accurate and detailed. In addition, this might as well add more information to current studies either at the site area itself, or as an example practice to other sites. As this research aims to establish healthy and sustainable eco - forest and forest reserves, it also takes into considerations the voices and opinion of stakeholders according to their power and interest in developing recreational areas. Therefore, this Management Plan is proven to be prepared in a detailed manner.

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TWEET IT! ESL WRITING ACTIVITY MODULE USING TWITTER

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ABSTRACT

There is a demand to transform the whole teaching and learning experience in accommodating the needs of the students from the younger generation who are more familiar with the advanced technology in the present days. When it comes to learning English as a second language, many would find learning it in a common classroom setting with a fixed syllabus to be challenging and less effective as there is a tendency to make the learning process an isolated experience from the real world. With the utilisation of one of the popular social networking sites, Twitter, the learning of English writing could be transformed into a more interactive and relatable one to these young generations. Twitter has a lot of facilitative features for engaging interactions among users, along with simplicity as its main highlight of the site. Available on both the website and mobile application, engaging with students through Twitter would only require simple steps into the application to begin with. The 'TWEET IT!' highlights the need to improve ESL learners' ability to improve their argumentative skills, This is a crucial element in writing as the 'TWEET IT!' ESL Writing Activity module provides a guideline to use Twitter for ESL writing activity, with 14 argumentative topics from easy to advance level. These topics are comprised of general knowledge, current issues, and relevant discussion prompts. The module aims for a duration of 14 weeks (one semester), which is suitable for the target ESL learners in higher learning institutions. By fully utilising this module, it is expected that ESL learners would be able to improve their argumentative skills, enhance their vocabulary skills as well as increase their confidence to interact with others using the English language correctly.

Keywords: ESL, writing, twitter, language learning tools

INTRODUCTION

In tandem with the advancement of technology, many aspects of life have shifted from traditional approaches to more advanced, interactive ones. The Internet, especially, has become a prominent part of our younger generation's lives especially those who are Generation Z (Taskiran, Gumusoglu & Aydin, 2018). Social media or social networking sites (SNS) are one of the services on the Internet which has gained tremendous popularity over the years. SNS are known as the online platform for people who want to build social relationships with people of similar interests, background, or connection (Meishar-Tal & Pieterse, 2017).

Among the many sites for SNS, Twitter is one of the most popular networking sites which allow users to connect with people globally and discuss diverse topics across the platform. Within 280 characters per posting, which is also known as 'tweet', users can express their thoughts and opinion to their 'followers'. Besides its social features that allow users to connect with English speaking users, the character limit feature is an element which can be used to encourage creative communications as users are more likely to concentrate on their main point

when posting on Twitter (Allam & Elyas, 2017). Many educators find this feature of Twitter something beneficial especially in terms of language learning. When it comes to teaching and learning writing, several studies found that the usage of Twitter in the helped students to perform better in writing and feel less restricted in using the language (Ahmad, 2015, Bonnah & Donellan, 2017). Another study done in the following year (Bozkurt et al, 2016) also stated that the Twitter platform enhances creative writing among students. Through a creative writing competition on Twitter, students are more motivated to be creative in selecting vocabulary to write. Taskiran *et al* (2018) conducted a study in which students would respond to argumentative topics on Twitter as an extracurricular activity for 4 weeks, and it was found that their language learning experience improved in terms of expressing and communicating in English through writing. Local studies who explored the use of Twitter in ESL writing classes also revealed that students find this platform useful in improving their writing skills (Arshad, 2018; Azlan & Yunus, 2020).

There are many promising possibilities of using Twitter as an effective tool in English language learning especially in writing. Hence, this product proposes an English as a Second Language (ESL) writing activity module for a 14-week lesson.

MATERIALS AND METHODS

This 'Tweet It!' ESL writing activity module consists of 14-week duration of activity plans which incorporate the use of Twitter features to elicit interactive discussion and feedbacks from students. Instructors can use the module as either in-class activity or extra-curricular activities for continuous learning experience.

The module provides a list of argumentative topics which would prompt students to respond argumentatively. Argumentative writing is an important skill in terms of ESL writing and is considered a critical lifelong skill in forming learners' judgments and beliefs (Jonassen & Kim, 2010). Approaching argumentative topics on a more informal setting like Twitter would provide an authentic learning experience for students as they would be able to prolong the language learning experience for a lifelong skill in expressing their thoughts and opinions with maturity (Blattner & Dalola, 2018). This proposed module targets undergraduate ESL learners in higher learning institutions, which shall be carried out within the duration of one semester (14 weeks). The argumentative topics are listed from easy and entertaining topics to serious and controversial ones towards the end of the semester.

Table 1. The Module

Week	Topics
1	Would you rather travel back to the past, or jump into the future?
2	It is okay to judge an actual book by its cover.
3	The breakfast cereal is a scam. What do you think?
4	Travelling in space for everyone will become something feasible soon.
5	"Just do what you love" is not a good advice.
6	Idolising celebrities is harmful to young adults. Do you agree?

7	Ignorance is a blessing. Do you agree?
8	The authorities are the ones to blame for the global climate change. Discuss.
9	The learning process is more important than the result. Do you agree?
10	Bullfighting should be made illegal everywhere.
11	Strict parents have well-behaved children. Discuss.
12	Should criminals get second chances? Why?
13	The normalization of victim-blaming is apparent in our society. Discuss.
14	Being a YouTuber is a profession many would opt for in the future. Discuss.

The following are the necessary guidelines for both instructors and students. A visualized guide is provided in the attached document (Appendix A) as well as in the following link: https://tinyurl.com/tweet-it-esl).

Guide for Instructors:
1. The instructor would set up a Twitter account and act as the moderator.
2. Every week, the instructor will post a tweet containing the topic. It is encouraged to include a unique hashtag (written with a # symbol) at the end of the tweet to index the keyword on Twitter.
3. Instructors will then interact with the replies from students under the topic and encourage interaction among the students for a fruitful discussion.
4. Encourage the students to share the tweet by 'retweeting' to include more genuine responses from people outside the class.
5. Encourage students to 'like', 'retweet' and 'quote' their classmates' statements that they agree with the most, as a visual representation of agreement to the proposed reasons.

Guide for Students:
1. Students should have a twitter account and follow the moderator's (instructor's) Twitter account.
2. Every week, the students will log on to Twitter and respond to the weekly topic posted by the instructor. Every reply should include the same unique hashtag, so it is easy to track responses from the particular group of students.
3. Students shall respond to the replies under the topic as well, whether they agree or disagree with them. They can use the 'like', 'retweet' and 'quote' feature of Twitter.

Alternatives:
4. For advanced ESL learners, instructors can divide the class into two groups: opposing and proposing team for a balanced discussion.
5. A Twitter poll can be created before the discussion topic is posted.
6. Instructors can also turn the discussion into a competitive one, where responses with the most replies, likes and retweets to win the argument.

This activity should be carried out weekly basis, and the discussion should be opened until the end of the week. The instructor will be looking through the replies and can also refer to the indexed posts by navigating through the hash tags used for the class.

EXPECTED OUTCOMES

Through the interaction on Twitter, it is expected that students will be able to express their thoughts without being restricted by the environment of a classroom. The topics and responses obtained from this activity on Twitter can be carried forward into the class session to expand it into essay writing, provided that everyone has contributed to the discussion so that each ESL learners have gained background knowledge of the topic. From the activity, students shall have enhanced their vocabulary skills, knowledge of a certain topic, and the ability to justify their opinions during arguments.

CONCLUSION AND RECOMMENDATION

In conclusion, Twitter is an effective language learning tool which allows ESL learners to interact outside the classroom setting. The limitation of words on Twitter no longer poses as a barrier, but a door to creativity and challenges to these learners to improve on their message delivery and vocabulary skills. Teachers and language instructors should incorporate the usage of Twitter in the writing activity of their learners to enhance the learning experience and improve students' writing performance.

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Link:

MALAYSIAN SECONDARY BOARDING SCHOOL MENU PLANNING SYSTEM

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ABSTRACT

Boarding school students need to eat well balanced nutritious food which include proper calorie, vitality, and supplements for legitimate development, keeping in mind the end goal is to repair and support the body tissues and averting undesired ailments and disease. Serving healthier menu is a noteworthy stride towards accomplishing that goal. Arranging a nutritious and adjusted menu physically is confounded, wasteful and tedious. This study intends to build up a scientific mathematical model and decision support system for menu planning that improves and meets the vital supplement consumption for boarding school students aged 13-18 and in addition, saving the financial cost. It gives the adaptability and flexibility for the cook to change any favoured menu even after the ideal arrangement has been produced. A recalculation procedure was performed in view of the ideal arrangement. The data were gathered from the Ministry of Education and boarding schools' authorities. Menu arranging is a notable enhancement issue and one of the well-established problems in optimisation. A well-balanced menu scheduling is produced which meets all the constraints. The model was fathomed by utilising Binary Programming and "Sufahani-Ismail Algorithm" and a system was developed to comply with the problem. The Malaysian Secondary Boarding School Menu Planning System is the first system in Malaysia and in the world. It can also be used for other problems such as military, hospitals and others.

Keywords: mathematical modeling, decision support system, menu scheduling, integer programming, information systems.

INTRODUCTION

Planning adequate menus faces many economic and psychological constraints. It involves simultaneous consideration of several types of constraints: the desired nutritional content, the likes, and dislikes of the person that it is being planned for, the amount (volume or weight) of food to be consumed, and the expected form and content of different kinds of meals. The menu or diet problem model was first formulated by Stigler in 1945. This model, as in most operation research models, has been set up on the traditional fundamental assumption that the decision maker seeks to optimise a single objective function. The problem has continued to be investigated by scientists and nutritionists. Therefore, in this paper, we expand the current knowledge in menu planning focusing on Malaysian recipes, minimising the cost, fulfilling the nutritional requirements, serving variety of food serve each day and optimising the user's preference. We use zero-one programming to determine the most nutritious and palatable

meal for Malaysian children aged 13 to 18 years old. The menu lists are given to caterers in boarding schools who provide six meals per day, breakfast [B], morning tea [M], lunch [L], evening tea [E], dinner [D] and supper [S]. The menu provided is a nonselective menu where the school children do not have the choice to choose their preferred foods. Planning adequate and palatable menus is important to prevent the school children from suffering any undesirable diseases. Hence, research on menu planning by developing mathematical models using operational research and decision science techniques is important in order to help caterers provide nutritious meals over extended time periods within the limited budget allocation.

DATA COLLECTION

There are several types of data needed to build a menu planning model. These include the standardised price of each Malaysian menu, the nutritional contents for each menu, recommended nutritional daily allowance (RDA) which include upper and lower bound of each nutrient for Malaysian school children aged between 13-18 years old, and the government budget for caterers. The information on current monthly caterers' budget and cost per serving for each meal was collected from the nutritionists of the Ministry of Education, the boarding schools' authorities through interview sessions and caterers. The budget is RM15.00 per student per day.

MODEL FORMULATION

The main aim of this research is to formulate a menu planning model that minimises the budget provided by the government to the school caterers, maximises the variety of food intake and maximises the nutritional requirement based on the Malaysian RDA requirements. There are 11 nutrients considered; energy, fats, carbohydrate, protein, niacin, vitamin A, vitamin B1, vitamin B2, vitamin C, calcium, and iron (refer Table 1). Furthermore, we will consider 10 types of foods; beverage, cereal flour based, rice flour based, cereal based meal, meat dishes, seafood, vegetable, fruit, wheat flour based and miscellaneous (re-fer Table 2). There are 426 of foods and drinks to be considered. Based on the data, a zero-one programming model is developed and discussed. We have 426 of foods and drinks, therefore we have 426 variables (x_i) where i=1,2,..,426. Each type of food has its own available range of selection as presented in Table 2. For example, Bever-age dishes (x_1 - x_{37}). We need 18 dishes from 10 types of food per day. Therefore, in a week we need 126 dishes that will be suitably selected from the 426 dishes that are available.

Table 1. Values of upper bound and lower bound of the 11 nutrients

Nutrients	Lower Bound (LB)	Upper Bound (UB)
Energy (kcal)	2050	2840
Fat (g)	46	86
Carbohydrate (g)	180	330
Protein (g)	54	-
Calcium (g)	1000	2500
Vitamin A (mg)	600	2800
Vitamin B1 (mg)	1.1	-
Vitamin B2 (mg)	1.0	-
Vitamin C (mg)	65	1800

Niacin (mg)	16	30
Iron (mg)	15	45

Table 2. Food requirement per day

Type of food	No. of requirement per day (n)
Beverage (x_1 - x_{37})	6 [including 2 Plain Water]
Cereal Flour Based (x_{38} - x_{85})	1
Rice Flour Based (x_{86} - x_{113})	1
Cereal Based Meal (x_{114} - x_{126})	2 [including 1 Plain Rice]
Meat Dishes (x_{127} - x_{158})	1
Seafood (x_{287} - x_{324})	1
Vegetable (x_{159} - x_{212})	2
Fruits (x_{213} - x_{261})	2
Wheat Flour Based (x_{262} - x_{286})	1
Miscellaneous (x_{325} - x_{426})	1
Total Dishes Per Day	**18**

For the objective function, we minimise the total cost Z,

$$Z = \sum_{i=1}^{426} \text{Cost}(x_i) = \sum_{i=1}^{426} c_i x_i \tag{1}$$

by selecting the dish and providing a palatable daily menu. The maximum budget provided per day by the government is MYR15.00. Therefore, we try to minimise the cost. The daily constraints,

$$LB \leq \sum_{i=1}^{426} \text{Nutrient}(x_i) \leq UB \quad i = 1, 2, .., 11 \tag{2}$$

where LB and UB is the vector and give a different value for each nutrient. This is to ensure that we meet the nutrients requirements. We have 11 constraints of nutrients with lower and upper bound values except for protein, vitamin B1 and B2 as stated in Table 2. Based on Table 1 we then specify the 10 food requirements,

$$\sum_{i=1}^{10} \text{Type of foods } (x_i) = n \quad i = 1, 2, ..., 10 \tag{3}$$

so that we can serve 18 dishes per day. All 426 variables are in binary values $x_i = \{0,1\}$. Each food can only be served once (1 chosen and 0 otherwise) in a week except for Plain water and Plain Rice. Each time running, the programme will consider different available variables. For example, 18 variables are selected from the 426 variables that are available to be served on Day 1. The selected variables will be denoted as 1 (except for plain water which is 2) and the rest are zeros. As mentioned earlier all variables are binary except for plain water and plain rice. Binary means that the lower bound value for the variable is 0 and the upper bound value is 1. Before running for Day 2, each variable that is selected in Day 1 will be eliminated except for plain water and plain rice. It means that all the foods that are served on day *1* will be deleted from the model and will not be served again on day ($i + 1$) except for the two compulsory foods. We will use a looping process in running the programme for 7 days; deleting the selected variables from the existing model and reshuffle all the optimal variables into a proper serving schedule. The selected variables in Day 1 will be rewritten as $x_i = \{0,0\}$, where the lower bound value is 0 and the upper bound value is 0 except for plain water and plain rice. Then the selected food will be arranged into proper serving schedule (Breakfast, Morning Tea, Lunch, Evening Tea, Dinner and Supper). Even though an optimal solution has been obtained, the users are still being given the flexibility to change any food

from the optimal results. As mentioned earlier, for Day 1, 18 foods are being selected from each food group. If the user is keen to have another food on that day, the selected food can be replaced with any other food that are still available, and a recalculation process will be done based on the optimal result. As mentioned in Table 2, a daily meal consists of 6 beverages (BEV), 1 cereal flour based (CFB), 1 rice flour based (RFB), 2 cereal meals based (CMB), 1 meat (MEAT), 1 seafood (SEA), 2 vegetables (VEG), 2 fruits (FRU), 1 wheat flour based (WFB) and 1 miscellaneous (MIS). These foods are rearranged accordingly into a complete 1-day menu schedule by applying Algorithm 4.2. This present study involves many decision variables, constraints, and parameters. The coding was programmed using Matlab with LPSolve and optimal results were obtained through 2.26GHz PC. By eliminating the selected variables and reducing the size of variables, it will help the programme run faster.

RESULTS AND DISCUSSION

The results are presented in Table 3. It shows meals for one day to be provided by the management of the school to the children aged 13 to 18 years old. In Table 3, we can see that there are a variety of drinks and foods presented in the first optimal solution which includes six types of meals from breakfast to supper. Then we decided to change one item each in Beverages and Fruits from the first optimal solution based on our preferable menu. A recalculation process was done, and second optimal solution shows the results. Both results meet the daily nutritional requirement for the school children at a minimum cost. Therefore, it can be concluded that all the meals chosen are nutritious and is advisable to serve to the school children aged 13 to 18 years old. The value of the total cost is less than the budget provided by the government. It means that the management of the school will spend less than RM15.00 per person per day. The total cost for each day increases because the programme chooses the cheapest food but the RDA requirement need also to be satisfied.

Table 3. First and second optimal solution for Day 1

	Day 1: First Optimal	Day 1: Second Optimal
Beverages	Orange flavoured drink, powder [B]; Plain water (2 times) [T,L]; Coconut water [E]; Sugar cane juice D]; Milo [S]	Milk powder, skim [B]; Plain water (2 times) [T,L]; Orange flavoured drink, powder [E]; Sugar cane juice D]; Milo [S]
Cereal Flour Based	Biscuit soda/plain [S]	Biscuit soda/plain [S]
Rice Flour Based	Kuih kasui [B]	Kuih kasui [B]
Cereal Meal Based	Rice, chicken [L]; Rice, cooked [D]	Rice, chicken [L]; Rice, cooked [D]
Meat	Chicken satay [L]	Chicken satay [L]
Seafood	Fish unspecified, dried, salt [D]	Fish unspecified, dried, salt [D]
Vegetables	Celery [L]; Mengkudu [D]	Celery [L]; Mengkudu [D]
Fruits	Guava [L]; Nangka [D]	Guava [L]; Lychee [D]
Wheat Flour Based	Doughnut [E]	Doughnut [E]
Miscellaneous	Candy coconut [M]	Candy coconut [M]
COST	RM5.90	RM6.50

CONCLUSION

The researchers have produced a suitable menu plan that can be used as a guide for the management of the school. The model was solved using Matlab with LPSolve. It fulfilled all the constraints set by the researchers and gives a better solution compared to other heuristic methods such as Genetic Algorithms. This research focused on 13 to 18 years old school children at secondary boarding schools. The nutritional requirements required for children below 12 years old and adults will be different from the ones used here, and it will affect the menu selection and the cost of preparing the meals. The total cost for each day is less than RM15.00. Therefore, we can serve slightly expensive and better quality of foods for the children. An approach using post-optimality and sensitivity analysis will be developed in the future based on the changes in the coefficient value (ci).

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MALAYSIAN STUDIES POCKET READ

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ABSTRACT

People say attending university is a great learning opportunity due to the fact that the students are given the chance to explore and gain new enriching experience. Sometimes it could be an adventurous journey for the new students where it offers a hectic experience that is more than what they had in mind. The university is where the students try to make new friends and fit in and at times, some need to learn how to manage their money especially for their food and public transportation. Some students might even struggle to cook their own proper meals while undergoing meaningful university's events and programs in one semester. With all that in hands, they must not forget their main agenda in university; exploring and digesting new topics, making sense of the unfamiliar terms in their chosen fields, and trying to excel. In a study conducted by Alfan and Othman (2005), it was found that knowledge prior to entering the university is crucial in assisting the student to undertake the chosen courses. In addition, based on the study conducted by Perander et al (2021) the main findings confirmed that starting studies in higher education is challenging for many students. Therefore in order to address negative emotional learning experience among students especially those taking public administration related subjects, Malaysian Studies Pocket Read was created with high anticipation that it can ease the students understanding and unfamiliarity upon terms, related policies, government structure and issues related with national concern. The pocket read came in a petite size, handy and to make it different with other books in public administration, it will be using infographics to explain various terms and policies. The recent study conducted by Becerra-Rodríguez et al (2021) shows that there is a significant improvement in learning scientific topics by using infographics construction. The findings also has been supported by Ozdamli et al.(2016), saying that students think that using

infographics are more understandable and more satisfactory. Moreover, since infographics are easier to remain in minds, it was hope that this kind of teaching method can be more effective and gratifying.

Keywords: students, learning, teaching method, infographics

PROBLEM IDENTIFICATION

In order for students to have an effective learning experience, it is substantial for them to overview on the subjects that they are going to enrol. Some might have better view on the subjects, some might still in vague. For the new students taking public administration related subjects, some of them were *facing difficulties to understand terms, related policies, structures of government and also what are the issues that became national concern.* It is crucial to demonstrate greater attention to both students' affective needs and their understanding on course content to address negative emotional learning experiences as well as safeguarding the students' expectations, satisfaction, and retention in the future.

SOLUTION

As it is not easy to capture student's attention, the lecturers might potentially come up with an innovation that focusing on creation of books that using *infographics* on public administration related subjects as images will help students to store the information longer and at the same time works as motivational driver in learning new things. Therefore, in response to the above problem, *Malaysian Studies Pocket Read* is created**.** By using infographics to explains terms related with public administration, this teaching method can makes the conventional forms of lecturers to be easily understandable. We are very optimists that this product can ease students' understanding the subjects focusing on the terms, related policies, structures of government, and also issues related to the national interests. As an educator, it is crucial to ensure students are able to grasp at least the basics of any subjects.

OBJECTIVES

The Malaysian Studies Pocket Read serves several objectives. To begin with, this product has been designed to provide assistance for students to have *better understanding* on public administration related subject. By using infographics, this product will provide a brief knowledge on public administration related subject such as the structure of Malaysian Parliament, the existing Malaysian Policies, the structure of Malaysian government and also the issues related with national interests. In addition, this product may help students to strengthen their *writing abilities* and also to improve vocabulary on related terms. As students need to answer in essay forms during test or final exam, this product may assist them to write better.

NOVELTY

For novelty, this product will create *extra excitement for students, lecturers and the public.* To begin with, this product consists of six pocket books with six different titles. The books are different than the ordinary books as it comes in a *mini version.* In addition, as the size is

small and handy, it can be ***kept in bag and ready to be brought anyway***. Either students, lecturers, or even the public, they can enjoy this pocket book anywhere such as at the bus stop, at the restaurant while waiting for foods or even in any public transportation. Furthermore, as it contains plenty of visual and images, the product is ***easily deciphered*** and definitely able to ***spark joy*** to those who reading it.

IMPACT / USEFULNESS

To begin with, Malaysian Studies Pocket Read will be useful for ***students especially to those preferred visual learning*** as this product contains plenty of infographics on public administration related subjects. In addition, this product may as well be useful for ***public*** who intends to enrich their knowledge on Malaysia in the hassle-free way, as it is more into infographics and thus make it something pleasant to read.

EFFECTIVENESS OF INNOVATON

In order to measure the effectiveness of the product created, hypothesis will be tested.

H_0: There is no significance difference between student's pre and post marks of test on Introduction to Public Administration

H_1: There is a significance differences between student's pre and post marks of test on Introduction to Public Administration

COMMERCIALIZATION POTENTIAL

Since the product has been advertised in the social media, it started to received high demands from students, lecturers and public. As this mini version of books are ***practical, captivate and graspable,*** it had created impression among potential buyers that this Malaysian Studies Pocket Read is a worth getting book.

MARKETING AND FUTURE PLAN

The marketing and future plan are as below:

Advertisement
Facebook, Instagram, Whatsapp

Placing an Order
Google Forms

Payment Method
Online Banking

Future Plan

Year 2022
To participate in IID competition

Year 2023
Research and Development – to expand the pocket books; to discover weaknesses if any, to discover another two/three new titles but still maintaining the same concept of mini version. At the same time, we will try to get the book published.

Year 2024
If R&D were succeed, we will be getting copyrights, entering another IID competition and will make an attempt to penetrate International market.

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MATHEMATICAL THINKING ENHANCEMENT PROGRAM (MaTh-EP)

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ABSTRACT

The present invention, called "Mathematical Thinking Enhancement Program (MaTh-EP)", generally relates to a program that enhances the development of mathematical thinking. This program is revolutionising from the problem-solving model from Polya (1973) and Schoenfeld (1992). This program integrates the problem-solving stages, heuristics, and metacognitive strategies instruction to guide students in solving non-routine problems that are intellectually challenging. This program is suitable for primary, secondary, and tertiary levels of education. Mathematics instructors, either at the school level or tertiary level, are encouraged to experience this program. The idea of MaTh-EP is to expose the participants to cognitive-metacognitive strategies and heuristics while solving non-routine problems. Non-routine problems are mostly concerned with developing participants' mathematical reasoning power and fostering an understanding that mathematics is a creative endeavour. MaTh-EP could develop participants' thinking in Mathematics especially viewing mathematics problems related to the application in daily life. The potential program is suitable for students or instructors interested in boosting their way of thinking in Mathematics.

Keywords: mathematical thinking, problem-solving approach, cognitive, metacognitive, heuristics

INTRODUCTION

The essence of mathematical thinking is inextricably linked to the cognitive processes which generate mathematical knowledge. One of the ways to ensure that students are involved with mathematical thinking is through non-routine problems. Mathematical thinking requires non-routine or unfamiliar mathematical problems so that students can flexibly include their understanding of mathematics' fundamental concepts and ideas and focus on the problem-solving process (English & Kirshner, 2016; Schoenfeld, 1992). Non-routine problems are the kinds of problems that contribute to students' mathematical problem-solving and reasoning skills. According to Hershkowitz et al. (2001), if the students solve a routine problem, they are likely to alternate between recognising and building with previously acquired structures. If they solve a non-routine problem, they can build and reflect on a new (for them) phenomenon, its internal structure, and its external connection to items they already know. Even though routine problems can serve essential didactic functions of teaching students to apply a certain method or a definition in mathematics correctly, they can only improve their

problem-solving skills by careful use of non-routine problems (Stanic & Kilpatrick, 1988).

The development of Malaysian students in solving a mathematics problem is still unsatisfactory. Even though the students are studying at university and college level, they are not able to recognise their final answer or solution as logically incorrect. Hoon et al. (2018) have found that the majority of the participants (university students) directly applied the procedural knowledge without any reasoning when solving mathematics problems. They could not describe their argument in a meaningful way other than specifying the algorithmic procedure processes. This phenomenon indicates that they are ignorant of their thinking when solving the problem. Singh (2009; 2017) has found that students are given the solution based on the direct assumption rather than proven through mathematical and logical reasoning. These difficulties and mistakes are found because many undergraduate students are too focused almost entirely on formal mathematical algorithms, principles and procedures that appear to be highly distant from conceptual comprehension (Singh et al., 2018; Bowyer & Darlington, 2016). Impact of that, the students have failed to comprehend the fundamental of formulaic structures in their mathematical learning. The students are too dependent on formula and procedural knowledge when solving problems (Han, Singh, Nasir, Ramly, & Hoon, 2016; Singh & Hoon, 2017; Hoon et al., 2018). Han et al. (2016) have found that some students can understand the theoretical concepts involved in the problem. However, they do not know how to solve the problem. The students lack alternative strategies even though they struggle to remember the mathematics formula to solve the problem. Hoon et al. (2018) supported these findings, who found that the university students did not show a second attempt or further effort to come out with a solution.

Generally, research indicates that the development of knowledge and awareness of one's own thinking strategies relates with the ability of the students' way of solving problems (Schoenfeld, 1992; Schoenfeld, 1994; Kaur & Areepattamannil, 2012; Safari & Meskini, 2016). These thinking strategies relate to students' cognitive of self-regulation or monitoring skills when solving the problem. This term "monitoring and control" is referring to the aspect of metacognition known as self-regulation. Schoenfeld (1992) described self-regulation or "monitoring and control" when explaining problem-solving and mathematical thinking. Due to these reasons and facts discussed above, there is a certain need to develop students with the thinking processes. Therefore, concerning the importance of thinking processes, the first component emphasised in this program is cognitive-metacognitive strategies.

Other than that, heuristics also play a role in developing students in mathematical thinking. According to Schoenfeld (2013), "strategic competence" is one of the main components to ensure students are proficient in solving problems. Pólya (1973) had promoted the essential idea that the application of general problem-solving strategies was crucial to problem-solving expertise and intellectual performance. According to Polya, heuristic aims to study the methods and rules of discovery and invention. He described heuristics as an adjective, means "serving to discover" (Polya, 1973, p.113) General problem-solving strategies have also been called heuristics. Schoenfeld (1992) argued that heuristics are general suggestions on the strategy that aimed to help the problem solver solves problems. Many researchers have studied the value of teaching heuristic strategies to improve problem-solving skills in one domain, such as mathematical problem-solving. Heuristics are specific techniques that help problem solvers approach and appreciate their tools to solve problems independently of any issue or subject matter. Despite the positive results indicated in the literature, the simple provision of heuristic strategies is to solve problems. Due to this consideration, heuristics is the second component embedded in this program on developing students' mathematical

thinking.

Various researchers have suggested a need program or an initiative to boost students' mathematical thinking, especially at the tertiary level (Hoon et al., 2018; Singh et al., 2016; Schoenfeld, 1992). According to Viitala (2017), the students need to be aware of their learning and problem-solving processes when learning mathematics. It could help them to cope in new situations and develop their metacognitive skills not only in mathematics but also in other subjects. Besides, the instructional used by the instructors used in mathematics class also relates to developing students' thinking process (Mevarech & Fan, 2018). Therefore, students need to be exposed to the approach so that they could develop their thinking in mathematics. Based on these issues, we have developed the Mathematical Thinking Enhancement Program (MaTh-EP). MaTh-EP aims to engage students in meaningful learning of mathematics through experience in solving non-routine problems. Specifically, the objectives of the program are:

1) to develop students' cognitive-metacognitive strategies and heuristics in mathematical thinking;
2) to reinforce mathematical processes (reasoning and proof, communication, connections and representation, and problem-solving).
3) to facilitate the application of mathematical strategies and concepts.

This program emphasised the role of cognitive-metacognitive strategies by implementing the six problem-solving stages (read, analyse, exploration, plan, implementation, verification) and heuristics when solving problems. This program encourages students to participate in various exercises, problems, and investigations as they explore mathematics concepts from a problem-solving perspective in an interactive manner. The program emphasised the exploration of various mathematics contexts to learn mathematics, pose problems and problem extensions, solve problems, and communicate mathematical demonstrations.

MATERIALS AND METHODS

MaTh-EP refers to the intervention program that integrates the problem-solving stages, heuristics and metacognitive strategies instruction to guide students in solving non-routine problems that are intellectually challenging. MaTh-EP will guide participants to solve non-routine problems through problem-solving stages and various strategies. This program was developed through the problem-solving six stages model known as read, analyse, explore, plan, implement and verify introduced by Schoenfeld (1992). Schoenfeld (1992) believed that to solve problems effectively, the students must control, monitor, and self-regulate their thinking. These processes are known as metacognition. Due to that consideration, the participants will be explicitly emphasised to use self-instruction and self-monitoring during the problem-solving process. Other than that, the usage of heuristics will be emphasised correspondingly to the participants when they are solving non-routine problems as this aspect also involves problem-solving stages (Polya, 1973; Schoenfeld, 1992). This program provides materials, teaching resources and assessments (formative and summative) for explicit teaching of problem-solving in the environment of deep mathematics content starting secondary level until tertiary level. This program completes basic problem-solving modules which are able to develop students' mathematical thinking. This program comprises eight (8) modules that are appropriate to be implemented from secondary to tertiary level curriculum.

The module materials consist of the following:

1) Program schedule – Modules rules and learning outcomes for each module.
2) Eight (8) two hours lesson plans.
3) Prompting question as a practical guideline for participants to apply cognitive-metacognitive strategies.
4) A collection of problems (Task and Homework) with
   a. accompanying complete solution(s),
   b. heuristics to be highlighted
   c. Polya and Schoenfeld stages to be highlighted.
   d. suitable scaffolding that instructor/facilitator can give to the students,
   e. suggested adaptations, extensions and generalisations to the problems.
5) Slide presentation for each module.
6) Formative assessment (Pre-Test and Post-Test).

RESULTS AND DISCUSSION

This program has been piloted and tested among selected undergraduate students in a public university in Klang Valley. The pilot study was implemented from September until November 2020. The purpose of the pilot study was two-fold. First, we wanted to observe how well the contents, materials, and assessment were implemented. Besides, we also wanted to see the ideal duration and time for conducting the program. Second, the pilot study examines the formative assessment (pre-post tests) constructed by the researchers. Based on the pilot study conducted, some amendments were done.

Then, this program was tested from March until May 2021. We employed a quasi-experimental design focusing on the pre-test and post-test to assess participants' ability in mathematical thinking before and after experiencing the program. Two intact groups from first-year undergraduates from the same university and program were selected as the experimental and control groups. The experimental group had experienced MaTh-EP for eight weeks, while the control group only received a normal classroom discussion. However, the control group still experienced similar tasks, questions and answer schemes like the experimental group. The pre-test and post-test were conducted before and after the program. The participants' performance in pre-test and post-test is compared and shown in Table 1 and Table 2.

Table 1. Overall Performance of Experimental and Control Groups in Pre-Post Tests

Test	Type	N	Mean	Std. Deviation
Pre-Test	Experimental	25	6.80	3.71
	Control	25	6.20	3.33
Post-Test	Experimental	25	23.28	9.26
	Control	25	8.16	4.52
Note: Full mark of pre-test and post-test is 40.				

Table 1 indicates the overall performance of the experimental and control groups in pre-test and post-test. In the pre-test, both groups (experimental and control) are seen to have not much difference in mean score and standard deviation with a value of 6.8 (s.d=3.71) and 6.2 (s.d=3.33) out of 40, respectively. However, for the post-test, it was found that there is a huge

difference in the mean score of the experimental group (mean=23.28; s.d=9.26) and control group (mean=8.16; s.d=4.52). To determine the significant difference between the mean score of the experimental group and control group, the researchers have conducted an independent sample t-test and paired sample t-test.

Table 2. Independent Sample T-Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | |
| | | | | | | | 95% Confidence Interval of the Difference | |
		F	Sig.	t	df	Sig. (2-tailed)	Lower	Upper
Pre-Test	Equal variances assumed	0.010	0.920	0.602	48	.550	-1.403	2.601
	Equal variances not assumed			0.602	47.45	.550	-1.404	2.605
Post-Test	Equal variances assumed	14.984	0.00	7.34	48	0.00	10.978	19.262
	Equal variances not assumed			7.34	34.81	0.00	10.936	19.303

Table 2 indicates the significant difference in mean score pre-test and post-test between experimental and control groups. An independent sample t-test showed that the difference in pre-test score between the experimental group (n=25; M=6.80. s.d=3.71) and the control group (n=25; M=6.20; s.d=3.33) is statistically not significant, $t(48) = 0.602, p = 0.92.$ While for the post-test score, the difference between the experimental group (n=25; M=23.28. s.d=9.26) and the control group (n=25; M=8.16; s.d=4.52) is statistically significant, $t(34.81) = 7.34, p = 0.00.$

Table 3. Paired Sample Test

| Pre-Post Tests | Paired Differences | | t | df | Sig. (2-tailed) |
	Mean	Std. Deviation			
Control	-1.96	4.49	-2.19	24	0.059
Experimental	-16.48000	9.35913	-8.804	24	0.000

We also have compared the difference of the pair (pre-post tests) according to experimental and control groups. The reason for comparing these pairs of scores is to determine which group have shown a significant improvement before and after the program. Table 3 indicates the significant difference between pair of pre-test and post-test according to the experimental and control groups. For the control group, a paired sample t-test shows that the difference in mathematical thinking test scores between before and after eight weeks is not statistically significant $t(24) = -2.19, p = 0.059.$ Meanwhile, for the experimental group, a paired sample t-test shows that the difference in mathematical thinking test scores between before and after eight weeks program is statistically significant $t(24) = -8.804, p = 0.000.$

Based on these results, it is indicated that MaTh-EP provides a positive outcome to the participants' performance in mathematical thinking. Furthermore, it has been observed that

the experimental group showed a significant improvement in their mathematical thinking performance compared to the control group. Besides, the experimental group who have experienced the program for eight weeks became more able to solve the non-routine problem consist in the test and employ successful cognitive-metacognitive strategies. The data also suggest that MaTh-EP has a positive influence on participants' beliefs and works. The percentage of participants who did not attain the question has also reduced drastically if we compare pre-test and post-test among experimental participants. To summarise, MaTh-EP helped developing undergraduate students' mathematical thinking while adopting more positive beliefs about solving mathematics problems.

CONTRIBUTION AND USEFULNESS/COMMERCIALISATION

a) Usefulness

This program promotes students' consciousness of cognitive-metacognitive strategies and provides an immediate boost in mathematics strategies and concepts through contextual and meaningful learning. Students are emphasised with logical thinking skills, computation skills, reasoning and problem-solving skills, and mathematics skills (reasoning and proof, communication, connections and representation) through this program.

b) Novelty

This program reinforces students' exploration, thinking, knowledge and understanding in mathematics while concurrently hones a host of generic (teamwork, leadership and communication) skills via exploration of ideas, application of concepts, and involvement in hands-on activities. Of prime importance, nonetheless, is getting the students excited about, having the interest in and continuously looking forward to learning and exploring mathematics; and doing so in a meaningful manner. The program's unique design has led to successful learning outcomes whereby students shown improved thinking manner, which also reinforced, computation skills and reasoning, as well as problem-solving skills.

c) Commercialisation

It has a high potential in commercialising this product to students in Malaysia and even the international market. The MaTh-EP is based on modules and instructional materials written on how the mathematics thinking activities are implemented. Seeing the demand from the industry, which places critical thinking and problem-solving skills as the mandate for the job plus with the direction of national curriculum education nowadays, which emphasises higher-order thinking skills, this program is seen to have great potential to be commercialised. Therefore, it will be in high demand among the community. The researchers have recently started collaborating with learning centres, educational organisations, and institutions (schools, universities, and colleges). In the pipeline, the module developers and facilitators of MaTh-EP plan to aggressively market the program to targeted schools, colleges, universities and communities. Besides, this program has many prospective participants (students, teachers, lecturers, parents). In addition, this program is also a program that does not require a high budget in its implementation. MaTh-EP could be implemented either in face-to-face or hybrid (online) mediums. As such, it makes the program more marketable in the future.

Alternatively, the modules can be printed, digitalised, and sold as texts to complement mathematics learning in schools. However, this has to wait since the modules are still in the development of publishing.

CONCLUSION

Preparing students and educators to practice thinking process has become a challenge that should be faced. Plus, to become a good problem solver and good thinker does not just happen. We believe that students or mathematics instructors must possess sufficient knowledge and skills to play their respective role. Unfortunately, the mathematics environment in schools or colleges/universities of education focuses almost exclusively on mastery of mathematical content knowledge rather than mathematical thinking or problem-solving. It is undeniable that mathematical thinking requires specialised knowledge and skills related to metacognition and strategies. People should not expect that student-teachers would develop much of this knowledge and skills for themselves.

Based on the quasi-experimental study done by the researchers, we have found that MaTh-EP is effective in developing participants' mathematical thinking. Furthermore, there is a significant development among participants in their level of mathematical thinking before and after experience in MaTh-EP. Therefore, we suggest that explicit attention to enhance mathematical thinking behaviour in solving the problem should be given among teachers and students in the future. This specific program provides direct instruction and training on various cognitive and metacognitive aspects of mathematical behaviour.

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MEDICINE REMINDER WITH LOW BATTERY ALERT
"MEDMINDER"

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ABSTRACT
Elderly who suffer with dementia tend to forget their daily routine in the new norm when living alone during lockdown. Furthermore, they require proper management for their medications. Taking wrong medicines at the wrong time including incorrect prescription, missed doses, or excessive dosage of medicine can lead to serious disease, hospital visits and even death. Even though a traditional medicine box is capable of resolving the management issue for prescription, there are several features that can be designed to assist the elderly in managing their daily prescription intakes. The current automated pill box is typically inexpensive and produces reliable performance. In addition, it allows users to administer on-time via increased accessibility in elderly care. However, their reminder box is sold for a normal 16×2 LCD panel. The size is too small for the elderly to see it clearly from a certain viewing distance especially for those who are facing vision loss. Medicine Reminder with Low Battery Alert (MEDMINDER) is designed as a portable medicine reminder box with a low battery alert function and to improvise the existing medicine box with additional features. In this work, the design uses Arduino Uno as controller and interface with the push button as input in performing action to set the alarm for the reminder. The output of the 20 × 4 LCD will display the time, date, and day of the alarm set together with the percentage of battery indicator. The LED was used to alert the elderly on the day that they should take their medicine by blinking along with the buzzer. Finally, the speaker will be added as an additional feature for elderly with dementia who are facing vision loss to hear the alert of time taken to eat their medicine and alert to do battery replacement once the battery is running out. MEDMINDER was tested using Proteus to emulate the concept of the pill compartment for the elderly

Keywords: portable pill compartment, traditional medicine box, automated medicine box, reminder pill box, elderly with dementia.

INTRODUCTION

The number of women who suffer from dementia outnumbered men with a ratio of 2:1[1]. The studies show the rate of brain cells is dying faster in women's brains than in men and cause dementia [1]. Research has shown that dementia disease is more prevalent as the age of women and men increases from 65 to 85 years old. The frequency of patients who suffer from dementia per year between 65 to 69 years old patients, are usually less than 2%. While elderly between 75 to 79 years old is around 5% and more than 20% are patients from the group age of 85 to 89 years old [2]. Issues arise when elderly living alone in a new norm. Some studies have shown that people who live alone are much more likely to experience poor health conditions, poor vision, everyday activity problems, and social isolation especially for the elderly [3]. While this may not occur in every case, it is important to consider when it comes to elderly who suffer from dementia. They are most likely to be a vulnerable group of people among the

elderly due to critical reasoning and physical mobility issues that occur with age, which makes it even difficult to complete day-to-day tasks. Furthermore, 4 out of 5 elderly over the age of 75 take at least one medication, and most of them had to consume more than four types of medication which approximately 36% of the elderly of the age group [4]. The timing for each of these medications is important to avoid any health complications from occurring. For elderly who are facing memory problems, they might have trouble remembering to take their medicine on a specific schedule. Hence, this could lead to many side effects and pose some threats to their health [5]. An alternative solution is needed to assist the elderly with assistive technology especially their timely medication for pills [6]. Some traditional medicine boxes lack a reminder alarm, no screen time, and no day indication. Even though the existing medicine box consists of the standard pill box with seven pill compartments for seven different days in a week. However, this pill box does not have a reminder for medication. Thus, the MEDMINDER idea is aimed to accommodate the elders via technology devices for pill boxes. The medicine box is designed for its portability, and the add-on features to assist the elderly for scheduling their pills intake daily. The design will be cheap and practical as an automatic reminder box. Also, the box can minimise the difficulty faced by the elderly.

CONCEPT IDEA for *MEDMINDER*

Proof of concept for MEDMINDER is presented in two stages: 3D concept and software simulation. The software simulation consists of code for MEDMINDER to function for daily reminders using Proteus software. 3D design is an illustration prototype using SketchUp Free. As shown in Figure 1 and Table 1 are the block diagram of MEDMINDER and design specification of MEDMINDER, respectively. Details on the specification are explained in Table 1.
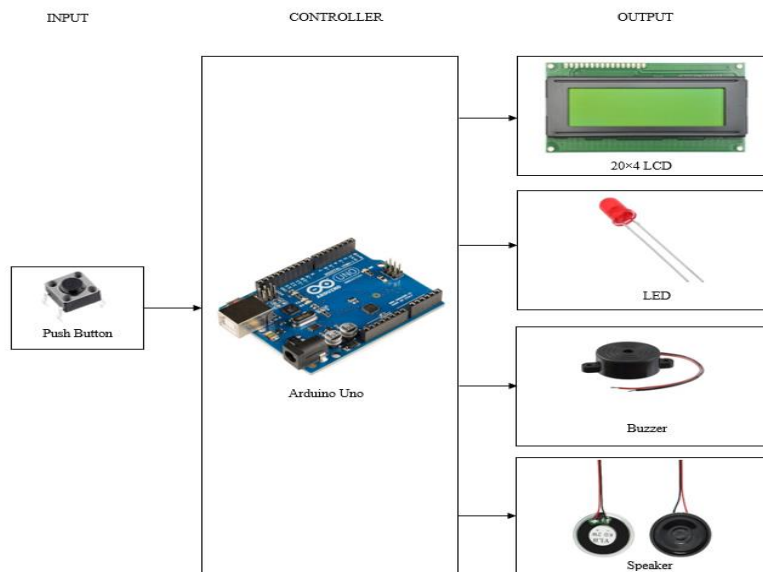
Figure 1. Block diagram of MEDMINDER

Table 1. Design Specification of MEDMINDER

Specification	Current Condition	Desired Condition	Reason	References
Height of character size	0.523 cm	1.05 cm	The character size is eligible for the elderly vision.	[7]
Time taken before the failure of battery	973 hours	960 hours	Usage of 2 9V batteries will consume approximately 1 year (960 hours) battery life before its failure.	[8]
Battery capacity	6929 mAh	1100 mAh	Usage of a 9V battery is much suitable for the functionality and practicality of the device.	[8]

RESULTS AND DISCUSSION

3D modelling

Figure 2 exhibits the 3D modelling prototype using SketchUp Free software. MEDMINDER consists of two main parts which are the pill compartment and the alert system. The medicine required by the elderly can be stored into the pill compartment with a dimension of 19 cm × 7.5 cm that was divided into 3 partitions for each 7 days. While for the alert system, it consists of a connection of electronic components used in developing the MEDMINDER which are the 20×4 LCD, push buttons, LED, buzzer, speaker, and Arduino Uno. Figure 3 represents the side view of MEDMINDER. It is to show the compact and practical medicine box with a total dimension of approximately 30 cm × 11.5 cm × 4 cm. The pill compartment holds the size of 19 cm × 7.5 cm × 4 cm from the total dimension of the design.
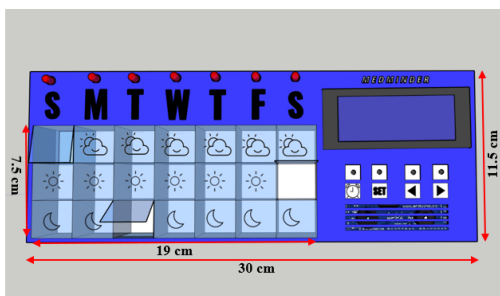
Figure 2. 3D Modelling Prototype of a MEDMINDER
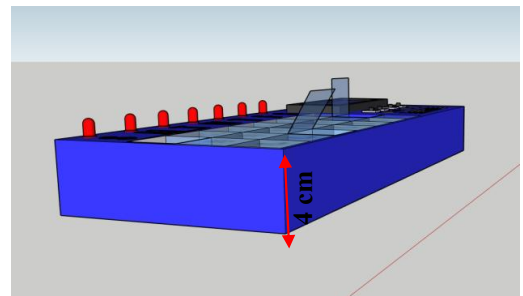
Figure 3. Side View of MEDMINDER

As displayed in Figures 4 and 5, the alert system consists of a connection of several electronic components such as 20×4 LCD, push buttons, LED, buzzer, speaker, Arduino Uno and two 9V batteries. The 20×4 LCD is to display the character size as well as to improve the legibility of the character size for elderly's vision. The push buttons are to set the time, day, and date of the desired reminder. Furthermore, the 7 LED is placed on the top of the pill compartment for daily indicator by blinking to alert the elderly on day, their medicine time, and the alarm to alert with the buzzer. An additional feature such as a speaker is used for the elderly with dementia with vision loss to capture the time alert for their medicine intake. The indicator for the battery replacement is designed with audio to alert the elderly.
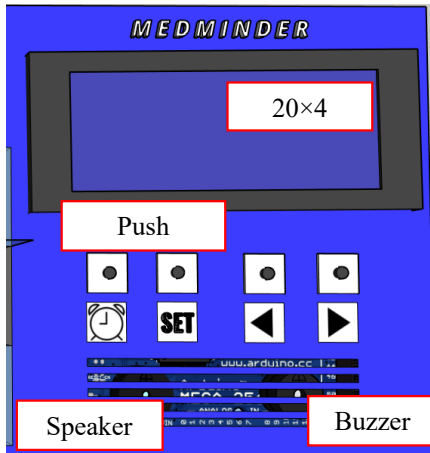
Figure 4. Alert System Structure
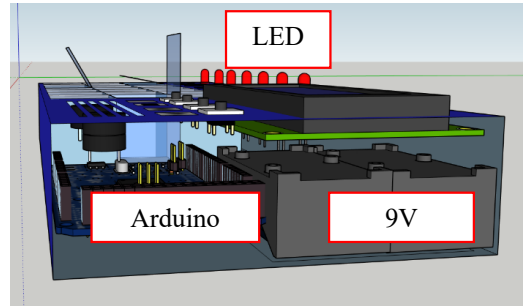
Figure 5. Side View of the Alert System Structure

Circuit Simulations

To illustrate the components to function according to the system design, circuit simulation is performed using Proteus simulation software. The components used for the simulation are DS3232 representing a real time clock (RTC), Arduino Uno, push button, LED, buzzer, LCD, speaker, and virtual terminal. Figures 6, 7 and 8 depict the setting of the current date and set the alarm, alarm 1 on Monday and alarm 2 on Tuesday, respectively. Figure 6 shows the setting of the current date, time, and year as well as setting the alarm for medication intake. This is to remind the elderly with dementia the time to take their medicine and it will be started as soon as RTC has reached the set time. The alarm has been set 3 times. Alarm 1 represents for morning, alarm 2 represents for afternoon, and alarm 3 represents for night. The alarm can only be set maximum 3 times per day. If the alarm is set more than 3 times, it will replace alarm 1 and so on. At the alarm setting, there are two options, which are activate and deactivate functions for the alarm.

Figures 7 and 8 display the examples of daily reminders. The function of alarm 1 on Monday. Alarm 1 was set at 3.50 AM, so the alarm will go off when the RTC reaches the set time. The LED will indicate Monday and the buzzer will turn on simultaneously. Both will turn on simultaneously until the next minute, which is when the RTC reaches 3.51 AM. When the alarm goes off, the blinking indicator at the LED and buzzer will change from blue to red. Similar action as in alarm 2 on Tuesday. Two LEDs function to indicate the day of the medicine. As depicted in Figure 8, Alarm 2 was set at 3.52 AM, so the alarm went off when the RTC reached the set time. The LED indicates Tuesday and the buzzer will turn on simultaneously. Both will turn on simultaneously until the next minute when the RTC reaches 3.53 AM. When the alarm goes off, the blinking indicator at the LED and buzzer will change from blue to red. As mentioned previously, the speaker is an additional function to guide the elderly with dementia who are also facing vision loss to hear the alarm of which medicine should the elderly take and when they should replace the device battery.
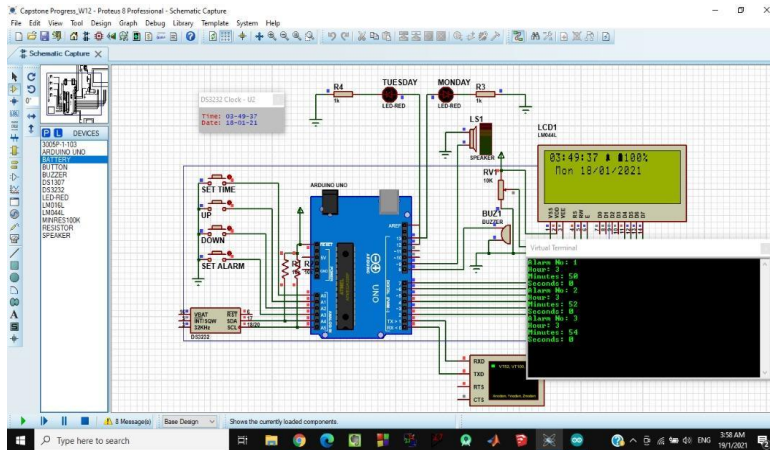
Figure 6. Simulation on setting the current date and set the alarm
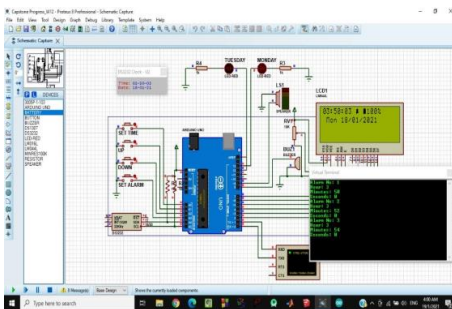
Figure 7. Simulation of alarm 1 on Monday
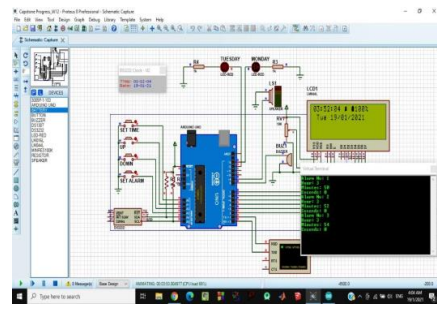
Figure 8. Simulation of alarm 2 on Tuesday

CONCLUSION

MEDMINDER was inspired to assist the elderly who suffer from dementia. They are facing difficulty in doing their daily routines especially when they have to live alone. An affordable and improved medicine reminder box has been successfully developed using an electronics system design concept. For easy reminders and alerts, a buzzer and an LCD display have been attached, thus the elderly with dementia can manage their pill on scheduled time without depending on their caretakers. The objectives have been achieved by assisting the elderly with dementia taking their medication, designing a portable medicine box, and improvising the existing medicine box with more features.

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MEOW-MEOW FOOD DISPENSER USING INTERNET OF THINGS (IOT) PROGRAMME

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ABSTRACT

This project is about a pet feeding machine where the feeder automatically feeds the pet according to the command made by the owner via a mobile phone. This project set up is controlled by a mobile app where the command is to feed the cat or not. The cats at home can get food and owners can supervise the pet feeding time using the mobile app to always ensure the cat is fed especially when the owner is busy. The food for the cat is stored inside a box or storage. The food would be served to the cats based on the amount specified by the owner to feed the pets. It is a smart idea to prevent cats from hunger if no one is at home. The cost of taking care of a cat is reduced due to the launch of such device in the market. Such idea is getting popular globally due to the automatic system and mobile app involvement. The other factor is due to the ease to operate the device to feed the cat. Besides that, the device was also installed with a camera in order to monitor the cat's condition. By adding a camera to the device, the owners will know their cats' health conditions so if there is something wrong with their cats, the owners can respond fast.

Keywords: cat, pet, food dispenser, IOT

INTRODUCTION

Feeding the pet is the most important job when someone has a pet. If the owner does not take care of the pet's diet, the pets will have a digestion problem making the pet sick. This is the main factor why we embarked on this Meow-Meow Food Dispenser project. According to the online news [1-2], the pet owners do not have time to feed their pets because they have to go to work. Hence, with this project the pet owner is able to feed the pet wirelessly, so the pet does not starve to death. This project is the improvement of the original project by adding the Internet of Things (IOT) programme, which is Blynk to enable the feeder to control wirelessly. This project also focuses on making the owner schedule the pet feeding time so that the pet's health is being taken care of [3].

The idea of this project is based on five other successful projects as a reference. The five projects are IoT Pet Feeder by Circuit.io team [4], IoT Pet Feeder by Ntrobotics [5], Google Assistant controlled Pet Feeder by IoT DESIGN PRO [6], Automatic Arduino Pet Feeder by Techpins [7] and Automatic Pet Feeder by Pankaj Khatri [8]. All these projects used Arduino as a microcontroller to control the circuit by programming the Arduino with appropriate coding. Projects by Techpins and Pankaj Khatri only use Arduino as the medium to control the feeder to feed the pets while the projects by Circuit.io team, Ntrobotics and IoT DESIGN PRO used mobile applications such as Freeboard, Blynk and Adafruit respectively to control the feeder wirelessly making the owner able to feed the cat even if he/she is not at home. In

order to control the feeder using mobile application, the ESP8266 component is being used because this component's function is to connect to the Wi-Fi. The information made by the owner via the mobile application is transferred via Wi-Fi and the signal is being received by ESP8266. Arduino receives input from ESP8266 to produce the desired output, which is the pet's food being transferred to the pet's bowl so that the pet can eat.

METHODOLOGY

System Diagramme

Figure 1 shows the system diagramme for Meow-Meow Pet Feeder. The system of this device starts with the command from the mobile device to 'feed the cat'. When the owner gives the command, the programme will start the servo motor which holds the food, turns 180 degrees, dropping the food and being hold by the bridge and turns back to its position. If the quantity of the food in the storage is low, the device will send a notification to the owner's mobile device.
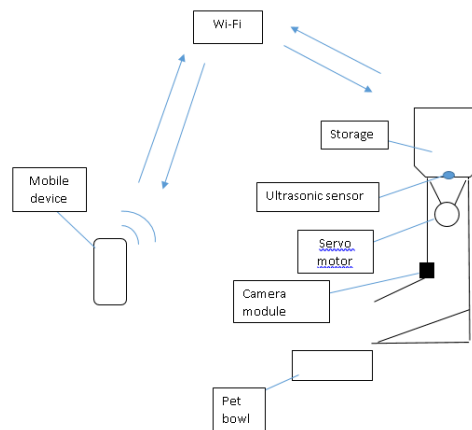
Figure 1. System diagramme of Meow-Meow Pet Feeder

FLOW CHART

Figure 2 shows the flow chart of the programme. Firstly, an ultrasonic sensor was used to detect when the food in the container is running out. The sensor will give response to the microcontroller and notify the owner that the food in the container is running out. A camera module is used for the owner to monitor the pet's condition. Next, The NodeMCU ESP8266 connects to the Blynk server via Wi-Fi router, the module then controls the servomotor and provides feedback to the Blynk app [9].
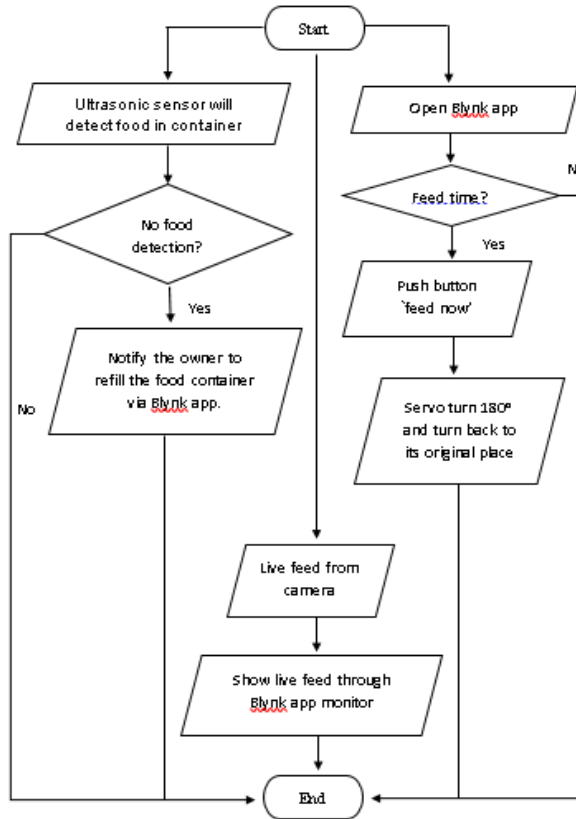
Figure 2. Flowchart of Meow-Meow Food Dispenser

RESULT

Figure 3 shows the Ultrasonic Sensor that has been attached to the NodeMCU for food detection and Blynk app layout on the right side shows the functionality of the project. As shown in the figure, the Ultrasonic sensor did not detect any food in the container. Hence, the Blynk app notified the owner by displaying "Refill Pet Food!".
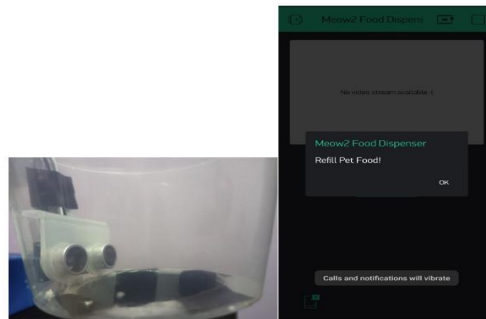
Figure 3. Ultrasonic Sensor of Meow-Meow Food Dispenser and Blynk
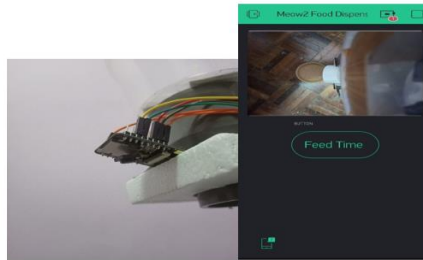
Figure 4. ESP32 Cam of Meow-Meow Food Dispenser and Blynk

Figure 4 shows the ESP32 Cam that is connected to the Arduino Uno using Wi-Fi to show live streaming in Blynk layout as shown in the figure on the right.
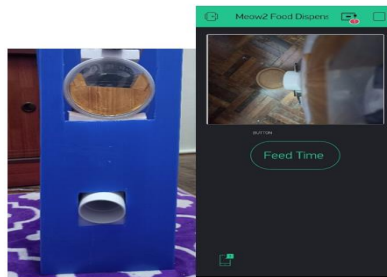
Figure 5. Servo Part of Meow-Meow Food Dispenser and Blynk

Figure 5 shows the servo part that will turn 180 degrees when the owner pressed the "Feed Time" button in the Blynk layout and dropped the food into the pet container.

ACKNOWLEDGEMENTS

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MESIN PENAPIS TURPENTIN
Turpentine Filter Machine (TFM)

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ABSTRAK

Pelajar dalam bidang Seni Halus di Fakulti Seni Lukis & Seni Reka, Perak khasnya yang mengambil jurusan seni catan akan menggunakan turpentin dalam proses penghasilan karya catan mereka, terutama sekali yang menggunakan cat minyak. Dengan penggunaan turpentin yang banyak ini telah mendatangkan masalah ekosistem di sekitar fakulti iaitu pencemaran air. Di mana sisa buangan turpentin ini telah dibuang ke saluran perpaipan dan disalurkan ke tasik Al-Burunni FSSR, UiTM Perak sekaligus menyebabkan kemusnahan hidupan akuatik di situ. Oleh itu, reka bentuk inovasi yang diberi nama *Turpentine Filter Machine (TFM)* ini diciptakan sebagai alat atau mesin penapis yang sesuai digunakan oleh pelajar Seni Halus untuk menapis semula sisa buangan turpentin untuk dikitar semula. Prototaip yang dihasilkan menggunakan kaedah penapisan ini memerlukan bahan-bahan mekanisme yang mudah didapati di sekitar Fakulti Seni Lukis & Seni Reka, Perak. Hasil kajian yang dilakukan ke atas pelajar seni catan membuktikan bahawa penggunaan alat dan teknologi ini dapat mengurangkan sisa buangan turpentin dan juga dapat menjimatkan serta mengurangkan kos pembelian turpentin. Sekaligus ianya juga dapat menyelamatkan hidupan akuatik yang terjejas di Tasik Al-Burunni FSSR, UiTM Perak.

Kata kunci: turpentine, inovasi, mesin, penapisan, pelajar

PERMASALAH KAJIAN

Perkataan turpentin ini berasal daripada bahasa Perancis dan Latin iaitu *terebinthine* yang mewakili nama spesis pokok. Turpentin yang juga dikenali sebagai *turps* ini merupakan cairan yang disuling daripada pokok pinus yang digunakan sebagai bahan pelarut untuk menipiskan

atau mencairkan sedikit bahan cat. Bahan ini memiliki aroma yang tajam, bahkan bagi yang memiliki masalah alergi terhadap bau akan mengakibatkan kesan sampingan dan tidak digalakkan untuk menghidunya. Ketika digunakan sebagai bahan pelarut, wap yang terhasil dari proses itu boleh mengganggu kulit dan mata. Wap yang terhasil ini juga sekiranya dihidu boleh merosakkan paru-paru dan mengganggu sistem pernafasan terutama sekali bagi yang menghidapi asma dan batuk yang kuat. Turpentin juga boleh menyebabkan kerosakan buah pinggang apabila dihidu, kerana ianya merupakan bahan api yang boleh menyebabkan kebakaran di dalam badan.

Menurut Evva Febri (2020), bagi pengkarya seni catan bahan turpentin ini bukanlah asing dan ia merupakan bahan yang wajib dimiliki sekiranya ingin tetap sihat dalam melukis menggunakan cat minyak. Turpentin ini haruslah dicampurkan bersama cat minyak dan juga *linseed oil* untuk mendapatkan warna yang diinginkan. Turpentin ini berfungsi untuk mempercepatkan serta memudahkan proses pengeringan cat minyak serta mewujudkan kesan *transparent* pada atas kanvas. Selain daripada itu bahan turpentin ini juga biasanya digunakan ketika proses mencuci peralatan mewarna seperti berus, *pallet knife*, *plate* dan sebagainya. Ini kerana bahan yang terdapat pada turpentin memudahkan proses mencuci dan dapat menghilangkan kotoran cat minyak dengan mudah. Turpentin juga lebih selamat digunakan dan tidak merosakkan peralatan mewarna berbanding dengan bahan cucian yang lain.

Selain daripada itu, terdapat juga kesan negatif akibat daripada penggunaan bahan turpentin dalam penghasilan karya catan. Secara amnya fenomena pencemaran yang berlaku di tasik Galeri Al-Biruni adalah disebabkan oleh pembuangan sisa bahan turpentin dengan kadar berlebihan secara terus ke ekosistem sehingga menimbulkan masalah yang dikenali sebagai pencemaran air. Ini kerana bahan yang terdapat di dalam sisa buangan turpentin itu bercampur dengan cat minyak dan mengakibatkan kemusnahan hidupan akuatik di tasik Galeri Al-Biruni. Kaedah penapisan yang digunakan ini diciptakan sebagai alat atau mesin penapis yang sesuai digunakan oleh pelajar untuk menapis semula sisa buangan turpentin. Sisa buangan ini akan dikitar semula dengan melaksanakan proses penapisan yang mengasingkan campuran cat minyak dan juga turpentin.

Rajah 1. Kemusnahan hidupan akuatik di tasik Galeri Al-Biruni, FSSR UiTM Perak

OBJEKTIF

1. Untuk mengkaji kaedah penggunaan semula bahan buangan turpentin di kalangan pelajar Seni Halus.
2. Untuk menguji keberkesanan mekanisme dalam sistem penapisan bahan buangan turpentin.

BAHAN DAN FUNGSI

Jadual 1. Bahan dan Fungsi Penapisan

No.	Bahan	Fungsi
1	Paip PVC	Paip PVC berfungsi sebagai struktur atau badan rekaan bagi *Turpentine Filtration Machine TFM.* Penggunaan PVC paip ini adalah bertujuan untuk memastikan struktur rekaan lebih tahan dan kuat.
2	Batu Kerikil	Batu kerikil berfungsi untuk menyaring sedimen atau kotoran-kotoran besar yang terdapat pada sisa buangan turpentin.
3	Pasir Halus	Pasir halus berfungsi untuk menyaring partikel-partikel yang berukuran kecil. Organisme kecil ini akan membentuk sebuah zona biologi pada bahagian pasir paling atas yang mampu untuk menyaring virus, bakteria, parasit dan sejenis dengannya. Pasir halus juga dapat mengasingkan pigment colour daripada turpentin dengan lebih berkesan.
4	Arang	Arang berfungsi untuk meneutralkan zat kimia berbahaya yang terkandung di dalam sisi buangan turpentin. Arang juga bertujuan untuk menjernihkan air, menyerap kekotoran dari cecair dan gas serta dapat menghilangkan bau, Mohd Mahyeddin Mohd Salleh (2015).
5	Kapas	Kapas berfungsi sebagai penahan dan penganjal mekanisme penyaring agar tidak ikut keluar dari penapis ketika proses penapisan dilaksanakan.

REKAAN MESIN PENAPIS TURPENTIN
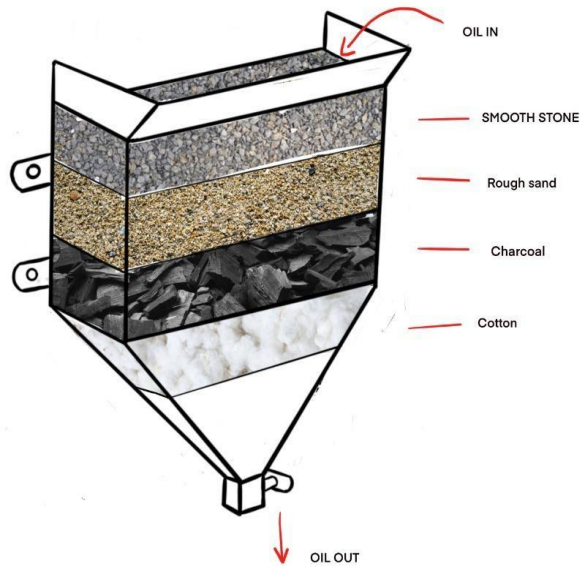
Rajah 2. Mesin Penapis Turpentin *(Turpentine Filter Machine (TFM))*

Turpentine Filter Machine (TFM) adalah satu produk inovasi yang direka khas untuk membantu pelajar seni halus mengitar semula sisa buangan turpentin terpakai. Produk ini bertujuan untuk menangani masalah pembuangan sisi turpentin yang berlebihan sekaligus menyelamat hidupan akuatik yang musnah disebabkan daripada pencemaran air.

DAPATAN KAJIAN

Hasil kajian yang dilakukan membuktikan bahawa penggunaan alat dan teknologi *Turpentine Filter Machine (TFM)* ini dapat mengurangkan sisa bahan buangan turpentin dikalangan pelajar Seni Catan secara efektif. Para pelajar dapat menggunakan semula sisa bahan turpentin yang telah ditapis dan mencampurkannya ke dalam cat minyak bagi menghasilkan karya catan mereka. Dalam masa yang sama pelajar juga dapat menjimatkan serta mengurangkan kos pembelian turpentin. Bahkan dengan pengurangan buangan sisa turpentin ini juga dapat menyelamatkan hidupan akuatik yang terjejas di Tasik Al-Burunni FSSR, UiTM Perak dan secara tidak langsung ianya turut membantu menyelesaikan masalah pencemaran air.

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MIND YOUR RIGHT BOOKLET: AWARENESS ON CYBER DEFAMATION LAW & MEDIA

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ABSTRACT

Defamation is an area of law that provides a civil remedy when someone's statement or words end up causing harm and injury to reputation of others. The statement tends to lower a person's reputation and dignity in the estimation of public generally which causes him to be shunned and avoided and exposed the claimant to be ridiculed by others. In Malaysia, defamation can be both a civil and criminal offence. For civil cases, the relevant legislation is the Defamation Act 1957 whereas criminal defamation is covered by Chapter XXI (Sections 499 to 502) of the Penal Code. The action of defamation is arising and becomes a highlight in media in recent year. The defamation suit filed by FashionValet and Duck group founder Vivy Yusof on June 15 2020 against alia Najwa Hassannuddin, an Instagram and Facebook user for instance, has caused uproar among the social media users. This project aims to impart knowledge on law of defamation to the target groups namely students and media personnels. The project also aims to evaluate the participant's understanding on this law. For the first phase, the project is applied to the university students from Universiti Teknologi MARA Cawangan Pahang. The booklet uses simple language without legal jargon for easy understanding and learning. A fun and simple game-related technique is also used explain the elements of defamation to the participants. This booklet is user friendly and easy to comprehend. It uses interactive practices to disseminate, deliver, and expose the participants with up-to-date legal knowledge on selected issues which is aligned with Malaysia education blueprint 2015-2025. In terms of its' potential for commercialization, the booklet can be used not only in an academic setting but also very beneficial to the community at large especially to the media personnel who is an easy target for a claim of defamation.

Keywords: cyber defamation, litigation, awareness, lower reputation

INTRODUCTION

Nowadays, many people share their thoughts, opinions, or even what they are having for lunch to social media platforms such as Facebook, Instagram, Twitter, or WhatsApp. Some of them make remarks about others, not concerned about whether the comments they make are true or untrue. The need to share their experiences such as bad customer service or a road rage incident are easier with social media. This form of wide-open, instantaneous, interactive, and largely uncensored communication can expose them to claims of defamation (The Sun Daily, 2021). Not many knows how to prove that someone is defamed. In laymen term, defamation is a statement made to damage another person's reputation. The victim can sue their defamers for compensation. For instance, the founder of FashionValet and Duck Group, Vivy Yusof has filed a defamation suit against a netizen for allegedly slandering her using the netizen's Facebook and Instagram account on the issue of government helping the B40 and M40 groups affected by Covid-19 outbreak (Malaymail, 2020). This indicated that most social media users are still not aware of the consequences they might face if they made nasty posting on social media.Hence, this project aims to impart knowledge on law of defamation to the target groups namely students and media personnel. The project also aims to evaluate the participant's understanding on this law.

Mind Your Right Booklet: Awareness on Cyber Defamation Law & Media

Product Description

Mind Your Right Booklet: Awareness on Cyber Defamation Law & Media is designed to provide an awareness to the Malaysian community pertaining to the law on defamation. Due to recent unprecedented situation of Covid-19, various aspects of our lives have been drastically changed. Fear of unknown has made the society anxious and thus indirectly they used social media to express opinions or used the social media to publish or posted content, statement, picture, video on issues which have triggered them. Unfortunately, many are unaware on the potential of legal implication of dissemination false information or content in social media. The situation is alarming as it might open the gate to potential litigation in the absence of legal knowledge on ingredients that constitutes defamation action. Due to these reasons, Mind Your Right Booklet: Awareness on Defamation Law & Media is developed. As comprehending laws are arduous and complicated, this product featuring eye-catching visual, incorporated simplifies words and refine legal procedure in the form of infographic in imparting the legal knowledge.

Mind Your Right Booklet: Awareness on Cyber Defamation Law & Media is developed using infographic design tool to suit the subject-matter and objectives of the product's development. The necessary resources from legal documents are organized in a systematic flow to ensure the information can be easily comprehend by students and specific group. Simple words, diagrams and engaging colours are used to attract readers in understanding the legal meaning on defamation and elements to be established for the aggrieved party to take legal action.

Benefit To Mankind

Mind Your Right Booklet: Awareness on Cyber Defamation Law & Media has huge potential

in assisting the community to better understand pertaining to the law on defamation. In addition, this booklet may guide readers on the correct method to express views or publish contents on social media to avoid potential legal action on defamation. The product is practical and powerful tools to comprehend laws pertaining to specific area as the information is easily digestible as it is presented in simplifies words in the form of infographic.

Potential commercialization

Mind Your Right Booklet: Awareness on Cyber Defamation Law & Media can play a significant role as teaching and learning tool in specific area of private law. Therefore, this simplified legal knowledge is an essential tool to impart the awareness on protection accorded by laws from any wrongful actions and abuse especially in the area of defamation. This knowledge is pertinent so that reader will know whether he is eligible to file a claim should an entity is violating their rights.

LITERATURE REVIEW

The law on defamation is based on the English Common Law. In Malaysia the law is governs by Defamation Act 1987. Unfortunately, the Act does not define the meaning of defamation. In the case of *Dato' Seri Anwar bin Ibrahim v The New Straits Times Press (M) Sdn Bhd & Anor ([2010] 2 MLJ 492* ,defamatory statement is defined as statement published which has the effect of exposing the aggrieved party to be shunned or ridiculed by the community, said to be made if its effect expose the plaintiff, in the eyes of community. A defamatory statement may either be a libel or slander. Libel is defamation in a permanent and visible form (*Monson v Tussauds Ltd (1894) 1 QB 671,692)* whereas slander is defamation in a temporary form (BHLB Trustee Bhd & Anor v HSBC (M) Trustee Bhd & Ors [2006] 4 MLJ 48).Under Malaysian law, a defamatory action can be taken if the essential elements for an action of defamation can be proven by the plaintiff. These elements are; (i) the words are defamatory, and (ii) the words refer to the plaintiff, and (iii) the words have been published (*Kian Lup Construction v Hong Kong Malaysia Bhd [2002] 7 CLJ 32). The statement published must therefore has a tendency to lower the aggrieved party's reputation in the eyes of society which as a result exposed the person to be shunned and ridiculed. The words may be defamatory in three ways. First, through its natural and ordinary meaning (*Institute of Commercial Management United Kingdom v. News Straits Times Press (Malaysia) Bhd [1993] 1 MLJ 408*), second by innuendo (*Syed Husin Ali v. Sharikat Penchetakan Utusan Melayu Bhd [1973] 2 MLJ 56)* and third by employing visual effects such as placing the plaintiff's photograph with offensive material or better known as juxtaposition *(Monsoon v. Tussauds [1894] 1 QB 171)*. Besides proving the statement must be defamatory, the plaintiff must show that the statements must refer to him. The final essential element that needs to be proven is the defamatory statement must be published. A statement is considered to have been published when the defamatory statement is disseminated to another person besides defendant *(Theaker v. Richardson (1962) 1 All ER 229)*.

These Days, cyber defamation occurs when defamation is committed with the assistance of computers or the Internet, for instance, someone publishes any defamatory matters about someone on any online platform (Alam et al,2015). According Othman et al (2019), there are two sorts of defamation. First, is libel that is the publication in permanent sort of a

defamatory statement like writing or printing. Second, is libel that is transitory form such vocable or gestures. Proven defamation, the plaintiff must establish three elements which are the words are defamatory, the words ask the plaintiff and therefore the words are published. Other words, "any act, deed, word, gesture in cyberspace designed to harm a person's reputation on the internet amounts to defamation" (Rahman, 2013). Accordingly, every repost or share of a defamatory statement is considered a new publication because those who do so are deemed to have approved, endorsed or repeated the same. This position was reiterated in the recent Court of Appeal case of *Raja Syahrir bin Abu Bakar & Anor v Manjeet Singh Dhillon and other appeals* [2019] MLJU 75.

METHODOLOGY

This paper only included studies that provide relevance toward cyber defamation. Selected papers included studies written in Bahasa and English, not related to cyber defamation were excluded. This study conducted search via four different journals database consist of Scopus, Web of Science, Science Direct and CLJ Law. This study includes the publication date from to 2010 and 2021 (articles published within the past ten years). Searched using keywords cyber defamation and awareness exclude crime. Once the search, evaluation, identification, and extraction process are complete, the researchers organize the information consistent with the review in Table 1 and Table 2.

Table 1. Search strings

Database	Search strings	Total paper	Selected paper	Country
Scopus	(TITLE-ABS-KEY (cyber AND defamation) AND TITLE-ABS-KEY (awareness)) AND PUBYEAR > 2010 AND PUBYEAR < 2021	44	7	Malaysia (2) India (2) South Africa (1) Jamaica (1) Israel (1)
Web of Science	cyber defamation and awareness NOT crime	2	1	Australia (1)
Science Direct	cyber defamation and "awareness" NOT crime NOT bully	33	3	India (1) South Korea (1) Germany (1)
CLJ Law	cyber defamation and awareness NOT crime	1	1	Malaysia (1)

Table 2. Cyber Defamation study conducted in Malaysia between 2010-2021

Year	Authors	Country	Area of Concerns
2020	Zakaria, Z., & Harun, S. A.	Malaysia	Platform for cyber defamation via social networking (Twitter, Facebook, Instagram, Telegram, YouTube, WhatsApp &WeChat). It is because these social networking are low barriers to entry and the almost no need to pay anything other than easier to access it. This research shown the level of awareness for cyber defamation among adolescent users is still at medium level which is awareness in cyber defamation cases among adolescent can practically differ from the perspective of early adulthood.
2019	Markom, R., Zainol,	Malaysia	Bagi aspek pemahaman undang-undang berkaitan media baharu tahap literasi belia masih berada di tahap yang sederhana. Majoriti

	Z.A., Fuad, N.A.		responden masih berada di tahap 'tidak pasti' mengenai kefahaman perundangan media baharu. Bagi tema kedua pula, iaitu pengetahuan mengenai senarai undang-undang berkaitan media baharu, tahap pengetahuan belia masih berada di tahap yang sederhana.
2012	Syahirah Abdul Shukor	Malaysia	Create awareness of its importance in rearing and guiding our children on the Internet. The information on the Internet, if it is not supervised and morally guided based on religion, culture, and customs, could be a "silent killer" to the development and thinking of our young generation.

According to Table 1, there were eighty articles related to cyber defamation that have been found in four database journals: Scopus, Web of Science, Science Direct, and CLJ Law. However, only twelve articles relevant to cyber defamation and awareness were included in the review after going through the evaluation and extraction process. Seven of them were found in the Scopus database, three from the Science Direct database and one article found from the Web of Science database and CLJ Law database, respectively. In comparison to other nations such as India, South Africa, Jamaica, Israel, Australia, and Germany, the result shows that Malaysia has the most studies on cyber defamation. This may be due to several factors. First, the internet penetration rate in Malaysia is among the highest in the world. According to the newest Digital 2019 study from Hootsuite and We Are Social, Malaysia ranks fifth in the world and first in Southeast Asia in terms of mobile internet and social media penetration, spending an average of eight hours and five minutes per day online and nearly three hours on social media (BHOnline, 2019). Table 2, according to the Zakaria et al (2020); Malaysian Communications and Multimedia Commission (MCMC), Facebook is the most popular social network application among Malaysians, with 91.7 percent, and WhatsApp is the most popular communication application with 98.7 percent. This makes cyber defamation easier to do as it is easily spread through Facebook and WhatsApp. Second, the culture of Malaysians who are easily influenced by fake news and information and quickly spread slander to bring down or embarrass someone through social media. This is seen to be increasing in recent times where it stems from the attitude of individuals and the lack of awareness among them regarding the legal action that can be taken against those who commit cyber defamation.

ACKNOWLEDGEMENTS

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MODELLING THE EFFECTIVENESS OF USING ONLINE FOOD DELIVERY SERVICES APPS AMONG CUSTOMERS IN KLANG VALLEY DURING COVID-19 PENDAMICS.

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ABSTRACT

Online services of food delivery are more critical than ever. It has become more and more popular worldwide. Customers are getting comfortable using the apps for services to order the meals they want via their smartphone using the apps. There are more than ten online food distribution service providers currently operating on the market in Malaysia. What separates them, though, is the speed of services, the food prices, the delivery rates, the selections offered and deals, the user interface(UI) of the apps, user friendliness etc. This research is therefore carried out to examine the key factors affecting the intention of customers to use online food delivery services among customers in the Klang Valley during Covid-19 in 2020. The research investigating the most significant factors that influence the customer purchase intention on using Online Food Delivery (OFD) services. There are 4 independent variables which we are focusing on; time, price factor, convenience motivation factor and food illustration. From the research, we have found out that convenience motivation factor is the most important exogenous variable that can influence purchase intention directly, sequentially through shopping motivations. Customers wants the transaction to be quick, easy, convenience and simple. The other factors that have significant impact to customer's purchase intentions are price and time factor. The least factor that influence customer's purchase intention is the food illustrations. The study is carried out by gathering responses from over 207 people and only 167 participants are eligible for inclusion.

Keywords: online food delivery systems, convenience, time factor, price factor, food illustration.

INTRODUCTION

Day after day, the world is getting involved and the changes are constantly changing rapidly. Everything around us is changing on around, without us even noticing it (Lau et al,. 2019). Talking about eating out, for example, by understanding or not, people often use online food delivery (OFD) services more than ever before. The market size for 2017 stands at USD 66.3 million for Malaysia as a whole and has increased dramatically since then. As of 2020, the size of the market is expected to reach USD 192 million by the end of this year. This a sign that the demand for food delivery is enormous and it keeps increasing day by day. However, what is the determining factors that makes customers choose to purchase foods online. What makes the industries growth rapidly? Does Malaysians accepted the additional costs incurred when they ordered food online and by having it delivered to their door steps does really saves their money on travelling, petrol, parking etc (Lisnawati et al,. 2020) or is it the attractive foods displayed in the websites and applications does have impact on consumers purchase intention the ordering foods online. In Malaysia most restaurant still depending on 3rd party apps for delivering their foods and products. This is due to limitation of resources and expertise in the food company. Some due to logistics issues and the cost of starting up the system and the whole team of delivery business from back-ends, software, runners etc is very expensive. For some established companies like McDonalds, KFC, and Pizza hut, there also uses the services provided by these 3rd party platforms due to limited runners they have and the logistics issues. This study conducted to perform a research towards factors influencing the purchase intention of using online food delivery services among customers in Kuala Lumpur during covid-19 Movement Control Order (MCO) period. The respondents are collected from the customers who used the OFD services during the MCO in 2020.

Literature review and hypotheses development

One of the most dominant and most important factors in using OFD services is TF. In today's fast-paced life, many can't afford to go out for dinner or wait for dinner to be served in a restaurant (Euromonitor, 2015). So, instead, they make the food come to them. This is about taking as little time as possible to get a job completed, and it is a time saving tool for them. Thanks to its convenient, ease and accuracy of orders, OFD services also tend to be beneficial to customers (Verma et al. 2009). Some of these food deliveries are catered for the household market, meaning they are distributed to households, at about 70 percent of the order. That figure suggests that the food distribution target market relies primarily on household assets. The time saved by online shopping is a value earned by consumers. Online shopping is seen by a customer as useful as it can save time, reduce energy, and deliver extended store hours and efficient checkouts (Chiu et al., 2014). H1: Time factor (TF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

Consumers are searching for price cuts by price discounts, and they are curious about how much money they can save from these discounts (Darke et al. (1995). Lower rates stimulate an organization 's profits, and higher discounts boost the market value of the individual commodity (Madan and Suri, 2001). In addition to recognizing the consideration of monetary savings, the price saving approach can also be viewed from the viewpoint of not incurring any extra costs for buying a product or using a service (Escobar-Rodríguez and Carvajal-Trujillo, 2014). Online users have the opportunity to compare prices by visiting multiple

pages or OFD services applications, so it would be viewed as the most valuable website by the business that can deliver a lower price. Comparing conventional retail and online shopping, the relative benefit of online shopping is that it can offer both lower prices and save time, making online shopping much more convenient, as has been empirically proved (Akroush and Al-Debei, 2015). H2: Price Factor (PF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

This study adopts part of the Technology Acceptance Model (TAM) Davis (1989), Dinev, and Hu (2007) to examine the acceptance of a new technology. TAM indicates that when a consumer discovers a new technology, there will be many factors influencing how they embrace and use the technology. This has been used to describe factors influencing the adoption of other technologies or systems in both the customer and organizational sense (Rezaei et al., 2016c). Examples of these contexts include business graphics systems, online fashion shopping (Kim and Forsythe, 2008), mobile Internet (Venkatesh et al., 2012), smartphone use (Chun et al., 2012), social networking (Pinho and Soares, 2011), mobile police (Lindsay et al., 2011), teleworking (Pérez et al., 2004), and social media, specifically instant messaging services (Zhao et al., 2016). These studies have shown that the factors perceived to be useful and perceived to be user-friendly have been able to explain how easy or difficult it is for users to accept the use of the different technologies.
H3: Convenience Motivation Factor (CMF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

Salleh Mohd Radzi, et al. (2015) refers to food presentation as an appealing appearance and decoration of the product as measurable indicators for the interpretation of quality by the customers. Aforesaid, presentations are important for indicating the customer's first perceptions of the product. In addition, the ideal combination of food presentation helps the diners to completely appreciate the dining experiences. Spence (2010) also accepted that it was discovered that the interpretation of consumers is typically influenced by what they see through their eyes in terms of providing a better dining experience. H4: Food Illustration Factor (FIF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

Research methodology and data analysis

There are two data forms secondary and primary in existence. The aim of data collection is to identify primary data by gathering the data necessary for this analysis. All data obtained will help address the goals and hypotheses of research. This would also provide legitimacy and validation to a report to be carried out. The data obtained would of course provide researchers with a clearer picture. In primary data collection or secondary data collection the respondents will be tracked by questionnaire. Sometimes on study, primary data will be chosen to collect data required for this information gathering phase. In addition, this study will benefit from the quality of the data information. The object of this descriptive study is to know the purchase intention of using Online Food Delivery services apps in Klang Valley among users and customers. Number unit of population of this research on frequency. The questionnaire will be given in English.The questionnaire consists for namely Section A demographic profile of respondent's question 1 to 7, section B respondents experience using online food delivery services question 8 to 12, Section C Purchase Intention for Online Food Delivery services

question 13 to 17, Section D Time Factor question 18 to 22, Section E Price Factor question 23 to 26, Section F Convenience Motivation Factor question 27 to 30, Section G Food Illustration Factor question 31 to 34.
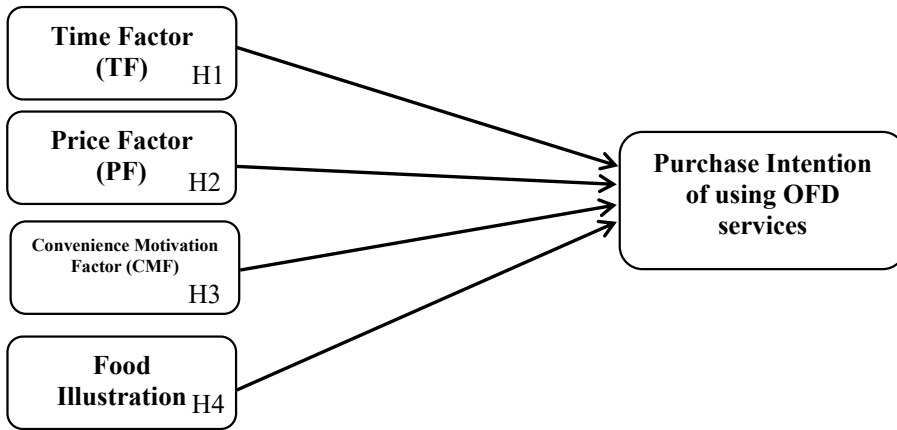
Independent Variable   **Dependent Variable**

Table 1. Summary of Pearson Correlation of Purchase Intention of Using Online Food Delivery Services Apps

	Purchase Intention	Time Factor	Price Factor	Convenience Motivation Factor	Food Illustration Factor
Purchase Intention	1	.692**	.558	.700	.350
Time Factor	.692**	1	.533	.754	.324
Price Factor	.558**	.533	1	.493	.383
Convenience Motivation Factor	.700**	.754	.493	1	.389
Food Illustration Factor	.350**	.324	.383	.389	1

**. Correlation is significant at the 0.01 level (1-tailed).

RESULT

The result of the Reliability Test has revealed that the entire variable (time factor, price factor, convenience motivation factor, food illustration factor, and purchase intention to use online food delivery services apps) is confident. The Cronbach's Alpha result states that the built objects are a good match for presenting the variables, and further research can be performed with confidence. This means that all the variables provided by a number of items were a good order and placement as the result of the data analysis shows that these items are closely related and within the same variable, but it is sufficiently secure to be classified as redundant secure. In this research, convenience motivation factor plays the most important role for most customers when they are choosing the best online food delivery services for them. They love apps services that is easy to use and navigate. The ordering process should

be simple and straightforward. A friendly apps will be their main preference. They also love apps that could understand their preferences so every time when they open the app to buy the foods, the app system would know what best to offer to the particular customer. This would help customers to make purchase decision instantly and seamlessly. Existing customers are essentially important to any establishment as they have experience in buying and using the services provided by the company. Thus, the process should be simple and less hustles.

CONCLUSIONS

From the study we could gain a lot of information that could help the online food delivery services apps to improve their system and customers experiences. Apart from the new norm post covid-19 pandemic, customers love to choose convenient more than ever over hustles. Dependable on smartphone usage has increased significantly over the years. Everyday duties and routines are mainly made using smartphones. Thus, it is important for the player of the industries to know precisely what customers do loves. In the study it shows customers frequently ordered foods for 2-4 person for each transaction thus more food meals should offered particularly for 2-4 pax so customers can make decision easily. The average spending is below RM40 thus the price range on focused items should within the range. It clearly shows that the current trend in online food delivery is fast foods and the particular industry makes take up the major market shares. It probably the marketing efforts made by them or maybe by other reason thus those particular fast-food industries could enhance their foods and services to take advantage of the situation. However, for other restaurant or cuisines, they might need to do more aggressive marketing or promotion so they could capture the customers to encourage them to choose to buy their meals over other competitors. In this research, convenience motivation factor plays the most important role for most customers when they are choosing the best online food delivery services for them. They love apps services that is easy to use and navigate. The ordering process should be simple and straightforward. Existing customers are essentially important to any establishment as they have experience in buying and using the services provided by the companyThis would improve the customers experience significantly as the customers could plan ahead their time and schedule more effectively and just focused on their other tasks but still can have their meals on the time, as they want it to. Price factor plays a quite significant impact on customers purchase intention towards using online food delivery services apps. The current economic conditions post covid-19 have affected most of us. Customers would think twice when they want to spend every ringgit of their hard-earned money. They will ensure the money spent gives value to them. Value often be the main criteria over other factor. Thus, the apps service provider and the restaurant should be more creative on determining the foods price and the delivery charges by still managed to obtain their target revenues. Although there are saying that good foods plating is more tempting to the eyes. But on this particular online food delivery services, it might not be the main factor that customers are looking for or at least for now. Customers tend to weigh other factors over food illustration shown on the app's menu.

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THE INNOVATION PROCESS MODELLING FOR ETHANOL GAS SENSING USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT
Ethanol gas is one of the most common sources of pollution in the majority of installation and emission units, and it can be toxic if overexposed. A precautionary measure to control this pollutant such as a gas sensor may be designed to limit the amount of ethanol released into the air. The performance of a particular gas sensor is mainly dependent on the operating temperature. SnO_2 is one of the most used sensor materials in ethanol gas sensors. Although the host material of the sensor is the same, doping with different metals often resulted in different response values at specific operating temperatures. Hence, this research successfully develops a process modelling using Artificial Neural Network (ANN) that can predict the response of different doped SnO_2 towards ethanol gas at different temperatures. In this context, ANN is an artificial program that can create a linear and non-linear model without making any assumptions. Three input neurons which are time, temperature and concentration of target gas were applied with one output neuron, which is the response of the sensor. The optimal numbers of hidden layers were achieved by the trial-and-error concept. Four models were developed which involve undoped SnO_2, cobalt, nickel and iron-doped SnO_2. For the method involved, each of the network structures of the model was built with two hidden layers. Training rule and transfer function of Levenberg-Marquardt (trainlm) and tangent sigmoid (TanSig) were used. The mean square error (MSE) performance plots and coefficient of determination (R^2) graphs were observed to evaluate the performance of the ANN model developed, where for all results obtained the value ranged from 0.0-0.1 for MSE and performance plots. The finding shows that the constructed ANN model can produce a decent recognition. This novel process modelling is highly demanding in controlling ethanol gas pollution from industrial activities.

INTRODUCTION

Ethanol is widely used in industrial and consumer products. However, it causes the highest rate emission in most installation and emission units (Brady & Pratt, 2012). An early preventive measure control of this pollutant such as a gas sensor can be developed to monitor the ethanol vapor emission to the environment.

Gas sensor, also known as gas detector, is working as a detector to the toxic gases, explosive gases, and malodors such as VOCs (Srivastava, 2003). There are three common materials used in gas sensors, namely metal oxide semiconductor, conductive polymer composites, and carbon nanomaterials (Feng et al., 2019). The most widely used gas sensing material is metal oxides. It utilizes the usage of semi-conductive oxide, where this material applies changes in its electrical resistance when exposed to target gases. A chemical gas sensor normally has two main functions, namely as receptor and transducer. These receptors and transducers work as a recognizer to the gases and transduces that detect chemical signals into the output signal (Yamazoe, 1991). This device can be modelled by using an artificial related program which will develop the best sensing model through the learning process of the data set gained from the experimental procedure. The performance of a gas sensor is mainly dependent on the type of sensor material, doping and operating temperature. Scientists and users often face problems determining the sensitivity of sensors prepared from different doped materials. To overcome this difficulty, we proposed a processing modelling using Artificial Neural Network (ANN) that can predict the response of sensor material with different dopants at different temperatures. In this research we focus on tin oxide, SnO_2 as sensor material, while cobalt, nickel, iron as dopants.

Artificial neural network (ANN), also called neural network is a type of artificial related system that has the ability to illustrate the learning process inside the human brain (Wanto et al., 2017). The system can be trained with various types of activities such as patterns recognition, data grouping and future events prediction. Generally, ANN consists of three-layer structures which are input layer, hidden layer, and output layer (Litta et al., 2013). The output data generated is the result of the application of the backpropagation algorithm. This algorithm works as a weight adjuster of the neurons in order to get the output closer to the true result. Hence, this research successfully develops a process modelling using Artificial Neural Network (ANN) that can predict the response of different doped SnO_2 towards ethanol gas at different temperatures.

METHODOLOGY

This research utilizes the real time data of the ethanol gas sensing using a gas sensing measurement system (Figure 1). The sensing materials, SnO_2 nanostructures (undoped SnO_2 and doped (Co, Ni and Fe) SnO_2 were synthesized at the lab using hydrothermal methods. The experiment was conducted to evaluate the gas sensing response versus real time. The sensing test was conducted at different temperatures 400 and 450°C and constant ethanol gas concentration of 1000 ppm. Figure 2 exhibits the gas sensing data obtained from the gas sensing test.
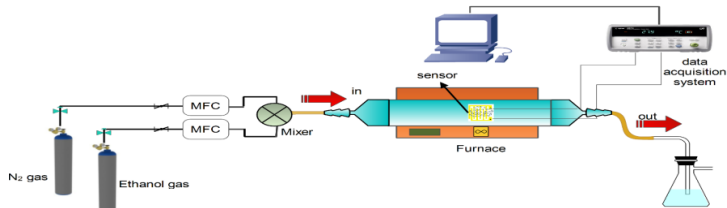
Figure 1. Gas sensing measurement system. (Inderan, Arafat, Haseeb, & Sudesh, 2019)
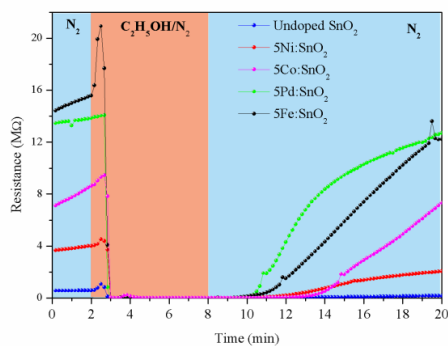
Figure 2. Response of the sensors towards the gas sensor. (Inderan et al., 2017)

In this study, the data sets were processed through the input neurons by using the MATLAB R2020a software. To develop the optimum ANN model that fits the data set, some of the required parameters need to be considered and these parameters are optimal numbers of the hidden layers, number of neurons by layer and the type of transfer functions. This project applies several neurons which consist of input and output neurons. The input neurons are fully dependent on the variables of the system to be modelled, with 3 inputs: time, temperature, and target gas concentration. The output of the project would be the sensor response. The network structure for each of the models is built with one input layer with three neurons, one output layer with one neuron and two hidden layers with different neuron numbers. The training rule of the model used is the Levenberg-Marquardt (trainlm) which is the most used model since it is observed to be the best learning algorithm (Naidu et al., 2020). The network is trained by the backpropagation algorithm with feedforward neural network. The training progress was carried out with the output error goal of 0.001 followed by a maximum iteration of 1,000.

RESULT AND DISCUSSION

As for the results, the mean square error (MSE) and best performance plots will be observed to evaluate the performance of ANN model. The less the value of the MSE which is approaching zero, it shows that the model has the most precise result. To obtain the smallest value of MSE, the concept of trial and error also needs to be performed in terms of finding the optimum neuron numbers inside the hidden layers. Several regression graphs will be generated from the neural network training. Table 1 shows the results of all the models that have been successfully

generated along with their setup. For the setup division data, it refers to the portioning of the input data where 70% data used for training, 15% used for testing, and another 15% data used for validation purposes.

Table 1. Setup and results of generated models of four semiconductor materials

Model	Fitting Network Sequence	Setup Division of Data	Performance (MSE)	Best Training Performance	Best Validation Performance	Best Testing Performance
Undoped	9-9-1	70, 15, 15	0.0038	0.0009	0.0139	0.0067
Co-doped	9-11-1	70, 15, 15	0.0073	0.0041	0.0031	0.0262
Fe-doped	9-12-1	70, 15, 15	0.0008	0.0004	0.0031	0.0003
Ni-doped	7-11-1	70, 20, 10	0.0020	0.0014	0.0002	0.0101

Figure 3 shows the validation performance graphs for each sensor model. The more the epochs, the lower the mean square error for the training, validation, and testing data.
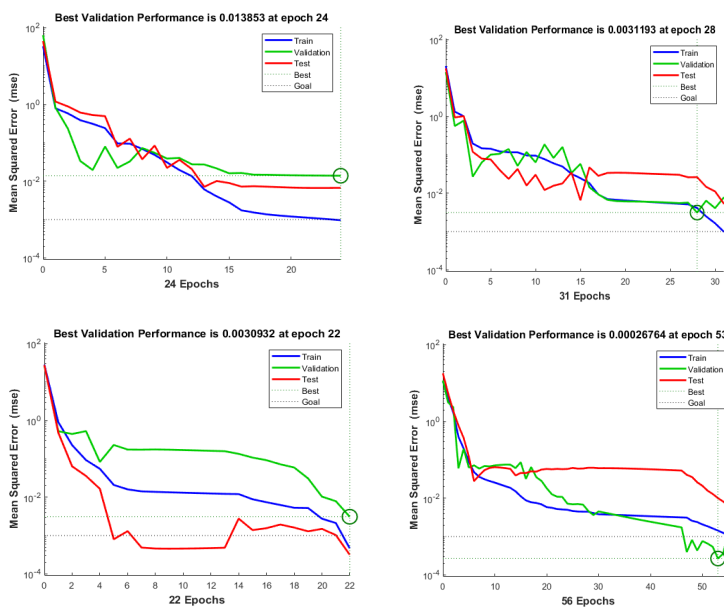
Figure 3. Validation performance for undoped SnO_2, Co-doped SnO_2, Fe-doped SnO_2 and Ni-doped SnO_2 models respectively.

CONCLUSION

A processing modelling using ANN for ethanol gas sensor was successfully developed. The network model was shown to be good with the experimental data and was used to recognize

the data pattern for the gas response sensed with different types of sensing materials with the sequence of 9-9-1 for undoped SnO_2, 9-11-1 for Co-doped SnO_2, 9-12-1 for Fe-doped SnO_2, and 7-11-1 for Ni-doped SnO_2. With each of the correlation coefficients (R_2) in the range of 0.9-1.0, the distribution of data points for the neural network model is almost the same and close to the actual experimental data. The finding shows that the constructed ANN model can produce a decent recognition. This novel process modelling is highly demanding in controlling ethanol gas pollution from industrial activities.

ACKNOWLEDGEMENTS

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THE EFFECTIVENESS OF I-LAB V2 AS A TEACHING TOOL FOR ONLINE DISTANCE LEARNING

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ABSTRACT

Due to COVID-19 outbreaks in Malaysia adapting a new norm for teaching and learning is required. UiTM has shifted the teaching and learning from traditional method to Open Distance Learning (ODL) which required sudden changes towards the lecture. All teaching and learning sessions should be conducted online but the concern arises on laboratory courses. Most of the Engineering Programmes in Malaysia are still practicing the traditional method for laboratory courses in delivering process, preparing the laboratory report, and submitting the report. Therefore, i-LAB v2 is introduced for the Water Engineering Laboratory subject in ensuring the CO and PO are achievable and to merge with ODL. i-LAB v2 consists of an excel template that provides all the information regarding the course which is Water Engineering Laboratory. The information includes the laboratory manual, apparatus needed for the experiment, video of the laboratory procedures and a section for the students to prepare their laboratory report. A pilot study on the application of i-LAB v2 was conducted among 29 semester five students. They were given a set of survey to get feedback regarding the effectiveness of this template to be used as a teaching tool for laboratory courses. From the survey given, 44.82% of the students agreed to use i-LAB v2 for preparing laboratory report, while 44.83% of the students were neutral and 10.35% of the students did not agree to use this system. As seen from the survey only 10.35% of the students preferred using the traditional laboratory method for laboratory report preparation and submission due to the template required a big storage that makes it difficult to download on handphone and unable to view the video procedure of the laboratory. Therefore, based on feedbacks received from the survey, i-LAB v2 will continue to be used in this subject. Improvements will be made based on the respondents' feedbacks.

Keywords: online distance learning, laboratory course, laboratory report

INTRODUCTION

In the process of flattening the curve for COVID-19 outbreaks in Malaysia, UiTM has shifted the teaching and learning from the traditional method to Open Distance Learning which

required sudden changes towards the lecturers and students since 13 April 2020. All teaching materials should be audience friendly for online teaching. It seems to be easy for lecture-based courses but a little bit of hiccup for laboratory courses. As for students taking the Engineering Programme, it is mandatory to register for a series of laboratory courses to complete the three years of study for Diploma in Civil Engineering.

Lecture-based courses are easier to digitise compared to laboratory courses. Meanwhile in laboratory courses, students need to be exposed to laboratory equipment and execute the experiment in the laboratory, but it is impossible during the pandemic. Therefore, preparing teaching materials for laboratory courses is a major challenge for the lecturers in providing content of the experiment and preparing the environment of the laboratory in digital content that are required to fulfill the course outcomes (CO) and programme outcomes (PO).

Most of the Engineering Programmes in Malaysia are still practicing the traditional method for laboratory courses in delivering process, preparing the laboratory report, and submitting the report. Based on previous studies conducted by Maiti (2010) and Kearns (2012), they urged academicians to provide a better laboratory management system including an online evaluation for the assessment, validation of experimental findings, evaluation of the laboratory report and giving feedback to students in a better platform for lecturers and students. Later, Anas et al. (2011) and Musingafi et al. (2015) found that online assessment and online submission are used for better tracking and grading process. Aini Hayati Musa et al. (2020) and Nurul Asma Mazlan et al. (2020) agreed that any module or programme used in online teaching should be user-friendly without compromising the quality of the content to satisfy the teachers' and learners' needs.

Therefore, i-LAB v2 is introduced for the Water Engineering Laboratory subject in UiTM Pasir Gudang in ensuring the CO and PO are achievable.

i-LAB v2

i-LAB v2 is developed to help the lecturer in compiling all information on the experiment that needs to be carried out by the students of the course in one semester via a single platform. The information provided in i-LAB v2 includes the report cover, laboratory manual and videos of apparatus and procedures of the laboratory. i-LAB v2 was created using Microsoft Excel as an interface. Microsoft Excel was chosen as the interface due to capability of students to adapt to the software and it is using low bandwidths to download (Azlina et al., 2020 & Norhidayah & Azni, 2021). The difference between manual laboratory report and i-lab are displayed in Table 1.

Table 1. Comparison of i-Lab and traditional laboratory manual

i-LAB v2	Traditional laboratory manual
Using Microsoft excel and available in digital platform and ready to edit as offline once it is downloaded.	Using Microsoft word and printed as hardcopy material. Students need to retype the information in laboratory manual to digital form.
Provide all the necessary information regarding the experiment including the demonstration video.	Provide all the necessary information regarding the experiment excluding the demonstration video.
Students are required to edit and complete the finding, discussion, and conclusion in i-Lab.	Students need to start from scratch to prepare the laboratory report and print out as hardcopy evidence

The product of i-Lab can produce a complete report that can be converted to pdf form and ready to submit via email or any online platform to the lecturer.	before submitting to the lecturer.

MATERIALS AND METHODS

i-LAB v2 consists of an excel template that provides all the information regarding the course which is Water Engineering Laboratory. The information includes the laboratory manual, apparatus needed for the experiment, video of the laboratory procedures and a section for students to prepare their laboratory report. Once they finish writing their report using i-LAB v2, they can save and convert their report into pdf format and send the report to the lecturer in softcopy form or students can print out the pdf format to submit the report in hardcopy. Figure 1 shows the first interface of the template. Students can use this template by hitting the 'Start Test' button.

Figure 1. Interface of i-LAB v2

RESULT AND ANALYSIS

A pilot study on the application of i-LAB v2 was conducted among 29 semester five students. They were given a set of survey to get feedback regarding the effectiveness of this template to be used as a teaching tool for laboratory courses.

34% of the students agreed that the template is easy to download with the average of 3.03 as stated in Table 2. Meanwhile, 52% of the students rated agree and strongly agree that this template is easy to fill in with the average of 3.45. 45% of the respondents rated agree and strongly agree that i-LAB v2 helps to reduce the time taken to complete the report with the average of 3.48. 45% of the respondents agreed that they like to use i-LAB v2 as a tool of preparing laboratory report with the average of 3.34.

Figure 2 shows the feedback from the students regarding the difficulties during using i-LAB v2. Students were allowed to choose more than 1 answer. 14 of the students chose that this template was not easy to download. This may be because of the large size of the template due to the video attachment in the template. The 2nd highest difficulty chosen by the students is their gadgets do not support the template. This template is designed using Microsoft Excel and suitable to be opened using a laptop or computer. Some students prefer to use smart

phone to use this template. However, other difficulties were due to the setting of the template itself and this can be improved by editing the template.
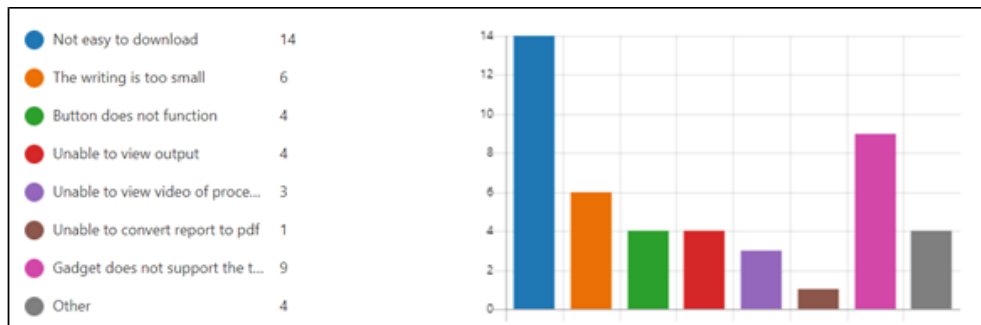
Figure 2. Feedback from the students regarding the difficulties using i-LAB v2

Table 2. Summary result of the survey.

Item	Description	Average
1	i_LAB is easy to download.	3.03
2	i_LAB is easy to fill in.	3.45
3	i_LAB helps to reduce the time taken to complete the report.	3.48
4	I like using i_LAB as a tool in preparing laboratory report.	3.34
5	i_LAB can reduce the printing cost of the laboratory report.	3.86
6	The quality of the video of procedures provided in i_LAB is satisfactory for Open Distance Learning.	3.69
7	i_LAB 2021 can be used in another course as a tool in preparing the laboratory report.	3.48
8	Overall, I like using i_LAB.	3.45

For the criterion on whether i-LAB v2 can reduce the printing cost of the laboratory report, 62.06% of the respondents strongly agreed and agreed that i-LAB v2 can reduce the cost of printing while the average recorded as 3.86. While for the quality of the video of procedure provided in i-LAB v2, 55.44% of the respondents were satisfied with the quality of video provided for ODL with the average of 3.69. 51.72% of the respondents agreed to use this system in other courses as a tool in preparing the laboratory report. For this criterion, the average is 3.48.

From the survey, 75.86% of the respondents did not have any suggestion to improve this system, while 24.14% gave suggestions on the improvement of i-LAB v2. The suggestions from the respondents were the system should be more user friendly and provide notifications to remind the students of the due date submission.

For the last criterion: whether respondents like to use i-LAB v2 in preparing the laboratory report, 44.82% of the respondents agreed, while 44.83% of the respondents were neutral and 10.35% of the respondents did not agree to use this system. As seen from the survey only 10.35% of the respondents preferred using the traditional laboratory method for laboratory report preparation and submission because the template required big storage capacity that makes it difficult to download on handphone and they were unable to view the video procedure of the laboratory. Therefore, based on feedbacks received from the survey, i-LAB

v2 will continue to be used in this subject. Improvements will be made based on the respondents' feedbacks.

CONCLUSION AND RECOMMENDATION

In conclusion, it can be concluded from the survey given to the students that most students agreed to using i-LAB v2 in preparing their laboratory report for online distance learning. To continue using this system in ODL, some improvements need to be done to cater the suggestions from the students. Several improvements will be done such as the video procedure will be given via a link in i-LAB v2 to reduce the storage capacity of the template. Secondly, i-LAB v2 will be developed as an application which is suitable for handphone users. Lastly, the application will be improved on the feature template or interface such as on the size of fonts used and ease in converting to pdf format. After developing applications which are user friendly, it is suggested i-LAB v2 be used in other laboratory subjects in the future.

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MY ECREDIT BANKING APPS (MECBA) V3

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ABSTRACT
Commercial banks are the major players in the banking system because they are the largest and most important suppliers of funds in the banking systems. The primary function of commercial banks is to provide retail banking services, such as accepting deposits, granting loans and advances, and financial guarantees. Basically, there are four (4) types of bank credit or loan available for customers to choose from; Simple Interest, Simple Interest with Compensating Balance, Discount Interest, and Discount Interest with Compensating Balance. Typically, the public is not aware of the best alternative. The best option is tochoose the one with the lowest annual interest cost of the loan. This is known as an effective annual rate (EAR). However, not everyone knows how to calculate EAR. Hence, My eCredit Banking Apps (MECBA) V3 has been innovated to help the borrower to calculate the best interest rate and finance options provided by the commercial banking system in Malaysia. This will help customer or borrower of the loan to decide what type of bank credit and which commercial banks are the best for them to decide upon taking theloan. It will also save their time and money in choosing the best alternative. It will also save their time and money in choosing the best alternative as the calculations are tedious and complicated. In fact, the loan sometimes takes long period which ends up the total sumof money to be paid become enormous. Therefore, My eCredit Banking Apps (MECBA) V3 is the best solutions for your credit banking choices.

Keywords: Financial Institutions, Bank Credit, Effective Annual rate, Interest

INTRODUCTION

The objective of this system or apps is to help the public in analyzing the best financing option being offered by commercial banks in Malaysia. MECBA offers a user-friendly solution for public in choosing the best credit financing alternatives available inthe capital market. MECBA provides a recommendation for the best options.MECBA promotes potential to be commercialized since little apps is available that helpful inassisting public to analyze credit banking facilities offered by financial institutions in Malaysia.

This project aims to offer an in-depth understanding of bank customers' buying behavior in relation to the selection process and provide customers of bank with useful insight into the importance of having knowledge and applications of selecting the best credit banking either for personal loan, house loan or mortgage.

LITERATURE RIVIEW

Financing decision is crucial as it determine the success of a business, organizations or government. Factors affecting financing decision are broad. Financing decisionby

corporations might be influence by their objectives and goals, capital structure and strategic financing planning. An integrated model of optimal capital structure that become a model for corporate financing decision has been developed by Taggart (1977). For individuals or household, their financing decisions can be categorized into two general categories: internal and external factors. Internal factors include financial education and literacy, demographic background, focus and attention, cognitive function, family dynamics, household structure and phycological factors (Ciumara, 2012). On the other hand, external factors include national culture, religion, income uncertainty, access to financial advice, financial systems development, and economic environment (Ciumara, 2012). According to Satoto et al. (2020) the orientation of economic goals, experience with creditors, financial knowledge, and family control have a positive and significant influence on attitudes related to debt financing decisions. In addition, they claimed that also proves that the moderating variable of family commitment can strengthen the positive effect of family control on managers' attitudes in debt financing decisions. Previous literature presents several factors affecting the choices made by customer in choosing the banking facilities. According to the study by Devlin & Gerrard, (2005) location, family relationship and recommendation by others are amongst the factors that affecting the choice of consumer for their credit banking. Choosing a bank near home,on the basis of family relationship, taking note of the recommendation of others and choosing a bank near a place of work dominate the rankings. Meanwhile, Boyd et al. (1994) sought to establish if there were differences in the selection criteria of retail banks between various demographic subgroups. On top of that, price, speed and access were found to be particularly important by Elliott et al., (1996) in what they termed value driven strategy. However, Reeves & Bednar, (1996) argued that customer service appeared more important than price and that consumers use additional criteria beyond price, speed and access to evaluate and choose between banks. Khazeh & Decker, (1992) claimed that service charge policy to be the most important factor in explaining how consumers choose their bank. In the study by Singh et al., (2013) conducted in North India seeks to find the factors influencing choice of a bank. The analysis revealed that marketing activities, selling activities, use of technology, service quality and atmospherics among others were the important factors considered by the youth while choosing the bank to transact with.

In contrast, a study by Lymperopoulos et al., (2006) on the importance of service quality in bank selection for mortgage loans claimed that four distinct factors were identified as the main choice criteria that influence consumers' bank choice. Bank service quality is the most important element that customers consider in order to select their mortgageproviders and establish a long-term relationship with them. The other three refer to product attributes, access, and communication. Meanwhile, Kennington et al., (1996) finds that in Poland, as in other countries, the most important variables influencing customer choice are reputation, price and service, but with certain variations related to the Polish context.

Analysis of data in the study by Awan & Bukhari, (2011) indicated that most of the customers value product features and quality of service as major factors for making selection of Islamic banks, and give lesser importance to religious belief as influential factorin selecting an Islamic bank. Findings suggest that there is a lack of awareness about basic conventions of Islamic financing options among respondents and customers of both the pure Islamic banks and conventional banks with IBBs do believe that the bank's staff to provide credible information about religious compliance of Islamic banking financialservices. In the study conducted in Malaysia, Amin, (2008) suggest that Shariah principle, lower monthly

payment, transparency practice, interest-free practice and 100 per cent financing are the first five decision criteria considered as being very important. The least preferred criteria, among others, are recommendation, longer financing period, product range and branch location. Their results also suggested that a small number of significant differences are apparent in the importance of choice criteria with respect to gender, marital status and age range. Due to various reasons that contributed to the choices of banking system, this project aims to ease the customer in choosing the best financing options offered by the banking system in Malaysia.

RESEARCH METHODOLOGY

The project involved a review of available literature on bank choice criteria, and distribution of questionnaire on the selection process of credit banking financing offered by commercial bank in Malaysia. A Google Form for a pilot test questionnaire was set up consisting questions asking about the bank credit financing choices and what are the factorsor tools being used by customers in deciding the best choices available in the capital market.The questionnaires were distributed and a total of 150 respondents were received.

The results received were analyzed and a problem statement was developed, and from there a system to help customers of commercial bank in calculating the Effective Annual Rate(EAR) and choosing the best alternatives of financing was developed.

RESULTS AND DISCUSSION

The results obtained from the questionnaires show that almost 45.80% of respondents face problems in choosing the best bank credit financings available in the market. Amongst the problems stated by them are they do not know how to calculate and choose the best EAR offered by various commercial bank in Malaysia. In addition, some respondents stated that it was a waste of time for them to go and check from bank to bank regarding the terms of the financing including the interest rate, duration, credit amount, types of credit and the cost involved for the processing. Majority of them prefer if there is an apps or system that could help them in calculating the effective annual rate and choosing the best option and the best offer of credit financing. The results also revealed that only 12.80% of the respondent has used apps that available on the internet to help them in making decision such as iMoney and Loanstreet.

Table 1. Factors that helps in making financing decisions
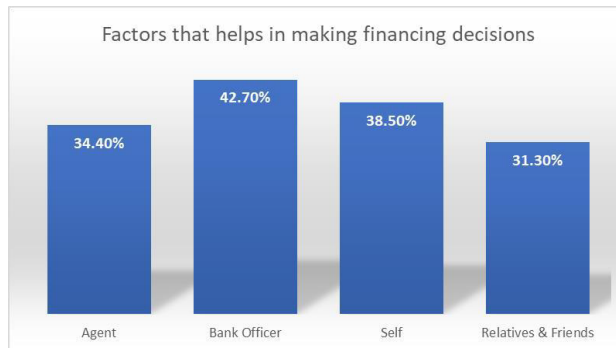
Table 1 presents the factors that helps customers in making financing decisions. The table shows that 34.40% of them rely on their agent in deciding the best alternatives available in the market. Meanwhile, 42.70% of them rely on bank officer to help them determining the best options available. On the other hand, 38.50% of them depends on their knowledge in choosing the best options. Finally, only 31.30% relying on their relatives and friends in selecting the best ones.

CONCLUSIONS

Due to the importance of making the right financing decisions especially with the varieties of financing offered by commercial banks, My eCredit Banking Apps (MECBA) V3 has been innovated to help the borrower to calculate the best interest rate and finance options provided by the commercial banking system in Malaysia. This innovation will assist customer or borrower of the loan to decide on what type of bank credit and which commercial banks are the finest for them to decide before making any borrowings. Thus,the novelty of MECBA V3 is it will become a one-stop center for the potential borrower to get first-hand information on the cost of borrowing (EAR) for bank credit such as car loan, housing loan and personal loan. In addition, MECBA V3 will assists potential borrower to make an informed decision when they decide to choose bank credit from a bank based on calculation provided by this application. On top of that, using this application, will also save their time and money in choosing the best alternative as the calculations are tedious and complicated. In fact, the loan sometimes takes long period which ends up the total sum of money to be paid become enormous. Therefore, My eCredit Banking Apps (MECBA) V3 is the best solutions for your credit banking choices.

ACKNOWLEDGEMENTS

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THE DYNAMICS OF MILO (MULTIMEDIA INTERACTIVE LEARNING ONLINE) IN ROLE PLAYING: ENHANCING THE LEARNING PROCESS IN COVID-19 PANDEMIC

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ABSTRACT

The onset of COVID-19 pandemic has affected the learning process of students throughout Malaysia, especially university students. A paradigm shift is needed in making the learning more dynamic was proposed in this research paper through the lenses of Multimedia Interactive Learning Online (MILO). This software was to enhanced and strengthened role playing among university students enrolling hospitality Front Office course. Similarly, role playing can act as a transition point from classroom into the hospitality industry, vis-ă-vis to an extremely complex operating environment. Consequently, a well practice role playing in the absence of face to face learning supervision, may help students to gain a high degree of motivation and subsequently confidence into executing relative tasks at ease in any given time and situations. To this end, role playing is an extremely vital component for students to be successful both in classroom and in the hospitality industry.

Keywords: multimedia interactive learning online (MILO), role playing, front office, hospitality industry

INTRODUCTION

The onset of COVID-19 pandemic since early 2020 has disrupted the face to face learning of many students in Malaysia. Many students and parents are struggling to cope with the new learning platform; which is online learning (Tan, 2021). According to (Tynjala, 2008), cited in Kettula and Berghäll (2013) a better approach to make up the lacking of learning through pedagogical is through role play. Furthermore, role play can integrate and supplement formal learning and working life (Kettula and Berghäll, 2013). In the Front Office operating environment, role play is extremely vital in order to understand how the operation works.

Although, Lean, Moizer, Towler, and Abbey (2006) stated… "role play as a form of non-computer-based simulation", Multimedia Interactive Learning Online (MILO) will be use as a guidance for students to refer when necessary. In a similar vein, Feinstein, Mann, and Corsun (2002) pointed out that during role play, the participants would act out the given scenario. Alternatively, MILO with numerous scenario availability; can delivered the intended scenarios to the participants.

Moreover, role play Maier (2002) cited in Kettula and Berghäll (2013) pointed out there are three possible objectives that can be measured namely, (1) emotional (affective) status, (2) enhancing each individual's skills and (3) expanding the person's knowledge base. Subsequently, participants involved in role play can put themselves into self-reflection as one of the measurements to gauge their performance and understanding of Front Office operations (Kettula and Berghäll, 2013). Likewise, Holden and Hamblett (2007) pointed that role play can intrigue the participants in real life working experience.

Issues

Online learning can be a tedious learning process (Tan, 2021). Similarly, online learning process when incorporating into role play will have a different challenging platform. According to Preziosi and Alexakis (2011), cited in Acharya, Reddy, Hussein, Bagga and Pettit (2018) enhancing learning meaning optimal information's ought to be provided and being justified. It was pointed out that when learning was too demanding, it will discourage the learner, while, in non-challenging learning situation it will lead to mundane learning participation (Acharya et al., 2018). Arising out of this predicament, Niemi, Heikkinen and Kannas (2010) and (Ferguson, Hanreddy and Draxton (2011) elaborated that by getting the students involved in the decision-making process of developing and sharing their learning experiences; will make the learning more meaningful.

Meanwhile James and Pollard (2011) opined "scaffolding for learning by offering intellectual, social and emotional support", are essential to bring learning closer from the real world into the classroom. In sharing similar view, Christmas (2014) pointed out an active learning made possible through "…. possible learner perceives the existence of a relationship between prior knowledge and new knowledge". Significantly, Serbessa (2006) argued that "learning-by-doing" in the technology driven world will continuously bringing immense development to the learner. Subsequently, Dipietro (2004) cited in Luo, Wang and Tai (2019) mentioned the three training approaches are (1) classroom training, (2) on-the-job training and (3) interactive media training; are the most effective tools to achieved all training goals. However, very limited literatures highlighted the most precise interactive media training for a specific department in the hospitality industry. Hence, this research paper tends to address the main issue; how MILO software can help student's role play in Front Office setting.

LITERATURE REVIEW

The onset of COVID-19 pandemic has disrupted the learning process of students' in Malaysia (Tan, 2021). The usual face-to-face engagement in classroom setting; allowing peers and lecturers into exchanging ideas which are deemed vital (Stack, 2015), are no longer allowed because of the COVID-19 pandemic. In addition, according to (Darling-Aduana and Heinrich, 2018) technological incorporated into learning can help to enhanced a better

learning experience. Besides, Garrison (2011) suggested that social presence; the ability of the subject to "relate with their peers and forming relationship", can help to expedite the learning process. In a similar vein (Law, Geng and Li, 2019) pointed out cognitive presence; the ability of the subject to "construct meaning by going through the interaction process." Meanwhile, the "integration" of social presence and cognitive presence has provided Multimedia Interactive Learning Online (MILO) a platform in synchronizing better learning experience. According to Woo, Shahril, Azmi and Rosli (2018), MILO is able to bring the social and cognitive presence together through role playing in a safe and secure environment. Notwithstanding, MILO is able to bring a new learning experience, whereby, learners are able to feel that they are in the hospitality environment, i.e. Front Office setting.

Role playing is used to promote learning experience that was being guided by an instrument (Bell, Kanar and Kozlowski, 2008; Keys and Wolfe, 1990). According to Furuunes (2005) cited in Borner, Moormann and Wang (2011), the learner will take on a role which will help in the overall learning of a skill or task. As mentioned by Bliesener (1994) the objectives of role-play can be measured by; ability to deal with difficult situations, developing self-assurance, improving auto-perceptive and self-reflection skills, increasing motivation and raising communicative effectiveness.

METHODOLOGY

A qualitative research was implemented for this study. The duration of this study is for three months and it involves two students yet to go for internship in Front Office; who are currently in their second year of study in hotel management degree from Faculty of Hotel and Tourism Management, Universiti Teknologi MARA, Puncak Alam campus in Selangor. The students were given MILO software for viewing, for the duration of two months. Upon completion of the viewing, the students were asked to go for role-playing. A face-to face interview was conducted through Google Meet after the role-played. A thematic analysis was conducted for this purpose, to determine the respondent's responses on any significant new discoveries of using MILO in role-playing

FINDINGS

Respondent 1: *laugh… [sic] I hope this software is available in my first semester of my study. It really helps with my confidence and make my mental strong*.

Respondent 2: *The MILO is one of its kind, very unique and arousing me as if I am now in the Front Office. Transforming me from where I am now[sic] into the Front Office setting.*

In summary, by using MILO as a tool for role-playing, respondents are generally feeling at ease and enabled to feel the moment of confidence and mentally strong of knowing what to aspect out of them, before they go for their internship. Notwithstanding, the ever-challenging operating environment of Front Office in the hospitality industry due to COVID-19 pandemic

CONCLUSION

Role playing will be more meaningful, if it was recorded for future analysis (Bright and Johnson, 1985). Similarly, Luo, Wang, and Tai (2019) stated that training for service standards and skills into providing delightful service should not be the end. Nevertheless, a recorded role playing as suggested by Bright and Johnson (1985) may infuse more attentive, appropriate, proactive and personalized services into an outstanding level.

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THE CONTINUANCE OF EXTERNAL REVIEW INFORMATION SYSTEM ADOPTION IN MALAYSIA

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ABSTRACT

Industrial relation 4.0 has penetrated digitalisation and seamless technology into the current organisational practices in higher learning institutions in Malaysia. Therefore, the quality initiative has to adhere to the importance of the seamless technology adopted and practices. External review initiates the internal quality evaluation in UiTM conducted by the InQKA, SKKO department. The external audit has to be conducted annually for the selected faculty and branch campuses. The external review report is mandatory for the SKKO and University to record continual improvements in the quality activities. However, due to the increase in the number of faculty and branch campuses to be evaluated every year and due to the pandemic restrictions, issues raised regarding the late preparation and cost have penetrated the unsystematic external review final reporting process. Therefore, due to the advantage of seamless technology opportunities, the External Review Information System (ERIS) has taken place. ERIS has been developed using a cloud-based development and has been implemented in the current external review process in UiTM. Currently, ERIS is used to cater reporting on the external review of 18 faculties and branch campuses in UiTM as data recorded in 2020. The overall preparation of the external review report was recorded in less than 20 days compared to the previous approach. Hence, ERIS has contributed to solving the main issues and becoming a system used in the external review process. This paper will discuss the development and the implementation of ERIS and the contribution of this cloud-based system that may benefit the external review implementation. These findings will benefit the external review practices in Malaysia, mostly in the higher learning, which is merely important during the worldwide COVID-19 pandemic.

Keywords: cloud-based, external review, ERIS, quality, seamless

INTRODUCTION

As for the current digitalisation requirements in organisations, the seamless and quality penetrate important factors to determine the quality assurances of the operation. Nowadays, the

rapid development of the system has penetrated the borderless opportunities in developing a system with the criteria stated. The cloud technology with seamless application development via the Google platform has contributed to this opportunity to enhance the seamless application to be adopted in a new way of system developments with economic and systematic approaches. It will acknowledge the time, cost, and efforts in managing thedevelopment of the particular application or system. For that reason, the Institute of Quality and Knowledge Advancement (InQKA) has been able to implement these new approaches withone of the main processes in the Sistem Kualiti and Kecemerlangan Operasi (SKKO) unit with the introduction of the External Review Information System, also known as ERIS, which is able to help to manage the process of the external review to be more systematic and effective.

External Review (ER) Process

External review (ER) examines the quality assurance and culture in each department in UiTM managed by the SKKO, InQKA, UiTM. As the leading autonomous higher learning institution in Malaysia with at least 1 branch in every state in Malaysia, UiTM acknowledges that InQKA (2021) is responsible in ensuring continuous improvement via this quality culture through proper evaluation. The ER process consists of various processes starting from the planning up to the final reporting phases, which involved various quality assurance expert panels from the main campus and branch campuses.

The issue on the ER processes is likely to happen during the final reporting period where the reporting will be disseminated to the respective faculties or branch campuses. The delay, unsystematic reporting, and quality of the report have been the factors of low satisfaction from the users' perspectives, indicating similar issues from the quality assurance issue regarding the academic implementation in Malaysia (Mokhtar et al., 2014). The respective department also contributed to the delayed action due to the late submission of the final report from the SKKO to the respective departments. The system platform used was the Lotus Notes which started in 2018; however, in 2020, the platform was changed to using the Google platform, which officially started in 2021. This will lead to the misuse of the previous Lotus Notes reporting system known as SePADU. The construction of the re-engineering of SePADU requires a major change and needs a longer period to complete. However, the process of ER has to take place as it begun in 2020 until now, which may contribute to more major issues in preparing the final reporting to the respective stakeholders in the ER processes.

Issues in External Review Process

Due to the issues raised from the previous ER implementation, we had conducted a preliminary investigation to check the opportunities to contribute to major issues in the ER processes. The only issues are on the reporting delay in delivering the report and low satisfaction of the stakeholders. We agree with Yurarach & Yoothanom (2010) who have listed various alternative solutions that can be included in the development of specific system implementation to resolve the ER, mainly in maintaining quality assurance issues in an organisation.

With the current migration of the Google platform, we designed and developed the External Review Information System, also known as ERIS, to be penetrated in the current ER process that will speed up the reporting process and delivery issues. In addition, we emphasise the observation on the satisfaction level of the ERIS implementation. Therefore, this project aims to implement the new platform of ER reporting with a seamless environment that will speed

up the reporting process in ER practice. In addition, we also aim to reach high satisfaction

and continuous feedback from the stakeholders in managing the improvement for the ER processes that adhere to the important aspects in continuous improvement needed by the processes and the department as the quality assurance department that deals with the quality in UiTM and higher learning institutions in Malaysia.

This paper will describe the ER in SKKO as described in the introduction. Then, ER design and development will be illustrated, including the interfaces and the overall template of the ERIS environment. Finally, the observation on ERIS continuance will be observed in terms of the users' satisfaction of ERIS and will be discussed related to ERIS implementation at the end of 2020 and 2021. Future suggestions and conclusions will be provided as well at the end of this paper.

ERIS Development

ERIS has been developed using the Google cloud-based platform consisting of Google Sheet applications as the main pillar of the template development. The supporting application, such as Auto-crat, is the third-party application used for a certain feature that supports the report generated being used to support the overall ERIS development. The overall workflow of the ERIS is illustrated in Figure 1. The template was solely developed in Google Sheet applications with all the requirements taken from the user's requirements, including details on external review information, rubrics of assessment for each area in the Code of Practice for Institutional Audit (COPIA). This scale represents the level of the rubrics, the comment section in which the auditor will conclude the findings, the previous audit findings sheet that bring the previous audit issues raised for the External Review (ER) audit. Also, the analysis and findings template show the ER audit's overall findings, and finally, the dashboard will navigate the overall diagramme of the ER performances for the ER summary. Some interfaces of ERIS are illustrated in Figure 2.

As for the ERIS, development is a concern; the smart and less cost was implemented to develop the ERIS. The stages of ERIS development are illustrated in Figure 3, which require user's requirements, development, user testing, and implementation. The time frame in the analysis and development is documented in less than four (4) weeks to complete the development.
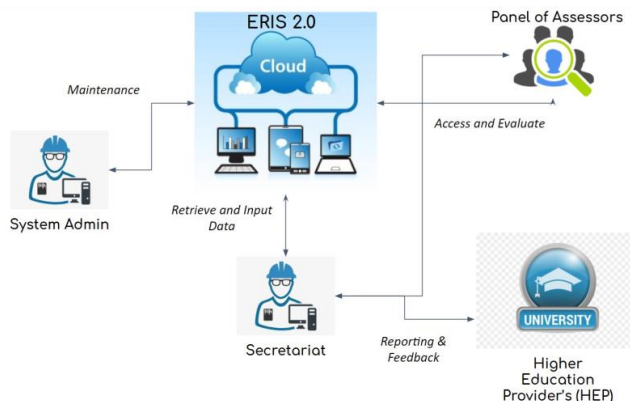
Figure 1. Workflow of ERIS
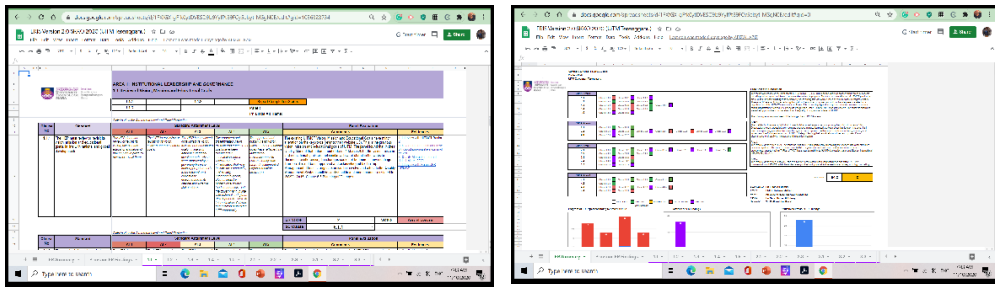
Figure 2. Interfaces of ERIS
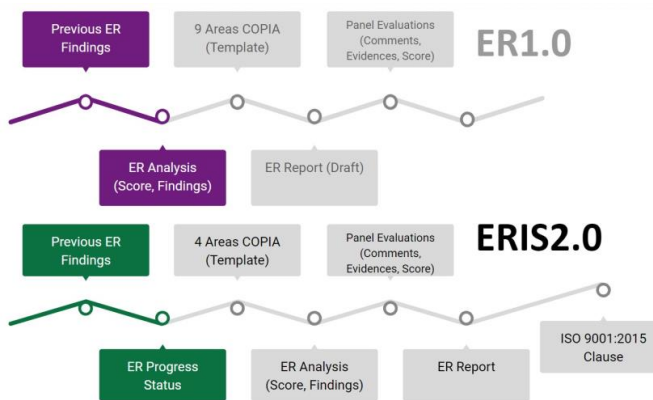
Figure 3. ERIS stages of development

ERIS Implementation

ERIS implementation was conducted in early January 2020, with the first implementation made during the ER visit to the UiTM Perlis branch campus. The users consist of the external and internal auditor, the InQKA representative to monitor the ERIS template from the main campus in Shah Alam, and the administration from the UiTM Pahang. The circulation of this ERIS implementation consists of a triangle of implementation with various access levels using the ERIS as in cloud-based access. In the ER visit, we had implemented the full use of ERIS in most ER exercises, as listed in Table 1.

Table 1. ERIS implementation according to ER exercise in UiTM (2020 - 2021)

Items	Year	
	2020	**2021**
Total ER Exercise	18	15
Number of Assessors	39	30

ERIS Continuance Framework

According to Table 1, which describes the whole exercise of ER in 2020 and 2021, we had conducted an experience study from the panel of assessors involved in the ER exercise. A questionnaire has been given at the end of each ER exercise which comprises several indicators to investigate the users' experiences while using the ERIS in the ER exercise as tools for the ER audit and mainly for the reporting of the ER findings. The framework consists of observation and investigation of ERIS implementation in the ER exercise prior to several indicators. Perceived Quality, Perceived Usefulness, Perceived Ease of Use, Satisfaction, and Experiences are indicators that will determine the ERIS continuance in most ER exercises. This framework was adopted from the Extended Total Acceptance Model, supplied the basis for The Technology Acceptance Model proposed by Davis (1989) and Pires & Halawi (2019). In order to investigate the ramification of the ERIS implementation in the ER exercise, we came up with the questionnaire that consists of 12 questions that were set up according to the indicators related to the ERIS continuance framework as shown in Figure 4 and Table 2. We observed the ERIS continuance in ER implementation from the identified indicators: satisfaction, experiences, usefulness, and ease of use. The perceived quality will be detailed in our future paper.
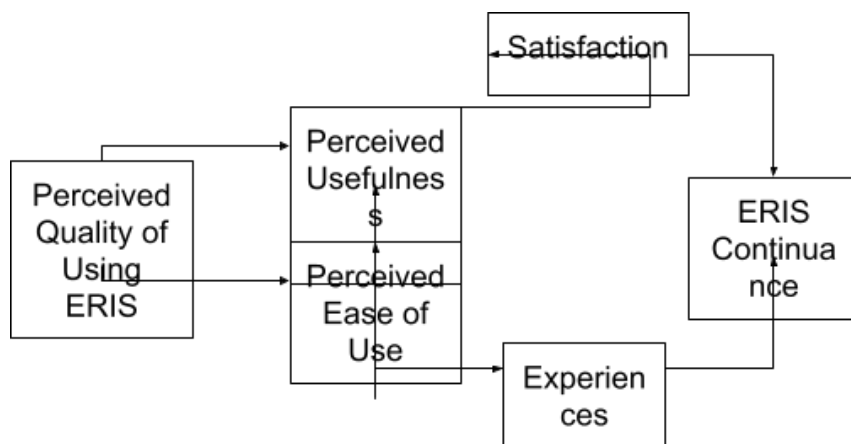
Figure 4. ERIS Continuance Framework

Table 2. ERIS questionnaires related to the Continuance Framework

Indicators	Scope of Questions	Total Questions
Perceived Usefulness (PU)	*Audit performances, effectiveness, usefulness*	3
Perceived Ease ofUse (PEU)	*Learning, Skills, Interactions*	3
Satisfaction (S)	*Performances, experiences, decisions*	3
Experiences (E)	*Overall experiences, productivity, processes*	3

RESULT AND DISCUSSIONS

The ERIS continuance data collection survey has been analysed, and the following table indicates the overall findings. The total number of respondents who answered and returned the responses was 39 (N=39). Table 3 shows the findings that consist of the feedbacks regarding the questions and percentage for each indicator as stated in the framework. The Likert scale used in the questionnaires indicates 1 is Strongly Disagree, and 5 is Strongly Agree. Table 3 shows the demographics analysis for this study regarding the demographic factors such as respondents' department, age, experiences, and administrative position in UiTM.

Table 3. ERIS Demographics analysis

Demographics	Category	Total	Percentage (%)
Department	Faculty Campuses Department	9 27 3	23.08 69.23 7.69
Age	30 - 40 years 40 - 50 years > 50 years	5 24 10	12.82 61.54 25.64
Experiences	< 5 years 5 - 10 years > 10 years	19 13 7	48.72 33.33 17.95
Academic Administrative	Yes No	24 15	61.54 38.46

Table 4. ERIS Continuance Indicators and Percentage

Indicators		Scale /Percentage				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Perceived Usefulness (PU)						
PU 1	Improve Audit performances	0	0	0	8 (20.52%)	31 (79.48%)

PU 2	Improve Audit effectiveness	0	0	0	7 (17.95%)	32 (82.05%)
PU 3	Useful for Audit Purposes	0	0	0	7 (17.95%)	32 (82.05%)
Perceived Ease of Use (PEU)						
PEU 1	ERIS is easy to learn	0	0	1 (2.56%)	13 (33.33%)	25 (64.11%)
PEU 2	Skillful with ERIS	0	0	2 (5.12%)	17 (43.58%)	20 (51.30%)
PEU 3	ERIS is very clear and understandable	0	0	2 (5.12%)	13 (33.33%)	24 (61.55%)
Satisfaction (S)						
S1	Satisfied with ERIS performance	0	0	0	11 (28.20%)	28 (71.80%)
S2	Pleased experiences with ERIS	0	0	0	11 (28.20%)	28 (71.80%)
S3	ERIS use is a wise one	0	0	0	7 (17.94%)	32 (82.06%)
Continuance (C)						
C1	Continue regular use of ERIS in the future	0	0	0	9 (33.33%)	30 (61.55%)
C2	Frequently use ERIS in the future	0	0	0	8 (20.51%)	31 (79.49%)
C3	Strongly recommended using ERIS	0	0	0	8 (20.51%)	31 (79.49%)
Experiences (E)						
E1	ERIS experience is acceptable	0	0	0	8 (20.51%)	31 (79.49%)
E2	ERIS experience will increase productivity	0	0	0	6 (15.38%)	33 (84.62%)
E3	ERIS experience will adopt ER process easier	0	0	1 (2.56%)	5 (12.82%)	33 (84.62%)

Table 4 shows the overall findings on the ERIS continuance according to four (4) indicators. The perceived usefulness contributed to ERIS, and External Review (ER) significance, with more than 80% of the respondents strongly agreed with the usefulness of ERIS in audit effectiveness and efficiency. Meanwhile, nearly 80% of the respondents strongly agreed that ERIS that will improve the respondents' audit performance. These findings also acknowledge that ERIS positively navigates audit performance, effectiveness, and purposes in ER

implementation. Also, ERIS support showing the acceptance of ERIS in supporting the ER implementation in UiTM and perhaps similar higher learning institutions, which indicate the use of externalreview as the quality culture and process evaluations.

The perceived ease of use (PEU) indicators revealed the differences in feedback with acknowledging neutral indicators on the overall findings. By relating the demographics and the PEU findings, perhaps these findings approved the new ER auditors that need more training and hands-on regarding ERIS use in ER implementation. Therefore, future improvements on the ERIS hands-on and manual details on ERIS guidelines will be enhanced and improved to ensure that ERIS is significantly adopted in various categories of auditors merely for the ER activities in UiTM. Hence, this will be a value-added feature to the future ERIS improvements regarding the ease of use of ERIS in the first place.

Meanwhile, the satisfaction and continuance indicators provide more significant feedbacks from the users of ERIS. The scale of strongly agree and agree navigate the users' satisfaction and continuance of ERIS in supporting the auditor ER implementation positively. More than 28 feedbacks strongly agreed on the satisfaction and continuance indicators which showed the impact of ERIS regarding the satisfaction and continuity of ERIS in the current ER implementation in UiTM. Therefore, this will indicate the importance of digital systems or applications to help and support the ER perspectives merely in the auditing processes that will significantly provide more continuous satisfaction. Also, it will navigate the full continuance of any digital applications implementation or adoption in improvements of ER processes either in UiTM or any organisation which supports the documented information requirements in ISO9001:2015.

In addition to the findings, the experiences of users on ERIS also indicated that more than 80% strongly agreed that ERIS experiences are acceptable by the users. In addition, the ERIS implementation had also helped the users manage the ERIS productivity with easier processes that support the overall navigation of ER processes in UiTM. Therefore, to conclude the findings of ERIS continuance in ER implementation in UiTM based on the survey, we can conclude that ERIS will significantly contribute to acceptable ways in ER implementation. The only consideration should also include the guideline for the new auditors and inexperienced auditors to get along with the ERIS adoption process in the ER implementation or any process that will benefit the ER continuance and improvements for UiTM.

CONCLUSION

External Review processes indicate the evaluation of the quality culture in UiTM. Therefore, continual improvement is needed to enhance the quality processes towards digitalisation adoption. Therefore, we had implemented ERIS as one of the continual supporting mechanisms that will benefit the ER implementation. We discussed the development of ERIS in this paper and also the continuance analysis on the first implementation of ERIS to support the ER process in UiTM. From the results, ERIS is significant based on the identified indicators such as satisfaction, experiences, perceived use, perceived ease of use, and most importantly, the continuance of ERIS in the ER processes implementation. Furthermore, the macro analysis on the perceived quality of ERIS shall be discussed in detail in future publications of ERIS implementation. Also, observation and evaluation of the importance of a system or application that will navigate the processes towards the digital transformation as required by the organisation during the pandemic will also be discussed.

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UNDERSTANDING ISLAMIC FINANCE CONCEPTS THROUGH INNOVATIVE GAME:
NAME THE RIBA TRANSACTION!©1

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ABSTRACT

The main idea of this innovative stick, card and cup game, (adapted from the method in the award-winning *Name the Numbers!©*) is to educate the players to classify the financial transaction items which are permissible or non-permissible in the shariah principles. Lack of understanding in the shariah Arabic terms or its concepts may hinder people, especially the Muslims to adopt Islamic finance as their way of life despite knowing that dealing with interests are very much the basis of conventional finance transactions. Hence, this motivates for the game called *Name the Riba Transaction!©* to be innovated to help more people to understand the shariah concepts in a fun and interesting way. A small focus group interview was done for a thematic analysis where the findings managed to answer the main research questions whether the game can help to understand the concepts of riba and gharar to the players. Few themes were reported were derived from the respondents after playing the game which are 'better understanding', ' knowledge into practical' and how the game is "promotable" to other people.

Keywords: shariah, game, Islamic finance, riba, gharar

INTRODUCTION

The Islamic finance industry worldwide has been experiencing exhilarating and continuous growth at a rate of 15% to 20% yearly (Abedifar, Hasan, & Tarazi, 2016). Islamic finance is primarily based on the shariah principles, is set to provide an alternative to the conventional finance practices. More Muslims and non-Muslim customers have accepted Islamic finance as it has been proven to be more resilient and has less impact during financial crisis shocks (Bitar, Madiès, & Taramasco, 2017; Derbel, Bouraoui, & Dammak, 2011; Nestorovic, 2013). As published by the 2020 Islamic Finance Development Report, the Islamic finance global assets is forecasted to reach US$3.69 trillion by 2024 (IFDI, 2020) In fact, Islamic finance is definitely being advocated by various agencies including the ICD that "it can play a major role in alleviating the social and economic consequences of the COVID-19 pandemic" (IFDI,

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The motivation to innovate *Name the Riba Transaction!*[©] game is to address to the issue that despite the expanding popularity of the said industry, there is still lack of understanding in the basic principles of Islamic finance among the public (Abdullah, Ab Wahab, Sabar, & Abu, 2017; Hamid & Nordin, 2001). In a latest study done by Ganesan, Pitchay, & Nasser (2020), they have concluded that the understanding of the shariah concepts are important to ensure that customers adopt Islamic finance. They suggest that banks must find attractive and easy ways to better educate customers in the methods used for the Islamic bank products.

Basic concept of Islamic Finance

Islamic finance is distinguished by its economic paradigm to abide to the belief system of one Creator, the lives of prophets sent to mankind and that everything will be accounted and judged by the Creator during Judgement day (Iqbal & Mirakhor, 2011); hence, the financial service rendered will have to comply to the Creator's law and principles, or Shariah in Arabic. The sources of the law must be derived from the Al Quran and the sunnah of the Prophet Muhammad (pbuh), while in the absence in these two primary sources, other secondary guidelines will be referred to such as by ijma (consensus of Islamic scholars), qiyas (analogical deduction), and more. It is understood that all Islamic financial businesses and transactions must be free from any elements of riba (interest), maysir (gambling), gharar (major ambiguity), trading of prohibited products in Islam such as pork and alcohol (ISRA, 2016), risk-sharing and equitable economic as well as ethical conduct (S. N. Ali, 2017). The use of Arabic term, which is the original language used in the primary sources of literature including Al Quran, is widely used in all of the financial products offered even outside of the Arab nations.

METHODOLOGY (How the game is played and players' feedback)

In this game, the method is adapting the game innovated by Zainuddin, Banchit, and Lai (2020) called *Name the Numbers!*[©] where the players will pick up a card with the assigned numbers and then place it in the correct cup with sticks to attain marks. In the end, the player with the highest marks will be the winner. In their pre and post analysis data of players paying this game, their findings have shown statistically significant difference in the players' result before and after playing the game which suggest better level of understanding in the concepts tested.

The 'paper and stick game model' is also adopted in this first ever competitive Islamic Finance game where the main fundamental financial concepts of riba and gharar mini case studies are incorporated in the game. Furthermore, *Name the Riba Transaction!*[©] game has added another element of challenge where the game will not only require the active participation of players to understand the shariah concepts, but also to apply the model of risks and returns as well as mathematics (negative and positive integers) skills in the quest of achieving higher marks by having different scores for the game: 1 mark for "Permissible" or "Non-Permissible", 3 marks for "Riba Duyun", "Riba Buyu'", "Gharar Fahish" or "Gharar Yassir", and 5 marks for "Riba Fadhl", "Riba Jahiliyyah", "Riba Nasi'ah" or "Riba Qardh".

For example, the question of "*Borrow USD100 within a month, failure to pay on time will*

Duyun" for 3 marks or "*Riba Jahiliyah*" for 5 marks. If the player places the question card at any of these three answers in the cup, he or she will be granted according to the score. However, if the player places it at other answers which is wrong then negative score will be given according to the score. For instance, once he or she places it to "*Gharar Yassir*", which is a wrong answer, then instead of getting a positive 3, then he or she will get negative 3 marks which of course will reduce his or her overall score. The concept of risks and returns in the financial model is also being applied, albeit in a subtle way as the players must decide whether they should risks the higher or lower returns (marks) based on their existing knowledge. When all the questions have been answered, the accumulated score will be counted by summing up all the positive and negative marks. Participant with the highest marks (either positive or negative) will be the winner of the game.

Data from a focus group interview (FGI) was conducted by the researchers that include six undergraduate students who had not studied/heard of the concepts. The evaluation was based on the extent of information gained before and after the game was played. The FGI consists of half an hour explanation of the basic terms and principles of Islamic finance as the game must be played by a person who has some basic knowledge of the terms 'riba' and 'gharar'. Hence, the game is to answer the main research question which is:

To what extent does the Name the Riba Transaction!© game help you to understand the Islamic finance principles of riba and gharar?

FINDINGS

Based on the focus group conducted, the following table shows the quotes that were coded for topic area of the focus group participants.

Table 1. Topic area

Topic area	Example participant quotes
Better understanding	"before the game, my knowledge is just so-so, but after the game, I gain better knowledge (of theconcept) when I had answered wrongly (and checking the answers)" "Islamic Finance concepts are not that easy to understand, but the game really helps to makemyself and others to be able to understand them…"
Promotable	Promotable because it helps to 'menguji minda dan boleh communicate dengan members lain'
Knowledge into practical	"playing game is better than just studying by reading notes and theory only; so much better and indepth understanding of the real situation from the real case studies"
Interesting	"The game helped me to recall all the terms in an interesting way"

CONCLUSIONS

The main strength of this game is that the game has managed to help the players to better understand and apply their knowledge of Islamic basic principles in a practical setting by the case studies given in an interesting and competitive manner. Furthermore, in the basic thematic qualitative analysis conducted, has also answered the main research questions whether the game is helping people to understand the basic concepts of riba and gharar. The existence of such game in the market is rare and this game while having a low cost in

production (may use recycled or new paper cup, sticks and papers) can be used as one of the teaching aids tools in secondary schools, colleges, or universities to increase the understanding on the main fundamental Islamic Finance which are getting more popular in the financial world and eventually across in all of the education level.

As the pandemic situation is overcoming the way people interact and learn, the game may also be promoted in households as card game for parents to help educate themselves and their young adult children to grasp and adapt the shariah way of life for their own success in this earth and the hereafter, as a mercy by Allah SWT in the verse below:

"O ye who believe! Devour not usury (Riba), doubled and multiplied; but fear Allah; that ye may (really) prosper". "Fear the fire, which is prepared for those who reject faith". And obey Allah and the Messenger; that ye may obtain mercy" (Ali Imran:130-132).

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NATMAG CLEANER
(NATURAL MAGNIFICENT CLEANER)

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ABSTRACT

Floors are usually affected by dirt, dust, and debris.. The dirtier the floor, the greater the health problems. These provide them a conducive environment to reproduce. Among the cleaning products used to overcome the problems is floor cleaner product which are mostly chemical based. In a typical Palm Oil plantation, almost 70% of the fresh fruit bunches are turned into wastes in the form of empty fruit bunches, fibres and shells, as well as liquid effluent. These by-products can be converted to value-added products or energy NatMag Cleaner, Natural Magnificent Cleaner is a floor cleaning product made of natural ingredients. The main material is the wastes of empty fruit bunches of the palm oil tree. These empty fruit bunches are dried and burnt to ashes and then mixed together blended curry leaves, fragrant lemon grass and pandan leaves. The ashes have the ability to clean heavy dirty stains just by spraying or spreading the powder on the dirty surfaces for a duration of time. The different types of leaves used have the speciality and ability of repelling different type of insects. Mixing them all together enable a multipurpose cleaner to be produced. NatMag Cleaner is an environmentally friendly product. It uses natural resources which can abundantly found in Malaysia. It is the first ever floor cleaning product using the waste of palm oil empty fruit branches as the main materials. This product also supports the government efforts to enhance the usage of Malaysian natural resources and which has been one of the country's agenda. It also supports the recycle campaigns launched by the government. And most important, it is a Malaysian product that can be proud of.

Keywords: ashes, pandan, curry leaves, lemongrass

INTRODUCTION

Empty fruit bunches (EFB) are what remains of the fresh fruit bunches after the fruit has been removed for oil pressing. Empty fruit bunches are a type of mill waste which is very valuable for farmers because it provides nutrients. It increases the soil organic matter content of the soil. Empty fruit bunches are usually burnt causing air pollution or returned to the plantations as mulch.

Floor cleaners can be found in various forms. They are either market in liquid form or powder forms. Nowadays cleaning products are created, designed and used to clean various types of flooring. An acidic tile cleaning solution can be used on ceramic and porcelain floors. Household and cleaning products such as soaps, polishes and grooming supplies often include harmful chemicals.
Many cleaning supplies or household products can cause health problems, including cancer. Some products release dangerous chemicals. Other harmful ingredients include ammonia and bleach. Even natural fragrances such as citrus can react to produce dangerous pollutants indoors.

PROBLEM STATEMENT

- Most floor cleaners in the market are chemical based.
- Problem of cleaning tough dirty floors.
- Some floor cleaners give side effects to the users which involved health problems.
- Empty fruit bunches are waste products of palm oil industries.
- The shortage of natural based products in the market. Most floor cleaners in the market are chemical based.

RESEARCH OBJECTIVES

- Preserving the environment by using safe and natural substances.
- Using tobacco leaves for a better use.
- Preparing a product that uses local resources which are easy to obtain.
- Prevent allergies due to the use of artificial and chemical materials.
- Produce a safe, healthy and environmental product.
- Enhance the use of Malaysian product.

THE PRODUCT : NATMAG CLEANER

NatMag Cleaner is invented by improving the already made products in the market   which are floor cleaning products. This product has multifunction purposes which cleans floor and at the same time repels insects. It can be used for different types of users and premises.
The main purpose of Natura Cleaner is to help overcome tough floor stains. It also has the ability to repels insects . The main ingredients are from natural resources and mixed together with other materials to enhance the quality of the product.

NatMag Cleaner is produced from the mixture of the ashes of palm oil empty bunches, pandan leaves, lemon fragrant grass, tobacco leaves and curry leaves The empty bunches of palm oil tree are dried and burnt slowly. The aches are collected and mixed with the blended fragrant lemon grass, pandan leaves and curry leaves. The solution is then dried to form the cleaning powder.

The ashes of the oil palm empty bunches is able to clean tough and dirty stains. Fragrant lemon grass contains citronella oil which is unfavourable to insects. Pandan leaves and curry leaves also give the same effect to insects. The mixture of these materials is able to produce a multipurpose floor cleaner.

NatMag   Cleaner will   give the an alternative to the customers to choose a safe andenvironmental floor cleaning product in the market.   It has special features and will be one of the potential products in the market. It can be one of the Malaysian product that can be highlighted because the production of Natura Cleaner uses simple and local
materials that can easily be found.

THE OUTSTANDING ASPECTS OF THE MATERIALS OF THE PRODUCT

Ashes of the palm oil empty bunches

The raw materials contain 37.3 – 46.5% cellulose, 25.3 – 33.8% hemicelluloses Liquid ethanol from the fermentation of cellulose acts as an eco-enymes to break down protein and lipid in stains. The slow burning of the empty fruit bunches produce ashes. The ashes provide an alkaline medium which will increace the water pH so that oil and stains can be easily clean.

Curry leaves

It was discovered to be a potential source of natural of active essential ingredient oil (contains alpha-pinene and beta-myrcene) for insect repellent which are not favourable to insects because insects have smooth and thin skin.

Fragrant lemongrass

It produces Citronella oil which is not favourable to termites. It is said that the oil has antiseptic character.

Pandan leaves

Pandan leaves contain a number of essential oils and chemicals that cockroaches find unpleasant. aroma of pandan is caused by the aroma compound 2-acetyl-1-pyrroline, found in the lower epidermal papillae

THE BENEFITS OF THIS PROJECT

- Turning waste to wealth.
- Helping the human society to resolve household problems.
- Producing a safe product from natural material.
- Beneficial pandan leaves as a cockroach repellent
- Widening the usage of curry leaves as a repellent.
- Educating the society of using natural products.
- The first ever Malaysian product using local resources.
- A product of Malaysian identity.

CONTRIBUTION

1. Recycle the wastes product into useable products.
2. Providing alternatives to the users to choose safe products.

3.   Helping individuals and farmers with the sales of the leaves, hence giving the opportunity to increase their income.
4.   Educating the society of using natural products and supporting the recycling programme

MARKETABILITY

1.   Floor cleaners are widely used in all premises.
2.   There are to many chemical based products.
3.   Since information can easily be seek through the internet, users are exposed to many information on safe, natural product.
4.   Product can be produced easily because the materials are from local resources.
5.   Palm oil industry is one of main and important industries in Malaysia. The supplies of the empty fruit bunches are always available

ACKNOWLEDGEMENTS

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NEW FUNDAMENTAL THEORY IN SOLVING THE ROYALTY PAYMENT PROBLEM

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ABSTRACT

This study deal with the non-classical Optimal Control problem (OCP) where we want to maximize the functional objective function. However, this project has to clarify a few constraints. Firstly, the final state value is unknown. Furthermore, the objective function involved the royalty function which is in terms of the piecewise function of the unknown final state value. In addition, the non-classical OCP of the unknown final state value resulting in the nonzero shadow value at the final time. Moreover, the royalty function is non-differentiable at a certain process. Therefore, this study applied a new modified shooting method which is Sufahani-Ahmad-Newton-Golden-Royalty Algorithm. The program is constructed in the C++ program language. As a validation process, the result was compared with the discretization method which is constructed in AMPL program language with MINOS solver. The discretization method involved Euler, Runge-Kutta, Trapezoidal, and Hermite-Simpson methods. It is expected that the new modified shooting method will give a more accurate optimal solution when compared with the discretization method. The difficulty in using the royalty function that is in the piecewise function is overcome by utilizing the continuous approximation of the hyperbolic tangent (tanh) approach. This is to make sure that the objective function can be differentiated at all processes. This project can be a stepping-stone for the researcher to explore a new approach in solving a real-world problem. The most important is, this project addressed the importance of fundamental theory in solving the untangled issue.

Keywords: optimal Control, royalty payment, shooting method

INTRODUCTION

A current Optimal Control (OC) problem in the financial aspects has numerical properties that do not fall into the classical OC formulation. This study deal with the non-classical OC problem where we want to maximize the functional performance index. However, solving the problem, this project has to clarify a few constraints. Firstly, the final state value is unknown. Furthermore, the integrand in the functional performance index involved royalty function which is in term of piecewise function of the unknown final state value. In addition, the non-classical setting of the unknown final state value resulting in the nonzero value of costate at the terminal time. Moreover, the royalty function is non-differentiable at certain process.

METHODOLOGY

Therefore, this study applied indirect method to solve the problem. This is by using new modified

shooting method which is constructed in C++ program language. The new modified shooting method involved Sufahani-Ahmad-Newton-Golden-Royalty Algorithm. As a validation process, the result will be compared with the direct method (discretization method) which is constructed in AMPL programming language with MINOS solver.

RESULT AND DISCUSSION

Finally, it is expected that new modified shooting method yield highly accurate optimal solution when compared to the direct method.
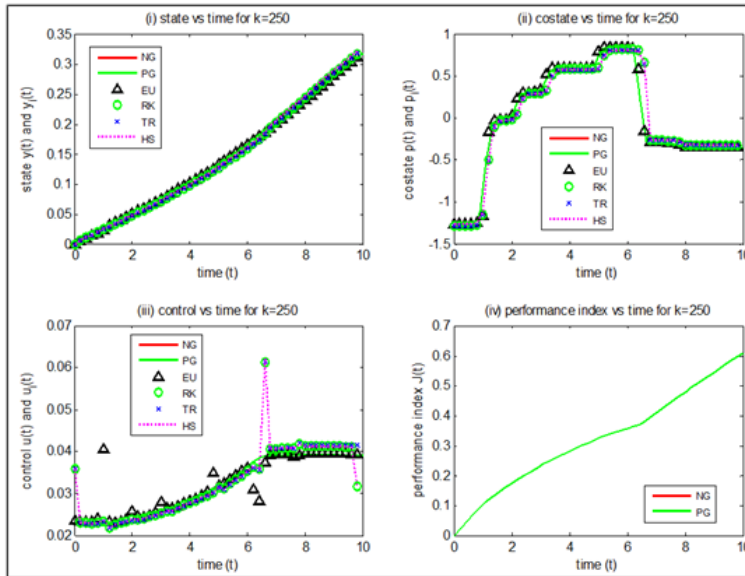
Figure 1. Optimal result of numerical testing with seven-stage royalty function. (EU=Euler; RK=Runge-Kutta; TM=Trapezoidal; HS=Hermite-Simpson)

RESULT AND DISCUSSION

Table 1. Result for the shooting and discretization methods with royalty function

Methods	Results				
	$y(T)$	$J(T)$	$p(0)$	$p(T)$	η_T
Shooting					
Newton & Golden Section Search	0.317978	0.606969	-1.254410	-0.356795	-0.356795
Discretization					
Euler	0.319074	0.611833	-1.26011	-	-
Runge-Kutta	0.323087	0.612860	-1.28002	-	-
Trapezoidal	0.322194	0.614032	-1.28354	-	-
Hermite-Simpson	0.328815	0.61295	-1.25833	-	-

To conclude, modified shooting method yield a more accurate and smooth optimal solution

and the differentiation process can be done in any time frame.

CONCLUSION

The difficulty in using the royalty function that is in piecewise function is overcome by utilizing the continuous approximation of hyperbolic tangent (tanh) approach. This is to make sure that the functional objective function can be differentiated at all process. This project can be a stepping-stone to researcher and academician to explore new approach in solving real-world problem. The most important is, this project addressed the importance of fundamental theory in solving the untangled issue

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NOTEBOOKLY (A PAGELESS NOTEBOOK)

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INTRODUCTION

Notebookless is one of the notebook innovation that inspired by those who work from home when the COVID-19 pandemic started. People start working and communicate virtually and forces all the organisation to shut down due to the pandemic situation. *Notebookless* functions as same as a normal notebook but with special features. It is an eco-friendly notebook and forever use. The pages are coated and designed to beuse with a special pen. The pages are not like normal paper but it also not plastic which the texture is quite similar to a tiny laminate paper and it smooth and easy to write on it. This notebook also comes with scanning features which whenever the user is done writing on it, they can directly scan it with smartphone which then it goes to a folder that they pre-designated and then it will automatically save to the devices such as tablet or computer before all the data being erased. This notebook comes with special its cleaning cloth to erase all the information written on it by wet the cloth before wiping.

PROBLEM STATEMENT

Paper consumption over the year has been increasing to more than 400 million metric tons each year and it has been growing in demand in recent years (2021). China and United States of America has been stated as the countries with the largest paper consuming in 2018. Meanwhile in Malaysia consumes about 119,000 tonnes and writing paper annually. Paper products have been contributing to the largest porting of multiple waste.

According to Thanam Industry Sdn Bhd, a scrap and recycle specialist in Kuala Lumpur (2021) stated that, over 57,000 tons of paper in Malaysia are being thrown in landfills in Malaysia where the amount of paper waste is equivalent to 680,000 trees being chopping down. With the amount of wastage of paper in Malaysia, paper recovery rates are still low in this country where it was only around 40% of papers are being recycled and recovered.

Paper wastage in Malaysia has contributed to the waste stream such as drains where it can cause problems such as flash floods and increasing the mosquitoes breed in Malaysia. Awareness on paper recycling is also still low in Malaysia as according to Solid Waste

Management and Public Cleansing Corporation (Star, 2017) stated that the recycling rate in Malaysia is only 17.5 despite many programmes and awareness on paper recycling has been introduced to the society. Therefore, in order to lessen down the paper wastage in Malaysia, the advancement of technology makes it possible to raise awareness on paper wastage and lessen down the paper usages where people could find another alternative to use paper without wasting them and lessen down the production of papers for daily usage such as notebooks and planner.

SWOT ANALYSIS

STRENGTHS	WEAKNESSES
1. This product is suitable for use by all groups such as students, teachers and lecturers as well as the industry worker. 2. If a student is unable to attend class, he or she has the ability to scan his or her colleague's handwritten notes, and transfer them directly to his or her computer or duplicate the notes into his or her notebook by printing the scanned document. 3. In addition to being economical, it offers portability and a scanner that makes it the perfect printer to meet all the demands for this network of customers. 4. The product is environmentally friendly that comes with wipe cloth 5. New technical products, and product improvements related to technological advances	1. Negative first impression by the public such as performance, price, and product quality. 2. Become a current trend in the market not in the long run. 3. The record of environmental considerations is not very encouraging. 4. Students usually learn to use their laptops which means that they will not use hardcopies often.
OPPORTUNITIES	THREATS
1. Life span of this product. 2. Worth the budget to spend on this product. 3. Expected to have more individual buyers after experiencing the convenience and advantages of using the product.	1. Changes of technological innovations in user preferences. 2. The challenge to maintain loyal customers.

POTENTIAL COLLABORATOR

The leading collaboration that is most anticipated for *Notebookless* is Xiaomi Corporation. Xiaomi Corporation was found in April 2010 and strives for a high-quality user experience and operational productivity while putting equal focus on creativity and quality. Since Xiaomi is an internet company with an Internet of Things (IoT) platform at its heart that connects smartphones and smart hardware, *Notebookless* would be a revolutionary invention especially

for those who tend to work from home and in need of high-speed and efficient working equipment. Furthermore, Xiaomi is also known as a business that creates outstanding goods at fair prices so that everyone in the world can live a better life thanks to cutting-edge technology. Hence, the concept of *Notebookless* matched Xiaomi's nature of business in which to strive easier daily life assisted by the technology and most importantly, an eco-friendly product. *Notebookless* could be a global collaboration of local and international company since Xiaomi products are available in over 100 countries and regions worldwide. Besides, their business was ranked 422nd on the Fortune Global 500 list in August 2020, up 46 positions from the previous year. It was also ranked seventh among internet businesses. In addition, they are a company that continuously refining their products to have the best possible user experience and most of the one-of-a-kind products were inspired by their fans.

NUTRITIOUS DIGITAL MENU SYSTEM FOR MALAYSIAN RELIGIOUS PRIMARY SCHOOL CHILDREN: IMPROVING GOOD MEMORIES

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ABSTRACT

Religious (Tahfiz) school students aged 7-12 need to eat nutritious meals which contain proper calories and nutrients for appropriate development with a specific end goal to repair and upkeep the body tissues. It averts undesired diseases and contamination. Serving healthier food is a noteworthy stride towards accomplishing that goal. However, arranging a nutritious and balanced menu manually is convoluted, wasteful and tedious. The aim of this study is to develop a mathematical model with an optimization technique for menu scheduling that fulfill the whole supplement prerequisite for tahfiz school students, reduce processing time, minimize the budget and serve an assortment type of food each day. It additionally gives the flexibility for the cook to choose any food to be considered in the beginning of the process and change any favored menu even after the ideal arrangement and optimal solution has been obtained. This is called sensitivity analysis. A recalculation procedure will be performed in light of the ideal arrangement and seven days menu. The data was gathered from the Malaysian Ministry and schools' authorities. Menu arranging is a known optimization problem. Therefore, Binary Programming alongside optimization techniques and "Sufahani-Ismail Algorithm" were utilized to take care of this issue and at the same time improving good memories for the children.

Keywords: Balanced menu; Binary programming; Menu planning; Optimization; Sensitivity analysis.

INTRODUCTION

Organizing adequate menus confronts various budgetary and mental objectives. It incorporates a synchronous idea of a few sorts of prerequisites: the desired stimulating substance, the inclinations of the person that it is being prepared for, the whole (volume or weight) of nourishment to be devoured, and the typical shape and substance of different sorts of meals. The menu or eating routine problem was studied by Stigler in 1945. This model, as in most operational research models, has been set up on the ordinary foremost supposition that the

decision makers try to progress or advance the work goal. The problem has continued being analyzed by specialists and dietitians. As needed in this paper, we expand the present data in menu masterminding focusing on Malaysian recipes, constraining the cost, fulfill the supporting essentials, serve a variety of food each day and upgrade the customer preference. We use Binary Programming to choose the most nutritious and adequate meals for Malaysian secondary school students from 13 to 18 years old. It is most likely going to be used by the Ministry of Education Malaysia and school authorities. The menu records are given to the school's cooks (in comprehensively) who give six meals everyday: Breakfast [B], Morning Tea [M], Lunch [L], Evening Tea [E], Dinner [D] and Supper [S]. The menu provided is a non-selective menu where the primary school students are not given the choice to pick a favoured menu. Planning adequate and pleasant menus is a basic way to keep the life of primary school students from tormenting any undesirable infections.

DATA COLLECTION

There are a few sorts of data that we need in order to build a menu planning model. This includes the cost of each Malaysian food, the dietary substance for each food, the Recommended Daily Allowance (RDA) which fuses with the upper bound (UB) and lower bound (LB) of each supplement, the nutrient involves for the Malaysian primary school students and the administration budget for the caterers. The information on current budgetary arrangement and cost per serving for each meal was assembled from the nutritionists of the Ministry of Education, the school's authorities through interviews and the school's cooks. The monetary allowance per student each day is Malaysian Ringgit 15.00. There are 11 supplements considered; Vitamins (A, B1, B2 and C), Calcium (Cal), Energy (E), Niacin (Ni), Protein (Pr), Carbohydrate (Car), Iron (I) and Fat (F) as appeared in Table 1. In addition, 10 sorts of food groups will be considered in this research; Cereal Based Meal (CBM), Rice Flour Based (RFB), Cereal Flour Based (CFB), Wheat Flour Based (WFB), Seafood and Fish (SF), Meat (MT), Fruit (FR), Vegetable (VG), Beverage (BV) and Miscellaneous (MS) as appeared in Table 2. We require 18 dishes from 10 sorts of food groups consistently.

Table 1. UB and LB of the 11 supplements

LB	Supplements (Nutrients)	UB
600mg	A	2800mg
1.1mg	B1	-
1mg	B2	-
65mg	C	1800mg
1000g	Cal	2500g
2050kcal	E	2840kcal
16mg	Ni	30mg
54g	Pr	-
180g	Car	330g
15mg	I	45mg
46g	F	86g

Table 2. Nourishment requirement each day

Type of nourishment	Requirement everyday (k)	Variable Notation
CBM	1 + 1 plain rice	(x_{114} - x_{126})
RFB	1	(x_{86} - x_{113})

CFB	1	$(x_{38} - x_{85})$
WFB	1	$(x_{262} - x_{286})$
SF	1	$(x_{287} - x_{324})$
MT	1	$(x_{127} - x_{158})$
FR	2	$(x_{213} - x_{261})$
VG	2	$(x_{159} - x_{212})$
BV	4 + 2 plain water	$(x_{1} - x_{37})$
MS	1	$(x_{325} - x_{426})$
Total Dishes Per Day	18	

Besides considering the whole 426 menus, the caterer is also given the flexibility to choose the number of days that he or she wants the system to generate nutritious menus for the school children. The caterer can choose from 1 day to 7 day menus. If the caterer chooses 3 days and below, the caterer is given the choice to choose either using automatic selection (consider the whole 426 menus) or manual selection (only consider 230 menus). Now if the caterer chooses manual selection, there is a limitation on the variable where the caterer can narrow down their preference to the following food (refer Table 3).

Table 3. Number of foods for manual selection from each food group

Food Group	Number of Food
Beverages (including Plain Water)	20
Cereal Flour Based	25
Rice Flour Based	25
Cereal Based Meal (Including Rice Cooked)	10
Meat	25
Vegetable	25
Fruit	25
Wheat Flour Based	25
Seafood	25
Miscellaneous	25
Total	**230**

This will help the caterer to meet with their preference. However, this only applied for a 3 day menu and below. For 4 days and beyond, the system will apply automatic selection where the system needs more than 230 variables to serve a variety of food for a higher number of days.

MATHEMATICAL MODEL

The essential purpose of this research study is to characterize a menu planning model that minimizes the budget given by the administration to the school's cooks, maximizes the assortment of nourishment and nutritious needs based on the Malaysian RDA requirements. Subsequently in a week, we require 126 dishes that will be sensibly chosen from the 230 or 426 dishes that are available. For automatic selection, all 426 variables will be considered in the calculation and for manual selection 230 variables will be considered. We will minimize the total cost J, therefore the objective function will become $J = \sum_{i=1}^{426} \text{Cost}(x_i) = \sum_{i=1}^{426} w_i x_i$,

$\sum_{i=1}^{426} w_i x_i$ by choosing the dish and giving an adequate daily menu. The maximum budget given by the administration per student per day is RM15.00. Hence, we try to restrain the cost. The daily constraints are, $LB \leq \sum_{i=1}^{426} \text{Nutrients}(x_i) \leq UB$, where i=1,2,..,11, and LB and UB are the restricted boundary values that need to be followed. It gives an alternate incentive for each supplement. This is to ensure that we meet the supplements essentials. We have 11 restrictions of supplements with lower and upper bound besides protein, vitamin B1 and B2 as

communicated in Table 2. In light of Table 1, we determine the 10 food group requirements $\sum_{i=1}^{10}$ Food Group Requirement(x_i), where i=1,2,..,10 and k is the number of requirements for each food group. The aim of this model is to serve 18 dishes each day. We have 230/426 variables which are in binary, $x_i = \{0,1\}$. Each food must be served once (1 picked or otherwise 0) for seven days except for plain water and plain rice. Each time looping, the program will consider available variables. For example, 18 variables are chosen from the 230 or 426 components that are available to be served on Day 1. The chosen variables will be meant as 1 (except for plain water which is 2) and the rest are zeros. As mentioned in (4), all variables are binaries except for plain water and plain rice. Binary suggests that the lower headed motivator for the variable is 0 and the upper bound regard is noted as 1. Before running for Day 2, each factor that is chosen in Day 1 will be wiped out besides plain water and plain rice. It infers that every last one of the foods that are served on day(i) will be deleted from the model and will not be served again on day(i+1) except for the two obligatory sustenance. We will use a looping technique for running the program for 7 days; eliminating the chosen variables from the present model and reshuffle all the perfect components into a genuine serving design.

RESULT AND DISCUSSION

The results are shown in Table 3 and Table 4. It shows a meal for one day to be given by the organization of the school to the primary school students. In Table 4, we can see that there is a collection of refreshments and sustenance shown in the essential primary ideal plan which consolidates six meals per day from breakfast to supper. By then we would like to change the menu one each in Beverages and Fruits from the essential primary ideal plan in light of our best menu. A recalculation process was done, and a second perfect course of action exhibits the results. Table 4 shows the different supplement recompense between the two perfect plans. The two results meet the daily nutritious essential for the primary school students at a minimum cost.

Table 4. Optimal and re-optimal result for Day 1

Day 1: Optimal Result	Type of nourishment	Day 1: Re-Optimal Result
Rice, chicken [L]; Rice, cooked [D]	CMB	Rice, chicken [L]; Rice, cooked [D]
Kuih kasui [B]	RFB	Kuih kasui [B]
Biscuit soda/plain [S]	CFB	Biscuit soda/plain [S]
Doughnut [E]	WFB	Doughnut [E]
Fish unspecified, dried, salt [D]	SF	Fish unspecified, dried, salt [D]
Chicken satay [L]	MT	Chicken satay [L]
Guava [L]; Nangka [D]	FR	Guava [L]; Lychee [D]
Celery(daun saderi) [L]; Mengkudu [D]	VG	Celery(daun saderi) [L]; Mengkudu [D]
Orange flavoured drink, powder [B]; Plain water (2 times) [T,L]; Coconut water [E]; Sugar cane juice D]; Milo [S]	BV	Milk powder, skimmed [B]; Plain water (2 times) [T,L]; Orange flavoured drink, powder [E]; Sugar cane juice D]; Milo [S]
Coconut candy [M]	MS	Coconut candy [M]
RM6.05	COST	RM6.61

CONCLUSION

The researchers have conveyed a sensible menu planning that can be used as a guide for the primary school authorities. The model was developed by using Matlab with LPSolve. It

fulfilled each one of the goals set by the researcher and gave an unrivaled arrangement which differs from other systems, for instance, Genetic Algorithms. This investigation focused on primary school students. The nutritious essentials required for youngsters under 12 years old and adults are not the same as the one used here. It will give an impact to the menu decision and the cost of setting up the meals. The total cost for each day is under RM15.00. In this way we can serve expensive and better quality foods for the primary school students. The post-optimality approach was used in this research and affecta-bility examination was made in this study towards the perspective of modifications in the coefficient value.

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ONLINE GAMES FOR LEARNING LEWIS STRUCTURE

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ABSTRACT
The application of online games has become prevalent in learning various courses including Chemistry. There are various online games for learning Chemistry which are available ubiquitously on many free online platforms. However, most of the games are developed by using applications which provide specific templates. The applications also only allow limited modifications in terms of game design which involves multimedia and gamification elements. Therefore, the Chemistry online game called Play Chemistry: Lewis Structure is developed by using the application called Scratch which allows unlimited game design based on the creativity of the developers. The topic, Lewis Structure, is selected due to the reason that the topic is challenging to be learnt by the students at the tertiary level. This paper aims to describe the development of a series of Chemistry online games called Play Chemistry: Lewis Structure. The series contains three games for three molecules namely tetrachloromethane (CCl_4), methane (CH_4) and water (H_2O). The games are developed for tertiary students at the diploma/degree level. The instructional design model applied for the design and development of the games is the ADDIE Model. The game adopts structural gamification by applying selected gamification elements such as score, praise feedback, explanatory feedback, verification feedback, and lives. The games are embedded on Google Site (https://sites.google.com/view/lewis-structure/home) for the students' easy access. The three molecules are considered easy molecules. Therefore, future work will focus on more difficult molecules.

Keywords: Games-based learning, online game, chemistry, Scratch

INTRODUCTION

Online games are widely used in educational institutions, schools, and homes as one of the platforms to attract students' interests and encourage them to be actively involved in the learning process. Nowadays, games are popular among students no matter at the school level or higher education. The use of games in learning aims to help students understand what they have learned in an interesting way. Digital game-based learning approaches have proven to be a more effective method and can increase motivation among students to study the subject matter (Hamari et al., 2016; Marina, 2008; Reynolds et al., 2020). Games for learning or known as educational games incorporate gamification approaches. Gamification is defined as applying game elements in non-game settings with the intention to engage and motivate the students through the learning process (Legaki et al. 2021). A new "race style" game called Fastest Fingers was proposed by Michael (2013) to solve an organic chemistry problem and then build the correct molecule as quickly as possible. The developed game required the students to work in teams of three or four to build the molecules themselves. Through this process, students gain a better understanding of the three-dimensional shape of these molecules. In chemistry, Lewis structures can be considered a very important and fundamental topic. Usually, the tertiary level students can have the knowledge on Lewis structure in General Chemistry (Cooper et al., 2009; Nassiff and Czerwinski, 2015; See 2009). Despite this, drawing a simple molecule is considered very simple for the students, however, as they progress and arrive at more complex molecules, the students feel that it is a challenging task and some students consider the Lewis structure topic to be very difficult to visualise and apply (Cooper et al., 2010). In addition, the concept of electron octet is not very clear to some of the students. Hence, it is important to develop a different approach where the students are able to know the number of electron valence and remember all the steps (rules) in a more entertaining way. This paper describes the development of Lewis structure games especially for chemistry students in terms of selecting the game content, development of the storyboard and games development.

GAMES DEVELOPMENT

Play Chemistry: Lewis Structure is designed by using the ADDIE Model which consists of five phases namely (1) Analysis, (2) Design, (3) Development, (4) Implementation and (5) Evaluation. The model is selected due to its systematic and easy approach in creating an effective, creative, and efficient product. Apart from that, the ADDIE Model is chosen as it involves a teaching and learning environment which fits the objective to enhance the student's understanding in constructing chemical structure of molecules using Lewis diagrammes (Hidayanto et. al., 2017; Sahrir and Alias, 2012). The game is mainly designed for the first-year students at diploma or degree levels who have basic knowledge in general chemistry. At the first stage, the game is limited to simple and common covalent molecules including CCl_4, CH_4 and H_2O which have single bonds and follow the octet rule (no expanded octet). The game starts with the simple molecules to familiarise the students with common patterns of Lewis structure and bonding. Structural gamification is chosen for the game design in the storyboard development. Structural gamification is basically the use of game elements to increase the students' participation by keeping the content unchanged (Lamprinou and Paraskeva, 2015). Several gamification elements such as praise feedback, explanatory feedback, verification feedback, and lives were deliberately selected. This is because the objective of the game is to help the teaching and learning process either in the virtual or physical class. The purpose of applying the selected gamification elements are as follows:

a. Explanatory feedback
To construct understanding based on the mistakes done in performing the tasks in the game so that students' knowledge and skills can be improved.

b. Praise feedback
To make students feel good so that it can increase their motivation to perform the tasks in the game.

c. Verification feedback
To inform students' performance so that they can gauge their learning progress.

d. Score
To reward students' achievement so that it can positively reinforce them to engage in the game.

e. Life
To allow freedom to fail so that students have several opportunities to perform the tasks in the game.

The game tasks in the game are arranged according to cognitive difficulty levels based on the revised Bloom's Taxonomy (Krathwohl, 2002). The taxonomy has six cognitive levels which are (1) Remember, (2) Understand, (3) Apply, (4) Analyse, (5) Evaluate, and (6) Create. The following gamification elements are provided when students give the correct or wrong response to the task in the game.

a.   When students answer the task correctly

One point (score) is awarded to inform their achievement. Verification feedback is provided in the form of a pleasant sound to notify that their answer is correct. Praise feedback is provided in the form of onscreen text such as "Well done!". Then, they will proceed to the next task.

b.   When students answer the task incorrectly

No point is awarded to notify that there is no achievement. Verification feedback is provided in the form of an unpleasant sound to notify that their answer is incorrect. Praise feedback is provided in the form of onscreen text such as "Try again!" to increase their motivation to proceed with the next attempt. Explanatory feedback is provided to improve their understanding so that it will facilitate them to answer correctly in the next attempt. Another opportunity (life) to perform the task is provided.

The game was developed using Scratch, an online application for developing interactive games, stories, and animations. Scratch can be accessed at https://scratch.mit.edu/. Projects can be downloaded and accessed offline or shared on the website. The shared projects can be embedded on any social media such as Facebook, Telegram, and Whatsapp, or online platforms such as learning management systems, Google Sites, blogs, and websites. Scratch was chosen to develop the game as it is not costly as no subscription fee is required. Furthermore, it is easy to use since users do not need to learn any programming language. Besides, there are many supports to learn using Scratch such Scratch Wiki, YouTube tutorial video channels and Facebook support groups.

CONCLUSION

An online game for Lewis structure that uses structural gamification has been developed. This online game was developed as an alternative for online teaching and learning that is suitable particularly for the current COVID-19 pandemic situation where all the teaching and learning processes are carried out through online and distance learning (ODL). The developed game is expected to create an exciting and fun way of teaching and learning Chemistry as well as assist students to personalise their learning. In the future, the project will be continued by creating more games in learning Lewis structure of more difficult molecules which consist of multiple bonds (double and triple bonds), and molecules which deviate from the octet rule as well as charged molecular ions.

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OPTIMAL CHARGING SCHEDULE OF ELECTRIC VEHICLES USING EVOLUTIONARY PROGRAMMING TO MINIMISE COSTS

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ABSTRACT

Electric vehicle technology presents new opportunities to the transportation sector and car manufacturers worldwide. However, this development is becoming a concern to utility operators when a large number of electric vehicles are charged simultaneously, which overloading might occur, especially during peak hours. This condition can affect the stability of the grid. Since electric vehicles are considered as an additional load to the power grid, a suitable charging coordination must be presented in order to optimize grid operation. This study implemented an electric vehicle charging schedule on an IEEE 33-bus residential network using evolutionary programming for optimization. Some constraints, such as power and voltage limits of the grid were taken into consideration to ensure the efficacy of the proposed optimal charging strategy. Simulation results showed the comparison between uncoordinated and coordinated charging schemes in terms of daily load curve and EV operating costs. Three case studies were analysed for coordinated charging based on different charging periods. Electric vehicle charging rate is varied in order to determine the minimum operational costs.

Keywords: charging coordination, cost minimization, electric vehicle, evolutionary programming

INTRODUCTION

Electric vehicles (EV) can be considered as one of the evolving technologies in recent years. EVs invention is an alternative to achieve environmental conservation by reducing carbon emission. Compared to the conventional internal combustion engine (ICE) transportation [1], EVs are expected to be accepted and popular among vehicle users in the near future. High EV penetration comes with the risk of degrading the reliability and distribution performance of the power grid [2]. Simultaneous charging of EVs, especially at residential nodes, will impose a

serious impact on peak demand and increase power transmission loss [3]. Thus, it may increase the operational costs, in terms of replacing new equipment and maintenance [4]. This study aimed to coordinate EV charging using EP optimization technique. The algorithm considered 24-hour electricity price data, and varied EV users' charging rate and time in order to achieve the minimum operational cost. This method also maintained grid operation within the normal voltage and power limit, especially during peak hours. The uncoordinated and coordinated charging results of three case studies were compared and discussed.

SYSTEM MODELING

An analysis was performed on a residential distribution system by considering a 24-hour load profile and energy market pricing. A distribution system of 415 V IEEE 33-bus, as shown in Figure 1 is used as the test network in this study. In this study, EV charging is assumed to occur at home and not at the charging station. EV users are assumed to be using their EV as their daily transport that they can use for a short distance, such as go to work, send their kids to school or go to shopping malls for groceries. After returning home from their respective activities, users can directly charge their EV overnight. A typical residential daily load curve is used to model the domestic load variations within 24 hours. This curve was based on real data captured from a distribution transformer [4]. Domestic EV chargers are assumed to be rated at 4 kW per hour. Battery capacity is important to determine reasonable charging profiles for all EVs. In this study, all EVs were assumed to have a maximum battery storage capacity of 16 kWh, with state of charge (SOC) from 0 percent to 100 percent [5]. Therefore, 4 hours would be needed for all EVs to be completely charged. Cost minimization is considered based on hourly electricity prices of the open market.
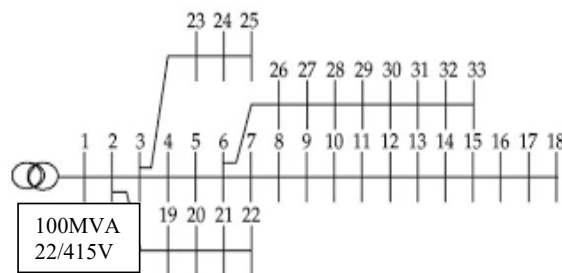

Figure 1. Distribution Network System

METHODOLOGY

The minimum cost function is shown in Equation (1), where the cost function is the summation of charging hour price. P_{ev_t} is formulated in Equation (2), whereby EV charging load, P_{ev} is multiplied by the EV charging rate. The charging rate is optimised in the algorithm to choose when the car would need to charge at a full rate and when it would need to charge at a lower rate. Flowchart of the optimization technique based on the EP algorithm is shown in Figure 2.

$$F_{cost} = \sum_{t=1}^{t=24}\left[P_{ev\_t} * Price_{t,i}\right]$$

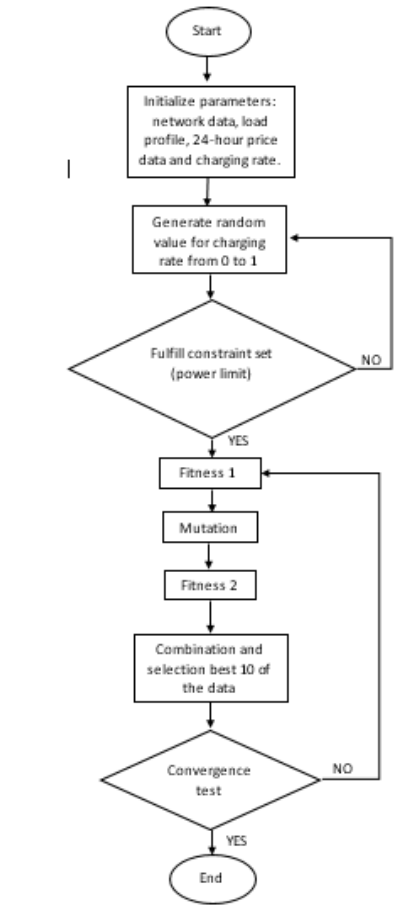$$P_{ev\_t} = P_{ev} * C_{rate_t} P_{ev\_t} = P_{ev} * C_{rate_t}$$

Figure 2. Optimization Process Flowchart

RESULTS AND DISCUSSION

Impacts of EV charging were presented for both uncoordinated and coordinated charging schemes. In the coordinated charging scheme, the optimal charging rate of EVs to achieve minimal cost is evaluated by comparing three case studies of different EV charging periods, as shown in Table 1. The coordinated charging scheme using EP algorithm was expected to distribute EVs charging over the designated charging period, while achieving the objective of minimum operation cost. The stability and safety of the grid was ensured by following the operational constraints set in the algorithm. Result for case no. 3 is given in Figure 3 showing that the coordinated charging led the load from EVs charging to be shifted from peak hours to off-peak hours. Data of optimal charging rates and total costs are summarised in Table 2 for both uncoordinated and coordinated schemes.

Table 1. EV Charging Schemes and Case Studies

Case no.	Charging scheme/time
Uncoordinated charging	
	5:00 pm - 9:00 pm (4 hours)
Coordinated charging	
1	5:00 pm - 2:00 am (9 hours)
2	5:00 pm - 3:00 am (10 hours)
3	5:00 pm - 5:00 am (12 hours)

Table 2. Summary Results including EV Charging Hours, Energy, Charging Rate, and Total Cost

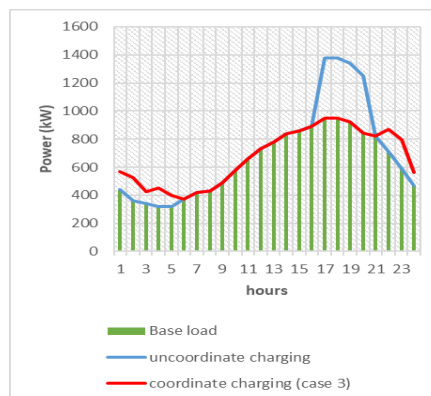| time (h)	Uncoordinated charging			Coordinated charging								
				Case 1			Case 2			Case 3		
	Energy (kWh)	Cost ($)	Rate	Energy (kWh)	Cost ($)	Rate	Energy (kWh)	Cost ($)	Rate	Energy (kWh)	Cost ($)	Rate
1				154.034	5.083	0.7	167.234	5.519	0.3	127.634	4.212	0.3
2				127.228	3.435	0.9	140.428	3.719	0.8	166.83	4.504	0.3
3							137.027	2.741	1	84.226	1.685	0.8
4										133.625	2.272	1
5										80.825	1.374	0.4
17	325.57	27.999	1									
18	325.57	19.209	1									
19	220.5	13.451	1									
20	207.7	12.67	1									
21												
22				240.1	17.287	0.5	239.555	17.248	0.2	160.355	11.546	0.2
23				229.146	9.853	0.9	179.546	7.72	1	205.946	8.856	0.3
24				198.737	8.546	1	159.137	6.843	0.7	93.137	4.005	0.7
Total cost	73.329			44.204			43.788			38.454		

Figure 3. Daily Load Curve with Coordinated Charging (Case 3)

CONCLUSION

This paper proposes the EV charging coordination for an IEEE 33-bus residential distribution system to minimise the operational costs using EP algorithm. The simulation results are presented and compared with the uncoordinated and coordinated charging schemes. The charging rates of EVs were optimised throughout the programming process. The EP method is proven to be practical and shows good convergence properties. The proposed algorithm has also successfully achieved the objective of minimising the operational costs of EV without violating network conditions. Future studies may consider larger aspects of variation in other parameters, such as battery capacity, EV penetrations, and pricing scheme.

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THE SMART ATTENDANCE of MICROSOFT TEAM (SAMT2021) IN AN ONLINE LEARNING CLASSROOM

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ABSTRACT

Microsoft Teams has developed into an efficient platform for conducting online education and providing students with an ideal learning environment. Microsoft teams have numerous components, such as basic Microsoft team functions, discussions, evaluations, features, and attendance sheet. In this study we focus on the attendance sheet. There are some restrictions on the attendance sheet in Microsoft Teams in which it could not identify missing students. Second, it takes time to determine the length of a student's attendance in class due to the duplications of student names, and lastly, they lack monthly report compliance. In addressing these issues, we developed the smart attendance of microsoft team (SAMT2021) with an easy-to-use absence detection coordination. SAMT2021 can abstract the student's attendance frequency (in and out) of class report via the new smart attendance in comparison to Google Meet attendance and uFuture instant attendance. This smart attendance can directly and instantly connect to the WhatsApp chat to query and remind students on class absence. The anticipated result of SAMT2021 will efficiently enable lecturers to use these SAMT2021 systems and integrate them with INFOTECH and the Academic Affairs System.

Keywords: Microsoft Teams, Smart Attendance Sheet, Online Learning, Higher Learning Institutions

INTRODUCTION

Globally the educational landscape drastically changed due the pandemic situation which saw the urgency of teaching and learning being done through online digital classrooms. The COVID19 pandemic which started in March 2019 had pushed the education ministries across Asia for mass migrations online, with the help of Microsoft Teams, Office 365 and Microsoft Azure, enabling millions of students to continue learning from home (Gnaneswaran, 2020). In Vietnam, the Ministry of Education and Training deployed Microsoft Teams in a record time of 27 hours for more than 200 schools in Hai Phong city. In over 2 months, Teams was successfully adopted for more than 3.3 million teachers and students from primary and secondary schools, high schools, and institutes of higher learning across the country. Similarly, the Tokyo Metropolitan Board of Education adopted Microsoft Teams and Microsoft 365 Education to create a conducive and interactive environment online. Meanwhile, in Malaysia, the Ministry of Education (MoE) and Digital Classroom Admin (DCA), with the help of Microsoft, rose to the challenge by conducting daily webinars to introduce teachers to

Microsoft Teams and Office 365. Training sessions were recorded on Teams and uploaded on MoE's Digital Learning portal (Ruang Ilmu), enabling over 430,000 teachers across the nation to review training materials at their own time (Gnaneswaran, 2020).

Microsoft is offering anyone its premium version of Teams for free for six months and lifted existing user limits. Google has announced that it is offering its enterprise video conferencing features such as larger meetings up to 250 people and recording functionality for free to G Suite and G Suite for Education customers through July 1, 2020. Consequently, Google had limited the meeting to just 100 participants in early 2021. Zoom has lifted the time limit of video calls in China, Japan, Italy, and the US by request (Rani, 2020). The education management information system reported in early March 2020 that the number of users in Microsoft teams was only 750, while at the end of March it reached 138698 showing a significant growth in the activity (OECD, 2020).

The global pandemic situation has made the technology connection of internet and database information an essential part of the academic profession. Evidently, an academician needs to discipline their efforts to create authoritative, collaborative, online information resources and databases overseen by the academic community not only for teaching and learning, research collaboration but also for career advancement. Schools and universities need to shift to an automated time attendance system due to the pandemic situation where educators need to properly record the attendance of its students for effective planning, management and functioning of the online distance classes. In fact, educational institutions, universities, polytechnics, colleges of education are concerned about student attendance, which is mandatory and has a written policy forming part of the requirements for eligibility to sit for an examination.

Given the importance of a good attendance system towards educators, this study aims to implement the proposed smart attendance system to reduce the burden on the educators since this technology will handle it. Educators will have more time in delivering valuable knowledge and skills by having this smart attendance system in saving lecture time, being more efficient, and improving accuracy.

The remainder of this section will proceed as follows, the study's problem statement and objectives will be discussed. Following that, a comprehensive review of the literature was conducted to determine the efficacy of attendance in Microsoft teams. The objectives are then achieved through the application's methodology and design. Following that, the pilot study's findings regarding the efficacy of SAMT2021 applications are presented. The final section contains a discussion of the research findings and a conclusion.

Research Problem and Objectives

The outbreak of COVID-19 globally caused an exceptional impact on education due to educational institutions' closures (Ali, 2020) including Malaysian higher institutions education. About 1 billion students are affected by school and university closures worldwide due to COVID-19 Pandemic (UNESCO, 2020a). These closures increased the students to have home online learning which bring challenges for both learners and educators. The typical

global method of teaching used to be in a physical dialogue but as the pandemic situation prolong, the scheduled class meeting had been changed using a virtual interaction such as Google Meet and Microsoft Teams or other suitable platforms. Hence, the need for a stable and efficient system to monitor, check and ensure the students attend the scheduled session should be developed in evaluating student's academic performance is imminent. Nonetheless, the current attendance system in the microsoft teams and google meet system do not allow for the lecturer to check on those absent students. Likewise, the lecturer needs to spend time to check and detect the absentee to allow for further actions on the students. Even the electronic system entry method is still suffering from the problem of wasting time (Alghamdi et.al 2020). Furthermore, through our observation of the current system we found many problems, including the lack of accuracy of the current attendance systems, the loss of time to call the names of students to check on the virtual attendance, and the difficulty of procedures to collect excuses of absence, and to raise excuses. Hence, the objectives of this study are as follows:

1)   to keep track of students who are absent from class
2)   to calculate the amount of time the students spend in class
3)   to calculate the number of the log-ins for each student during the class
4)   to link the letter of excuse to the attendance sheet
5)   to send WhatsApp message to students to remind them of their class absence.

LITERATURE REVIEW

Covid-19 has forced academic and higher institutions to drop century's methodology of teaching and learning and have made them acquire innovative solutions within a very short span of time. In fact, the continuation of the virtual classroom may further be enhanced in most academic and higher institutions even after the pandemic ends and become a norm to all academicians. Taking student's attendance is one of the major processes and concerns of lecturers in every class whether virtual or physical. The rise of student attendance and absence prevention have always been parts of concern for teachers as well as society members and parents (Hamdan & Lai, 2014) especially during this online digital learning where student's engagement is very important in absorbing the knowledge and skills. According to Hanapi, Nordin and Rus (2014), students with attendance problems are likely to develop negative social behaviors and personal practices not acceptable in the skill world.

In a recent study by Diab-Bahman, Al-Enzi, Sharafeddine, and Aftimos (2021) on effect of attendance on student performance, they concluded that both attendance and year of study did have a statistically significant influence on grades. Hence, they also concluded that further initiatives should be undertaken to link attendance and student performance. Spaho and Godolja (2014) examined the correlation between lecture attendance and final examination success and found that attendance of business students had a significant impact on their final success in the general mathematics course at the University of Tirana, Albania. In another study on student attendance on academic performance in accounting courses by Jameel and Hamdan (2015) revealed that attending classes significantly improves students' performance. Further study conducted by Abrokwa (2016) on 158 students taking accounting courses at a medium-sized state university located in the southeast of the US revealed that attendance has a significant moderately positive effect on student performance in an introductory accounting course. These results are consistent with the results reported by Marburger (2006), Snyder et al. (2014) and Nyatanga and Mukorera (2019), who found that the existence of a mandatory

attendance policy significantly reduces absenteeism and improves exam performance. As the uncertainty of Covid-19 pandemic to stop and with the increased number of online courses that have become compulsory, investigating the effectiveness of smart attendance should be initiated.

METHODOLOGY

Universiti Teknologi Mara (UiTM) are committed to health and safety during the pandemic situation to all campuses throughout Malaysia. Teaching and learning progresses through the usage of online digital learning systems by all the academicians. This study adopted an email and Google form survey as a data collection method and analysed using Microsoft Excel. Respondents of this survey are lecturers from Universiti Teknologi Mara (UiTM) Negeri Sembilan Branch who used Microsoft Team as their teaching and learning tool in the online distance learning (ODL) class. Data was collected within 60 days starting from 1 June 2021 until 30 July 2021. Hence, the methodology of our study is simplified in Figure 1.
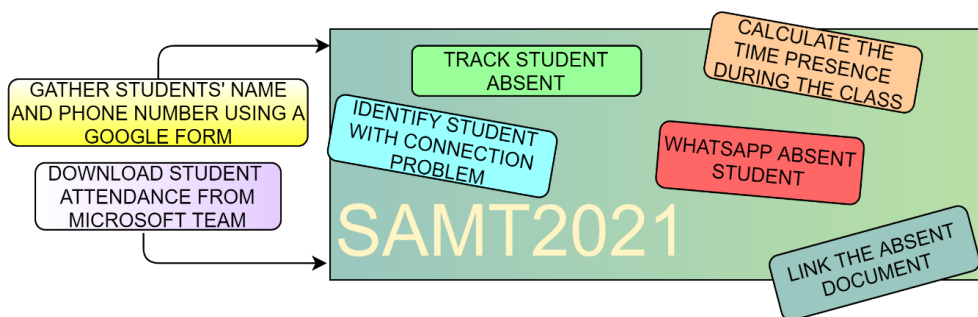
Figure 1. The SAMT2021 Flowchart

STEP 1. Gather information of students in the class (google form etc. UFuture, SIMS)

Students' information was collected at the beginning of a class, in the first week of semester using google forms as shown in Figure 1 below. Details such as full name, telephone number, email and student id are required for the lecturer to detect any circumstances occur throughout the running semester. Later, this form will be converted to excel for systematic labeling information after all the students submitted the forms.

STEP 2. Download and copy attendance report, paste to SAMT2021 template.

Attendance report will be downloaded at the end of the class that can be found in Post column as shown in Figure 2 below. Then, all the details are transformed into the SAMT2021.
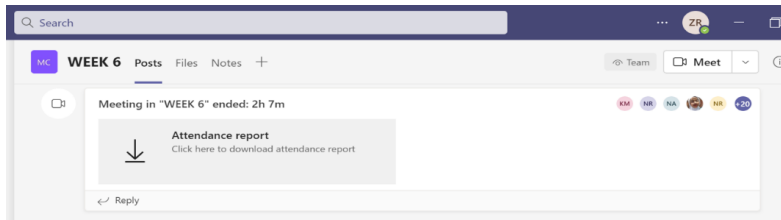
Figure 2. The attendance report in MT

However there are some problems detected within the attendance reported by the Microsoft team as shown in Figure 3. The first problem is the information in the Microsoft team attendance report could not detect an absent student during the class. Second, there are repeated name and time shown in the report. Third, the Microsoft team are unable to check the total time spent by the student in the class.

Figure 3. The Characteristics of Attendance Report of MT

Therefore, SAMT2021 is developed to enhance the Microsoft team attendance report. The advantage of SAMT2021 is it can identify an absent student after the class ends. It is also easier for the lecturer to proceed further actions on the absent student. Instead of transferring all the information to an excel, the data can be pasted into SAMT2021 based on the wanted column.

SAMT2021 as can be seen in Figure 4 is where the attendance report can clearly show the students time that they spent in the class. It makes it easier for the lecturer to track how much time the students are in the class during the class session which would make it easier for the lecturers to identify if the students are having internet connection problem or others.
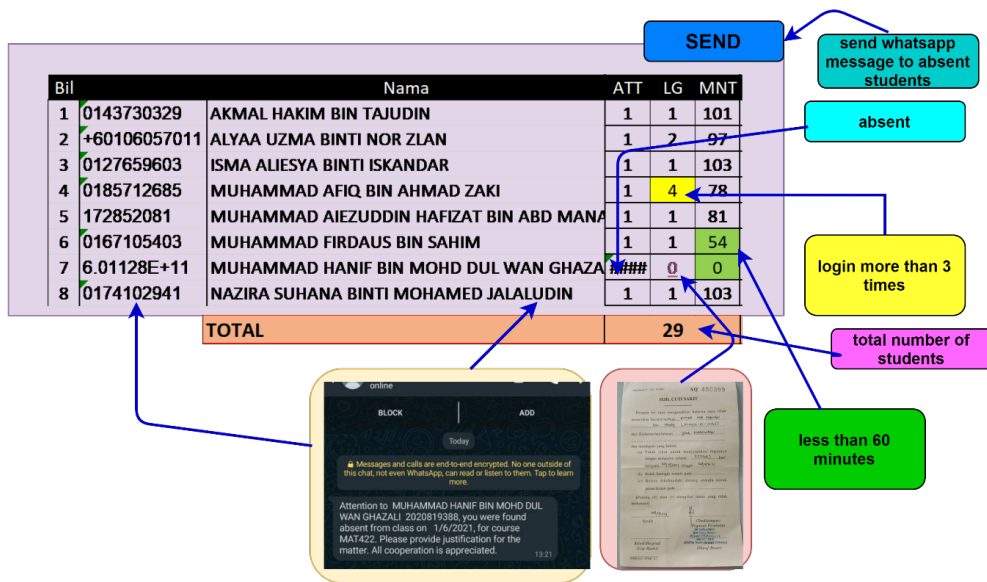
Figure 4. The SAMT2021

The advantage of SAMT2021 is, it can identify an absent student after the class ends. It is also easier for the lecturer to proceed further actions on the absent student through the tracking system. Illustration as per Figure 4 and 5.

Figure 5. Student Tracking in SAMT2021

SAMT2021 allows the lecturers to identify and check more accurately on the student's participations in the class. The system further allows the lecturers to connect with the students directly via the WhatsApp in giving reminder for the student absentee. Once the student gets the reminder, they should contact or reply to the lecturers for the reasoning of their absence.

RESULTS

In this section, the results of a pilot study on the efficacy of SAMT2021 application are presented in Figure 6-Figure 11.

Figure 6. I believe I would like to use this SAMT2021 to generate an attendance report

Figure 7. I believe that I would require the assistance of a technical person in order to use this SAMT2021

Figure 8. I discovered that this SAMT2021 passed easily without a lot of backtracking or

data re-entry

Figure 10. I imagine that the majority of people would quickly pick up on how to use this SAMT2021

Figure 9. I felt that this SAMT2021 contained an excessive amount of inconsistency.

Figure 11. I felt very confident in my ability to use this SAMT2021 but needed to learn a few things before I could get started.

This study investigates lecturer's engagement during online learning by using Microsoft Teams as the online teaching tool during the Covid-19 pandemic. The study was conducted in Universiti Teknologi MARA (UiTM) Cawangan Negeri Sembilan when most online learning is done virtually as the lecturers are working from home due to the pandemic situation. Majority of the respondents acknowledged the effectiveness of SAMT2021 attendance and its reporting. The respondents found the SAMT2021 attendance is not complex and easy to use. In fact, they mentioned that they can easily navigate through the attendance sheet system without a lot of backtracking or data entry. Most respondents also are interested to continue using as SAMT2021 is easy and can quickly be adapted. They also feel that they are confident in using it although they are new to SAMT2021 as the navigation is easy and not complicated. It can be concluded that SAMT2021 was found by the lecturers to be supportive and an efficient tool to

monitor the student's attendance in their online teaching and learning especially during the pandemic situation.

CONCLUSIONS

The objectives of this study are (1) to keep track of students who are absent from class (2) to calculate the amount of time the students spend in class (3) to calculate the number of the log-ins for each student during the class (4) to link the letter of excuse to the attendance sheet and (5) to send WhatsApp message to students to remind them of their class absence. The results show that most lecturers surveyed are aware of the importance of their attendance and agreed that the smart attendance Microsoft team 2021 are satisfied with its functions which are better and efficient as compared to uFuture attendance and the original system of Microsoft team attendance available. The results show that SAMT2021 have five advantages as compared to uFuture attendance and Microsoft Team attendance which are summarized in the table below.

Table 1. The comparison of attendance report

SAMT2021	Ufuture ATTENDANCE	ATTENDANCE REPORT FOR MT
Students do no need to fill the attendance sheet,	Students need time to fill the attendance sheet.	Students do not need to fill the attendance sheet, but it is not user friendly.
Lecturers are able to track student absentee from the class easily.	Lecturers are able to track student absentee from the class easily.	Lecturers are unable to track student absentee from the class easily.
Lecturers are able to track the time the student spent in the class.	Lecturers are unable to track the students spent time in the class.	Lecturers are able to track student's time spent in the class but need time to calculate manually.
Lecturers are able to identify the student that have internet connection problems.	Lecturers are unable to identify students that have internet connection problems.	Lecturers are able to track and identify student with the internet connection problems but need to check manually.
SAMT2021 has connection with WhatsApp which help the lecturers to directly connect with their students.	Lecturers are unable to connect with students via WhatsApp.	Lecturers are unable to connect with students via WhatsApp.

Based on the summarized table, this study has achieved the five objectives stated earlier. The researcher of this study is planning to develop and innovate a more stable system that can help lecturers to return personal exam test or assignment to a larger number of students. In fact, the future planning of SAMT2021 will be to efficiently help lecturers to send the student's carry mark and messages privately to each student. Nonetheless, the outcomes of this study indicate that it is crucial still to innovate the attendance system in helping lecturers to deliver an efficient teaching and learning from home. It is also hope that SAMT2021 can improve problems of tracking students absentee and internet problems, sending messages instantly and connect with the students directly, while sharing and delivering teaching and learning during the pandemic. This smart attendance system is hoped to help the educators and the academic student affairs in delivering an efficient and quality service during the pandemic.

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PENELITIAN TERHADAP KEPELBAGAIAN FUNGSI BANDAR KECIL TERHADAP PENDUDUK SETEMPAT DI GEMAS, NEGERI SEMBILAN

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ABSTRAK

Artikel ini meneliti tentang kepelbagaian fungsi bandar kecil terhadap penduduk setempat di Gemas, Negeri Sembilan. Fungsi bandar kecil Gemas dalam konsep pembangunan sekitar yang diteliti terbahagi kepada enam aspek utama, iaitu sebagai memenuhi keperluan asas, ekonomi dan peluang pekerjaan penduduk setempat, pusat pentadbiran, penyediaan input pertanian, pendidikan serta pusat pengangkutan. Kajian ini menggunakan kaedah kuantitatif dengan mengedarkan sebanyak 143 borang soal selidik kepada responden. Hasil kajian mendapati majoriti responden bersetuju bahawa Gemas menjalankan fungsinya sebagai bandar kecil. Justeru, kajian mendapati bahawa bandar kecil Gemas telah mengalami perubahan ke arah yang lebih moden dan maju. Hal ini kerana semakin banyak bilangan fungsi yang ditawarkan oleh bandar kecil Gemas menjadikannya semakin pesat membangun. Selain itu, kepelbagaian fungsi mengubah fungsi asalnya daripada menyediakan perkhidmatan asas kepada menyediakan pelbagai kemudahan kepada penduduk. Dengan wujudnya pelan strategik jangka panjang yang berintegrasi, Gemas dijangka akan berkembang pesat menjadi sebuah bandar yang berdaya maju.

Kata kunci: fungsi bandar kecil, pembangunan sekitar, penduduk

PENGENALAN

Aspek yang mendasari program pembangunan berteraskan bandar adalah bandar metropolitan dan bandar saiz pertengahan serta peranan sebagai pusat hierarki rendah. Bandar metropolitan dan bandar saiz pertengahan berperanan penting dalam memesatkan kadar pertumbuhan ekonomi negara manakala pusat hierarki rendah penting dalam memajukan taraf hidup penduduk luar bandar. Pusat perkhidmatan hierarki rendah mempunyai potensi besar untuk membantu dalam meningkatkan daya keluaran pertanian, menyediakan perkhidmatan dan kemudahan asas yang diperlukan dan mengurangkan kadar kemiskinan melalui peningkatan pendapatan dan taraf hidup (Katiman, 2001). Secara keseluruhannya, kedua-dua kategori tersebut harus bergerak seiring bagi mengimbangi pembangunan sama ada di bandar atau luar bandar supaya rantaian pembandaran diteruskan mengikut fungsi bandar atau pusat perkhidmatan yang pada akhirnya mencapai matlamat pembangunan negara.

Malaysia merupakan negara yang pesat membangun dalam pelbagai sektor. Oleh itu, berlaku perubahan dan pembangunan dalam pelbagai sektor di setiap kawasan sama ada bandar atau luar bandar bagi memenuhi hasrat negara menjadi negara maju. Apabila berlaku penerokaan dan pembangunan, sesuatu kawasan atau petempatan itu berubah menjadi maju atau menjadi bandar. Bandar merupakan tumpuan manusia menjalankan pelbagai aktiviti ekonomi dan perkhidmatan. Kawasan yang lambat membangun biasanya menjadi pusat perkhidmatan dan dikenali sebagai bandar kecil yang bertujuan memberi keselesaan dan meningkatkan kualiti hidup masyarakat sekitarnya dalam skala yang lebih kecil serta mempunyai pelbagai fungsi yang tersendiri kepada penduduk setempat. Perkhidmatan yang disediakan di bandar kecil adalah bertujuan memberi keselesaan dan meningkatkan kualiti hidup masyarakat sekitarnya.

Pembangunan luar bandar adalah suatu usaha menyusun keberhasilan pembandaran di Malaysia yang semakin pesat disebabkan oleh pelbagai faktor seperti perindustrian, perkhidmatan dan perdagangan di bandar utama, kebajikan dan kehidupan sosial di kawasan luar bandar. Situasi yang sama dengan mana-mana negara membangun, sejarah pembangunan luar bandar Malaysia adalah rencam dan mempunyai pelbagai corak. Walaupun bandar tersebut merupakan sebuah bandar kecil, namun mempunyai pelbagai fungsi yang tersendiri kepada penduduk setempat. Fungsi di bandar lazimnya pelbagai termasuklah perniagaan runcit, perindustrian dan pentadbiran. Fungsi ini boleh berubah dari semasa ke semasa kerana bergantung terhadap perkembangan aktiviti manusia dan bekalan sumber alam di kawasan tersebut. Sesebuah bandar atau bandar kecil memberi kesan kepada kualiti penduduk di sekitarnya. Hal ini dapat diteliti melalui fungsi ekonomi, sosial dan fizikal yang disediakan oleh bandar tersebut.

METODOLOGI KAJIAN

Metodologi kajian merupakan struktur logikal yang digunakan dalam satu-satu kajian. Kajian ini menggunakan kaedah kuantitatif yang mengukur secara objektif untuk menghasilkan data numerikal (Othman, 2013). Kajian dilaksanakan melalui pemerhatian dan pengedaran borang soal selidik. Dalam memenuhi kaedah kajian ini, pemilihan responden dijalankan secara rawak tetapi berstruktur ke atas penduduk yang berada di kawasan pilihan. Melalui kaedah ini, sebanyak 143 set borang kaji selidik diagihkan kepada penduduk di Gemas, Negeri Sembilan. Seterusnya, data yang diperoleh dianalisis mengikut urutan berdasarkan pemboleh ubah yang dikaji. Data yang diperoleh diinterpretasikan dalam bentuk analisis statistik deskriptif dengan menggunakan perisian *Statistical Package for Social Sciences* (SPSS).

HASIL KAJIAN

Bahagian ini membincangkan hasil kajian terhadap kepelbagaian fungsi bandar kecil Gemas dalam konsep pembangunan sekitar terhadap penduduk setempat.

Kepelbagaian Fungsi Bandar Kecil Gemas dalam Konsep Pembangunan Sekitar

Jadual 1 menunjukkan kepelbagaian fungsi bandar kecil Gemas dalam konsep pembangunan sekitar mengikut skor min. Fungsi bandar kecil Gemas dilihat berdasarkan enam aspek utama, iaitu memenuhi keperluan asas, ekonomi dan peluang pekerjaan penduduk setempat, pusat pentadbiran, penyediaan input pertanian, pendidikan serta pusat pengangkutan. Hasil kajian ini dirujuk kepada tafsiran skor min yang dikemukakan oleh Alias (1999) iaitu 1.00 hingga 1.80

berada pada tahap sangat rendah (SR), 1.81 hingga 2.60 berada pada tahap rendah (R), 2.61 hingga 3.40 berada pada tahap sederhana (S), 3.41 hingga 4.20 berada pada tahap tinggi (T) dan 4.21 hingga 5.00 berada pada tahap sangat tinggi (ST).

Jadual 1. Fungsi Bandar Kecil Gemas dalam Konsep Pembangunan Sekitar mengikut Skor Min

Aspek	Pernyataan	Min	Tahap
Memenuhi keperluan asas	Barangan asas	4.25	ST
	Pakaian	3.59	T
	Barangan basah	4.20	T
	Perabot	3.42	T
	Barangan elektronik	3.58	T
Ekonomi dan peluang pekerjaan penduduk setempat	Memasarkan hasil tanaman	4.13	T
	Pekerjaan perniagaan retail, borong dan pasar raya	3.96	T
	Perkhidmatan di bank	4.41	ST
	Pertumbuhan sektor perkilangan	4.05	T
	Bekerja lebih masa atau sambilan	3.80	T
Pusat pentadbiran	Mengurus cukai rumah dan cukai tanah	3.84	T
	Pembayaran utiliti di kaunter pentadbiran	3.94	T
	Urusan pembelian harta	3.44	T
	Mendapatkan info pembangunan kawasan bandar	3.73	T
	Urusan pendidikan	3.87	T
Penyediaan input pertanian	Membekalkan barangan input asas pertanian	3.80	T
	Menyediakan input teknikal pertanian	3.98	T
	Banyak kedai menyediakan barangan input pertanian	3.76	T
	Pernah membeli barangan input pertanian	3.76	T
	Tidak perlu ke tempat lain mencari input pertanian	3.54	T
Pendidikan	Kemudahan pendidikan	4.45	ST
	Perkhidmatan pendidikan swasta	4.10	T
	Kemudahan kemahiran	3.98	T
	Mempunyai lebih daripada tiga institusi pendidikan	4.06	T
	Pendidikan memberi kemudahan kepada penduduk	4.34	ST
Pusat pengangkutan	Terdapat perkhidmatan pengangkutan	4.33	ST
	Guna pengangkutan awam kerana patuh jadual perjalanan	3.46	T
	Kerap menggunakan pengangkutan awam	3.15	S
	Kerap menggunakan pengangkutan awam ke tempat lain	3.35	S
	Kemudahan pengangkutan awam adalah cekap	3.59	T

Sumber: Kajian Lapangan (2019).

Jadual 1 menunjukkan skor min bagi kepelbagaian fungsi bandar kecil Gemas dalam konsep pembangunan sekitar yang melibatkan tiga tahap, iaitu sederhana, tinggi dan sangat tinggi. Hasil kajian mendapati dua pernyataan mewakili tahap sederhana (S), manakala sebanyak 23 pernyataan mewakili tahap tinggi (T) dan selebihnya iaitu sebanyak lima pernyataan mewakili tahap yang sangat tinggi (ST). Empat daripada enam aspek yang dikaji mempunyai pernyataan yang mencatatkan skor min sangat tinggi (ST) kecuali bagi aspek pusat pentadbiran dan penyediaan input pertanian hanya melibatkan skor min ada tahap tinggi (T) sahaja. Pernyataan yang menunjukkan tahap skor min sangat tinggi (ST) adalah barangan asas sebanyak 4.25, terdapat perkhidmatan pengangkutan sebanyak 4.33, kemudahan pendidikan memberi kemudahan kepada penduduk setempat sebanyak 4.34, perkhidmatan di bank sebanyak 4.41 dan urusan kemudahan pendidikan sebanyak 4.45. Ini membuktikan bahawa fungsi paling utama yang dijalankan oleh bandar kecil Gemas adalah melibatkan urusan kemudahan pendidikan kerana pernyataan ini mempunyai skor min pada tahap yang paling tinggi

berbanding skor min bagi pernyataan yang lain.

Seterusnya, kajian ini mendapati bahawa nilai min keseluruhan bagi kepelbagaian fungsi bandar kecil Gemas berada pada tahap yang tinggi (T). Buktinya, daripada 30 pernyataan, 23 daripadanya berada pada tahap tinggi (T) iaitu dengan nilai skor min diantara 3.42 hingga 4.20. Skor min paling tinggi dalam tahap tinggi (T) adalah bagi aspek memenuhi keperluan asas, iaitu barangan basah sebanyak 4.20 manakala yang paling rendah adalah aspek memenuhi keperluan asas iaitu perabot sebanyak 3.42. Aspek pengangkutan iaitu sering menggunakan pengangkutan awam dan sering menggunakan pengangkutan awam dari Gemas ke tempat lain mencatatkan nilai skor min pada tahap yang sederhana (S) iaitu dengan nilaian masing-masing sebanyak 3.15 dan 3.35. Namun begitu, nilai skor min ini masih berada pada tahap yang memuaskan kerana berada pada nilaian melebihi 3.00.

KESIMPULAN

Keseluruhan kajian mendapati bahawa fungsi bandar kecil Gemas berkait rapat dengan keperluan penduduk. Fungsi bandar kecil Gemas adalah memenuhi keperluan asas, ekonomi dan peluang pekerjaan penduduk setempat, pusat pentadbiran, penyediaan input pertanian, pendidikan dan pusat pengangkutan. Kebanyakan perkhidmatan di bandar kecil Gemas disediakan oleh pihak kerajaan dan individu. Walaupun Gemas merupakan sebuah bandar kecil yang pada asalnya menekankan aspek pertanian. Namun begitu, seiring dengan kemajuan dan perkembangan zaman, fungsi yang ditawarkan di Gemas semakin bertambah dari semasa ke semasa kepada fungsi yang lebih pelbagai. Ini dapat dilihat melalui penawaran barangan yang berkualiti dan berjenama di Gemas, terdapatnya pendidikan selain daripada pendidikan asas dan sebagainya. Implikasi penyelidikan menunjukkan bahawa Gemas merupakan sebuah bandar kecil yang telah mengalami perubahan fungsi. Perubahan fungsi yang dikatakan ini adalah dari segi bandar kecil agropolis kepada bandar kecil yang pelbagai fungsinya. Dengan wujudnya pelan strategik jangka panjang yang berintegrasi, Gemas dijangka akan berkembang pesat menjadi sebuah bandar yang berdaya maju.

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PENENTUAN KAEDAH MENGUKUR KESANGGUPAN UNTUK MEMBAYAR (WTP) DALAM PELANCONGAN

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ABSTRAK

Pelancongan diakui sebagai industri yang mampu menjana pendapatan melalui aliran pertukaran mata wang asing di kebanyakan negara di dunia. Salah satu konsep yang berkaitan dengan pelancongan adalah kesanggupan untuk membayar (*willingness to pay* - WTP). Terdapat pelbagai takrif yang dikemukakan oleh sarjana dari pelbagai disiplin. Secara umumnya, kesanggupan untuk membayar ditakrifkan sebagai harga atau nilai bayaran maksimum yang sanggup dikeluarkan oleh seseorang untuk membeli suatu barangan atau perkhidmatan. Bagi memperkukuh imej sesebuah destinasi pelancongan, konsep WTP adalah relevan dalam pengurusan pelancongan yang lestari. Kertas kerja ini meneliti secara lebih khusus terhadap pelbagai konsep yang dikaitkan dengan WTP serta klasifikasi yang digunakan termasuk jenis bayaran yang dikenakan serta cara menentu dan menganalisis WTP itu sendiri. Tuntasnya, kesanggupan untuk membayar adalah signifikan dalam pelancongan kerana sifatnya yang berupaya memberikan penyelesaian dari segi penetapan harga yang sanggup dibayar. Oleh itu, konsep WTP ini adalah perlu difahami secara mendalam dalam usaha membantu pengusaha pelancongan untuk lebih kompetitif dan pada masa yang sama meningkatkan kualiti perkhidmatan dan penjagaan alam sekitar.

Kata kunci: pelancongan, kesanggupan untuk membayar, konsep, klasifikasi

PENGENALAN

Kesanggupan untuk membayar (*willingness to pay – WTP*) adalah merupakan satu konsep penting dalam pelancongan. WTP memainkan peranan penting dalam sektor pelancongan kerana mampu menjanan dana tambahan kepada pihak pengusaha pelancongan bagi meningkatkan tahap perkhidmatan dan pengurusan mereka dalam pelancongan selain menjadi sumber dana bagi memulihara alam sekitar. Menurut Krishna (1991), kesanggupan untuk membayar (WTP) adalah harga atau nilai bayaran maksimum yang sanggup dibayar oleh seseorang untuk suatu kuantiti produk atau perkhidmatan yang disediakan. WTP adalah merupakan suatu konsep yang penting untuk membuat keputusan dalam menetapkan sesuatu harga atau kadar bayaran bagi produk ataupun perkhidmatan (Wertenbroch & Skiera, 2002).

Schidmit dan Bijmot (2020) mendefinisikan kesanggupan untuk membayar sebagai harga maksimum yang sanggup dibayar oleh pengguna untuk kuantiti tertentu sesuatu produk atau perkhidmatan. Dengan harga tersebut, pengguna tidak peduli untuk membeli atau tidak membeli kerana kesanggupan untuk membayar (WTP) adalah mencerminkan nilai semula jadi produk dalam bentuk wang. Oleh itu, produk dan wang adalah dianggap mempunyai

nilai yang sama. Kesanggupan untuk membayar ini biasanya ditunjukkan dalam angka *'dollar'* ataupun dalam sesetengah kes dalam julat harga. Kesanggupan untuk membayar boleh berbeza secara signifikan daripada seseorang pelanggan kepada pelanggan yang lain. Variasi ini adalah dipengaruhi oleh perbezaan populasi pelanggan yang biasanya dikelaskan sebagai ekstrinsik atau intrinsik (Stobierski, 2020). Dalam pelancongan, kesanggupan untuk membayar adalah bermaksud kerelaan seseorang itu membayar bagi keadaan persekitaran atau penilaian terhadap sumber dan perkhidmatan alam semula jadi. Hal ini adalah bertujuan untuk meningkatkan kualiti persekitaran yang dapat memenuhi standard yang diinginkan (Sofyan & Herlina, 2015).

METODE KAJIAN

Pendekatan kajian ini adalah eksplorasi dan evaluatif. Kajian melibatkan temu bual mendalam dengan pengusaha pelancongan di destinasi terpilih di Kundasang - Ranau, Sabah. Kajian akan melibatkan premis pelancongan berikut:

(a)   Kundasang War Memorial
(b)   Desa Dairy Farm
(c)   Cat Village
(d)   Kinabalu National Park
(e)   Mesilou Highland Strawberry Farm
(f)   Arnab Village, Ranau
(g)   Tagal Luanti, Ranau
(h)   Ugou Stream Garden, Ranau
(i)   Alpaca Club, Kundasang

HASIL KAJIAN

Jenis Kaedah Pengukuran Kesanggupan Untuk Membayar

Jadual 1 menunjukkan kepelbagaian jenis kaedah pengukuran WTP yang digunakan untuk destinasi pelancongan.

Jadual 1. Kepelbagaian Kaedah Pengukuran WTP dalam Pelancongan

Bil.	Jenis Kaedah Pengukuran WTP	Ciri Pengukuran
1	*Contigent Valuation Method* (CVM)	- CVM adalah merupakan alat untuk meletakkan jumlah atau nilai pada barang dan perkhidmatan (Zaiton, 2008). - CVM adalah suatu teknik yang mudah difahami dan sangat fleksibel (Siew et al., 2015). - Hanya menggunakan borang soal selidik sebagai instrumen yang utama dengan mengemukakan soalan kepada orang ramai berkaitan dengan pendapat mereka serta memerhatikan tingkah laku mereka berkaitan dengan WTP. - Seseorang individu akan diminta untuk menyatakan harga maksimum yang sanggup dibayar oleh mereka di bawah satu senario ataupun hipotesis berkaitan dengan WTP.

		- Kelebihan CVM : ...dapat menghasilkan kewujudan satu nilai yang sanggup dibayar oleh seseorang berdasarkan kesanggupan mereka untuk membayar.
2	*Choice Experiment* (CE)	- CE diterapkan dalam bidang ekonomi persekitaran untuk penilaian barangan persekitaran yang tidak dipasarkan (Das, 2014). - CE juga adalah satu teknik yang hampir sama seperti CVM iaitu memerlukan penggunaan borang soal selidik dan kaedah tinjauan. - CE boleh digunakan untuk mengukur WTP kerana dihubungkan dengan model statistik seperti model ekonomi. - Dalam CE, isu yang dikaji akan dinilai secara berterusan kerana maklumat yang diterima adalah berbeza seperti perbezaan model statistik, kumpulan fokus dan kajian rintis. - Fannin (2007) membahagikan CE kepada dua pendekatan utama, iaitu *ratings based approach* dan *choice based approach.* (a) *Ratings based approach* memerlukan responden menilai atau memberi *'rating'* berkaitan dengan sesebuah produk atau perkhidmatan. (b) *Choice based approach* pula memerlukan responden untuk memilih satu produk di antara beberapa produk yang lain. Hal ini kerana terdapat beberapa produk yang mempunyai fungsi yang sama di pasaran tetapi mempunyai kualiti yang berbeza seperti roti atau kereta.
3	Analisis *Regression / ANOVA / MANOVA*	- Alat pengukuran lain yang boleh digunakan untuk mengukur kesanggupan untuk membayar aalah analisis *Regression*, *Anova* atau *Manova*. - Dalam hal ini, kesemua analisis tersebut boleh digunakan apabila tinjauan telah dibuat ke atas responden yang terlibat. - Selepas tinjauan dibuat, data dianalisis menggunakan perisian *Statistical Package for Social Science (SPSS).* - Lazimnya, antara data yang dianalisis menggunakan analisis ini adalah berkaitan dengan profil demografik responden seperti umur, pekerjaan dan jumlah pendapatan.
4	*Revealed preference*	**(a) Data Pasaran** - Digunakan untuk menganggarkan *'price response function'*. - Dengan adanya sumber data yang diperolehi daripada data pasaran, WTP mungkin akan dapat dibahagikan secara kasar kepada dua bahagian yang utama. (i) data panel dan (ii) data pengimbas. - Melalui tinjauan daripada data pasaran, dapat dianggarkan bahawa tuntutan perbelanjaan pada masa dahulu adalah berbeza dengan masa hadapan (Breidert et al., 2006). (b) **Eksperimen** - Secara umumnya, eksperimen dapat dibahagikan kepada dua, iaitu (i) ekperimen makmal dan (ii) eksperimen lapangan. - Kedua-dua jenis eksperimen ini dapat digunakan untuk menganggarkan nilai WTP. *(i) Eksperimen makmal*

		- Dalam eksperimen makmal, tingkah laku pengguna biasanya disimulasikan dengan memberikan sejumlah wang dan meminta mereka membelanjakan wang tersebut untuk membeli barangan yang tertentu (Breidert et al., 2006). - Tindak balas pengguna diteliti berdasarkan penilaian yang dikemukakan oleh Silk dan Urban (1978) dalam kaedah penilaian mereka. - Hasil daripada eksperimen makmal ini akan lebih cepat untuk diperolehi kerana sifatnya yang lebih rasional terhadap tingkah laku pengguna (Nagle & Holden, 2002). **(ii) Eksperimen lapangan** - Eksperimen lapangan dikenali sebagai *'in-store purchase experiment'*. - Eksperimen ini adalah dilakukan di dalam persekitaran dunia nyata yang memerlukan responden untuk turut serta secara langsung. - Dalam eksperimen ini, isu utama yang berkaitan dengan harga pasaran akan dianalisis dan hanya responden yang berskala kecil yang terlibat bagi mewakili keseluruhan populasi responden (Breidert et al., 2006).
5	*Stated preference*	Kaedah pengukuran WTP secara *stated preference* dibahagiakn kepada dua, iaitu tinjauan secara langsung dan tinjauan secara tidak langsung. **(i) Tinjauan Langsung** - Tinjauan langsung dapat dibahagikan kepada dua, iaitu pendapat pakar dan tinjauan pelanggan. - Dalam kaedah tinjauan langsung, pendapat pakar adalah salah satu cara yang sangat popular dalam mengukur WTP. Dalam hal ini, orang yang dirujuk biasanya adalah terdiri daripada pengurus jualan ataupun pengurus pemasaran. - Hal ini kerana mereka biasanya bekerja secara langsung dan banyak berhubung dengan pengguna. - Ini menyebabkan mereka lebih peka terhadap struktur dan trend keperluan pengguna. - Dengan adanya pendapat pakar, penjimatan kos dan masa dapat dilakukan tanpa menemu ramah pelanggan secara terus. - Lazimnya, pengurus jualan atau pengurus pemasaran adalah berfungsi untuk menganggarkan WTP pengguna. - Salah satu aplikasi tinjauan langsung untuk mengukur WTP yang melibatkan pengguna adalah kaedah bermotivasi secara psikologi yang dikembangkan oleh Stoetzel (1954). - Berdasarkan kaedah ini, Stoetzel menganggarkan bahawa terdapat harga maksimum dan harga minimum untuk setiap produk apabila melibat tinjauan secara langsung bersama dengan pelanggan (Breidert et al., 2006). - Menurut Forth (2018), tinjauan langsung kepada pelanggan dapat menyelesaikan isu yang berkaitan dengan kepentingan atribut sesuatu produk. **(ii) Tinjauan Tak Langsung** - *Conjoint Analysis* adalah merupakan satu analisis untuk megukur maklum balas responden melalui atribut produk dalam bentuk eksperimen.

| | | - Dalam hal ini, maklum balas pelanggan berkaitan produk akan diukur mengikut tahap keutamaan mereka. - *Discrete Choice Analysis* adalah hampir sama seperti *Choice Experiment* iaitu pengguna perlu memilih produk terbaik berdasarkan penilaian mereka walaupun produk tersebut mempunyai fungsi yang sama. |

Kaedah Pengukuran WTP manakah paling praktikal untuk Kajian di Kundasang-Ranau, Sabah? Mengapa?

Kaedah pengukuran paling praktikal untuk kajian di Kundasang-Ranau, Sabah adalah menggunakan kaedah *Contigent Valuation Method* (CVM). Menurut King et al. (2000), CVM digunakan untuk menganggar nilai ekonomi untuk semua jenis perkhidmatan terutamanya yang berkaitan dengan ekosistem dan persekitaran. Ini turut disokong oleh kajian Whitehead dan Haab (2013), iaitu mereka turut menjelaskan bahawa CVM adalah suatu pendekatan untuk menilai perkhidmatan seperti rekreasi dan tingkah laku yang berkaitan dengan persekitaran dan alam semula jadi. Oleh kerana pelancongan adalah merupakan salah satu sektor perkhidmatan yang berkaitan dengan alam sekitar dan persekitaran, maka CVM adalah dilihat sebagai suatu kaedah yang paling praktikal untuk kajian pelancongan di Kundasang-Ranau, Sabah. Kaedah CVM ini dianggap sesuai dalam kajian berkaitan dengan pelancongan kerana melibatkan kaedah tinjauan secara langsung kepada responden berkaitan dengan kesanggupan mereka membayar untuk perkhidmatan pelancongan yang tertentu. Penggunaan CVM ini turut relevan kerana nilai yang sanggup dibayar oleh pelancong dapat diketahui secara terus tanpa menyimpulkan nilai daripada kesanggupan sebenar mereka untuk membayar. Dalam CVM, lazimnya penggunaan borang soal selidik adalah diperlukan bagi menganggarkan nilai kesanggupan untuk membayar sekali gus dapat menjawab isu yang berkaitan dengan kajian tersebut. Selain itu, CVM boleh mengumpulkan maklumat berkaitan dengan WTP melalui kaedah tinjauan secara 'face to face' atau secara 'online' mengikut kesesuaian masa.

KESIMPULAN

Tuntasnya, WTP dapat memberi manfaat yang signifikan terhadap sektor pelancongan itu sendiri. Pada masa ini, konsep kesanggupan untuk membayar dalam pelancongan adalah penting bagi mengetahui kesanggupan seseorang itu untuk membayar apabila melakukan aktiviti pelancongan. Dengan adanya kaedah pengukuran dalam WTP, kesanggupan seseorang itu untuk membayar bagi barang dan perkhidmatan dapat diukur. Kesanggupan untuk membayar ini adalah penting kerana dapat membantu sektor pelancongan di sesebuah destinasi menjadi lebih maju dan berdaya saing.

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PENENTUAN KECENDERUNGAN TINGKAH LAKU PELANCONG YANG BERKUNJUNG KE KOTA KINABALU – PSIKOSENTRIK DAN ALOSENTRIK

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ABSTRAK

Artikel ini membincangkan mengenai penentuan tingkah laku pelancong psikosentrik dan alosentrik di Kota Kinabalu, Sabah. Secara umumnya, kajian mengenai kecenderungan tingkah laku pelancong ini masih kurang dan terhad. Oleh itu, kajian yang dijalankan ini meneliti faktor penentu kecenderungan tingkah laku pelancong psikosentrik dan alosentrik di Kota Kinabalu. Kaedah kajian yang digunakan ialah kaedah kuantitatif, iaitu dengan mengedarkan borang soal selidik. Responden dalam kajian ini terdiri daripada 70 orang pelancong yang berkunjung ke Kota Kinabalu. Hasil kajian mendapati majoriti responden bersetuju bahawa faktor kewangan yang dimiliki merupakan faktor yang paling utama dalam menentukan kecenderungan tingkah laku pelancong ketika melancong di Kota Kinabalu. Hal ini menunjukkan bahawa kecenderungan tingkah laku pelancong psikosentrik dan alosentrik dilihat daripada beberapa aspek tertentu. Oleh itu, kefahaman yang mendalam terhadap penentuan kecenderungan tingkah laku pelancong ini penting dalam membangunkan industri pelancongan.

Kata kunci: kecenderungan, tingkah laku, pelancong, psikosentrik, alosentrik

PENGENALAN

Pelancongan merupakan industri yang mengalami pertumbuhan yang berterusan serta berkembang dengan pesat di seluruh dunia semenjak beberapa dekad ini (Cooper & Hall, 2008). Oleh itu, industri pelancongan merupakan salah satu industri yang penting dalam sektor perkhidmatan kerana menjadi pemacu utama kepada kemajuan ekonomi sesebuah negara. Perkembangan industri pelancongan ini mempunyai hubung kait yang rapat dengan tingkah laku pelancong. Hal ini kerana penelitian terhadap tingkah laku pelancong merupakan suatu perkara yang mustahak untuk diambil kira bagi memastikan industri pelancongan sentiasa berkembang dengan lancar dan konsisten. Melalui kefahaman yang mendalam terhadap tingkah laku pelancong, produk dan perkhidmatan pelancongan dapat disediakan mengikut kemahuan dan kehendak pelancong demi memastikan kepuasan pelancong yang tinggi.

Kajian mengenai tingkah laku pelancong di dunia telah dijalankan semenjak dahulu lagi. Hal ini dapat dibuktikan melalui kewujudan model Plog (1974) yang diperkenalkan oleh Stanley Plog yang mengklasifikasi pelancong mengikut tingkah laku mereka, iaitu dari segi corak

perjalanan, keperibadian, destinasi pilihan dan sebagainya. Dalam model ini, Plog telah mengklasifikasikan pelancong kepada lima kategori, iaitu pelancong psikosentrik, pelancong hampir psikosentrik, pelancong midsentrik, pelancong hampir alosentrik dan pelancong alosentrik (Piuchan, 2018). Psikosentrik merujuk kepada pelancong yang memilih untuk pergi ke destinasi pelancongan yang terkenal dan biasa dikunjungi, gemar melakukan aktiviti santai serta cenderung memilih penginapan yang lengkap dan selesa manakala pelancong alosentrik pula merujuk kepada pelancong yang memilih untuk pergi ke destinasi pelancongan yang bukan merupakan pilihan utama pelancong, gemar melakukan aktiviti yang mencabar, cenderung memilih penginapan asas dan bersikap sederhana. Hal ini jelas menunjukkan bahawa dalam tingkah laku pelancong tidak wujud unsur homegenisasi yang menganggap semua pelancong sama. Hal ini kerana semua pelancong adalah berbeza mengikut umur, motivasi, tingkah laku serta aktiviti pilihan ketika melancong (Gallani-Moutafi, 1999).

Kecenderungan tingkah laku pelancong adalah penting untuk dikaji bagi memastikan industri pelancongan Malaysia terus berkembang pesat dan kompetitif. Tambahan pula, industri pelancongan merupakan salah satu penyumbang utama kepada ekonomi dan pendapatan negara. Sabah merupakan salah satu negeri di Malaysia yang popular sebagai destinasi pelancongan yang menjadi tarikan pelancong domestik mahupun pelancong antarabangsa. Kota Kinabalu merupakan salah satu destinasi pelancongan yang sering menjadi pilihan pelancong disebabkan oleh kedudukan Kota Kinabalu yang strategik serta kaya dengan kepelbagaian tarikan iaitu tarikan semula jadi, tarikan buatan manusia dan tarikan budaya. Namun, kajian tingkah laku pelancong terutamanya mengenai penentuan kecenderungan tingkah laku pelancong masih kurang dan terhad. Untuk itu, kajian ini adalah penitng dan relevan dalam usaha memastikan pelancongan terus pesat berkembang dan pelbagai inisaitf baahru boleh dilaksanakan sejajar dengan segmen pemasaran yang bersesuaian dengan keperluan pelancong.

METODOLOGI KAJIAN

Metodologi kajian merupakan tatacara bagi mendapatkan sumber atau maklumat berkenaan dengan isu yang ingin dikaji. Metodologi kajian merujuk kepada proses dan kaedah yang digunakan bagi mencapai objektif kajian yang telah ditetapkan dalam suatu kajian. Kaedah penyelidikan yang digunakan dalam kajian ini adalah kaedah kuantitatif yang dilaksanakan melalui kajian eksperimental dan data numerika yang dipungut serta dianalisis dengan menggunakan ujian statistik (Chua, 2011). Untuk itu, seramai 70 orang responden terlibat dalam kajian ini. Pemilihan responden dijalankan secara rawak kepada pelancong yang berkunjung ke Kota Kinabalu. Seterusnya, data yang diperolehi dianalisis mengikut urutan berdasarkan pemboleh ubah yang dikaji. Data yang diperolehi dianalisis dalam bentuk analisis deskriptif dengan menggunakan perisian *Statistical Package for the Social Sciences* (SPSS) versi 26. Setersunya, data dipersembahkan dalam bentuk jadual bagi membantu dalam memudahkan penyampaian maklumat.

HASIL KAJIAN

Bahagian ini membincangkan hasil kajian terhadap penentuan tingkah laku pelancong psikosentrik dan alosentrik di Kota Kinabalu.

Kecenderungan Penentuan Tingkah Laku Pelancong Psikosentrik dan Alosentrik

Jadual 2 menunjukkan kecenderungan penentuan tingkah laku pelancong psikosentrik dan alosentrik di Kota Kinabalu mengikut skor min. Kecenderungan tingkah laku pelancong ketika melancong di Kota Kinabalu dilihat daripada tujuh faktor penentu, iaitu kewangan yang dimiliki, kemajuan destinasi pelancongan, penawaran harga murah, keunikan alam semula jadi di destinasi pelancongan, keunikan budaya di destinasi pelancongan, personal dan keadaan ekonomi di destinasi pelancongan. Hasil analisis dirujuk kepada tafsiran skor min yang dikemukakan oleh Alias (1999)(Jadual 1).

Jadual 1. Tafsiran Skor Min

Julat	Tahap
1.00 – 1.80	Sangat Rendah
1.81 – 2.60	Rendah
2.61 – 3.40	Sederhana
3.41 – 4.20	Tinggi
4.21 – 5.00	Sangat Tinggi

Sumber: Alias (1999).

Terdapat lima skala tafsiran skor min, iaitu skala sangat rendah (1.00 -1.80), rendah (1.81 - 2.60), sederhana (2.61 - 3.40), tinggi (3.41 - 4.20) dan sangat tinggi (4.21 - 5.00).

Jadual 2. Kecenderungan Penentuan Tingkah Laku Pelancong Psikosentrik dan Alosentrik mengikut Skor Min

Kecenderungan Penentuan Tingkah Laku Pelancong	Min	Skala
Kewangan yang dimiliki	4.43	ST
Kemajuan destinasi pelancongan	4.09	T
Penawaran harga murah	3.91	T
Keunikan alam semula jadi di destinasi pelancongan	3.56	T
Keunikan budaya di destinasi pelancongan	3.26	S
Personal	3.20	S
Keadaan ekonomi di destinasi pelancongan	2.96	S

Jadual 2 menunjukkan skor min untuk kecenderungan penentuan tingkah laku pelancong psikosentrik dan alosentrik ketika melancong di Kota Kinabalu. Melalui analisis yang dijalankan, terdapat tiga skor berbeza yang diperolehi. Hasil kajian menunjukkan terdapat hanya satu pernyataan yang mencatatkan skor 'sangat tinggi', iaitu faktor kewangan yang dimiliki oleh pelancong ketika berkunjung ke Bandaraya Kota Kinabalu (4.43). Manakala, untuk skor 'tinggi' pula meliputi tiga pernyataan, iaitu kemajuan destinasi pelancongan (4.09),

penawaran harga murah (3.91) dan keunikan alam semula jadi di destinasi pelancongan (3.56). Akhir sekali, terdapat tiga pernyataan yang mencatatkan skor yang 'sederhana', iaitu keunikan budaya di destinasi pelancongan (3.56), aspek personal seperti dorongan ahli keluarga, penduduk kampung dan rakan-rakan (3.20) serta keadaan ekonomi di destinasi pelancongan (2.96). Oleh itu, dapat disimpulkan bahawa aspek kewangan yang dimiliki oleh pelancong merupakan faktor yang paling menentukan kecenderungan tingkah laku pelancong psikosentrik dan alosentrik ketika melancong di Kota Kinabalu. Hal ini kerana keadaan kewangan seseorang individu ketika melancong dapat menentukan pemilihan individu tersebut terhadap produk dan perkhidmatan pelancongan yang disediakan di Kota Kinabalu hingga menyebabkan berlakunya perubahan kecenderungan dalam tingkah laku mereka.

KESIMPULAN

Penentuan kecenderungan tingkah laku pelancong yang berkunjung ke Kota Kinabalu berkait rapat dengan penyediaan produk dan perkhidmatan yang memenuhi kemahuan dan kehendak pelancong. Hal ini kerana dengan kefahaman yang mendalam terhadap kecenderungan tingkah laku pelancong psikosentrik dan alosentrik yang berkunjung ke Kota Kinabalu dapat membantu dalam memastikan produk dan perkhidmatan pelancongan yang ditawarkan menepati segmen pasaran yang ditetapkan. Cabarannya kini adalah usaha dan inisaitif untuk memperkasa strategi membangunkan produk dan perkhidmatan pelancongan berdasarkan kecenderungan tingkah laku pelancong yang berkunjung di Kota Kinabalu. Justeru itu, sudah tiba masanya pihak pemegang taruh menyediakan produk dan perkhidmatan pelancongan berdasarkan segmen pasaran yang tepat iaitu kecenderungan tingkah laku pelancong bagi memastikan industri pelancongan terus berkembang pesat dan kompetitif.

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PENENTUAN KUASA BELI PENGUNJUNG TERHADAP PERKHIDMATAN PELANCONGAN TERPILIH DI BANDARAYA KOTA KINABALU, SABAH

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ABSTRAK

Artikel ini meneliti tentang kuasa beli pelancong dalam penggunaan sektor perkhidmatan terpilih di bandaraya Kota Kinabalu, Sabah. Sektor perkhidmatan itu adalah pengangkutan, penginapan, makanan dan minuman serta aktiviti membeli-belah. Kajian ini menggunakan kaedah kuantitatif melalui pengedaran borang soal selidik. Untuk itu, seramai 105 orang responden terlibat dalam kajian ini. Hasil kajian menunjukkan daripada lapan penyataan untuk pemilihan sektor perkhidmatan, lima menunjukkan skor min 'tinggi' antara 3.62 hingga 3.95 dan tiga mencatatkan skor min 'sederhana' dalam julat 2.99 hingga 3.09. Seterusnya, skor min tertinggi adalah 3.95 untuk penggunaan sektor perkhidmatan pengangkutan iaitu bas, van, grab dan lain-lain yang lebih murah agar kuasa beli meningkat. Manakala skor min terendah pula adalah memilih untuk makan di restoran (seperti coffee house, bistro, cafe dll.) yang lebih berkualiti (privasi dan persekitaran yang tenteram) meskipun kuasa beli tidak meningkat. Ringkasnya, penentuan kuasa beli pelancong ini penting kepada pihak pemegang taruh agar dapat menyediakan pelbagai produk dan perkhidmatan sejajar dengan segmen pasaran yang ditetapkan.

Kata kunci: kuasa beli, pengunjung, perkhidmatan, pelancongan

PENGENALAN

Kuasa beli sebagai pengguna sesuatu perkhidmatan dan barangan adalah penting difahami bukan sahaja oleh masyarakat tetapi juga oleh penyelidik. Pengguna perlu sedar bahawa mereka sebenarnya memiliki pengaruh yang sangat besar dalam mengubah sesuatu harga atau mutu barang dan perkhidmatan (McGhee, 2014). Jamalova (2018) menegaskan bahawa pemahaman terhadap sesuatu keperluan tentang kuasa beli pengguna menyediakan maklumat tambahan untuk penjual atau pengusaha untuk lebih berjaya dalam aspek pemasaran produk atau perkhidmatan. Ini membuktikan kuasa beli penting dalam menentukan pasaran kerana pengguna akan menjadi kuasa pemutus bagi sesuatu produk yang ditawarkan dalam pasaran. Sebagai contoh, apabila terdapat aduan kerosakan mengenai produk yang dibeli oleh pengguna dan syarikat perniagaan yang menawarkan produk itu melakukan tindakan untuk menyelesaikan masalah tersebut, maka pengguna dijangka akan membuat pembelian ulangan lagi terhadap produk tersebut kerana berpuas hati dengan perkhidmatan bantuan yang diberikan. Menurut Shah et al. (2018), terdapat beberapa faktor yang mempengaruhi keputusan seseorang pengguna atau pengunjung ke atas pembelian mereka, antaranya adalah faktor budaya, kepercayaan, imej sesuatu jenama dan barangan.

METODOLOGI KAJIAN

Reka bentuk kajian yang digunakan adalah penerokaan. Pendekatan kajian adalah kuantitatif dan deskriptif. Menurut Jaideep (2020), reka bentuk kajian adalah satu rancangan yang menyeluruh yang menyatakan objektif kajian dan menyediakan panduan terhadap aspek yang perlu diselesaikan untuk mencapai objektif berkenaaan. Ringkasnya, reka bentuk adalah *master plan* untuk merancang dan melaksanakan sesuatu penyelidikan dengan sistematik. Kajian ini menggunakan kaedah kuantitatif melalui pengedaran borang soal selidik dan pemerhatian. Sampel kajian adalah seramai 105 orang yang dipilih secara rawak.

HASIL KAJIAN

Kuasa Beli Responden dalam Penggunaan Perkhidmatan Terpilih

Hasil analisis berdasarkan skala likert yang kemudiannya dianalisis menggunakan skor min yang dikemukakan oleh Mohamad Najib (1999). Tafisiran analisis skor min menunjukkan lima skala (Jadual 1), iaitu skala sangat rendah (1.00-1.80), rendah (1.81-2.60), sederhana (2.61-3.40), tinggi (3.41-4.20) dan skala sangat tinggi (4.21-5.00).

Jadual 1. Tafsiran Skor Min Mengikut Skala

Julat	Tahap
1.00-1.80	Sangat Rendah
1.81-2.60	Rendah
2.61-3.40	Sederhana
3.41-4.20	Tinggi
4.21-5.00	Sangat Tinggi

Sumber: Mohamad Najib (1999).

Jadual 2 menunjukkan analisis skor min untuk kuasa beli responden dalam penggunaan perkhidmatan terpilih semasa berkunjung ke Kota Kinabalu, Sabah. Hasil kajian menunjukkan daripada lapan penyataan untuk pemilihan sektor perkhidmatan, lima menunjukkan skor min 'tinggi' antara 3.62 hingga 3.95 dan tiga menncatatkan skor min 'sederhana' dalam julat 2.99 hingga 3.09.

Pernyataan 'saya memilih untuk menggunakan sektor pengangkutan (bas, van, grab dll.) yang lebih murah agar kuasa beli saya meningkat', 'saya memilih untuk aktiviti membeli-belah di premis perniagaan (seperti pasar malam, gerai tepi jalan dll.) yang lebih murah agar kuasa beli saya meningkat', 'saya memilih untuk menggunakan sektor pengangkutan (bas persiaran, van pelancong, grab dll.) yang lebih berkualiti (selesa dan selamat) meskipun kuasa beli saya tidak meningkat', 'saya memilih untuk makan di restoran (seperti kedai makan, gerai dll.) yang lebih murah agar kuasa beli saya meningkat', dan 'saya memilih untuk menggunakan sektor penginapan (hotel, bajet, motel, homestay dll.) yang lebih murah agar kuasa beli saya meningkat' menunjukkan skor min yang 'tinggi'.

Manakala, pernyataan yang mencatatkan skor min 'sederhana' pula adalah 'saya memilih untuk menggunakan sektor penginapan (hotel tiga bintang & ke atas, resort dll.) yang lebih berkualiti (selesa dan bersih) meskipun kuasa beli saya tidak meningkat', 'saya memilih untuk

aktiviti membeli-belah di premis perniagaan (seperti di shopping mall- Imago, Suria, Oceanus dll.) yang lebih berkualiti (nyaman dan selamat) meskipun kuasa beli saya tidak meningkat' dan 'saya memilih untuk makan di restoran (seperti coffe house, bistro, cafe dll.) yang lebih berkualiti (privasi dan persekitaran yang tenteram) meskipun kuasa beli saya tidak meningkat'.

Jadual 2. Tafsiran Skor Min untuk Pemilihan Sektor Perkhidmatan Terpilih

Bil.	Pernyataan	Min	Skala
1.	Saya memilih untuk menggunakan sektor **pengangkutan** (bas, van, grab dll.) yang lebih murah agar kuasa beli saya meningkat.	3.95	T
2.	Saya memilih untuk **aktiviti membeli-belah** di premis perniagaan (seperti pasar malam, gerai tepi jalan dll.) yang lebih murah agar kuasa beli saya meningkat.	3.84	T
3.	Saya memilih untuk menggunakan sektor **pengangkutan** (bas persiaran, van pelancong, grab dll.) yang lebih berkualiti (selesa dan selamat) meskipun kuasa beli saya tidak meningkat.	3.79	T
4.	Saya memilih untuk makan di **restoran** (seperti kedai makan, gerai dll.) yang lebih murah agar kuasa beli saya meningkat.	3.71	T
5.	Saya memilih untuk menggunakan sektor **penginapan** (hotel, bajet, motel, homestay dll.) yang lebih murah agar kuasa beli saya meningkat.	3.62	T
6.	Saya memilih untuk menggunakan sektor **penginapan** (hotel tiga bintang & ke atas, resort dll.) yang lebih berkualiti (selesa dan bersih) meskipun kuasa beli saya tidak meningka.	3.09	S
7.	Saya memilih untuk **aktiviti membeli-belah** di premis perniagaan (seperti di shopping mall- Imago, Suria, Oceanus dll.) yang lebih berkualiti (nyaman dan selamat) meskipun kuasa beli saya tidak meningkat.	3.01	S
8.	Saya memilih untuk makan di **restoran** (seperti coffe house, bistro, cafe dll.) yang lebih berkualiti (privasi dan persekitaran yang tenteram) meskipun kuasa beli saya tidak meningkat.	2.99	S

KESIMPULAN

Kuasa beli pelancong dalam penggunaan sektor perkhidmatan terpilih adalah relevan untuk dikaji dalam sektor pelancongan kerana ia berkait rapat dengan kuasa membeli seseorang pelancong atau pengunjung di satu-satu destinasi. Dari segi literatur, kajian ini mengisi lompang kajian kerana isu sebegini masih kurang dan terbatas. Kajian ini turut menyumbang dari segi dapatan yang menunjukkan bahawa sektor perkhidmatan pengangkutan yang lebih murah menjadi pilihan pelancong kerana ia boleh meningkatkan kuasa beli mereka untuk perkhidmatan lain seperti penginapan, makanan dan minuman serta aktiviti membeli-belah. Namun begitu, kajian mendapati responden tidak akan memilih untuk makan di restoran yang mahal dan berkualiti untuk mengelakkan kuasa beli mereka menurun. Sehubungan dengan itu, terdapat limitasi dalam kajian ini iaitu responden yang dipilih terhad dalam kalangan pelancong domestik dan penduduk tempatan yang berkunjung ke Kota Kinabalu. Untuk kajian pada masa

akan datang, responden dari kalangan pelancong antarabangsa wajar dikaji dan dijangka akan memaparkan hasil kajian yang lebih dinamik kerana setiap negara memiliki nilai mata wang yang berbeza sekali gus impak terhadap kuasa membeli pelancong turut rencam dan pelbagai.

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THE ARTIFICIAL NEURON NETWORK FOR PHOTOCATALYTIC DEGRADATION OF ACID ORANGE 7 USING CERIUM OXIDE (CeO$_2$)

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ABSTRACT

The presence of dyes in water resources contributes to the accumulation of dyes in fish and other aquatic life. Azo dye toxic compounds mix with bodies and penetrate fish and other aquatic species that are taken up by humans with prolonged health effects. In order to overcome this problem, scientists discovered the photocatalytic process, which is one of the most effective solutions for eliminating organic compounds in wastewater. However, developing an automated dye wastewater treatment plant is very difficult because the condition (e.g. concentration, pH, etc) of dye waste changes severely, depending on the type of the dye. Hence in this research an artificial neural network was developed to predict the adsorption efficacy of CeO$_2$ photocatalysts. A network was trained by using the experimental data reaction time and pH as the input while the degradation of AO7 as output. The reflective input-response correlation is predicted *via* a feed forward neural network with hidden layers trained by Lavenberg-Marquardt method. The optimum number of neurons was decided by using trial and error methods. The simulation performance of ANN models was evaluated by using the Root Mean Square Error (RSME) and the coefficient of determination (R^2). ANN predicted high accuracy in which R^2 is 0.99835 while MSE is around 0.35014.

Keywords: Artificial Neural Network (ANN), photocatalytic degradation, cerium oxide, Azo dye.

INTRODUCTION

Synthetic dyes are widely used in many industrial fields commonly in textile, paper and plastics industries (J Perera, 2019) due to their versatility and cost efficient in synthetic solidness, high light resistance, temperature, detergent and microbial attack and colour variety of natural dyes (Rodríguez Couto, 2009). However, the effluent from these industries normally contains large

amounts of unused dyes. They are toxic for both humans and aquatic life. Hence, it is crucial to treat the effluent with proper treatment methods before discharging it into water resources. On the other hand, cerium oxide (CeO_2) has been widely used as an adsorbent in wastewater treatment, from heavy metal wastewater to organic wastewater including dye effluent (Kurian, 2020). Hence, in this study CeO_2 has been used as adsorbent synthetic dye, Acid Orange 7(AO7).

The photocatalytic degradation is generally depending on a number of parameters such as temperature, contact time, pH and dosage of absorbent (Sun et al., 2018). Consequently, developing an automated dye wastewater treatment plant is very difficult because the condition of dye waste changes severely, depending on the type of the dye. Therefore, in this research an artificial neural network was developed to predict the adsorption efficacy of CeO_2 photocatalysts. Two important parameters were selected as the input, namely time and pH.

ANN is a method developed based on the biological nervous processing and due to its simplicity, this method is popular among engineers. Moreover, this model can be trained and learned from experimental data and solve complex linear and non-linear function without any assumptions (Ghaedi et al., 2017).

METHODOLOGY

This research used the real time dye adsorption data obtained from experimental work. The ANN has been developed with the MATLAB R2021a software. The complex non-linear relationship between inputs and outputs was modelled by a multilayer feed-forward-back propagation network to present outputs as three-dimensional graphs, rather than as statistical models because of their strong non-linear mapping capability. A few stages will be applied in this modelling. Two inputs for this model are time and pH, respectively. The target variable to produce output for this modelling is the degradation of acid orange 7 (AO7). In this analysis, the reflective input-response correlation is predicted *via* a feed forward neural network with hidden layers trained by Lavenberg-Marquardt method. The optimum number of neurons is decided by using trial and error methods.

The sample data are distributed into three types of sets which are 70 percent training set, 15 percent validation set, and 15 percent test set, respectively. The validation was used to warn the ANN when the training is to be completed. The test set provides a completely independent approach for the precision testing of ANN. The test set is a set of data samples used for ANN mod evaluation (Alaloul & Qureshi, 1993). The simulation performance of ANN models was evaluated by using the Root Mean Square Error(RSME) and the coefficient of determination (R^2). RMSE values equal to zero represent a perfect fit while for R^2, the value one is the optimal value(Kourgialas et al., 2015).

RESULTS AND DISCUSSIONS

A two-layer feed-forward back propagation neural network (2:12:1) was used to study the effect of pH on photocatalytic degradation in presence of cerium oxide as a catalyst. In the feed-forward back propagation, numerous training runs were used to find the best potential weight, and the final network design was then trained for 15 epochs. Evaluation of the performance of the neural network based on mean square error (MSE) and coefficient of determination (R^2) was also carried out. Figure 1 shows ANN topology design for AO7 dye adsoprtion. Figure 2 and Figure 3 show that the R^2 is approximately 0.99948 while MSE is

around 0.35014. The finding verified that the selected algorithm and topology were able to predict well the effect of pH and contact time on degradation of acid orange 7. Figure 3 demonstrates that the R value for validation, testing, and training was approximately 1, indicating that the network model had a good regression. The result also demonstrates the model's accuracy, as the expected data is almost close to the regression experimental data. Table 1 summarizes the findings of models that were successfully generated, as well as their setup. The setup division data refers to the portioning of the input data into 70% training, 15% testing, and another 15% validation.

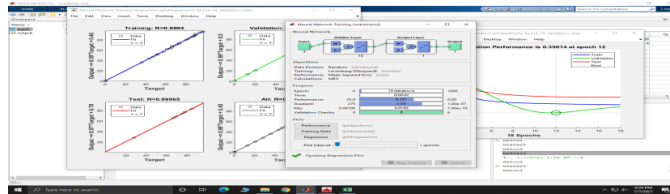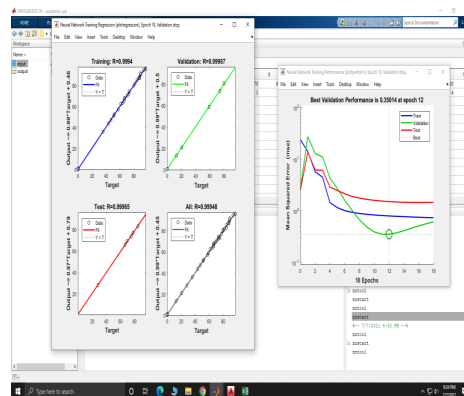
Figure 1: ANN Modelling for AO7 dye adsoprtion.

Figure 2: Validation performance for ANN modelling for AO7 adsorption.

Table 1: Mean square error (MSE) and regression for network design

Fitting Network Sequence	Setup Division of Data	MSE	Regression		
			Training	Validation	Testing
2-12-1	70-15-15	0.35014	0.9994	0.99987	0.99965
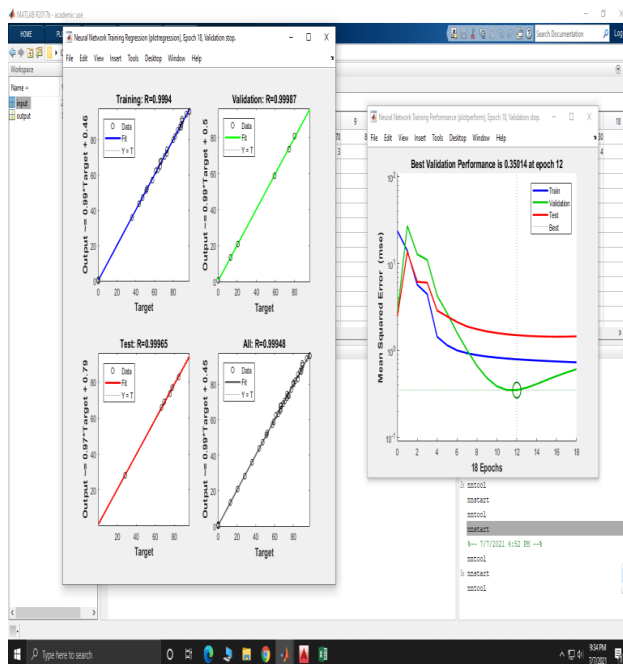
Figure 3: Regression Training of Developed ANN Modelling for AO7 adsorption.

CONCLUSIONS

In this research, the main goal is to develop Artificial Neural Network (ANN) modelling for the degradation of Acid Orange 7 using cerium oxide (CeO_2) by employing two important parameters, namely pH and contact time. By using a feed-forward backpropagation network with Levenberg-Marquardt Algorithms and topology (2:12:1) were established. The R^2 = 0.99948 and MSE = 0.35014, indicate that the developed ANN modelling is able to the adsorption of AO7 at different pH and contact time.

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PERCEPTION OF DIGITAL READING MATERIAL FOR ACADEMIC PURPOSES AMONG UMK UNDERGRADUATES

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ABSTRACT

The inclusion of technology in language learning is a new norm particularly when almost everyone, including students, is using electronic gadgets (connected to internet) such as smartphones, tablets and computer in their daily life, especially now. The aim of this project is to identify the students' perceptions on their usage of electronic gadgets in relation to academic reading and writing since they spend a lot of time browsing and reading digital reading material (DRM) online or offline. Throughout the project, we are trying to digitalize reading and writing component in ESL classroom in UMK by changing them from conventional reading and writing. Thus, we are piloting it through English for Business Communication course. For this specific project, a module is developed and it focuses on first semester undergraduates from Business Faculty in Universiti Malaysia Kelantan. Respondents have been using the module for the past 14 weeks (1 semester) and their responses were recorded using qualitative method through online questionnaires and interviews. The teachers considered digitalized reading materials suit the students' needs and the course syllabus. The findings revealed that more than half the undergraduates would prefer to use digital reading material for academic purposes. Lastly, this project serves as a basis for the educators to provide suitable online reading material in helping students for their academic reading and writing purposes.

Keywords: digital, reading-material, academic purposes, undergraduates.

INTRODUCTION

The inclusion of technology in language learning is a common trend nowadays, particularly when almost everyone, including students, is using electronic gadget such as smartphones and tablets in their daily life. A number of research studies have been conducted in relation to the educational values of these electronic gadget and most stated that students havepositive perceptions towards the use of these gadget in classes (Nalliveettil and Alenazi, 2016; Rambousek et. al., 2016; Tenku Putri Norishah et.al., 2014). This is particularly accurate as they rely on their smartphones and tablets to look for information on the spot.

The term Digital Literacy is used to refer to the students' abilities to find, read, use and disseminate information in a digital world (Hagel, 2012a). Being digitally literate would be an advantage in the 21st Century as it is the key that enhances graduate employability. The students are constantly exposed to digital technologies and hence they could be regarded as digital natives but are they digitally literate? It is a major concern if the students are not highly digitally literate which could lead to their inability to utilise the digital contents especially for academic purposes.

The expansion of information and communication technology (ICT) world-wide has prompted its usage in the education field as well. Liu et. al. (2002) review 70 research studieson ICT in second language learning and some of the findings indicated that students' comprehension on language and participation in the lessons were enhanced, and ICT encouraged teacher-student interaction and collaborative learning. In another review of articles on ICT in classrooms by Lloyd (2005), she concludes that there are some factors towards the effectiveness of ICT in education particularly the school readiness that includes the availability of resources, and the skills and motivations of teachers and students. Martinez(2009) also stated that the use internet in language learning led to learner autonomy even among young learners.

METHODOLOGY

The data were collected through interviews with the undergraduates who enroll in the English for Business Communication course at FBI, UMK and selected at random ranging from the first year students. The findings were analyzed using thematic analysis.

RESULT AND DISCUSSION

The evolution of Internet has enabled the users to access information with ease and provided abundant of sources and saves time. The two main focus of this research is to know the frequency and the perception of students regarding digital reading materials in their academic.
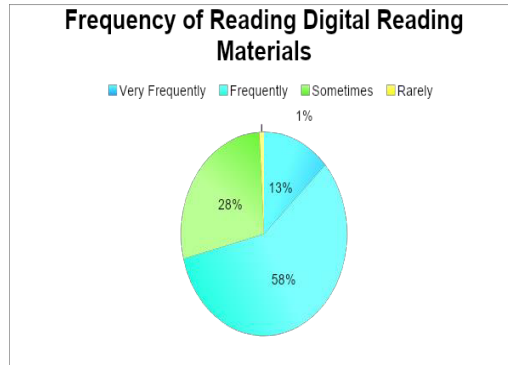
Frequency of Reading Digital Reading Materials

■ Very Frequently ■ Frequently ■ Sometimes □ Rarely

Figure 1. Frequency of digital reading materials

Items (5, 6, 7, 8, 9, 10) in the questionnaire survey was about the frequency of students in reading Digital Reading Material for academic purposes.

The result revealed (13%) and (58%) of respondents 'very frequently' and 'frequently' read Digital Reading Materials respectively. On contrary, (28%) and (1%) of the respondents 'sometimes' and 'rarely' read Digital Reading Materials for academic purposes.

Perception on Reading Digital Reading Materials

■ Very Much ■ Somewhat ■ Very Little □ Not At All
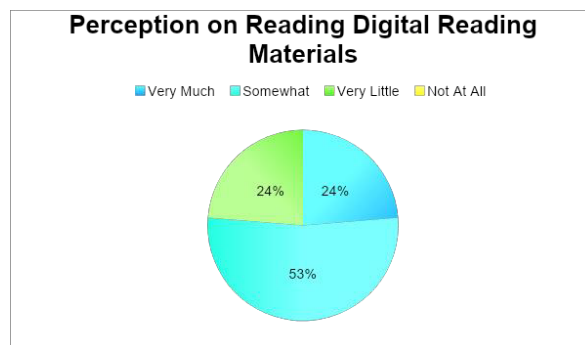
Figure 2. Perception on digital reading materials

Items (11, 12, 13, 14, 15) in the questionnaire survey was about the perception and attitude of studentsin reading Digital Reading Material for academic purposes.

The result revealed (24%) and (52%) believed that reading Digital Reading Materials are 'very much' and 'somewhat' important respectively. On the other hand (24%) and (0%) of the respondents believed that reading Digital Reading Materials construed 'very little' and 'not at all' important for academic purposes.

Significance
There is a moderate correlation (r=0.610) is recorded between perception and frequency of using Digital Reading Materials for academic purposes.

The findings indicate that the majority of the students practice online reading for information purposes. It can be concluded that they are now using gadgets for academic matters apart from personal and entertainment information.

Digital literacy is a part of the survival skills in this 21st century and students who are technology savvy but digitally illiterate may not be able to compete with the digital work environment in the future.

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PERCEPTION OF LANGUAGE AWARENESS THROUGH FRAMEGRAM: A CLASSROOM EXAMPLE

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ABSTRACT
Writing in English within the context of English as Second Language (ESL) can be a daunting prospect for many students. Such perennial challenge could potentially be damaging. It is even worse when constructing a piece of writing that requires critical thinking. This research is aimed at answering both conundrums. The research draws the context of Language Awareness (LA) within the framework of Framegram. This framework is used in one of the formative assessments in the university core subject of Adavnced Grammar of Undergraduates (UBI10302): Grammar Article Entry (Instagram Entry). Theoretically, LA is seen as a bridge to connect functional and purposeful language to a given phenomena (issues or problems); characterised by student's deep interest and critical thinking. While students interact as active participatory editors and publishers of their content on Instagram, such dynamic interaction emerged from relationship between student's language phenomena may result in predictable output of language learning. Hypothetically, as their ability to manipulate or discriminate the language increasingly progresses parallel to their interest and motivation on a given issue or phenomena, it is likely that their skills and language too will be improved. Consequently, this improves the student's current writing state in relation to language development and their ability to integrate critical thinking within the process. The research will investigate the extent of usefulness of the Framegram Framework in this course. Ultimately, the data gathered will serve as an informed decision of how the language learners perceived LA as part of their second language learning experience.

Keywords: writing skills, critical thinking, language awareness, language development, language learners

INTRODUCTION

Writing process in English as Second Language (ESL) setting can be very challenging(Moses & Mohamad, 2019). Students may be required to have appropriate language structures in order to produce a meaningful piece of writing. As students engaged in various type of writing, they are also consistently challenged to produce a good quality writing that resonates their critical and creative thinking skill. Understanding the extent of these challenges may provide insightful perspectives on how students could improve their languageand at be able to response critically in writing.

Language Awareness

Language Awareness (LA) relates to the idea of understanding the language explicitly and be able to consciously perceived and be sensitive to the language that is used to communicate in social life. As students are actively aware of the language use and function, Golken (1992) suggests that those students have established a metalinguistics activities as a reflection of metagcognitive knowledge of their language learning. Apart from the needs to master the process of language learning, the students are also presented with the challenge to produce a critical piece of writing by applying critical thinking (Sham, 2016). Apart from this, the process of planning, monitoring and evaluating them could potentially be more complex inthe case of English as Second Language (ESL) classroom (Wenden, 1998 as cited inKnospe,).

Many students are typically aware of the idea how language should explicitly be used through the learning of grammatical structures, be it in explicit or communicative grammar learningin classroom. Despite such fact, students are still struggling to write well (S. Singh, J. Singh, Abd Razak, Ravinthar, 2017). This can be seen through multiple grammatical errors in their writing.

Critical Thinking in Language Learning

Critical thinking is described as a series of skills that can be constantly utilised by students for whom 'constant revision and application of these skills is a significant way of internalizing what has often been seen to be just an attitude or bent of mind' (Mehta & Al-Mahrouqi, 2014). This skill could be further enhanced as they are given the opportunity towrite about issues which are relevant to their context. However, such opportunity may be limited due the specific nature of writing task in university. Subsequently may reduce their ability to write insightfully. #On top of that, one of the biggest fallacies is the assumption thatstudents have naturally developed such skills despite insufficient attention being given to the development of one (Mehta & Al-Mahrouqi, 2014).

Framegram

Framegram is framework which is mandatory to be used in completing one of the assessments in Advanced Grammar for Undergraduates (UBI10302). The tenets of the framework are based on the idea of LA and critical thinking. This is aimed at addressing the inability of students to be able to use correct and functional language structures by instigatingtheir critical thinking. Subsequently, solving the conundrum of LA and critical thinking in relation to ESL writing context.

This framework follows a series of linear development. Using Framegram, it starts with finding and critically evaluating a phenomena of their own interest and choosing. Thisphenomena will the discussed between student and instructor during consultation. Feedback that they received will be used for the re-evaluation of their writing topic before they start to write an actual Instagram entry and publish it.

FINDINGS

The purpose of this studies is to understand the extent of Framegram in developing appropriate language using correct grammatical structures that are suited in describing the given phenomena. Furthermore, this studies provide an insight into the degree of critical and creative

thinking that is perceived to be important in writing.

Table 1. Perception of the Use of Framegram (n=170)

No.	Item	Agree (%)	Disagree (%)
1.	Framegram helps to build up mypoints & arguments	95	5
2.	Framegram helps to build my language for Grammar Article Entry	94	6
3.	Framegram helps to think creatively & critically	97	3
4.	Concept of the Framegram can be extended to other domains that may require critical & creative thinking	90	10

The findings of this study reported highly-rated perceived notions of Framegram in helping students to write a critical piece of writing while constantly maintaining a high degree of LA. Item #2 is consistent to the notion that students are linguistically aware of how language is formed and its functions despite grammatical errors made in their Instagram entry. A high percentage of students, as seen in Item #3, believe that Framegram helps them to think creative and critically.

These findings provide several pedagogical implications as it helps instructors to understand practical implication of LA onto their teaching practices. Furthermore, more focus can also be given to creative and critical thinking skills.

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PERKASA @ APS : SOLUSI KEPADA KERAPUHAN KELUARGA YANG MEMPUNYAI ANAK CEREBRAL PALSY

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ABSTRAK

Keluarga yang mempunyai anak kelainan upaya (OKU) Cerebral Palsy (CP) sering dihimpit masalah kemiskinan. Ini adalah kerana ibu bapa tidak dapat keluar bekerja kerana keadaan anak CP yang terlantar, kejang otot, sawan dan memerlukan bantuan penjaga sepenuhnya. Mereka biasanya bergantung sepenuhnya dengan bantuan Jabatan Kebajikan Masyarakat dan derma orang ramai. Keadaan ini telah menyebbakan mereka merasa rendah diri, dan sering mengasingkan diri daripada masyarakat. Para ibu terutamanya, sering menyalahkan diri mereka ekoran daripada kecacatan yang dialami oleh anak mereka. Dari sudut kualiti hidup, ibu bapa sering berkonflik kerana tekanan kewangan, tekanan jiwa dan sering gagal mematuhi temujanji terapi kerana ketiadaan kenderaan dan wang. Mereka juga secara umumnya, lebih selesa mengharapkan bantuan masyarakat, dan sering menggunakan modal anak istimewa untuk menjana ekonomi keluarga. Model PERKASA@APS hadir sebagai solusi kepada kepada masalah ini. Pemerkasaan ekonomi bapa APS telah menjadikan mereka mandiri ekonomi melalui projek penanaman cili secara fertigasi. Ibu-ibu APS pula telah diberi latihan menjahit telekung, langsir dan baju kurung di Rumah Kebajikan APS melalui kerjasama Kolej Komuniti Kuala Terengganu. Ibu-ibu APS juga diajar pembungkusan semula kerepek Tortilla pedas, termasuk ilmu pemasaran atas talian. Mereka juga diajar menghasilkan cili boh berskala kecil, namun menguntungkan. Rasa malu dan rendah diri kerana mempunyai anak istimewa dan dihimpit kemiskinan diubati melalui pemerkasaan rohani oleh motivator dan psikologis yang memberikan dorongan dan semangat beserta sesi kaunseling kepada ibu-ibu yang depresi. Anak-anak CP pula di beri terapi saraf, terapi fizikal dan terapi seni secara berkala dan banyak membantu melegakankesakitan dan ketegangan saraf yang mereka alami. Gabungan model pemerkasaan ekonomi – rohani – fizikal telah terbukti berjaya mengubah kedudukan ekonomi keluarga APS, menghidupkan kembali semangat untuk berjuang demi anak CP mereka serta menambahbaik kualiti hidup anak CP melalui terapi intensif.

Kata kunci: Cerebral Palsy, golongan rentan, memperkasa ekonomi, sokongan sosial, anak istimewa

PENGENALAN

Keluarga yang mempunyai anak kelainan upaya (OKU) Cerebral Palsy (CP) sering dihimpit masalah kemiskinan. Ini adalah kerana ibu bapa tidak dapat keluar bekerja kerana keadaan anak CP yang terlantar, kejang otot, sawan dan memerlukan bantuan penjaga sepenuhnya. Para bapa yang bekerja kerap diberhentikan kerja kerana mereka sering memohon cuti akibat komitmen temujanji hospital, temujanji terapi dan anak CP sering dimasukkan ke wad. Mereka biasanya bergantung sepenuhnya dengan bantuan Jabatan Kebajikan Masyarakat dan derma orang ramai. Keadaan ini telah menyebbakan mereka merasa rendah diri, dan sering mengasingkan diri daripada masyarakat. Para ibu terutamanya, sering menyalahkan diri mereka ekoran daripada kecacatan yang dialami oleh anak mereka. Dari sudut kualiti hidup, ibu bapa sering berkonflik kerana tekanan kewangan, tekanan jiwa dan sering gagal mematuhi temujanji terapi kerana ketiadaan kenderaan dan wang. Mereka juga secara umumnya, lebih selesa mengharapkan bantuan masyarakat, dan sering menggunakan modal anak istimewa untuk menjana ekonomi keluarga.

MODEL PERKASA@APS

Model PERKASA@APS hadir sebagai solusi kepada kepada masalah ini. Model ini telah diadaptasi di Rumah Kebajikan Anak Permata Syurga Terengganu (APS) dan telah berjaya memperkasa dan mengubah keadaan ibu bapa kepada anak CP. Rumah Kebajikan APS merupakan sebuah badan bukan kerajaan (NGO) yang menaungi keluarga-keluarga yang mempunyai anak CP di Terengganu. Setakat ini, APS mempunyai 154 keahlian. Model ini merupakan gabungan pemerkasaan ekonomi-rohani- fizikal, telah mengubah keadaan ekonomi ibu bapa APS, membuang stigma rendah diri mempunyai anak istimewa dan membaiki kualiti hidup anak CP.

Pemerkasaan Ekonomi Bapa

Pemerkasaan ekonomi bapa APS telah menjadikan mereka mandiri ekonomi melalui projek penanaman cili secara fertigasi. Projek Rimbunan Segar dengan kerjasama Kerajaan Negeri telah menyewa tanah kebun untuk diusahakan oleh bapa APS, manakala benih, baja, racun dan khidmat nasihat datang dari sumbangan Jabatan Pertanian Bukit Payong. Seramai 10 bapa telah terlibat dalam Fasa 1 projek ini. Tuaian pusingan pertama sebanyak 5 kali tuaian telah membawa hasil lumayan. Kejayaan Fasa 1 telah membangkit semangat mereka untuk mempelbagaikan hasil tanaman di Fasa 2 dengan menanam sawi, terung dan bendi. Sepuluh lagi bapa akan menyertai peojek Rimbunan Segar pada Fasa 2 November 2021 nanti.

Pemerkasaan Ekonomi Ibu

Ibu-ibu APS pula telah diberi latihan menjahit telekung, langsir dan baju kurung di Rumah Kebajikan APS melalui kerjasama Kolej Komuniti Kuala Terengganu. Latihan selama 4 minggu telah memberi keyakinan kepada mereka untuk mengambil upah menjahit pakaian di samping dapat menjaga anak CP mereka. Ibu-ibu tidak lagi mempunyai alasan tiada pengasuh yang boleh menjaga anak CP mereka semasa mereka keluar bekerja. Jahitan yang kemas dan harga berpatutan telah perhatian pelanggan untuk menggunakan khidmat jahitan

ibu-ibu APS. Ibu-ibu APS juga diajar pembungkusan semula kerepek Tortilla pedas, termasuk ilmu pemasaran atas talian. Setiap pek kerepek Tortilla dijual denganharga RM8, dengan ibu-ibu mendpaat keuntungan bersih sebanyak RM2.50 daripada setiap pek yang terjual. Mereka juga diajar menghasilkan cili boh berskala kecil, namun menguntungkan. Ibu-ibu terpilih telah menjalani kursus jangka pendek penghasilan cili boh, penawetan dan pembungkusanagar tahan lama.

Perkasa Rohani

Rasa malu dan rendah diri kerana mempunyai anak istimewa dan dihimpit kemiskinan diubati melalui pemerkasaan rohani. Setiap pagi Jumaat, ibu-ibu APS berkumpul di Rumah Kebajikan APS untuk membaca Yaasin dan solat dhuha bersama-sama. Motivator dan psikologis seperti Ustazah Wan Nurhidayah Wan Pauzi dan Ustazah Norhashimah Yahya sering hadir memberikan dorongan dan semangat beserta sesi kaunseling kepada ibu-ibu yang depresi.

Perkasa Fizikal Anak CP

Pada setiap Isnin-Rabu, anak-anak CP diberikan sesi terapi saraf percuma oleh Kumpulan Terapi Darul Iman, terapi seni oleh Pusat Kesenian dan Warisan UniSZA dan terapi cara kerja oleh para sukarelawan. Anak-anak CP yang selama ini terperuk di rumah lantaran kemiskinan keluarga dan kekurangan sokongan sosial telah menikmati kehidupan yang lebih baik. Terapi saraf, terapi fizikal dan terapi seni telah membantu melegakan kesakitan dan ketegangan saraf yang mereka alami.

PENUTUP

Gabungan model pemerkasaan ekonomi – rohani – fizikal telah terbukti berjaya mengubah kedudukanekonomi keluarga APS, menghidupkan kembali semangat untuk berjuang demi anak CP mereka serta menambahbaik kualiti hidup anak CP melalui terapi intensif. Model PERKASA@APS ini boleh diguna pakai kepada semua golongan rentan, aktivis – aktivis NGO, rumah –rumah kebajikan dan tidak terhad kepada keluarga Cerebral Palsy sahaja. Model ini sedang diadaptasi oleh Persatuan BukuJalanan Chow Kit. Model PERKASA@APS ini juga telah berjaya melonjakkan usaha Malaysia mencapai matlamat 1 (sifar kemiskinan) dan matlamat 10 (kesaksamaan sosial) dalam Matlamat Pembangunan Mampan (Sustainable Development Goals).

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POKET PEKA UNDANG-UNDANG DILETTANTE V2: PEMBERHENTIAN KERJA

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ABSTRAK

Pandemik Covid-19 telah memberi impak yang besar pada ekonomi negara sehingga mengakibatkan penutupan perusahaan dan pemberhentian kerja. Petroliam Nasional Berhad misalnya telah mengalami kerugian sebanyak RM 21 billion akibat daripada pandemik ini, manakala Airasia Berhad dan Airasia X Berhad terpaksa memberhentikan 10 peratus daripada tenaga kerjanya.Pemberhentian kerja ini secara langsung memberi kesan yang serius kepada masalah pengangguran negara. Pemberhentian kerja atau perkhidmatan oleh majikan terhadap pekerja merupakan prerogatif majikan dan ia dilakukan apabila syarikat menghadapi masalah kewangan atau apabila syarikat melakukan penstrukturan semula perusahaan yang mengakibatkan lebihan pekerja. Senario ini amat membimbangkan kerana terdapat segelintir majikan yang tidak mengendahkan peraturan dan peruntukan undang-undang buruh dalam melaksanakan pemberhentian kerja ini. Produk inovasi ini dicipta bagi memberi kesedaran dan pengetahuan kepada majikan dan pekerja berkenaan kepentingan mengetahui dan mengikuti prosedur yang betul dalam melaksanakan proses pemberhentian pekerja. Poket undang-undang ini menggunakan infografik dan laras bahasa yang mudah difahami supaya informasi undang-undang dapat dihayati dan dipraktikkan. Produk inovasi ini juga menyediakan senarai semak prosedur pemberhentian kerja untuk rujukan para pekerja dan majikan bagi pemastian pematuhan prosedur. Dari sudut pengkomersilan, produk ini amat efektif untuk digunakan sebagai rujukan majikan dan pekerja dalam proses pemberhentiaankerja. Ia juga senang dipasarkan dengan kos yang minima kerana ia dibangunkan dalam bentuk e- brosur.

Kata kunci: poket peka undang-undang, pemberhentian kerja, kesedaran, pengetahuan undang-undang

PENGENALAN

Kehidupan harian penduduk di Malaysia bagaikan berubah 180 darjah semenjak Perintah Kawalan Pergerakan (PKP) dilaksanakan pada pertengahan bulan Mac 2020 yang lalu. Pada

masa kini, kebanyakan syarikat terpaksa menggunakan kaedah *work from home* (bekerja dari rumah) berbanding keluar mencari rezeki di luar atau berada di pejabat bagi mengekang penularan wabak Covid-19. Pada masa yang sama juga, ada syarikat yang terpaksa berhadapan dengan keadaan yang sukar apabila pengoperasian syarikat mereka mula terjejas dan mengalami kesukaran untuk membayar gaji pekerja dalam tempoh masa yang ditetapkan. Ada juga majikan yang terpaksa melakukan pemberhentian kerja terhadap pekerja mereka secara serta-merta. Apabila berlaku situasi sebegini, semakin ramai golongan pekerja yang mula mengambil berat terhadap hak dan tuntutan masing-masing di sisi undang-undang. Namun begitu, menurut badan peguam dan aktivis di Malaysia, ada juga di antara mereka yang dicabuli haknya (Nur Hasliza Mohd Salleh, 2020). Kementerian Sumber Manusia turut melaporkan bahawa mereka menerima hampir 24,000 aduan tentang isu kebajikan dan pembuangan pekerja melalui Jabatan Tenaga Kerja sepanjang PKP (Samadi Ahmad, 2020). Justeru, pekerja-pekerja yang telah diberhentikan kerja oleh majikan mereka perlumengetahui hak-hak mereka menggunakan kaedah yang paling mudah dan pantas untuk dirujuk sekiranya perkara ini berlaku kepada mereka. Objektif kajian ini adalah untuk mengenalpasti tahap kesedaran dan pengetahuan para pekerja berkenaan hak dan prosedur pemberhentian kerja yang telah digariskan undang-undang. Hasil kajian akan digunakan oleh penyelidik untuk membentuk suatu produk yang memberi maklumat berkenaan prosedur dan hak pekerja yang dijamin oleh undang-undang seperti yang termaktub di dalam undang-undang buruh dengan menggunapakai bahasa yang mudah difahami dan persembahan yang menarik.

POKET PEKA UNDANG-UNDANG DILETTANTE V2: PEMBERHENTIAN KERJA

i.   Deskripsi produk

Poket Peka Undang-Undang Dilettante V2: Pemberhentian Kerja direka bagi memberi pengetahuan dan kesedaran kepada orang awam berkenaan prosedur pemberhentian kerja dengan cara yang mudah difahami. Poket Peka Undang-Undang ini direka dalam bentuk infografik bagi membantu menyampaikan informasi undang-undang yang kompleks kepada bentuk yang lebih efektif, berkesan dan pantas kepada para pembaca. Ia menyediakan senarai semak prosedur pemberhentian kerja untuk rujukan para pekerja dan majikan bagi pemastian pematuhan prosedur undang-undang. Senarai semak ini membantu majikan dan pekerja untuk mengenalpasti kelompongan prosedur yang gagal diikuti oleh pihak-pihak yang berkenaan.

ii.   Faedah dan kepentingan kepada orang awam

Poket Peka Undang-Undang Dilettante V2: Pemberhentian Kerja amat berfaedah kepada majikan dan pekerja terutamanya di dalam keadaan ekonomi yang tidak menentu akibat pandemik Covid-19. Produk ini mampu membantu para majikan dengan menjelaskan secara terperinci prosedur undang-undang yang perlu diikuti agar hak pekerja dipelihara dan supaya litigasi undang-undang dapat dielakkan. Bagi para pekerja, inovasi ini membantu mereka untuk memahami hak pekerja di dalam situasi ini bagi mengelakkan daripada ditindas oleh majikan. Produk inovasi ini direka dalam bentuk e-brosur. Ia membolehkan perluasan jangkauan dan akses kepada orang awam, dan seterusnya sampai kepada sasaran populasi pekerja.

iii.   Potensi pengkomersilan

Poket Peka Undang-Undang Dilettante V2: Pemberhentian Kerja mempamerkan maklumat

undang-undang dengan bahasa yang mudah dan paparan yang menarik. Produk ini mempunyai potensi yang besar untuk dikomersilkan dan dipasarkan kerana ia dicipta dalam bentuk e-brosur dimana jangkauan kepada awam lebih meluas dengan kos yang minima. Produk ini berpotensi dipasarkan di sektor perusahaan dan perindustrian terutamanya disektor swasta agar para majikan dan pekerja lebih peka dengan kehendak undang-undang dan perlindungan yang diberikan oleh undang-undang buruh

KAJIAN LITERATUR

Kajian lepas berkaitan dengan pemberhentian kerja telah banyak dibincangkan dari perspektif undang-undang (cth: Abd Razak et al., 2021; Anantaraman, 2004; Marsono & Kamaruzaman, 2008) dan pentadbiran perniagaan (cth: Hassan et al., 2016; Muniapan, 2013). Walaubagaimanapun, isu kesedaran hak berkaitan pemberhentian kerja dalam kalangan majikan dan pekerja masih belum diterokai sepenuhnya. Dalam menangani isu ini, perkara yang perlu dititikberatkan adalah laras bahasa undang-undang. Menurut Marmor (2008), bahasa undang-undang sukar untuk difahami disebabkan oleh konteks dan kandungan tersirat yang terdapat dalam peruntukan undang-undang. Berdasarkan hujah ini, masyarakat umum yang tidak mempunyai latar belakang undang-undang berkemungkinan besar mengalami masalah yang sama. Oleh itu, penggunaan laras bahasa yang mudah difahami dan digabungkan dengan medium penyampaian yang menarik seperti infografik dapat meningkatkan kesedaran majikan dan pekerja berkaitan dengan hak-hak pemberhentian kerja. Meskipun kaedah ini dianggap baru, ianya telah digunapakai dalam meningkatkan kesedaran undang-undang berkaitan hak pengguna (Elvira et al., 2021).

METODOLOGI

Satu kajiselidik ringkas berkaitan dengan infografik prosedur pemberhentian kerja telahdiedar secara maya mengunakan medium *Google Form.* Kajiselidik ini mengandungi soalan ringkas berkaitan dengan latarbelakang responden, pengetahuan am mereka berkaitan denganprosedur pemberhentian kerja, Infografik Poket Peka Undang-Undang, dan pendapat responden berkenaan infografik. Data dianalisis menggunakan statistik deskripsi. *Pearson Chi-Square Test* juga telah digunakan untuk mengkaji hubungan jantina responden dan kecenderungan mereka untuk peka terhadap prosedur pemberhentian kerja.

PERBINCANGAN DAN KEPUTUSAN

Jumlah keseluruhan responden yang menjawab kajiselidik mengenai Poket Peka Undang-Undang V2 adalah seramai 101 orang. Daripada jumlah keseluruhan itu, responden lelaki adalah seramai 39 orang berbanding responden perempuan seramai 62 orang. Apabila ditanya adakah mereka tahu mengenai prosedur pemberhentian kerja, 48 orang menyatakan "Ya", 18 orang menyatakan "Tidak" dan 35 orang menyatakan "Mungkin". Dapatan ini menunjukkan secara keseluruhannya hanya 47% berasa yakin mereka tahu prosedur pemberhentian kerja.
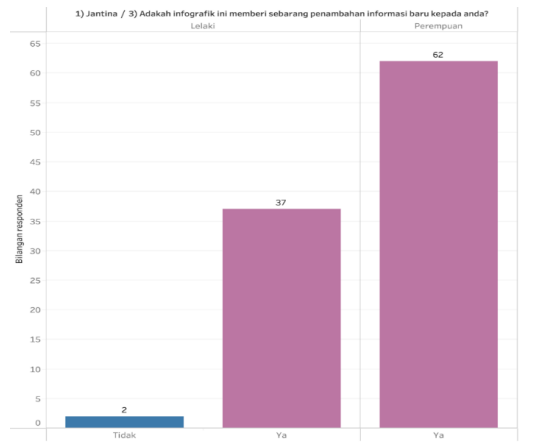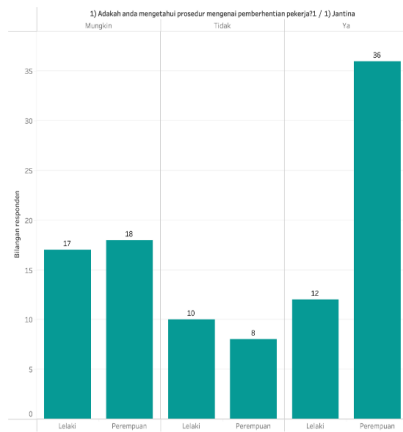
Rajah 1a. Bilangan responden mengikut jantina dan pengetahuan tentang prosedur pemberhentian kerja

Rajah 1b. Pendapat responden tentang penambahan informasi daripada infografik

Berdasarkan Rajah 1a, 75% daripada responden yang menyatakan mereka tahu mengenai prosedur pemberhentian kerja adalah perempuan. Seramai 10 orang responden lelaki juga dengan jelas menyatakan mereka tidak tahu prosedur tersebut berbanding hanya 8 orang responden perempuan. Tiada perbezaan yang jelas antara lelaki ($n = 17$) dan perempuan ($n = 18$) bagi bilangan yang menyatakan mungkin mereka tahu. Oleh itu jika dibandingkan kepekaan responden perempuan berbanding lelaki, 58% daripada responden perempuan peka tentang prosedur pemberhentian kerja berbanding hanya 30.7% responden lelaki.

Jadual 1. Analisis *Chi Square*

	Nilai	df	Kepentingan asymptotic
Pearson Chi-Square	7.397	2	.025
Likelihood Ratio	7.525	2	.023
Bilangan responden	101		

*df – darjah kebebasan

Analisis lanjut menggunakan *Chi Square* seperti dalam Jadual 1 bagi mengkaji sama ada jantina mempengaruhi pengetahuan responden berkaitan dengan prosedur pemberhentian kerja menunjukkan nilai p signifikan pada 0.025, iaitu kurang daripada nilai piawai 0.05. Ini menunjukkan secara statistiknya jantina boleh dihubungkait dengan jelas mempengaruhi kecenderungan responden untuk menjadi lebih peka kepada prosedur pemberhentian kerja.

Responden juga diminta memberi pendapat sekiranya infografik yang digunapakai memberi penambahan informasi baru berkaitan dengan prosedur pemberhentian kerja. Rajah 1b menunjukkan secara keseluruhnya hampir 99% responden berpendapat infografik ini memberi penambahan informasi. Hanya 1% iaitu 2 orang responden lelaki yang merasakan infografik berkaitan prosedur pemberhentian kerja tidak memberi sebarang penambahan maklumat kepada mereka. Responden juga diminta memberikan pendapat umum tentang infografik ini. Antara komen yang diterima adalah infografik "*sangat mudah difahami dan*

menarik", "kreatif dan lengkap", dan "harus diedarkan atau dipaparkan lagi di sektor sektor awam terutamanya, sekaligus dapat memberi kesedaran kepada khalayak umum mengenai hak-hak sebagai seorang pekerja".

KESIMPULAN

Pemberhentian kerja merupakan pilihan terakhir majikan sekiranya penstrukturan syarikat terpaksa dilakukan. Ini adalah kerana ia bukan sahaja memberi impak negatif kepada pekerja, malah ia juga memberi kesan kepada pihak majikan. Bagi pekerja, jaminan kerja amatpenting bagi kelangsungan hidup, kestabilan ekonomi, dan kesejahteraan psikologi. Manakala pemberhentian kerja akan merugikan pihak majikan kerana majoriti pekerja adalah terlatih dan berpengalaman di dalam bidang tugas masing-masing. Walau bagaimanapun, tidak dinafikan tanpa kesedaran dan pengetahuan berkenaan prosedur undang-undang, pekerja mungkin akan ditindas oleh pihak majikan apabila hak mereka tidak dipelihara seperti yang termaktub di dalam undang-undang. Bagi majikan pula, litigasi undang-undang boleh memburukkan lagi keadaan kewangan syarikat. Justeru, Poket Peka Undang-Undang yang memberi informasi undang-undang dengan bahasa yang mudah amat diperlukan bagi mengatasi kesan-kesan negatif yang mungkin timbul akibat daripada ketidakpekaanpihak-pihak yang berkenaan dalam proses pemberhentian kerja.

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POWER GENERATION USING THERMOELECTRIC POWER GENERATOR WITH PARABOLIC SOLAR CONCENTRATOR

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ABSTRACT
Solar Thermoelectric Generator (STEG), a hybridization system of a thermoelectric generator (TEG) with a heat exchanger have been thoroughly explored because of its ability to produce both electricity and heat simultaneously. In this project, a STEG system consists of parabolic solar dish collector and a single TEG was constructed to produce both heat and electricity simultaneously. An absorber plate placed on the focal point of the dish was used to facilitate the heat transfer of the reflected solar radiation to the TEG through the plate. The absorber plate thickness was 1 mm and made up from copper to ensure high heat transfer rate and was well insulated to ensure minimal heat loss. To evaluate the performance of the STEG, Water-Cooled Cooling Method with Water Heat Sink and Air-Cooled Cooling Method (Forced-Convection) with Finned Heat Sink were introduced to cool down the generators. Results showed that Water-Cooled Cooling Method with Water Heat Sink was more effective to cool down the generator and allow a higher electricity being generated than air-cooled cooling method.

Keywords: Thermoelectric power generator, Parabolic Solar Dish Collector, Solar Energy, Solar Thermoelectric Generator.

BACKGROUND

It is vital for our society to realize the consequences of using fossil fuels as the main energy resource, especially when we are too dependent on it. We have been utilizing fossil fuels for almost two hundred years (Gomesh et al., 2013). Burning of fossil fuels will emit pollutants to the atmosphere, which will cause greenhouse effects and global warming. To ensure the sustainability of our future, using renewable energy as an alternative to fossil fuels is a great start. Renewable energy is a clean energy source because it does not harm the environment. Also, they are finite and does not deplete. Solar energy, as one of the many renewable energies available, is widely used for thermal and electrical power generation. To harness the solar energy, a solar collector is needed. In this research, a parabolic solar dish concentrator is coupled with thermoelectric generator (TEG) to generate power. TEG is a solid state device

that converts thermal energy to electrical energy directly (Ismail & Ahmed, 2009). TEG is compact, robust, have no moving parts, relatively simple, and environmentally friendly (Eswaramoorthy et al., 2013). This hybridization system is called Solar Thermoelectric Generator (STEG). STEG can produce both electricity and heat. To further enhance the performance of STEG, a water-cooled cooling method with water heat sink and air-cooled (forced convection) with finned heat sink are introduced.

METHODOLOGY

The conceptual design of the parabolic solar dish concentrator is illustrated in Figure 1. A recycled satellite dish is used as the collector. The dish is covered by small segment of mirrors. One thermoelectric (TE) module is placed at the focal point of the dish. The cooling system used in this research were water-cooled with water heat sink and air-cooled (forced convection) with finned heat sink. For the air-cooled cooling method, a USB powered fan is placed on top of the finned heat sink.
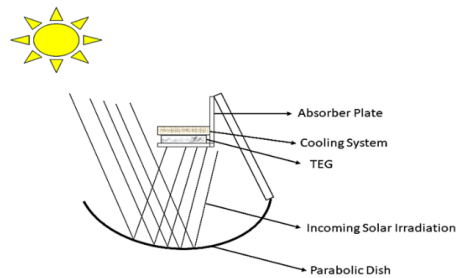

Figure 1: Schematic Diagram of the setup

For efficient experimental data collection period, both water-cooled cooling method and air-cooled (forced convection) cooling method are conducted concurrently. The experiment is conducted for two days (21/11/2019 and 22/11/2019). Both setups are placed side by side as shown in Figure 2. To ensure optimum concentration, the axis of the reflector is set to be parallel with the incoming radiation. This is to focus the solar ray's incidents to the concentrated area. To achieve this, the parabolic concentrator is manually adjusted 5 minutes before each intervals of 30 minutes so that maximum solar radiation was reflected onto the TEG. The adjustments are based on two-axis tracking mechanism. At each intervals, the parameters (ambient temperature T_{amb}, hot side temperature T_{hot}, cold side temperature T_{cold}, water in temperature $T_{water,in}$ and water out temperature $T_{water,out}$ for water-cooled cooling method setup) are taken and tabulated. The experiment is conducted for 4 hours, from 11.00 a.m. until 3.00 p.m.
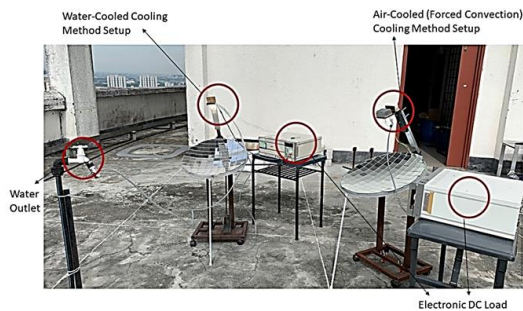

Figure 2: STEG setup for both cooling methods

RESULTS

Figure 3 shows the comparison of TEG temperature difference value and the solar irradiation value for both cooling methods for both experimental days. As expected, water-cooled cooling method are able to cool the TEG more efficiently. A larger temperature gradient is established; hence a higher power output is generated.

Figure 4 shows the comparison of the maximum power generated and the solar irradiation value for both cooling methods for both experimental days. The highest power generated among the introduced cooling methods is consistent with water-cooled cooling method. It is no doubt that water-cooled cooling method is able to enhance the performance of the TEG for maximum power generation possible.
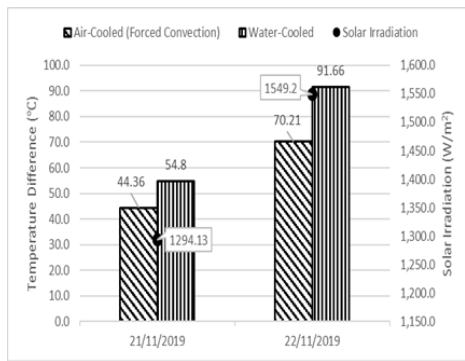

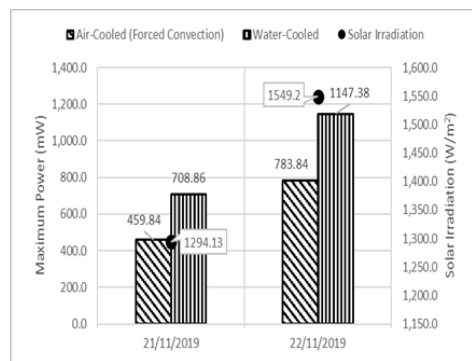**Figure 3: Comparison data of TEG Temperature Difference for both cooling methods.**

Figure 4: Comparison data of Maximum Power Generated by the TEG for both cooling methods.

CONCLUSION

The highest power generated for water-cooled cooling method is 1148 mW whereas the highest power generated for air-cooled cooling method is 784 mW for solar irradiation of 1550 W/m^2 with TEG temperature difference of 92°C and 70°C. All results showed TEG power output increases as TEG temperature difference increases. Water-cooled cooling method is indeed the most efficient cooling method to cool down the generator for high power generation.

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PREDICTION OF NANOSTRUCTURE OF SnO$_2$ PROPERTIES USING ARTIFICIAL NEURAL NETWORKS

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ABSTRACT

Tin(IV) oxide, SnO$_2$ nanostructures such as nanorods, nanoflowers, nanosheets, nanocubes have been receiving significant interest in various fields due to their inherent properties. The types of shape and size of nanorods vary based on the applications. A fine tuning of the parameters (e.g concentration, pH, temperature, template, type of solvent etc.) during the synthesis process can alter the morphology of the SnO$_2$. However, producing nanostructures with the desired size and shape is extremely complex and still remains a challenge. Hence, in this study a mathematics modelling called Artificial Neural Network (ANN) for the prediction of the SnO$_2$ morphology was developed. This study was carried out using the real time data collected *via* experimental work and training the data using a neural network toolbox in MATLAB Version (R2016a) software. An ANN modelling was constructed with the input parameters of reaction time and concentration of precursors and three different output parameters namely, crystalline size, band gap energy and size of particles. This modelling was developed based on trial and error at different network architecture, activation function and training algorithm. The data set was trained using hyperbolic tangent sigmoid (tansig) activation function and Levenberg-Marquardt training algorithm. The performance of modelling was evaluated based on the mean square error (MSE) and coefficient of determination (R^2). The finding shows, there is no overfitting while constructing the neural network and it is able to track the data. The result shows that the MSE performance plot and R^2 are in the range of 0.1-1.0. Therefore, it is suggested that the ANN modellings constructed in this study are able to produce a decent prediction. These values indicate that prediction of nanostructure SnO$_2$ properties using artificial neural network (ANN) is a great success.

Keywords: SnO$_2$, nanostructures, ANN, process modelling, hyperbolic tangent sigmoid, Levenberg-Marquardt training

INTRODUCTION

Tin (IV) oxide nanostructures represent an important class of crystalline semiconducting nanomaterial as it shows exceptional characteristics for instance high surface to volume ratio, high electron mobility (100-200 cm^2 V^{-1} S^{-1}) (Inderan et al, 2015), large energy gap (3.1-3.6eV)(Karmaoui et al, 2018), low electrical resistivity, high optical transparency and high theoretical specific capacity which made it one of the most popular metal oxide nanostructures. Several techniques have been developed for the preparation of SnO$_2$ nanostructures such as hydrothermal, sol-gel, wet chemical synthesis, co-precipitation, etc (Dontsova et al,2017). Among them, the hydrothermal method has been extensively used to synthesize SnO$_2$ nanostructures due to its high efficiency, simplicity and economical fabrication (Kundu et al, 2019). In addition, hydrothermal synthesis can generate nanomaterials that are stable at elevated temperatures, and by liquid phase or multiphase chemical reactions, the composition of nanomaterials to be synthesized can be well regulated. Nanomaterials with high vapor pressure can also be generated with minimal loss of materials by this process (Gan et al,2020).

The properties of nanostructures of SnO$_2$ can be simply tuned by changing the experimental parameters such as concentration, pH, temperature, template, solvent form, etc. However, to obtain a nanostructure with a desired size and shape remains a challenge. Therefore, Artificial Neural Network (ANN), a mathematical modelling can ease the process for the prediction of SnO$_2$ nanostructure properties. To create an optimal ANN model, there are few significant parameters to consider, namely the number of neurons in input, output and hidden layers. To build a successful network, the number of hidden layers, weights, bias, activation function and training algorithm must also be considered as ANN model for this research consists of several neurons. First, input neurons received input parameters fed into the network and stored the scale of the value input and calculated the value of the output layer called as output neuron. Hidden layers are located between the layers of input and output and are linked to each other. The sum of input and output values in each neuron will be weighted and added with a parameter called bias and the sum is passed through a function called the activation function. This activation function produces an output by taking into consideration all the contributions from its input links. Therefore, this study emphasizes on the prediction of the nanostructure SnO$_2$ properties synthesized at different reaction time and concentration of metal precursors *via* hydrothermal method. The particle size, band gap energy and crystalline size are selected as SnO$_2$ important properties in order to create the ANN models.

METHODOLOGY

The data were obtained from the analysis of nanostructure of SnO$_2$ that was conducted experimentally (Inderan et al, 2015). Two different experimental works have been carried out. The first experimental work was performed at a relatively low temperature (180 °C) and at pH 13 using different reaction times (6 hours, 12 hours, 18 hours and 24 hours). The second experimental work was carried out at the same temperature using various concentration of metal precursors (0.04M, 0.08M, 0.12M, 0.16M and 0.20M) in a mixed solution of water and ethanol by adding 6M NaOH to obtain the desired pH, pH 13.

Depending on the data collection, the hidden layer arrangement of this ANN model can be built either in multi-layer or single layer. In this analysis, the input dataset is divided into three sets, 70% of the data collection are for the training of data, 15% of the data is considered validation data, and the remainder 15% of the data is assigned for test data. Back propagation (BP) feed

forward neural network is employed because it is possible to adjust the number of hidden layers and neurons in each hidden layer according to any circumstances. The Levenberg-Marquardt (trainlm) algorithm is used in a typical BP neural network. The transfer function that is chosen is tangent sigmoidal (tansig). The trial and error of the number of hidden neurons will be a good strategy for this neural network model to get the optimal results. ANN model will be constructed where the input parameters are time and concentration of precursors while the output parameters are band gap energy of the metal oxide SnO_2, diameter of the particle size and lastly, crystalline size.

RESULT AND DISCUSSION

Figure 1 demonstrates the neural network design for the prediction of nanostructure of SnO_2 properties that consist of two input layers, a hidden layer and three output layers. Performance of the neural network design can be evaluated based on mean square error (MSE) and R^2, a coefficient of determination. Figure 2(a) presents the result of R^2 which is also referred to as "goodness of fit" as it measures how strong the linear relationship is between the two variables and gives a value of 0.99895. The value of MSE that is shown in Figure 2(b) gives a value of 0.12748 where it falls in the range of 0.1-1.0 which means that it is a highly reliable prediction model. Table 1 tabulates various values of mean square error (MSE) and regressions for the network designed during training, validation and testing process.
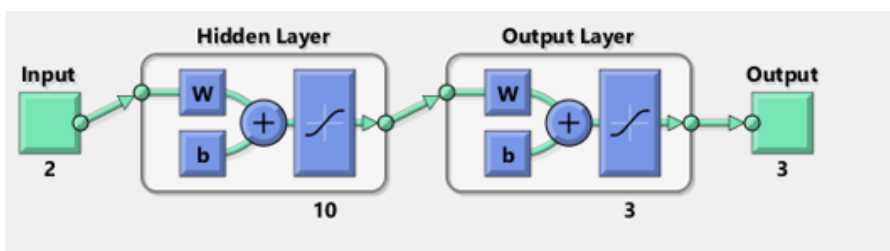

Figure 1: Neural network design for the prediction of properties of SnO_2

Table 1: Mean square error (MSE) and regression for network design

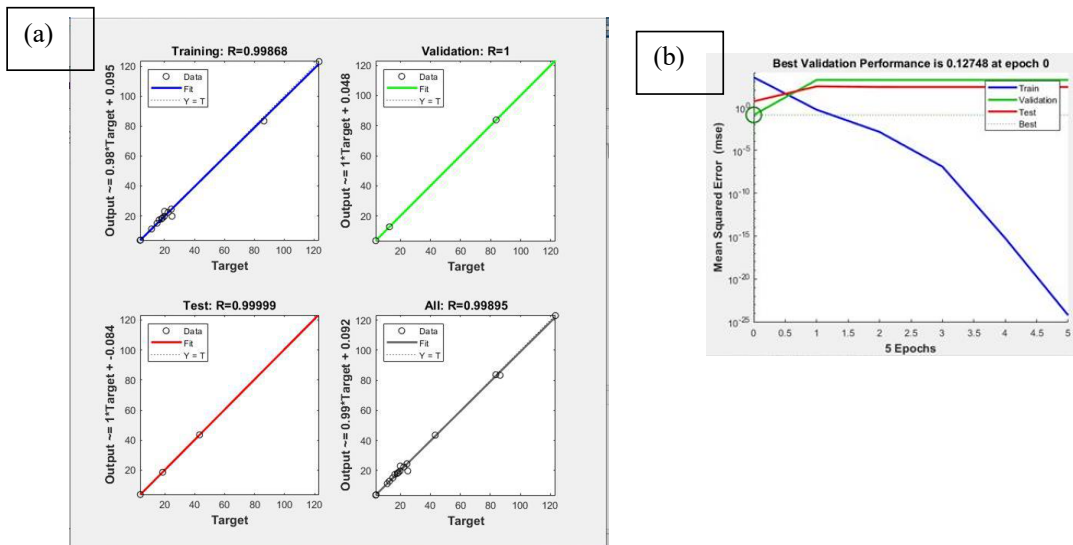| Fitting Network Sequence	Setup Division of Data	Performance (MSE)			Regression		
2-10-3	70-15-15	Training	Validation	Testing	Training	Validation	Testing
		0.3147	0.12748	0.3791	0.99868	1	0.99999

Figure 2 : (a) Neural network regression and (b) Validation performance for ANN model

An ANN model was successfully developed to predict the properties of SnO_2 nanostructures in which the accuracy of the model is highly dependent on the training data. Hence, in order to produce a highly reliable model that is accurate, an excellent collection of training data is required. The data presented should be well distributed, sufficient and measured accurately. Although the data are small, the results generated are properly trained and give an excellent result.

CONCLUSIONS

The prediction of properties of nanostructure of SnO_2 using ANN was successfully achieved. The network uses two different inputs namely reaction time and concentration of precursor with a neural network topology of 2-10-1. The values of R^2 ranging from 0.95-1.0 show that there is a high correlation of experimental data and predicted results proving a correct evaluation with the least error. As a conclusion, this research shows that an intelligent system such as ANN is able to develop a neural network model precisely as the best alternative compared to the conventional method as it produces an acceptable accuracy.

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PRODUCT DEVELOPMENT - e-TA'AWUN PA TAKAFUL+

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ABSTRACT
Takaful has rapid growth as an industry that has great potential in Malaysian and the global markets. Takaful is a modern and innovative approach to manage the demand for a shariah compliant instrument that can mitigate an individual's exposure to specific types of risk. It is largely due to the shariah principles that emphasize the value of mutual help and shared responsibility with the elimination of shariah prohibited elements such as interest, excessive uncertainty, and gambling in its business operation. The introduction of the Islamic Finance Service Act (IFSA) 2013 has opened a new chapter in the Takaful industry in Malaysia, starting with the segregation of Family Takaful and General Takaful that have provided an opportunity for the Takaful operators to focus on expanding their business to compete or at least be at par with the conventional insurance in the market. One of the famous Takaful products under General Takaful is personal accident protection. In this study, digitalization is an important element to be highlighted by the researchers. Realizing the importance of financial technology (Fintech) in Takaful management, some modifications and innovations have been done to cater for the demand from the Takaful market. A new personal accident product namely e-Ta'awun PA Takaful+ has been developed to provide the potential customers with conveniences and accessible to the Takaful product.

Keywords: Takaful, Shariah compliant, interest, uncertainty, gambling, conventional, insurance.

INTRODUCTION

With Personal Accident Takaful, people will be better prepared in the event of an accident that causes death or total permanent disability where they will receive compensation from the Takaful policy. They will be able to cover debts without burdening their loved ones, and even

the compensation money can also be used to cover hospital treatments, daily expenses, medical costs, buy special support equipment or renovate your home to facilitate movement if you are paralyzed by an accident. Nowadays, the pandemic of Covid-19 has hit all over the world. As the pandemic situation is constantly evolving, the health and wellbeing of the community remain the highest priority. The Takaful operators need to come out with a new product that caters for this current situation. They are committed to fulfilling their purpose and will continue to support the community during these uncertain times. Several Takaful operators provide hospitalisation coverage to bear the vaccination cost or any treatment related to the Covid-19 (Tan, 2021). However, fewer of the Takaful operators offer the protection for the participant's death because of the Covid-19. Until now, the deaths due to covid-19 have reached thousands of cases in Malaysia. Takaful operators should play an important role in introducing a product that covers the participant's death because of this pandemic.

Problem Statement

Personal Accident (PA) Takaful is one of the financial security planning provided in the General Takaful policy. This kind of Takaful product helps to ensure the financial security of family members once the policyholder dies. The participants of the Takaful policy can save money while protecting against any unexpected events in their life. However, there is still a lack of awareness about the importance of having personal accident Takaful coverage. According to Basaruddin (2019), statistic shows almost 85% of Malaysians still do not have Takaful coverage in the event of a personal accident. To ensure protection in the event of any unexpected accident, people should allocate about 10% of their monthly income for contributing to the Takaful protection. The main problem here is weaknesses in Takaful management that require digitalization. There are a few situations that indicate the weaknesses of Takaful management without attachment with financial technology development. One of the issues is related to the inefficiency of Takaful agents in providing information to prospective Takaful participants. It is because the inefficiency of Takaful agents is one of the main reasons why people are not interested in taking out Takaful policies. A study by Samsuri and Jamal (2017) indicated that the reliability on the Takaful agents is a factor that influences people to buy Takaful products. This statement is supported by Shaladdin et al. (2018) that the role of Takaful agents significantly affected overall customer satisfaction. They are responsible for developing the relationship between the agents and potential customers. Unfortunately, some Takaful agents do not have communication skills that results in the potential participants feeling uncomfortable and avoid meeting with Takaful agents. This issue is also related to a lack of integrity and credibility in promoting and explaining a particular product and giving services to a customer (Abdullah, Hassan, & Yusuf, 2020). If such qualities are disregarded, issues arise as the agents may become dishonest in explaining a particular product or Takaful service, give false information, hide information and delay settlement claims. The digitalization in Takaful management also will solve the issue related to the complicated Takaful claim process that is always a topic of discussion among policyholders. Some Takaful policies require the policyholders to submit a claim application within a specified time.

Objectives

There are three objectives related to this study. (1) To identify the importance of having Personal Accident Takaful to the society. (2) To examine the impact of digitalization in Takaful

products. (3) To determine the alternatives to the mode of contribution to the community through the development of Takaful products.

Scope of Product

This study focuses on the development of Personal Accident Takaful products under the General Takaful business. Researchers have innovated on the Takaful product that exists in the market. The innovation is based on feedback from the existing customers and in line with the current trend in the Takaful market.

LITERATURE

Ta'awun from Islamic definition is a manifestation of brotherhood (ukhuwwah) (Suhaimi, 2019). It is an expression of love, care, responsibility, and accountability that unites the people regardless of their differences. Ukhuwwah is authentic and normative. According to Ahmed Haj Ali, Noordin, and Achour (2018), ta'awun is simply mutual cooperation in executing religious obligations. There is an interaction process or exchange in performing religious obligations through mutual cooperation. As specifically in terms of e-Ta'awun PA Takaful+, the product development has been designed in helping the specific organizations, NGOs or government armed such as health department or specifically Kementerian Kesihatan Malaysia (KKM) for example in helping them in combating the Coronavirus (COVID-19) in current pandemic. According to Saeed (2019), Takaful is derived from the Arabic word 'Kafalah,' which is characterized as assurance that it is part of practices whereby people in society are mutually assertive against loss. Ahmad, Masood, and Saeed, (2010) stated that in Takaful, the prohibition component of Riba' which is interest, Maysir which is gaming and Gharar which is ambiguity is detached from the processes.

METHODS AND OVERVIEW

This study will be conducted to observe the viewpoints of PA Takaful with the plus benefit features on the introduction of e-Ta'awun PA Takaful+ plan along with application technology as an evidence keeper. This allows the researchers to be able to identify whether this application technology system may contribute to the ease of the procedure which at once could educate the population on the actual application process and accessibility for the Takaful product. To study this issue on Takaful PA and the apps applied in Malaysia, this study will be conducted based on the perspective of the people who are interested in the Takaful product and how do they apply and reach for this Takaful product available in the market. This product is not only related to the PA Takaful, but also to the concept of Ta'awun which means helping others. While subscribing this PA Takaful, customers also can help misfortunate people around them, by doing Waqf, Fidyah and others besides getting the benefits featured in this e-Ta'awun PA Takaful+.

METHODOLOGY

The b Bold by Takaful apps, which is the Robo apps for this newly developed Takaful product, has been created altogether with the Takaful product and also with the Robo apps. The

prototype of this product along with the apps have been designed. However, to design, create and develop new apps need expertise in the field of technology in apps. Due to lack of expertise in apps engineering and apps development, Kipple Pay Sdn Bhd has been appointed. Kipple Pay Sdn Bhd is a company that has been an expert in developing the electronic payment system and developing the apps, mostly on the payment services and also e-wallet apps. Takaful is a type of Islamic insurance wherein members contribute money into a pool system to guarantee each other against loss or damage. Takaful branded insurance is based on Shariah or Islamic religious law, which explains how individuals are responsible to cooperate and protect one another. Takaful policies cover health, life, and general insurance needs. Takaful insurance companies were introduced as an alternative to those in the commercial insurance industry, which are believed to go against Islamic restrictions on Riba' (interest), *al-Maisir* (gambling), and *al-Gharar* (uncertainty) principles all of which are outlawed in Shariah. All parties or policyholders in a Takaful arrangement agree to guarantee each other and make contributions to a pool or mutual fund instead of paying premiums. The pool of collected contributions creates the Takaful fund.

RESULTS AND DISCUSSIONS

Based on the study, we noted that it is crucial for a Takaful company to swiftly migrate its business module from traditional to a modern approach by leveraging IT technology and digital platforms. Hence, this paper intends to propose a new Takaful product known as *"e-Ta'awun PA Takaful+"*, a general Takaful which could be easily self-subscribed by customers via website or mobile application. This Takaful product is a combination of personal accident protection with additional element of *Sadaqah* and W*aqf* to entice customers to participate in contribution to societies or charitable bodies in Malaysia and other countries such as Palestine, Laos, African states, and others. To differentiate our product against other Takaful companies in Malaysia, our strong proposition is leveraging totally in digital platform such as websites and mobile applications in which our mobile application will be branded as the 'b-Bold by Takaful'.

This product is designed interactively and user-friendly which is suitable to all level of customers from young generation up to senior citizens in line with rapid changes in technology in the decade. At this modern age, most people are technology savvy and comfortable to purchase online. Our digital platform will enable customers to access our products and services for 24 hours a day, 7 days a week for 365 days. The customers can make self-purchase of our product via online at anytime and anywhere. Robo-advisor functions will make it convenient for the customers to understand our product features, packages, charities information, and many others. Furthermore, all transactions can be made online by clicking the buttons and menus provided in the platform to complete related transactions.

By using advanced technology such as leveraging digital platforms as new sales channels, it will help in increasing closing sales of our products effectively due to the increase in customers' reach. With a shift to digital platforms, there is no limit to how many customers are actually visiting our products physically. As per research data by Think with Google in 2018, 63 percent of shopping occasions nowadays begin online. Customers can obtain easy access to our product offering by directly subscribing through our application or website. Our website would be mobile as well as desktop friendly whereby the rise of smartphone usage has given rise to shopping via this device.

With an online presence, we really do not have a close down time. Our application is 24/7 visible to as many customers as would want to come. Also, all of this is possible within the comfort of their laptops and desktops, over the sofas in their leisure attire. Furthermore, Robo advisors will assist the customers on information requested by them. Customers can choose Takaful packages available via websites or applications as well donation needed and make payment via secure digital gateways. All features are attractive and interactive to customers.

The most important point is that customers can easily get protected without hassle in process in terms of Takaful application and claim submission in which everything could be performed via online. In the same time, we will be able to play our roles in helping those affected communities and societies for survival via our donation.

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PROMOTING MALAYAN EMERGENCY STATE BY USING GAMING PLATFORM AS AN ILLUSTRATIVE MEDIUM

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ABSTRACT

Based on a series of events that took place in 2019 that seemed to elevate the Malayan communists as freedom fighters, rather than terrorists. If the narrative were to succeed, it would mean that the services of soldiers and security forces fighting day and night would be forgotten (Prof Dr. Zainur Rashid Zainuddin, 2020). Previous research shows that this issue arises because people already forgot the history of our nation. This was also proven from our survey research and findings. To strengthen the memory, we develop a game design which focuses on events happened during Malayan emergency 1948 -1960. This research is about using a gaming platform as an illustrative medium to promote the Malayan emergency state. Hence, the design objective is to remind the young generation to be discreet and vigilant towards the ideologies of communist.

Keywords: Game-Based Education, Malayan Emergency, Illustration.

INTRODUCTION

The Malay Emergency (Malay: Darurat Malaya) was a guerilla war waged between 1948 and 1960 at Federation of Malaya. The dispute was between the armed forces of the Commonwealth, the pro-independence rebels of the Malay National Liberation Army (MNLA) and the Malayan Communist Party's (MCP) military wing. By the lead of Chin Peng as the President, the goal of the communists was to seize power from the British and replaced it with a Communist Republic. However, they acted brutally and killed civilians to spread communist ideology.

Based on a series of events that took place in 2019 that seemed to elevate the Malayan communists as freedom fighters, rather than terrorists. From an article by Prof Dr. Zainur Rashid Zainuddin in Harakah Daily, 2020, there are a few events that prove the ideology of communist is being resurrected in these past years such as: (1) There are parties who are malicious by raising the wrong Malaysian flag which is the 5-star flag at the opening ceremony of the 28th Basketball Championship organized by MABA in November 2019. (2) A senior DAP leader (NKM) who claim that his grandfather is a national hero while actually are involved in Malayan People Anti-Japanese Army (MPAJA) activities and the Malayan Communist Party (August 2019). (3) The ashes of the Communist terrorist leader, Chin Peng, were brought into Malaysia on 16 September 2019 and welcomed by 150 individuals in Ipoh Perak before being scattered into the sea near Lumut, Perak and in the Banjawan Titiwangsa Forest (November 2019).

Nowadays, there is a lot of game used as an illustrative medium especially history related games. To name a few, Battlefield 1 is a gameplay about world war one, Call of Duty: WWII by Activision is about world war two, and lastly Assassin's Creed III is a gameplay during American liberation. Each of them with a good storytelling to take players inside this historical world. Using current technology, they can create immersive environments and detailed

historical characters.

FUNCTION AND DEFINITION OF USING GAMING PLATFORM AS AN ILLUSTRATIVE MEDIUM

In the light of recent work, it shows that the average person responds far better to visual information compared to just plain text. According to Harris Eisenberg, (2014) this is since 90% of information transmitted to the brain is visual, and visuals are processed in the brain at 60,000 times the speed of text. In other words, people tend look at pictures and videos regularly and consume them more quickly than texts. On a neurobiology & behavior perspective, a research done by Craig Stark, (2015) state that video games are not created with specific cognitive processes in mind but rather are designed to immerse users in the characters and adventure. They draw on many cognitive processes, including visual, spatial, emotional, motivational, attentional, critical thinking, problem-solving and working memory. In other words, playing three-dimensional video games can boost the formation of memories of the events that occurs during the gameplay. Therefore, people will understand faster towards contents that contain images and visual compared to only texts content.

Using games as a learning method is not a new thing. Game-based learning is the creation of learning activities to inherit game functionality and game concepts within the learning activities themselves (see Vandercruysse et al., 2012). Not to be confused with Gamification. To improve participation and motivation, gamification is the incorporation of game elements into "conventional" learning practices (Halden Ingwersen, 2017). In short, Gamification converts the learning process into a more interactive environment like a game, while Game-Based Learning (GBL) uses a game as a platform for learning.

One of the problems that this issue rises is because people already forgot the history of our nation. Almost everyone in the community has forgotten what our fighters been through (Ismail Che Ros, 2019). Malayan Emergency is the sixth chapter in the Malaysia Highschool form 4 History Textbook KSSM published in 2020. Nevertheless, by understanding the details of the major events, students can memorize the larger aspect of the story. The details are like little sticky mental notes that help the viewer remember the bigger plot. As they watch, it helps them construct a mental picture and fortify their memory (Doug Rose, 2016).

Lastly to support this statement, two years study done by Mehmet Sükrü Kuran at Abdullah Gul University in Turkey (2018) and his colleagues shows that one of his game series was clearly better for learning purposes. They achieve this by creating an undergraduate history course in which students use historical video games to understand their subject better. Due to their level of detail, high historical accuracy and flexibility in modelling various cultures and nations, the most detailed experience was given, and the result is the student able to understand and comprehend the history of the specific subject higher.

DATA ANALYSIS AND FINDINGS

The target audience for this research is young adults aged from 15 – 29 years old. The primary data is used to define trends and averages, make prediction, and generalize outcomes to larger populations. The survey was formed by 50 respondents and 66.7% are Malay teenagers, 76.7% aged around 21 – 25 years old. It shows that they are from higher education level which half

of them got minimum of degree level education. The findings are as follows:

53.3% of respondents only remember the history that they study during school classes using textbook. Furthermore, 43.3% of respondents did not know why the Malayan Emergency in 1948 was declared. This shows that among teenagers, there are still many people that does not know about the Malayan State of Emergency. Meanwhile, 96.7% of respondents agreed that an interactive gameplay can give a long-term memory to the player, plus teach the younger generation to appreciate the history of Malaysia more effectively.

Other data was also being collected from previous researchers' works. Below are the data:

Table 1. A Summary of Previous Works in History Educational Games Related.

Name	Method Used	Description
(Azizah Jaafar et al., 2009)	- Propose a comparison between Pedagogy and Digital Games approach towards students and present a bridge that connect the student engagement for each test.	- A detailed explanation on the phase and steps for the test including the characteristic of their subject to test (students). - Drawbacks: does not justify the concept, platform, genre, and gameplay mechanics that being tested towards the students.
(Zainal Arifin Hasibuan et al., 2011)	- Propose a 3D simulation game to preserve the culture and history of Indonesia using DayaBaya as a visualization medium and education.	- Details the genre, concept art, gameplay mechanics and the game engine used for the game as the platform to reach their objective.
(Wenda Novayani, 2019)	- Propose an education game from school syllabus by using role-playing strategy game to visualize and fortify the memory of the event.	- Specific the target chapter and does not bombast it with other unnecessary side event that will ruins the immersion of the gameplay. - Using the latest technology and game platform to tighten the gap between what the school students wants and how the knowledge being pass to.

In this secondary data, a vast majority of past review work had already focused on their history chapter and steps on achieving their goals. However, the lack in visual immersion and very focusing on education syllabus damaged the element of entertainment in video games.

CONCLUSION AND RECOMMENDATION

Having looked at data collected and all statistics from reliable sources, we can conclude that the communist ideology is still being raise by some irresponsible organizations. Yet, younger generation were still in blind. From the primary data taken, it is proven that people already forgot what causes the Malayan emergency state. From school students to advanced education level of PhD students, they do not have any interest in remembering the past. As they busy on shaping the future, the past event which shape today moments will be forgotten. This made it easier to alter their perspective on who is the real terrorist, and which one is the real fighter to fight for the independence for this nation. For that reason, creating an interesting game which will be focusing on the event of the Malayan emergency state will be a good solution to overcome this problem. This is because, younger generation have a bigger interest in video games nowadays. As proven by the previous researcher, video games will help develop better long-term memory while following the interesting actual event that occurs during the Malayan

emergency.

PROJECT PROTOTYPE

For this project, we created a prototype of the game as the main idea and has two supporting item which is the concept art book for education purpose and in-depth explanation for the story, and a virtual reality/ 360° panorama video as an innovation for the illustration media.

Figure 1. Screenshot of the gameplay.

The storyline for this game will focus on two major war which is Bukit Kepong incident and Sungai Semur ambush. Also, to show how the villagers protect themselves against communist, another story followed the legendary of the red sash warrior (Panglima Selempang Merah) will also be added in the game. For this prototype of the game, only the story of Sungai Semur ambush is available. The player will follow Corporal Jamaludin to defend the area of Sungai Semur that being ambushed by the communist. The location is a re-creation from an interview with Corporal (retired) Salleh Nahu which describe the place and how the battle occurs.

Figure 2. Screenshot of the 360° panorama video titled Erti Perjuangan.

This 360° panorama video which been uploaded to YouTube can be viewed with or without the virtual reality headset. The purpose for this video is as a teaser for the game by showing a summary of the Malayan emergency state in 360° view. Viewers can feel and see in first person on how our great-grandfather fight during the emergency state. Together with audio and narrative, it is almost like a time machine itself.

Figure 3. Screenshot of the digital e-book of The Art of Emergency State.

The objective for the concept art book is to show how the game developed, more details of the game story and as an education for students.

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PROTECME

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ABSTRACT
Workplace violence (WPV) and other forms of aggression in any setting, particularly in the workplace are unacceptable and are of serious concern. WPV can come from a variety of sources in hospitals, including patients, their families and friends, other individuals outside the hospital, and individuals who are or have been employed by the hospital. The ProTecME mobile phone app was developed specifically to fix this concern. Through its easy user interface and mechanism for efficiently reporting WPV, this is the first application in Malaysia to provide true transparency and a sense of security. The benefits of using this system can improve the rapid communication process between the victim and the management, definite documentation accountability, legal protection and reduce any possible errors. This mobile apps Prototype was given to the stakeholders and expert for critiques and recommendations. Expert panels comprise of the academicians and stakeholders. Content validity was calculated by using the percentage of experts' agreement. Individuals can use this app to report inappropriate behaviour in a discreet and secure manner. Employees and employers can use this app to take action against WPV in the workplace in a simple, discreet, and quick manner. Its goal is to encourage employees to come forward and report WPV cases. It encourages both employees and management to unite together and change their own workplace cultures in order to put an end to WPV once and for all.

Keywords: Protecme, mobile application, form, nurses, workplace violence

INTRODUCTION

Workplace violence (WPV) and other forms of aggression in any setting, particularly in the workplace are unacceptable and are of serious concern. There have been cases that went viral on social media where patients or caregivers were mistreated by nurses. Conversely, some nurses also claimed that they experienced WPV perpetrated by patients or caregivers. In fact, several studies have revealed that patients are actually the major contributors of WPV in hospitals, but they are not the only sources of this phenomenon. The other possible sources that contribute to WPV in hospitals are co-workers, patients, caregivers or relatives and intruders (OSHA, 2015). WPV can come from a variety of sources in hospitals, including patients, their families and friends, other individuals outside the hospital, and individuals who are or have been employed by the hospital. A research conducted at Pusat Perubatan Universiti Kebangsaan Malaysia (PPUKM), showed that the percentage of WPV among nurses was 3.70% with an average of 1.20% being mistreated per month and one nurse being mistreated every other day (Ruth, Samsiah, Hamidah, & Santhna, 2009). The authors also found that the main WPV perpetrators were patients (40.6%), patients' relatives (37.5%) and the most common victims were the nursing staff. The study revealed only 19.0% of nurses submitted a formal post-incident report, while 38.0% talked to their colleagues about the incident, with the remainder claiming that work pressures do not allow staff the time to report such incidents (Jacobson, 2007). As far as we are concerned, normally the process of reporting and submitting the incident report form is handed in hard copy forms as no online system is yet available. Nowadays there are a lot of apps that have been introduced to make your work. The ProTecME (short form for Protect Me) mobile phone app was developed specifically to fix this concern.

PROBLEM STATEMENT

Workplace violence is one of the common issues for healthcare providers, especially among nurses and doctors. In their line of work, healthcare providers need to deal with human beings and will encounter complaints from patients who are not satisfied with the services. Most healthcare providers have proper complaints channels in place but as is often the case, patients or relatives use the wrong way to express their dissatisfaction towards the healthcare providers. Today, one of the more common ways for patients to express their dissatisfaction is by using social media, often by making and sharing viral photographs and video recordings without consent. Researchers had raised several concerns about WPV being significantly underreported, particularly when there is no physical injury (Arnetz et al., 2015). According to Zahra and Feng (2018), more than half of nurses (55.6 %) had no incentive to report violence in the workplace. The earlier study revealed only 19.0% of nurses submitted a formal post-incident report, while 38.0% talked to their colleagues about the incident, with the remainder claiming that work pressures do not allow staff the time to report such incidents (Jacobson, 2007). Nurses do not report the negative act that they receive during working time because they feel like their action will not make any changes, some may think that the bully action is because of their own weakness, while some other nurses are afraid of making a report because they think that they may receive the blame from their own management. Most nurses also view workplace bullying as a component of their job scope and some of them will accept it as a culture which will lead this problem unsolved (Martinez, 2016). This dilemma raises questions as to what can be done by health professionals and policy makers in the healthcare sector to reduce the risk of physical and non-physical harm to healthcare workers from violence and

bullying. Therefore, the development ProTEcMe application expectantly offers true transparency and a sense of security channel to effectively report the violence in the workplace.

DEVELOPMENT OF PROTECME MOBILE APPS

The ProTecME app was developed based on the references from the ministry of health and current and relevant literature related to workplace violence in the health sector. In order to create a prototype of the ProTecME, Adobe XD was used for the development of the app's prototype. This prototype developer is free, can be previewed on supported mobile devices for android and ios. XD is compatible with custom plugins that add additional features and uses. Plugins range from design to functionality, automation and animation. This ProTecME app's interface consists of a register/ login button, report form, type of WPV, report status, things to know, terminology, workflow, prevention strategies, and contact us. For validation of content, researchers draft story board and content of the apps, and are validated by expert panels composed of the academicians and practitioners. The experts were chosen based on their vast experiences and expertise in mobile apps development, nurses, and academicians. Each of them was given a copy of the complete module draft to be reviewed. Critiques and recommendations by the experts were identified. The content validity was calculated by using the percentage of experts' agreement. Finalize ProTecME apps will be published at the google play store (android) & app store (ios) to download.
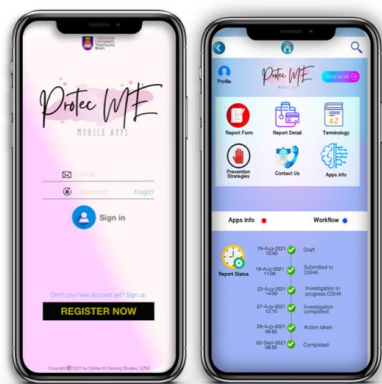

Figure 1. ProTecME apps interface

BENEFITS OF THE PROTECME MOBILE APPS

Through its easy user interface and mechanism for efficiently reporting WPV, this is the first application in Malaysia to provide true transparency and a sense of security. The benefits of using this system can improve the rapid communication process between the victim and the management, definite documentation accountability, legal protection and reduce any possible errors (such as legibility, accuracy, and timely data of the report). Since there is a frequent reported case of workplace violence, it will be helpful for the victim to record the incident in a specific and accurate way. Individuals can use this app to report inappropriate behaviour in a discreet and secure manner. Individuals can use the ProTecME to record the time, place, and perpetrator of an incident, as well as other facts. Sometimes the victim is not aware that they have been bullied, by using this ProTecME app it was hoped that it can help the victim to accurately report the incident. Employees and employers can use this app to take action against

WPV in the workplace in a simple, discreet, and quick manner. Its goal is to encourage employees to come forward and report WPV cases. It encourages both employees and management to unite together and change their own workplace cultures in order to put an end to WPV once and for all.

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PROTEIN AS THE BUILDING BLOCKS OF LIFE

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ABSTRACT

Protein is not limited to being a source of food but also provides other benefits such as maintaining body weight, key nutrients for bone health and reduces disease risks including type 2 diabetes and neurodegenerative diseases such as Alzheimer's, Huntington's and Parkinson's disease. With those benefits, it is essential to consume protein for optimal growth and development in an individual. Proteins are made up of amino acids and can be classified into four major structures. Primary structure is a linear sequence of amino acids in a polypeptide chain with an example of insulin productions. Next, protein secondary structure includes alpha-helix or folded into beta-pleated sheets due to their crucial structure role in most globular and fibrous proteins. The formation of alpha-chain and beta-pleated sheets is due to hydrogen bonding between carbonyl and amino groups in the peptide backbone. Moving on to the production of essential biological compounds such as enzymes, hormones, antibodies, and plasma protein which are the examples of tertiary structure that either has folded helix or formed pleated sheet into a 3-D polypeptide shape. Factors influencing the R chain in tertiary structures include ionic interactions, hydrogen bonds, Van der Waals depressive forces, and sulfur bridges mainly caused by amino acid group interactions. Quaternary structure is the combination of two or more tertiary structure polypeptide chains that form one large and complex protein molecule. For instance, the synthesis of haemoglobin where the organisation of protein is in multiple subunits. Evidence from repairing and building new cells in providing one's body framework proves that proteins must be included in our daily diet to maintain a healthy lifestyle.

Keywords: Protein

MATERIALS AND METHODS

To kickstart this project, information gathered from reliable sources are transferred to Microsoft PowerPoint which acts as a very well-known presentation software. To compliment the software, the program uses slides to convey information rich in multimedia and is used to create complex business presentations, simple educational outlines and much more. The truth is, it's a very powerful and versatile software. Visual aids provided in this software allows the speaker to use verbal and nonverbal communication to solidify the message and provide a

point of reference for the mind as it decreases its ability to retain information and listen effectively. Other than just visual engagement, audio insertions are the way to go as it boosts the production value and cohesiveness of the slides allowing smooth transitions. Last but not least, this software has made the exportations of slides into any needed format file very handy and user friendly which does not bring any hassle to the users.

RESULTS

The video was made to present the audience about the topic given which is proteins. From the video, audiences are able to have a better understanding about proteins as the content presented accordingly. At early minutes of the video, audiences are able to know the importance of proteins in a lifestyle and its structure from simple to complex. Furthermore, the details are also given such as the functions for each structure of proteins. At the last minutes of the video, the audience may consider consuming proteins as the benefits and research about proteins on human health were presented.

To check the quality control, we involve setting standards about how much variation is acceptable. The aim is to ensure that the product is made and meet the specifications which ensure audience needs are met. Therefore, the quality control checklists remove all distractions that occur during the production of video, frequently watch the video a couple of times to double check that any changes that have been made do not affect its overall flow, and to ensure that any mistakes made have been corrected. Besides, we also took good care of finding the colour backgrounds, fonts, audios and animations to meet a good quality video standard.

CONCLUSION

This informative video can attract the audience's attention because it is easy to understand and comes with colourful graphics and images compared to books that only have long text and a few images. However, there is a limitation in this video which is that audiences are not able to test their understanding as the questions are not included.

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PULL UP CRISP CONTAINER

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ABSTRACT

Pull-Up Crisp Container is a product for introducing a new innovation for crisp container. This product created to make it easier for consumers to take food by eating it and crisp automatic push up from inside. The mission of Pull-Up Crisp Container is to produce a new version and ways of eating more hygiene for consumer use. The problem we get from this existing product is the way people want to eat crisp. For example, when user want drive whileeat crisp to prevent sleepy, and when drive they difficult to grab crisp inside container. The innovator of Pull –Up Crisp Container is Kamarul Asyraf bin Shamsudin. Kamarul had been use this idea and creativity to create this innovation to attract supplier invest on our new product. He also has an experience with a moment of difficult to eating crisp which is easily broken, food becomes lethargic and difficult to store for a long time after the container is opened. This idea needed to be proposed to suppliers so that this innovation can be realized inmarket sector. This idea was pop-up when one of us started to create an easy way to take out crisp from a deep container. From there, we use method Research and Development (R&D) which is we use an existing crisp container and improve it with push up spring with stack make crisp are not sluggish and crispy which is we use double cover.

Keywords: container, innovation, product, R&D, crisp, difficult, market, push up, spring, stack, double, cover.

INTRODUCTION

Pull- up crisp container is an established by Mohamad Firdaus Bin Shaari and our innovator which is Kamarul Asyraf bin Shamsudin and Nurul Fatihah after we have a long discussion about this product. The ideas come out when we look out for many brands that have long container such as mister potato and pringles and then we compare it with push up pop that distributed on 2017 and one more product called as push up ice- cream, after doing research we decide to combine this product into one product and setup design for it. After that, created this pull-up crisp container, for the name of product we decide to use pull up rather than push up because if we use push up crisp that name same as the name of exercise at gym called push up crisp. We use existing crisp container for base of our innovation and improve it with spring and stack. Also, we improvise the cover of container which is more secure that existing

container when opened it for long time. Besides that, we also customized thiscontainer using friendly users and high-quality packaging besides with the low-price market item for designing our container.

Our team member for this innovation product is me as distributor that give any ideas and do decided from our discussion, our partner in crime Kamarul as innovator that created this prototype container and give creative idea and has critical thinking about our product, last one not least, Nurul Fatihah as financial that always reminded us about budget and experiment that we do for prototype limited when this covid-19 break. The significant of our container is to give safety to driver and user when it crisp and reduce the crushed chip rate into 10% compared to existing container which is has 30% to 50% rate of crush chip. So, it retains the shape of chip also prevent potato chip from being sluggish when user opening itfor long time.

METHODS

We use Research and Development process which is the process to develop new product or service or improve the already existing product which we need to do some experiment to create prototype to being real. For the first time, we have many problems when to create the container such as we need to measure the heavy of potato chip between our spring can accommodate. We need to look for right spring which is we need to know between heavy spring and soft spring. To settle with this problem, we create a draft every single experiment that we do:

Table 1: Experiment for new product development.

No	Springs	Load	Chip Load	Result
1		20g > 50g	42 G (Small Container)	(Too Short, Small)
2		120g > 150g	160g (Long Container)	(Fix, Achieve Average Load)
3		250g > 340g	160g (Long Container)	(Too Hard, Not Achieve Goal)
4		100g > 130g	110g (Long Container)	(Fix, Achieve Average Load)

CONCLUSION

In this paper, we propose a new product development R&D process. The main idea is to provide best convenient product to ease user to eat chip without any barrier such as big hand and need to shake and flip the container to reach the deep part of container. In this method, we can see the problem to determine the best and ideal spring to match up with container. To solve this problem, we use full of R&D process which is as we can see spring number 2 and 4is the best to use for our container compared with number 1 and 3 which is to small and hard to push up our crisp from container. This result verifies our method is the best to determine the best item to create innovation. In the future, our hope is we can explore more on R&D to develop more idea and innovation in product development.

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RE Protect-i

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ABSTRACT

Climate change is an inevitable and urgent global challenge with long-term implications for the sustainable development of all countries. As part of leading Islamic finance sector in the world, Malaysia can become a pioneer to become an environmentalist to contribute to the nature. Bank Negara Malaysia (BNM) issued a discussion paper on climate change and principle-based taxonomy in December 2019 as a guidance to facilitate financial institutions including takaful operators in identifying and classifying economic activities that can contribute to climate change objective. Malaysia is committed to reduce the carbon emission by 45% by 2030 in Paris Agreement 2016. Therefore, Takaful industry is not quite ready as it is almost not being discussed and it is not encouraging takaful operators to step up.The study aims to promote green environment via takaful product as well as to observe the viewpoints and potential demand on introduction of RE Protect-i in Malaysia. The study collected primary data via survey questionnaires from green energy consumers inMalaysia and secondary data including articles, books and internet resources. The finding of this study is that most of the green users in Malaysia realized the importance of RE Protect-i in Malaysia to improve climate change. In conclusion, RE Protect-i is one of the potential products from Islamic financial institutions (IFIs) and takaful operator that have a significant impact in promoting green environment in Malaysia as well as increase customer knowledge and awareness on the green environment through InsurTech or TakTech. The RE Protect-i gives a significant impact to climate change in Malaysia and helps takaful operators, regulators and policy makers to do further improvement and research related to product. Few studies have addressed the importance of green takaful to climate change which is big gap in the industry.

Keywords: Bank Negara Malaysia, Takaful Operator, InsurTech, Renewable Energy

INTRODUCTION

2% of carbon dioxide (CO2) emissions in 2019 make it the fastest growth in seven years according to the BP Statistical Review of World Energy 2019. It is a global issue and need to be taken into consideration by every country to preserve the environment. The CO2 excessive release will trap all the heat from leaving the atmosphere and cause unnatural warming. This increase in CO2 in the atmosphere is due to activities such as open burning, release CO2 from our cars due to combustion and from the use of natural gases. The government has started the initiative to help us reduce CO2 emission via various industries. All industries can help toplay an important role to help the government. A financial institution such as bank or takaful that contributes to the 3.1% economic growth of service sectors in the first quarter of 2020 can be a tool to contribute to the environment. As part of leading Islamic finance sector in the world, Malaysia can become a pioneer to become an environmentalist to contribute to the nature. This effort is being encouraged by the shariah. Al Baqarah verse number 11: "Do not damage the earth". Al A'raf verse 56: "Don't you cause destruction on Earth. These are the examples in Quran for human to preserve the environment. Therefore, it is a wise idea and choice for the takaful operators to act as environmentalist and become a pioneer to educate the people on green environment and change the good act into business opportunity instead.

Problem Statement

The main challenge to this initiative for go green environment is when the public discussion on green environment is almost none and becomes a big gap in the takaful industry. Therefore, takaful industry is not quite ready as it is almost not being discussed and it is not encouraging takaful operators to step up (Muhamat et al., 2017). In both developing and developed countries, to take an initiative to a green environment or climate change is not an agenda. Bank Negara Malaysia (BNM) issued a discussion paper on climate change and principle-based taxonomy on 2019. It can be used as guidance to facilitate IFIs including takaful operators in identifying and classifying economic activities that contribute to climate change objective. During the ratification of Paris Agreement in 2016, Malaysia has committed to reduce the carbon emission by 45% by 2030. Government creates a partnership with private and business sectors to address the climate change because it is everyone's business to take care of. This effort as well will become a blessing in disguise for takaful operators to utilize this joint effort into business opportunity. It is parallel to Islamic teaching that preserve the environment and increase on the efficient use and sustainability of the resources and contribute to the green environment. Corporate social performance for Takaful operators is divided into four segments by Carroll (1979), legal, ethical, economic and discretionary responsibilities. By doing so to participate in leading the financial sectors for green environment, takaful can fulfil their discretionary responsibilities and meet all the conditions of being able to serve the society. In view of the above, the main focus of this study is to create a green takaful product which will promote green environment as well.

Objectives of RE- Protect i

The main objective of the study is (1) to create a green takaful product in Malaysia. Other than that, the study aims (2) to promote green environment via takaful product and (3) to implement the Value Based Intermediation guideline from BNM for Takaful Operator point of view.

LITERATURE REVIEW

Green environment is related to the concern of environmental conservation and improved health of the environment. According to World Health Organization (WHO), there are 13 million of death annually worldwide due to environmental causes. These include asthma, chronic obstructive pulmonary disease (COPD), cardiovascular and stroke. According to Wasim Aktar et al. in 2009, exposure to pesticides can affect our hormones in the body. It can even lead to immune suppression and cancer. Since there is an initiative globally to replace standard appliances to energy efficient appliances, it helps millions of these appliances to reduce carbon emission from polluting our air. Nowadays, with the growth of world population and technology, the used natural resource is more than tripled compared to last two decades. According to Environmental Protection Agency (EPA) in USA, switching to energy efficient appliances could help to reduce the carbon emissions by 19%. Taking this initiative and increase the awareness on green environment can protect the planet for future generation. The word "takaful" is a term which comes from the Arabic language which is masdar or word derived from the word "takāfala" which means mutual guarantee or mutual protection. Takaful is a type of Islamic insurance where the participants contribute money to a pool system where it guarantees each of the participant against loss or damage. A takaful contract is an agreement between groups of individuals to the risk of certain accidents. They agree to protect each other in reducing the harmful effects of such accidents if it befalls one of the members joining the alliance made. Each member is therefore bound to pay a certain amount of contribution as a participation fee also known as premium. Takaful operators are in place where to formulate a strategic roadmap to advance VBI in their business offerings and practices.

METHODOLOGY

This study is conducted to develop green takaful product as well as to observe the viewpoints and potential demand on the introduction of RE Protect-i in Malaysia. The study applies primary and secondary research method. Primary data was collected via survey questionnaires from consumers in Malaysia and secondary data used in this research include articles, books and internet resources (Rusni et al., 2018). The secondary data collection is applied in order to develop green takaful product such as model use, pricing and others. The researchers refer to journal articles and internet sources as guideline to conduct this study. This method guides the researchers to come out with the principal, foundation and underlying contract that will be used in the green takaful product (Nazarov & Dhiraj, 2019). Besides, this study implements quantitative method in which 30 questionnaires were disseminated through online survey such as Google form and the targeted respondents were citizens anywhere in Malaysia to investigate their level of awareness with regards to the general takaful features in Malaysia. In addition, the open-ended questions were included to acquire customers' opinions and perceptions toward green takaful product, hence will increase the reliability and accuracy of the study.

RESULT AND DISCUSSION

RE Protect-i is a comprehensive fire takaful policy designed to meet the needs of green energy users who wish to protect their renewable equipment (RE) such as solar panel or photo-voltaic module (PV) solar panel system installed in the building such as house, commercial office and factory. The coverage of RE Protect-i in PV solar panel system

includes the solarpanel itself, charge controller, inverter, batteries backup and any other additional declared items which involved in PV solar panel system. RE Protect-i provides the end-to-end protection to protect the valuable asset of the participants. Other than that, this takaful policy also covers personal liability and loss of use due to covered event mentioned unless extra coverage is applied. The policy will run on yearly basis where participants have the right to renew or terminate policy after 1 year. RE Protect-i contract consists of shariah concepts such as Tabarru', Wakalah, Ju'alah, Waqf, Donation, Hibah and Ibra'.

COMMERCIALIZATION VALUE

The estimation percentage of renewable energy shows the increasing of renewable energy from 8% in 2019 to 21% by 2025 (IEA, 2019). According to Energy Commission annual report 2019, Peninsular Malaysia had a population of approximately 26 million that was 99.9% electrified consisting of coal, gas, hydro and solar. Electricity is supplied to industrial consumers (40%), commercial consumers (35%) and domestic consumers (23%) whereby the remaining 2% is supplied to mining and agricultural activities and public lighting (Energy Commission, 2019). In addition, there are almost 7 million properties in Malaysia in 2019 according to the Malaysia Property Market Centre (NAPIC, 2019). Table 1 below shows a huge number of potentials RE Protect-i that can be commercialized in Malaysia which is 539213 properties in peninsular Malaysia. This data can be used to estimate the potential RE Protect-i participants from 2022 to 2025 in line with the increasing of properties year by year, and the most important is the increasing of renewable energy percentage to the consumers in Malaysia that definitely will create more demand to the green takaful product. Table 1 below shows the breakdown of electricity consumer:

Table 1. Breakdown of Consumers

Type	Property	Property (%)	Usage (%)	Usage of RE	Potential RE Protect-i
Industrial Consumer	117526	1.74	40%	3.2%	**3761**
Commercial Consumer	584,327	8.67	35%	2.8%	**16361**
Domestic Consumer	6,038,315	89.59	23%	1.8%	**111105**
Others	NA	NA	2%	0.2%	**NA**
Total	6740168	100.00	100%	8.0%	**539213**

The premium is derived from claim cost plus expense plus profit. For RE Protect-i, the minimum premium RE Protect-i for domestic consumer is RM 22.004 per year which covered for at least RM20,000, while the minimum premium for Industrial and Plantation consumer is Rm 66.004 which is covered for at least RM60,000 of RE equipment. The premium will be increased if the participant wants to increase the sum insured value depending on the cost of the total PV solar panel system installed in their premises.

IP Ownership

The RE Protect-i is in the process of IP registration under Business Innovation and Technology Commercialization Centre (BITCOM).

Novelty and Originality

There is almost none of green takaful product such as general takaful specifically focus on the products that contain any renewable energy. However, instead of introducing a green takaful product, takaful companies introduce paperless policy where all the statements, quotations and policies will be issued via email or online. Therefore, the researchers would like to introduce a green general takaful product for houses, buildings and plantations. Therefore, the novelty of the product is tested to ensure the originality.

Social Responsibilities

The researchers believe that this product can cater to the need of potential contributors. RE Protect-i enables takaful roles to enhance Value Based Intermediation and promote green environment to the community by encouraging more people to use green energy as alternative source of energy for their daily activities and help to reduce CO_2 emission.

Design, Display and Packaging of Product

RE Protect-i aims to give a futuristic and sophisticated visual on the product. RE stands for 'Renewable Energy' which basically means that this product is playing in a specific industry which is the renewable energy industry in Malaysia. Protect-i in the name shows that this product offers a type of protection that complies with the Shariah requirements. Protect by definition means to defend or guard from an attack, invasion, loss, annoyance, insult and others. Basically, this product simply offers compensation due to loss or damage after an incident. The compensation can be used for maintenance or purchasing new item. In a way, it 'protects' the item from total loss. RE and Protect-i basically sums up that this product offers a Shariah-compliant type of protection to customers who have installed Renewable Energy equipment in their properties or facilities due to damage from fire, flood and others. This will encourage more people to install RE equipment, and also promote takaful to be a pioneer in the industry. RE Protect-i offers benefits that does not just profit the participants, but also promotes the industry as well such as Ibra' and eligible to claim tax incentives from government which is Green Investment Tax Allowance (GITA) and Green Income Tax Exemption (GITE).

CONCLUSION AND RECOMMENDATION

Renewable Energy industry is growing rapidly around the world. The rise of supports and assistance provided by the government helps to encourage and promote the industry. RE Protect-i aims to be the pioneer of takaful product in the RE industry and hopefully can be a leading one. Based on the survey done by this study, 73% of the participants will purchase or subscribe to a green takaful product for their home or building in the future. Nowadays, even residential houses have started to install solar panel in order to reduce their monthly electricity cost. Therefore, the demand for green general takaful product, not just RE Protect-i, will be a huge potential for the takaful industry to jump into. Takaful operators should be the leaders among financial institutions to promote Green Environment via takaful products. The researchers recommend that the RE Protect-i will be marketed and promoted through

effective ways. In the era of digitalisation, the promotion should be in a way of using the online marketing platform or web such as using the robo-advisory to help the potential participants to get more information about this product. The takaful operators, policy makers, and regulators should work together to boost the awareness of the green energy product into Malaysia market. Furthermore, this study also proves that demand for green takaful is not justlimited to buildings and properties. Participants have also listed their interest for green takafulin other industry sectors as well such as transportation and automotive, factory and machinery industry as well as the technology sectors. More green takaful products should be innovated because this is considered as an untapped market.

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ReProDB WEB APPLICATION
(RESEARCH PROJECT DATABASE)

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ABSTRACT

At undergraduate and postgraduate levels, most universities required students to do research projects and submitted the report to the faculty for marking and record purposes. The current practice is most universities will keep all research projects or selected ones in their library departments or their faculty offices. Some universities required the students to submit their report in a soft copy by downloading it in CD. This practice required sufficient space and involved cost in purchasing office cabinets or racks. In addition, while using CD, it will expose data being corrupted or damaged. Moreover, some research will become wasted since the research knowledge or data is not being kept properly. At the same time, every semester new batch of students needs to submit their report, which required more space to keep it. To overcome this issue and embrace the technology, the group proposed a project, namely "ReProDB Web Application (Research Project DataBase)" The project aims to create a database to keep all student's research project reports, reduce clerical tasks or administrative tasks among the administrator, and have one research database that all researchers and their supervisors can turn to. Thus, the database is expected to save space and energy, less administrative work among administration staff, faculty members, and the research facilitator. Furthermore, it's also foreseen as one effort which is not only able to reduce the cost of printing and purchasing office equipment but also cost of recruitment and emolument cost. Nevertheless, it is an organized web-based system or application that is designed to maintain long-term access to digital data which greatly increase efficiency in data/record management which becomes as an organization's information asset.

Keywords: research, database, web application

INTRODUCTION

High quality of file management is essential since its repository becomes objective evidence and proof that the document is well kept, in placed and accessible. Proper document management enhances efficiency and always ready for any upcoming issues from the organization. While, according to Galetto, M. (2016), data management is an administrative process that includes acquiring, validating, storing, protecting, and processing required data in ensuring the accessibility, reliability, and timeliness of the data. It has to be organized and maintained data so that it is able to meet any organization's needs. Nonetheless, electronic data management era has evolved from storing and moving information/ document physically in hardcopy to digitally based on web-based system or applications that is designed to maintain long-term access to collections of digital data where it is open-source tool and free that allows users to access to data. The information is stored digitally, it is already in a form that can be easily transmitted. With the accessibility to electronic filing systems, it allows users to quickly check whether information already exists somewhere in the system, which helps avoid problems like redundant files and data loss. It enables to create, store, manage, and share documents and other files with ease (Kiely,K., 2020). Perhaps, ReProDB Web Application is a software system uses a standard method of cataloguing, retrieving, and running data queries. The ReProDB Web Application handles incoming data, organizes it and offers ways for users to change or remove the data. The users can sort and filter the data quickly and easily. It vastly improves the way record keeping where it can be used to capture, distribute, and track documents and to manage channel workflows, output systems, and information retrieval systems. It proves that ReProDB Web Application provides valuable benefits in terms of accessibility, reliability and security which greatly increase efficiency in data/ record management and add value to organization's information assets (Mulauzi, Hamooya and Munsanje-Mwale, 2015).

PROBLEM STATEMENT

The archiving of information has been done manually through excel/ words/etc and hardcopy documents are stored in particular physical space. Unfortunately, this condition may cause unstability whenever the team's management approach is ad-hoc or temporary in nature and it is kept/housed in random file cabinets or in a dropbox folder. Setting up an office filing and documentation cabinet caused workspace crowded and there is high probability that the document can be damaged, lost or misplaced (Bowers, 2017). It requires protection and preservation of records.

PRODUCT SPECIFICATIONS

Content of ReProDB Web Application

ReProDB Web Application is a system where students and supervisors can upload and review research papers online. The system required students to key in their details (name and matric no), choose designated supervisor, faculty, upload the research title, insert research abstract, upload Turnitin index report, and upload their entire research file. At the same time, a message will be sent to the supervisor email to notify them that the students had submitted their full paper to the system. Thus, supervisors can log in to their account, review the details, and decide to approve if they are satisfied that the students had submitted accurate and completed
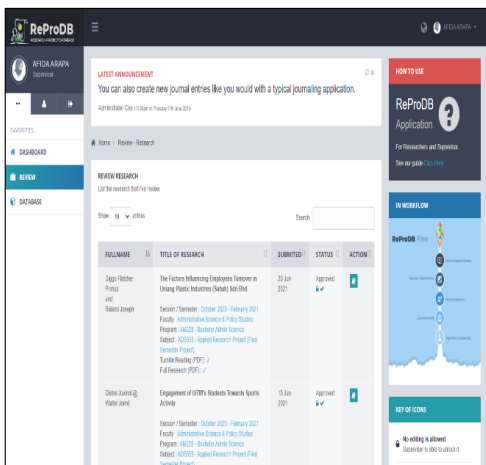
documents. It is designed with user-friendly interface, systematic submission process and data storage. Pictures 1(a) and 1(b) are the user interface for the students, while pictures 2(a) and 2(b) are the user interface for the supervisor.
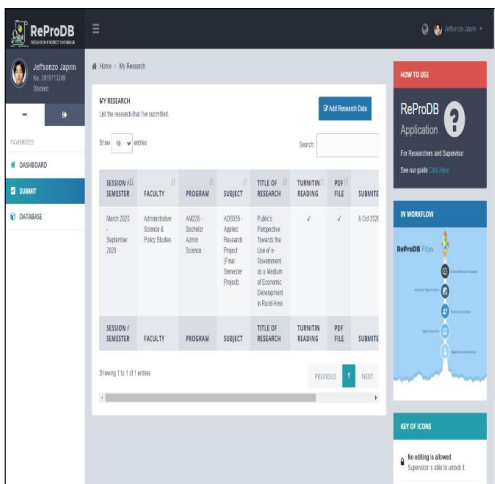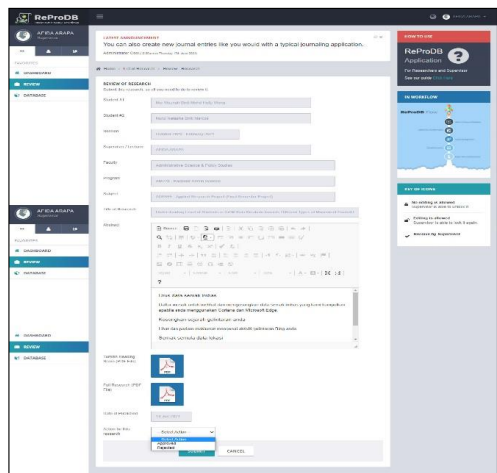

Picture 1(a): User Interface for Students (front side)
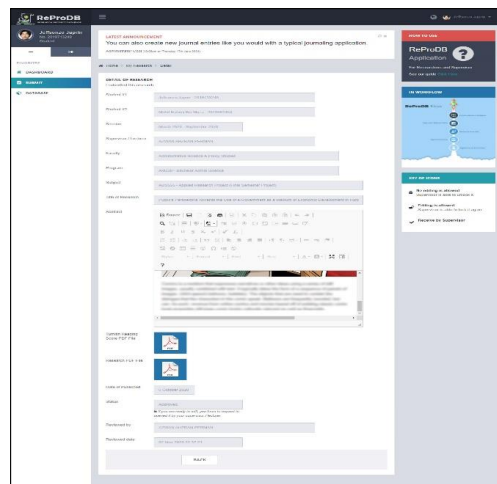
Picture 1(b): User Interface for Students (view side)

Picture 2(a): User Interface for Supervisor (front side)

Picture 2(b): User Interface for Supervisor (review side)

Novelty

Faculty's research database is not yet been introduced in any branch campus. The department keeps the hardbound copies in the office and library. It needs spacious place to fit all. Besides, all the data on research topics are only kept manually in excel/words/etc form. This requires

efforts by the head of department/ resource person/ lecturer-in-charge to fill in and this data enables him to track on research topics done by the students. But this data is not accessible to others not even to students. That is why the students may not be able to propose on new topic. It may incur redundancy. The ReProDB Web Application may help on record keeping and it can be used widely by the students and the supervisors at any where and any time. The system is designed to suit for a wide range of operating on compilation of all researches done by students and kept in one database. Digital storage like ReProDB Web Application may strengthen authorization, access control, and reduce damage compared to manual storage. Furthermore it discourages illegal users and losing years of records due to unexpected natural disaster such as fire and flood (Nextprocess,2019). Figure 1 below states the advantages and limitations of ReProDB and figure 2 show the clear difference between original research submission and record keeping workflow and ReProDB research submission and record keeping workflow.

Advantages and Limitations of ReProDB Web Application

Advantages	Limitations
Paperless and eco-friendly	Not applicable to all faculty's branch campuses
Cost-effective due to ability to reduce budget to purchase office cabinet and paying staff emolument. No physical storage cost and no printing cost.	No research area
	Only accessible to registered or legitimate member
Provide an important platform for research database and easily accessible.	Only abstract view is seen
	Only able to use email notification (supervisor)
Promote work efficiency since no more physical papers to be collected and kept	
Novel user friendly interface that can be operated any where and any time	
Encourage data security and data protection	
Able to store large amount of data	
Assist in analysing data	

Table 1: Advantages and Limitations of ReProDB Web Application
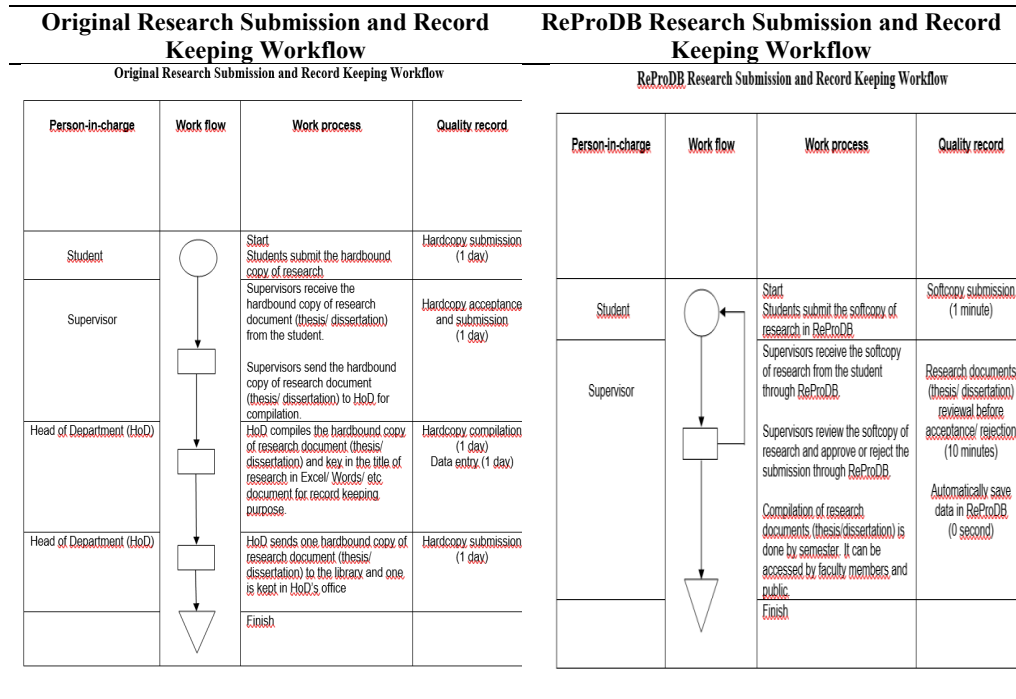
Figure 1: Original research submission and record keeping workflow and ReProDB research submission and record keeping workflow

Potential Applications and Commercialization

ReProDB Web Application has potential for application in all faculty's branch campuses where this kind of system has not yet available. It is very relevant and highly recommended to be used not only among faculty's branch campuses but to all other faculties, research departments, educational sector or others, public and private sectors. It can be adopted by any organization which wanted to ensure the documents database is kept secured and submission monitoring process is in placed.

METHODOLOGY

Flowchart of ReProDB Web Application

Students will register to this system as researchers and the lecturer as supervisors. The process starts with student's registration, upload the full report (submission), the information reviewed by the supervisor, and the process will end with approval/rejection of the proposal as described in Figure 2 below:
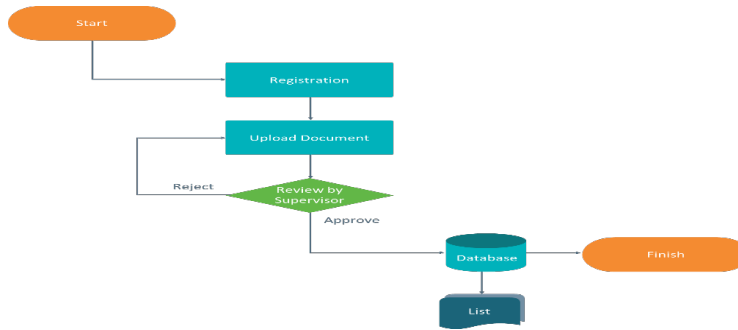
Figure 2: Flowchart of ReProDB Web Application

User-Level of ReProDB Web Application

Student:
Students must register as users. Then only they may have an access to the title of all researches compiled by the faculty at the early stage of deciding research topic. Later, they are able to submit their final research to the supervisor and the data will be kept safely in the system.

Supervisor:
Supervisors are registered by administrator based on the supervisor list provided by the head of faculty/ resource person/ lecturer-in-charged. They may have an access to the title of all researches compiled by the faculty and can use this data to advise the supervisees on potential title of research.

Visitor/ Public:
Visitor/ public may have an access once they got the address. They can only access the front page which contain the list of research which indicates the title, the name of researchers, the name of supervisors and when the research is published (semester).

Administrator:
Administrator is the one who manage applications including supervisor account, configuration, etc. There are 2 administrators; 1 from IT Unit who may handle on technical part (networking, internet, hosting - server); 1 from the faculty who manage the system and foresee whether problems occur under technical (will be passed to IT administrator) or administration. Figure 3 below describes the user-level of ReProDB Web Application.
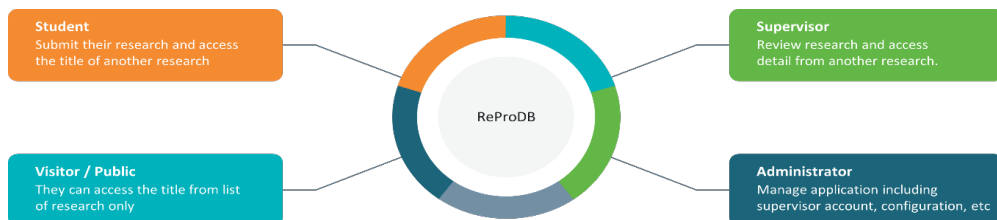

**Figure 3**: User-Level of ReProDB Web Application

FINDINGS

A questionnaire survey was conducted to find out student's experience operating the ReProDB Web Application. The survey consists of response of the usage of ReProDB Web Application, purpose and advantages and overall opinion. It was found that there were eight users who were experiencing the ReProDB Web Application.
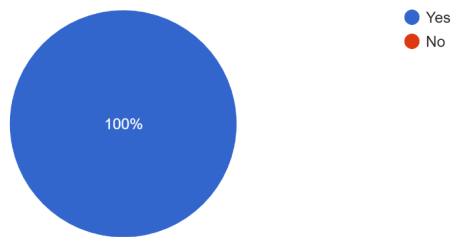
1. Response of ReProDB Web Application Usage
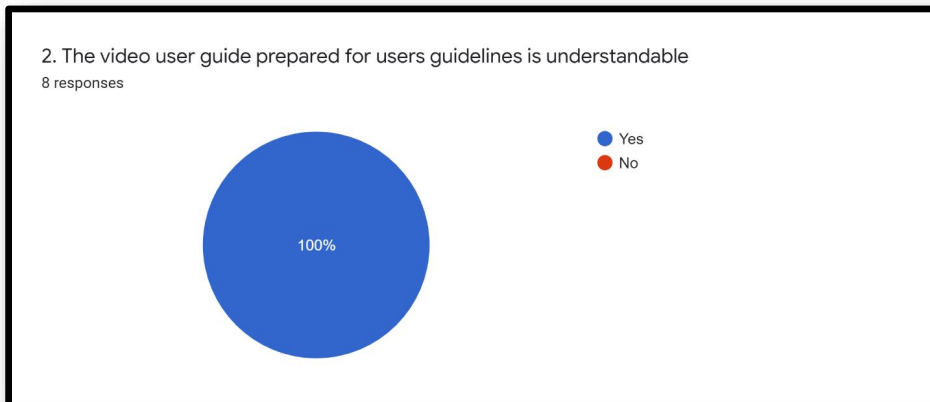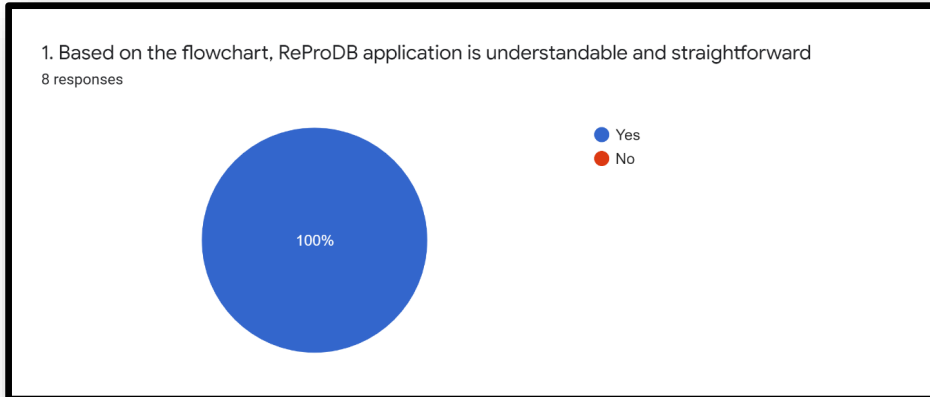
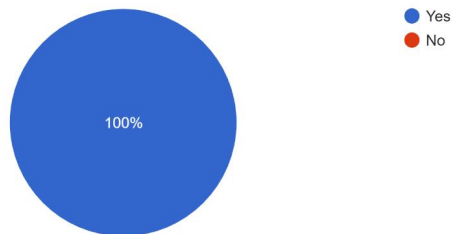### 3. User registration is easy
8 responses

- Yes
- No

100%
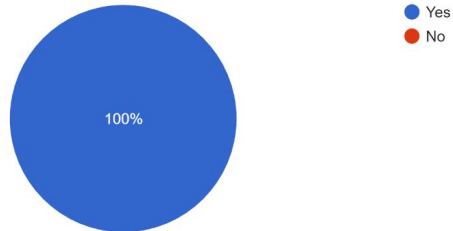
4. Parameter used in the web application (title, abstract, turnitin score and etc) relevant to research project requirement.
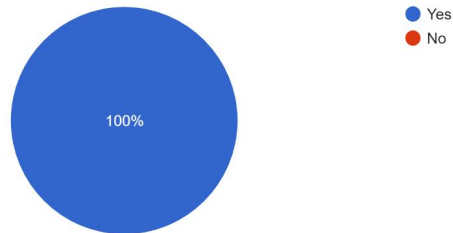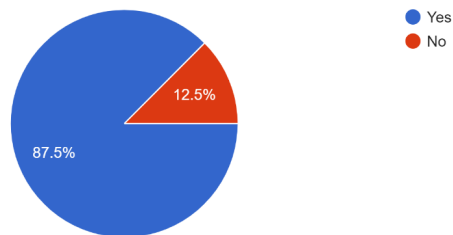8 responses

- Yes
- No

100%

5. Instruction is understandable
8 responses

- Yes
- No

100%

6.Information provided is useful for researchers

8 responses

- Yes
- No

100%

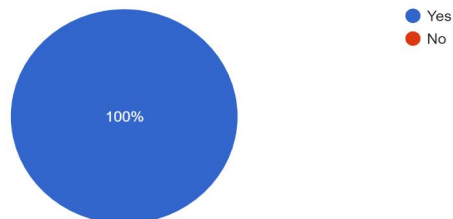**7. ReProDB is a user-friendly web application**

8 responses

- Yes
- No

12.5%

87.5%

8. Research submission is easy

8 responses

- Yes
- No

100%

2. Purpose and Advantages of ReProDB Web Application

1. ReProDB can save my printing budget
8 responses
Yes
No
100%

2. ReProDB can save my time in submitting my research paper
8 responses
Yes
No
12.5%
87.5%

3. ReProDB allow me to access other research paper information (title, abstract and etc)
8 responses
Yes
No
12.5%
87.5%

3.   Overall Opinion

1.Rate your overall satisfaction to ReProDB
8 responses

- Very satisfied
- Satisfied
- Dissatisfied
- Very dissatisfied
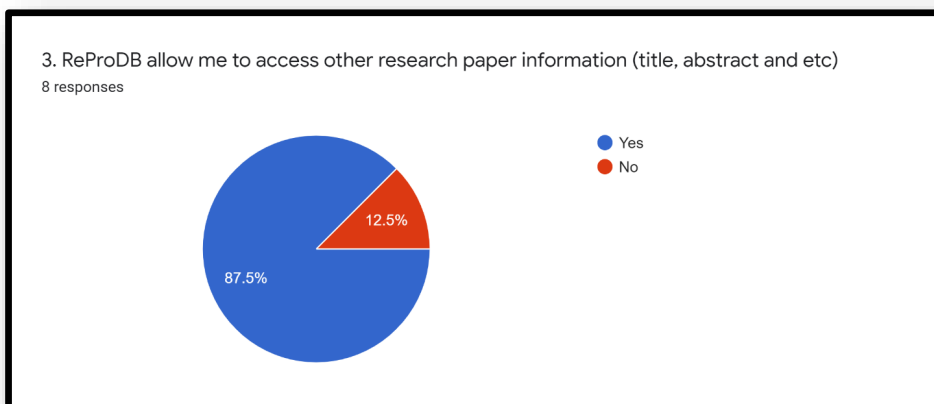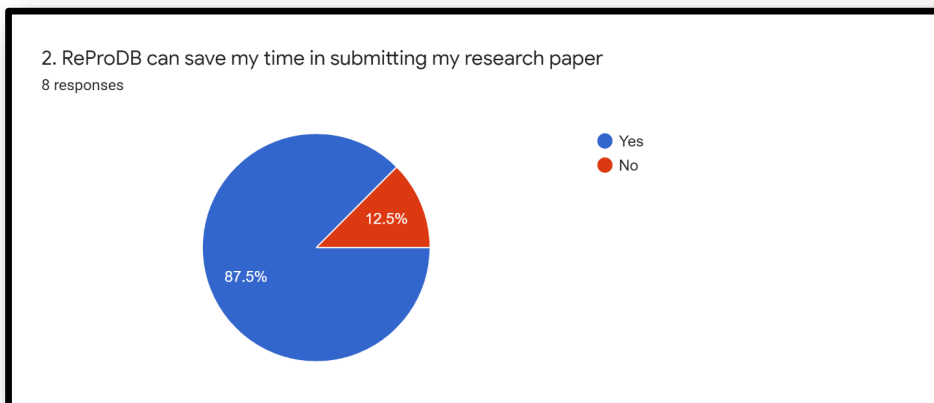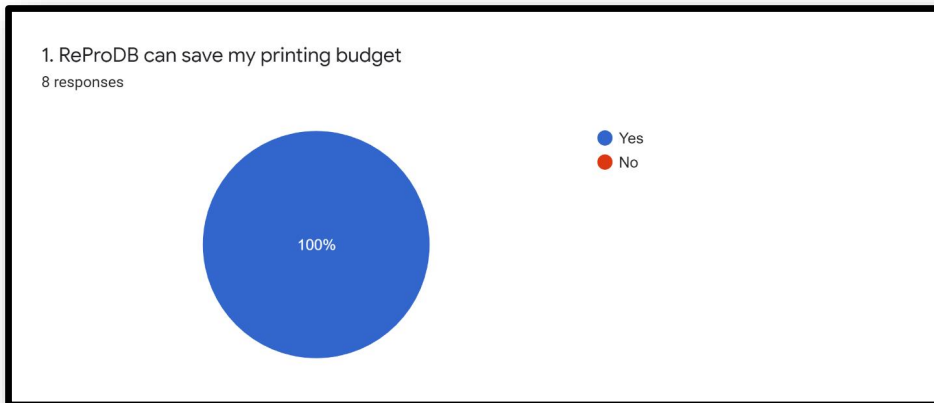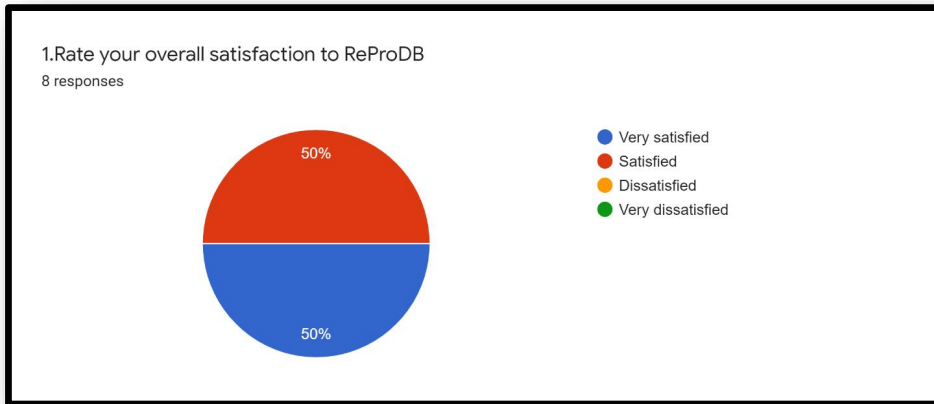
CONCLUSION

In summary, ReProDB Web Application is expected to add value for multiple users including researchers, administrators, and university. Moreover, it is a one stop digital storage to store students research in effective, accessible and informative way. Various types of cost also be minimized where it may create a culture of paperless organization, save human resource budget and storage budget. The database also useful for the respective lecturer in charge to conduct analysis on areas research interest among researchers.

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RIZBRUNANA: ADVANCES IN HIGH-FIBRE BISCUIT USING BROWN RICE AND BANANA PEEL

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ABSTRACT

The consumption of brown rice is limited among Malaysians. This study was conducted to develop a product of high-fiber brown rice biscuits made from Saba' banana peel flour. Out of the eight formulations developed, hedonic scale sensory test results showed samples of F6 formulation with a combination of brown rice flour (31.5%) and 13.5% banana peel flour. F6 had the highest mean value for each attribute examined and significant differences ($p < 0.05$) were observed in regard to the colour, aroma and appearance of the biscuits. The results of the proximate test analysis shows high fiber brown rice and banana peel flour biscuits contains $92 \pm 0.07\%$ moisture, $2.10 \pm 0.27\%$ ash, $9.23 \pm 0.34\%$ protein, $18.98 \pm 1.62\%$ fat, $6:42 \pm 0.05\%$ crude fiber, $7:53 \pm 0.00\%$ dietary fiber content and $60.16 \pm 1.67\%$ carbohydrate and the amount of energy supplied was 463.44 kcal per 100g. Brown rice with banana peel flour biscuits are expected to have a storage life span of more than 8 weeks. Finally, the consumer tests showed that this biscuits product has good potential to be commercialized from the positive response of 77% of respondents said they would buy these biscuits if they are available in the market.

Keywords: Product Development, Brown Rice, Banana, Formulation, High-Fiber

INTRODUCTION

The food industry is now primarily concerned with functional food ingredients that are high in fiber. In this light, the development of this product is sparked by the awareness on the importance and benefits of dietary fiber contents of food products available in the current market. Dietary fibers have been shown to have many health benefits. For instance, it can improve the function of the digestive system and are able to reduce the risk of many chronic diseases such as cancer, diabetes and heart disease (Cui & Robert, 2009). According to the American Dietetic Association (ADA), the proposed dietary fiber intake for adults is 20g to 35g/1000 Kcal for Americans. Meanwhile, the recommendations for fiber intakes among Malaysians are 20g to 30g per day for all ages. However, 77% these populations failed to achieve the recommended average intake; Americans were found to take about 14g to 15g dietary fiber per day, while Malaysians consumed 13g to 16g per day. These figures are

lower than the proposed recommendations (Ng et al., 2010).

Rice is an example of high-fiber cereals. There are more than 40,000 varieties of rice grown around the world. Rice is the staple food in Malaysia and white rice is commonly consumed. On the other hand, brown rice is rarely consumed because of its dreadful tastes and takes longer time to cook compared to white rice. However, brown rice has gained its popularity in recent years due to its health benefits, brown rice is recognized for its food value content and its potential as a source of antioxidants, anti-carcinogenic and others (Paretti et al., 2002).

Bananas are one of the foods with high fiber contents. They also have high nutritional values. Banana is easily reproduced at an optimal temperature of 27^OC, easily grown and available in tropical Malaysia and could be bought at low prices. However, the high consumption of bananas also caused an increase byproduct of banana peel wastes. High amount of waste has been giving problems to the disposal system of this material without affecting the environment (Emaga et al., 2008). There are various studies conducted regarding the use of other waste products that has been utilized into marketable products, and reported that mostof these waste materials contain greater nutritional value than its fruits and vegetables. A study by Emega et al. (2008), found that 50% of the fiber in bananas are contained in the banana peel. Production of flour from banana peel is able to address the issues of minimizing food waste disposal and maximizing the use of natural resources. Therefore, this issue also provides an opportunity for researchers to develop a product that could solve this problem.

METHODOLOGY

The main raw materials in the production of the high-fiber biscuits are brown rice and banana peels. These materials were locally sourced where the brown rice bought from local market and the bananas peel which are Saba' Banana type were collected from fried banana stall.

Processing of High-Fiber Brown Rice Biscuit and Banana Peel Flour Mixes
To ensure the quality of biscuits produced, brown rice flour and banana peel flour were sifted to remove the impurities. Each ingredient including the brown sugar, baking powder and butter, was weighed respectively. Then, the granulated sugar, baking powder, egg yolks and butter were put into the mixer and mixed thoroughly until they become smooth. Brown rice flour and banana peel flour were added into the dough. The dough was refrigerated for 20 minutes, then, it was shaped and divided into portions weighting 10.0 ± 0.5g for each dough. The doughs were then baked in the oven with a temperature of $170 \pm 5°C$ for 20 minutes. Thecooled biscuits were wrapped with plastic polypropylene (PP).

Product Formulation of High-Fiber Brown Rice with Banana Peel Flour Mixed

The basic formulation was modified from flour, brown sugar, butter and made into 8 new formulations using experimental design factorial 4 x 2 where 4 levels of the ratio of brown rice flour and banana peel flour and 2 levels of the ratio of brown sugar and butter. Based on the basic formulation by Nagao (2001), the ratio of butter and brown sugar is 2:2. The formulation developed in the initial test was changed based on the results obtained in all three best formulations with the butter and brown sugar ratio of 3:2. Thus, the ratio of butter and brown sugar formulations developed for the next test using the formulations with the butter and brown sugar ratio of 3:2 and 2:3 to test the formulation that will be most accepted by the expert panel. These formulations were modified to obtain the taste and texture to suit the developed product.

Selection of Best Formulations

Sensory evaluation test used to select the best formulation of the eight formulations available are ranking tests and hedonic test. The tests were conducted to select three out of eight formulations that were produced based on the overall level of acceptance of the expert panel towards brown rice biscuits produced. A total of 42 member panel members, consisting of students of School of Food Science and Nutrition, Universiti Malaysia Sabah were chosen to carry out this test. The panel members were served with samples of high-fiber biscuits along with plain water, and were given the sensory test evaluation form. Three samples that scored the lowest amount of the composition, and those with significant difference were selected to undergo the Hedonic Test.

Proximate Analysis

A proximate analysis of the biscuits was conducted to determine the content of protein, crude fiber, moisture, ash, fat and carbohydrates. In this study, the proximate analysis conducted on a sample of the best formulation using AOAC method (2000) to determine moisture content, ash, protein, fat and crude fiber. The carbohydrate content was calculated based on the difference between the amount of water, protein, fat and ash at 100 (Nielsen, 2003).

Shelf Life Study

Samples of high-fiber brown rice with banana peel biscuits that have the best formulation undergone the shelf life study. The resulting sample was packaged using Polipropena Plastic (PP) and kept at room temperature until the end of the storage period of eight weeks. Microbiological, physicochemical and sensory (paired comparison test) tests performed every two weeks during the storage period.

FINDINGS

Sensory Evaluation Test

Ranking tests were carried out on eight biscuit formulations, which were divided into three sessions. Each session consists of four sample formulations. The data obtained from the ranking test using BIB designs were analyzed using Friedman test to get the T value on the degree of accuracy and the level of differences of 5% to determine significant differences between the data obtained. It was found that there was no significant difference ($p > 0.05$) between F6 samples and other samples. However, there were significant differences ($p < 0.05$) between samples F8 and F4 and also between samples F2 and F5 and F7 and F1. No significant difference ($p > 0.05$) between F3 samples and other samples. Samples 6, 8, 4 and 2 which had the same amount of sugar content of 52.5% and a little more butter content of 47.5% were the most popular among respondents.

Three samples which had the lowest amount of the composition, as well as showing a significant degree of difference are sample 6, 8 and 4. These samples were selected to undergo Hedonic Test. Sample 6 was the sample that has the lowest score among respondents; this sample had the second largest banana peel content, which is 13.5% while the ratio of butter and sugar content was 2:3. In conclusion, majority of the respondents favoured the formulation containing a moderate amount of banana peel flour (7:3), and followed by formulation with the highest ratio of banana peel content (6:4).

Hedonic Test

Three best formulations of sample F4, F6 and F8 were selected to undergo Hedonic Test. Table 1 shows the results obtained from one-way ANOVA analysis for the Hedonic Test. Based on the results of sensory evaluation, the F6 formulation is the most accepted formulation by the panelists in all attributes tested and there were significant differences (p <0.05) exists in every attribute tested. This means that there are significances in each attribute.

Table 1: The mean scores for all attributes tested for three samples

Sample / Attribute	F4	F6	F8
Colour	$4.98^b \pm 0.95$	$5.65^c \pm 0.80$	$4.15^a \pm 0.74$
Crunchiness	$4.83^a \pm 0.64$	$5.85^b \pm 0.77$	$4.03^c \pm 0.66$
Aroma	$4.95^{ab} \pm 0.99$	$5.25^b \pm 0.90$	$4.75^a \pm 0.81$
Taste	$5.28^a \pm 0.96$	$5.45^b \pm 0.75$	$4.25^b \pm 0.90$
Shape	$4.73^a \pm 0.64$	$5.43^b \pm 0.55$	$5.18^b \pm 0.78$
Overall Acceptance	$5.30^b \pm 0.99$	$5.53^b \pm 0.64$	$4.43^a \pm 0.87$

1. The overall acceptability attribute using a hedonic Likert scale of 7 where 1 representsthe very least preferred and 7 represents the most preferred.
2. Letter of the same on the same line did not show any significant difference (p> 0.05)between samples ofthe same attributes.

Proximate Analysis

The proximate analysis was conducted on the best formulation of high-fiber brown rice biscuits (Sample F6). The results of the proximate test analysis shows high fiber brown rice and banana peel flour biscuits contains $92 \pm 0.07\%$ moisture, $2.10 \pm 0.27\%$ ash, $9.23 \pm 0.34\%$ protein, $18.98 \pm 1.62\%$ fat, $6{:}42 \pm 0.05\%$ crude fiber, $7{:}53 \pm 0.00\%$ dietary fiber content and $60.16 \pm 1.67\%$ carbohydrate.

Energy Content

The energy content of the biscuits were calculated by adding the amount of energy in carbohydrates, protein, fat and dietary fiber. The amount of fat, protein, carbohydrate and total dietary fiber obtained are shown in Table 2 below.

Table 2: Nutrition information per serving

Nutrition	100g	Serving size (10g)
Energy (kcal)	463.40	46.34
Protein (g)	9.23	0.92
Fat (g)	18.98	1.90
Carbohydrate (g)	60.16	6.02

Dietary Fibre (g)	7.53	0.75

According to Table 2, the amount of energy supplied by the biscuit is 463.44 kcal where the energy is derived mostly from carbohydrate composition of 15.05 kcal and other nutritional content; 170.82 kcal of fat, 36.92 kcal of protein and 15.06 kcal of dietary fiber. The amount of energy supplied per serving is 46.34 kcal for each serving 10g biscuit.

Storage Quality Study

The storage quality study for high-fiber brown rice with banana peel flour biscuits was carried out for 8 weeks. Throughout this study, these biscuits were packed in polipropena plastic (PP) and stored at room temperature. In this study, physicochemical analysis, microbiological test and sensory evaluation tests were conducted on the biscuits during storage period.

Consumer Test

Finally, the consumer tests showed that this biscuits product has good potential to be commercialized from the positive response of 77% of respondents said they would buy these biscuits if they were available in the market.

CONCLUSION

The study has successfully produced high-fiber brown rice and banana peel flour biscuits. However, a better research output is desirable and further improvement of the formulation could be made. The production process of the banana peel flour should also be reviewed so that the process is simpler and suitable for a larger scale production. Method of producing banana peel flour should be studied so that the final result will have appealing colour to attract potential consumers. This study could be replicated using different types of banana to determine the best type of banana that can be used to produce banana peel flour.

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READY-TO-BAKE (RTB) COOKIE DOUGH

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ABSTRACT

The aim of ready-to-bake (RTB) cookie dough is to create a dough formula which can be kept and well-preserved at an optimum temperature. The RTB cookie dough that provides convenience to consumers in Malaysia has yet to be fully explored and properly introduced. Despite the abundance of cookies flour mix available on the shelves, there are still very limited choices available in Malaysian market for the RTB cookie dough. The formulation of this RTB cookie dough will ease the end user much more as it is already an all-in-one product whereby no extra ingredients need to be added and ready to be bake compared to the flour mix that still needs eggs and butter. The final product was kept refrigerated at temperature of 4°c and frozen at -18°c for preservation. The products were baked and compared in term of texture, taste, appearance against freshly made cookie dough through sensory test. The results show positive outcome, and the product can be kept up to 4 weeks in chiller and longer time in freezer. The RTB cookie dough also provided richer flavor and crunchier texture to the cookies. This product can be the new ultimate choice in term of convenience in baking for home usersand hospitality business such as hotels and restaurants with a promising end product results in taste and texture. This RTB cookie dough is formulated using only Halal ingredients hence it can give more confidence to Muslim consumers.   In conclusion, this study opens up an opportunity to produce new solution for convenience in baking cookies for Malaysians.

Keywords: Ready-to-bake (RTB), all-in-one product, frozen, refrigerated, Halal.

INTRODUCTION

Ready-to-bake dough production is not a new thing in the global food production industry. Previous studies were done focusing on different elements to study including usage of new ingredients to enhance the flavor and texture. Dough freezing is a way to shorten the producing time and labor intensity. This can extend the shelf life of the product, improve productivity and facilitate distributions to distant location (Chen, et al., 2013; Ban et al., 2016). However, Yadav et al. (2008) stated that during the freezing process and storage, a shift in physical, rheological and sensory may occur. Hence a choice of suitable ingredients and ratios can help to reduce the changes. A study by Kumar and Sudha in 2020 was made in trial of replacing the usage of fat

and sugar to multigrain cookies. The findings show that the absents of fats did increase the hardness of cookies and the closest result that can imitate at least to almost 50% was by using the dry peas (Pisum Sativian). Fat and sugar have a major role in building the structure of cookies (Mamat and Hill, 2014) and finding a total replacement that can give the same results will be hard so instead a minimal to partial replacement can be made instead (Zoulias et al., 2002).

According to precious findings, the researchers had studied the frozen dough's characteristic and the effect of oven types on characteristics of the biscuits or cookies. Dogan (2005) studies have shown that the frozen and chilled biscuits dough did not cause a significant difference in terms of physical characteristic such as spread, baking loss, surface color and density. The chilled dough with temperature of 4°c can be kept up tosix weeks meanwhile the frozen dough with temperature of -18°c can be stored up to 6 months. Two types of ovens were used to test the result of finish products. The electric oven without air circulation gave better results on snap cookies and hazelnut biscuits. On the other hand, chocolate chip cookies show better results on gas oven with air circulation. Based on the previous studies, this study h a s guided to improve the cookie dough recipe and production in pursuit to give it better texture and taste along with convenience for the end users.

METHODOLOGY

Sample Preparation

The dough was prepared using regular all-purpose wheat flour, brown sugar, eggs, baking powder, soda bicarbonate, corn flour, salted butter and vanilla essence. T h e oven was preheated to 180°c where baking sheets were lined with parchments paper. In a medium bowl, flour, corn flour, soda bicarbonate and baking powder were sifted and combined. Meanwhile, in a separate bowl the butter and brown sugar were beat until creamy and well combined. Eggs and vanilla essence were beaten before adding the flour mixture gradually. The dough was portioned, packed and kept in refrigerator in two temperatures: chilled (4°c) and frozen (-18°c). the product is packed in air-tight condition to prevent oxidation process that might affect the dough. The ready-to-bake dough were bake on temperature of 180°c for 12-15 minutes using convection oven after four weeks of storage and compared with a freshly madebatch of cookie dough in order to make comparison for sensory evaluation on texture and taste.

RESULTS AND DISCUSSIONS

Table 1. Sensory Evaluation and Observation

	Freshly made Dough	**Chilled Dough (4°c)**	**Frozen Dough (-18°c)**
Appearance:	Brown	Brown	Brown
Texture:	Crunchy	Crunchier than Freshly made Dough	Crunchier than Freshly made Dough and no significant differences with chilled dough

Taste:	Good with balanced flavor	Better in flavour intensity than freshly made dough	Better flavour intensity than freshly made dough and no significant differences with chilled dough

The results have shown that there are differences between freshly made dough with the RTB cookie dough in terms of texture and flavor. However, there is no major difference in between chilled and frozen RTB dough.

Freshly made Dough	Chilled RTB Dough	Frozen RTB Dough

Figure 1. RTB Dough in three different temperatures

In terms of spread and thickness, the freshly made dough has bigger spread compared to chilled and frozen dough. This may be due to the cold temperature of butter corporation inthe dough hold the shape better compared to the freshly made dough.

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RTGreennmFUND: SEJAUHMANAKAH KEBERKESANANNYA DALAM PENGURUSAN DANA RUANG TERBUKA HIJAU BANDAR

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ABSTRAK

Kekangan kewangan pihak berkuasa tempatan (PBT) dalam pelaksanaan ruang terbuka hijau bandar (RTHB) di Malaysia dan Indonesia sering mempengaruhi prestasi bandar hijau. Ketidakupayaan dalam mempelbagaikan sumber pembiayaan, pengamalan sistem kewangan tradisional dan kebergantungan pembiayaan dari kerajaan pusat menjadi penyebab utama kepada kekangan kewangan yang sering dihadapi oleh PBT dalam perancangan dan pembangunan pengurusan bandar. Oleh itu, kajian ini mencadangkan untuk mengenal pasti sumber pembiayaan inovatif yang sesuai digunakan untuk menyokong dan memperkuatkan kemampanan projek-projek RTHB supaya sesebuah negara dapat mencapai prestasi bandar hijau yang cemerlang. Hasil daripada analisis kandungan beberapa pemboleh ubah (dana inovatif dan tiga tonggak kemampanan) telah dikenal pasti dan dicadangkan dalam pembinaan kerangka sistem pengurusan dana RTHB yang dipanggil RTGreennmFUND. Walau bagaimanapun kajian lanjutan perlu dilaksanakan untuk menguji kesahan dan kebolehpercayaan pemboleh ubah-pemboleh ubah tersebut supaya ia sesuai diamalkan dalam konteks kedua-dua negara dan seterusnya dapat meningkatkan sistem pengurusan kualiti dana RTHB PBT di Malaysia dan Indonesia.

Kata kunci: bandar hijau, kemampanan, pembiayaan, pihak berkuasa tempatan, ruang terbuka hijau bandar

PENGENALAN

Pihak berkuasa tempatan (PBT) memainkan peranan penting dalam mempelbagaikan sumber kewangan mereka. Ini bertujuan pihak berkuasa tempatan (PBT) dapat membiayai projek-projek yang dilaksanakan secara konsisten tanpa masalah kewangan untuk pembangunan bandar hijau terutama melalui pelaksanaan projek RTHB (Gambetta et al., 2019; Mell, 2018). Selain itu, untuk mencapai pembangunan bandar mampan, mereka juga perlu memastikan sumber kewangan tersebut menyokong tiga tonggak kemampanan iaitu mampu memberi impak positif kepada kemampanan ekonomi, sosial dan alam sekitar. Malangnya, negara-negara membangun masih tidak mampu mempelbagaikan sumber kewangan mereka untuk

membiayai pembangunan bandar mampan (Houda and Lamia, 2016; Mohd and Kaushal, 2018). Malah, sistem pengurusan kewangan mereka masih tidak memberi impak yang positif terhadap kemampanan terutamanya kemampanan ekonomi (Houda and Lamia, 2016). Oleh itu, kerangka sistem pengurusan dana harus dicadangkan supaya dapat membiayai projek-projek RTHB kearah pembangunan bandar mampan secara konsisten.

SOROTAN LITERATUR

Menurut Zhan et al. (2018), kejayaan projek-projek pembangunan ke arah bandar hijau di China dipengaruhi oleh keupayaan mereka mempelbagaikan sumber pembiayaan. China telah mempelbagaikan sumbernya melalui dua cara iaitu dengan melaksanakan pengeluaran bon di pasaran modal antarabangsa dan pelaksanaan 'metro plus property model' (model metro plus hartanah) di peringkat tempatan (Zhan et al., 2018). Selain itu, PBT China tidak mengamalkan sistem kewangan tradisional. Sebaliknya mengamalkan sistem kewangan inovatif dengan tidak bergantung kepada pinjaman bank, bon korporat dan perkongsian awam-swasta termasuk tidak mengharapkan bantuan kewangan daripada kerajaan pusat (Gambetta et al., 2019; Lee, 2020; Zhan et al., 2018; Ziolo et al., 2021). Ini menunjukkan sistem pengurusan dana bagi projek pembangunan bandar hijau di China mencapai tahap cemerlang kerana keupayaan mereka berinovatif dalam mempelbagaikan sumber pembiayaan dan telah dibuktikan dengan pencapaian China sebagai salah satu bandar paling hijau di antara negara Asia (Brilhante and Klaas, 2018).

BAHAN DAN METODOLOGI

Bahan literatur menjadi sumber rujukan utama. Kriteria pemilihan literatur ditentukan berdasarkan kata kunci RTHB termasuk pemboleh ubah-pemboleh ubah yang mempengaruhi proses pelaksanaan projek RTHB seperti kewangan, sumber pembiayaan dan kewangan yang mampan. Pencarian literatur telah dijalankan melalui beberapa pangkalan data terpilih iaitu SCOPUS, Science Direct, Web of Science, Sage Publications, Emerald Publishing dan Google Scholar. Maklumat literatur kemudiaannya dianalisis secara konseptual dengan sokongan analisis kandungan selepas ditapis melalui protokal 'systematic literature review' (SLR).

HASIL DAN PERBINCANGAN

Berdasarkan kajian-kajian lepas, satu kerangka sistem pengurusan dana RTHB yang dinamakan RTGreennmFUND berjaya dibina (rujuk Rajah 1). Ia mempunyai dua komponen teras iaitu komponen dana inovatif dan komponen kemampanan sebagai satu sistem tadbir urus bandar hijau melalui pelaksanaan projek-projek RTHB. Komponen-komponen yang dibina adalah berdasarkan pemboleh ubah-pemboleh ubah yang dijumpai dalam sorotan literatur.
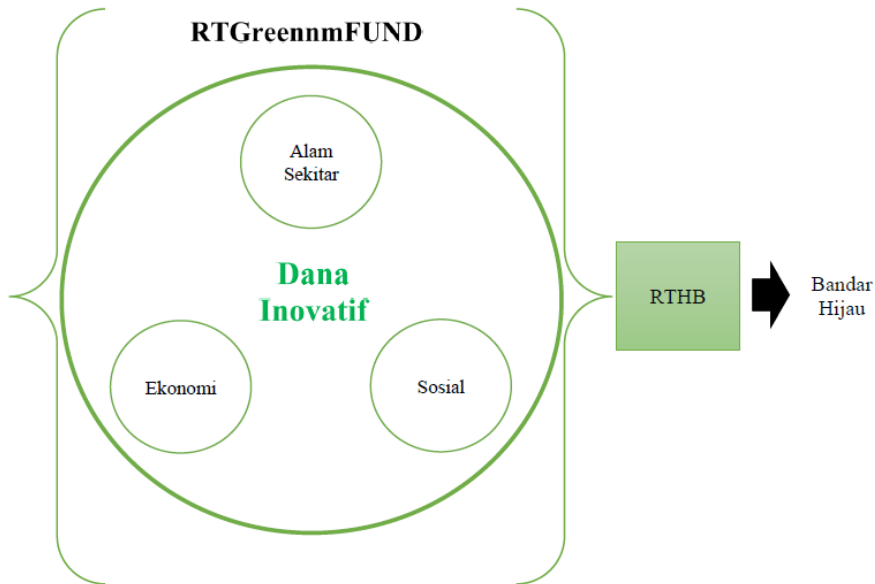
Rajah 1. Kerangka Sistem Pengurusan Dana RTHB: RTGreennmFUND

Komponen dana inovatif merujuk kepada kepelbagaian sumber pembiayaan projek RTHB yang digunakan oleh PBT supaya dapat menghasilkan RTHB yang produktif (Dobbs et al., 2019; Richards and Thompson, 2019; Takyi and Seidel, 2017; Zhan et al., 2018). Melalui adopsi sumber pembiayaan projek pembangunan bandar hijau di China, sumber dana inovatif dicadangkan untuk amalan PBT di Malaysia dan Indonesia adalah pelaksanaan pengeluaran bon di pasaran modal antarabangsa dan pelaksanaan 'metro plus property model' (model metro plus hartanah) di peringkat tempatan. Manakala, untuk komponen kemampanan, ia menunjukkan impak dana innovatif keatas tiga tonggak kemampanan bandar iaitu ekonomi, sosial dan alam sekitar kerana impak tersebut adalah pemacu kearah pembangunan bandar hijau supaya dapat mencapai matlamat pembangunan mampan (SDG) (Gambetta et al., 2019; Houda and Lamia, 2016; Lee, 2020; Ziolo et al., 2021). Komponen kemampanan ini juga membantu urus tadbir PBT untuk mencapai SDG dan sekaligus menuju kearah pencapaian yang lebih komprehensif dan cekap.

KESIMPULAN

Melalui soroton literature, pemboleh ubah-pemboleh ubah telah dikenal pasti dan digunakan untuk membina sebuah kerangka sistem pengurusan dana RTHB iaitu dinamakan RTGreennmFUND yang merangkumi dua komponen teras iaitu komponen dana inovatif dan komponen kemampanan. Ia dibina kerana ketiadaan pengurusan kepelbagaian dana untuk pelaksanaan RTHB oleh PBT di Malaysia dan Indonesia.

Oleh itu, dengan menggunakan kerangka tersebut ia dapat meningkatkan kualiti tadbir urus RTHB PBT dalam mencapai SDG secara lebih efektif melalui pelaksanaan pengeluaran bon di pasaran modal antarabangsa dan pelaksanaan 'metro plus property model' (model metro plus hartanah) di peringkat tempatan. Walau bagaimanapun kajian lanjutan perlu dilaksanakan untuk menguji kesahan dan kebolehpercayaan pemboleh ubah tersebut supaya ia sesuai diamalkan dalam konteks kedua-dua negara dan seterusnya dapat meningkatkan sistem pengurusan kualiti dana RTHB PBT di Malaysia dan Indonesia.

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TCD (Table Connector Design)

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ABSTRACT
Academic writing is essential for students to complete their studies successfully and to compete professionally. University students are required to write based on various styles and are evaluated for their ability to write proficiently. This Table Connector Design (TCD) software is developed to improve writing skills, organise facts and organise academic writing data more systematically. It was developed to offer a fast, easy and user-friendly approach to academic writing that organises facts as found in the literature. The software also helps arrange ideas and facts in the form of a table that can be arranged and rearranged quickly and accurately to suit changing contexts and purposes.

Keywords: TCD, Writing Skill, Academic writing, Software.

INTRODUCTION

Since writing is a crucial factor in academic and career success, students need to be able to write independently of every support and technological method. Writing abilities, such as skills, strategies for writing, writing in a way that communicates ideas clearly and concisely, builds reasoned arguments, organises evidence and generated ideas. These skills are critical and are applied widely. A student's inability to express ideas in writing with accuracy and sophistication risks them being rejected from colleges, universities and many areas of professional employment.

Students need to acquire writing skills to graduate from university and college and compete in a highly competitive global economy. It is, therefore, essential to introduce students to formal

writing and provide an opportunity to produce formal academic reports. Industry requires people to write with grammatical precision, examine a subject thoroughly, and present evidence-based arguments logically and coherently (Alhusban, 2016).

What is TCD?

TCD (Table Connector Design) is a software developed to help organise and expedite academic writing. It addresses the problem faced by new students in various fields of study, organising and gathering information and writing facts. TCD is developed in the form of electronic software in accordance with Microsoft Windows. It is easy to use, as it is built with a user-friendly concept and is easy to operate. This simple and precise concept is needed to accelerate the comprehension process and improve writing skills so that the layout and facts in academic writing can be coordinated. It is a writing tool that helps organise ideas and presents them clearly and systematically.

LITERATURE

Several researchers participated in the development of computer programmes that contribute to writing skills assessment and feedback. In Burstein, Khodorov and Leacock (Parra & Calero, 2019), writing can be improved most effectively by writing frequently and receiving immediate and proper feedback. Furthermore, Automated Writing tools as an assistant tool that provides high-level feedback and writing quality are growing (Wilson & Czik, 2016).

Technology and writing

Writing is the first step towards better pedagogy and learning outcomes in the composition classroom. Research has shown that digital tools have a positive impact on the writing process. They increase feedback and communication with authentic audiences and multimodal composition opportunities (Noble & Paganucci, 2015). The quality of student writing skill also improved with word processing and other tools compared to pencil and paper, and the quality incrementally improved as grade level increased (Noble et al., 2015).

A collaborative study by the Pew Research Centre and National Writing Project has also shown the benefits of digital devices in the composition classroom as increasing collaboration among student writers and authentic audiences. The study examined 2462 professors, asking them how their schools and students are affected by digital tools (Purcell, Buchanan, & Friedrich, 2013).

Due to increased access to and use of such programmes, research on student writing in multimodal web-based technologies, such as Wiki platforms such as Google Sites and blogs, is still emerging. The transition from the alphabet to multimodal works through the use of current technology has been addressed by Pamela Takayoshi and Cynthia L. Selfe (2007). The integration of digital tools in a classroom can enhance the quality of writing by promoting students' knowledge. This has been demonstrated with word processing by Goldberg, Russell, and Cook (2003), while the Wiki suggest potential advantages by Dymock and by Hughes (2009) and Wheeler, Yeomans, and Wheeler (2008). In particular, tools that encourage cooperation and offer authentic viewers can improve peer review, teacher feedback and lead to critical thinking (Purcell, Buchanan, & Friedrich, 2013).

The literature suggests that certain applications can aid writing. Furthermore, the current world needs technology in helping to accomplish something, as well as in academic writing. Therefore, we developed this application to help accelerate writing by providing a guideline, methods, and skills to help in effective academic writing.

METHODOLOGY

The design and development research (DDR) approach is used to develop the software. Due to its pragmatism in testing theory and validating its practicality, the use of DDR as a select approach is justified. In addition, new methods, techniques and tools based on specific analysis of needs have been described (Richey & Klein, 2007). This methodology is also known formerly as research into development (Richey, Klein & Nelson, 2004), research based on design (Reeves, 2006; Herrington et al., 2007), and research on design (Bannan-Ritland, 2003; Van der Akker, 2007).

This software contains four main phases: the needs analysis phase, design phase, development phase, and evaluation phase. Each phase contains a specific method that is the needs analysis phase of the researcher to identify the problem, then the design phase of the researcher to formulate a basic software model, the third phase builds software while the fourth phase evaluates the usability of software feedback results from software users.

First Phase: Need analysis phase finding

After identifying the problems faced by most PhD and master students in writing their theses, they faced problems organising the content and structuring the writing to be more systematic. Most freshmen have trouble organising factual names and coordinating literature sources in writing. This causes students to often lose direction and lack focus in writing.

Second Phase: Design (Flow board)

The phase sees the researcher building a flow board in compiling this software. This includes arranging the main items according to the prioritised needs.
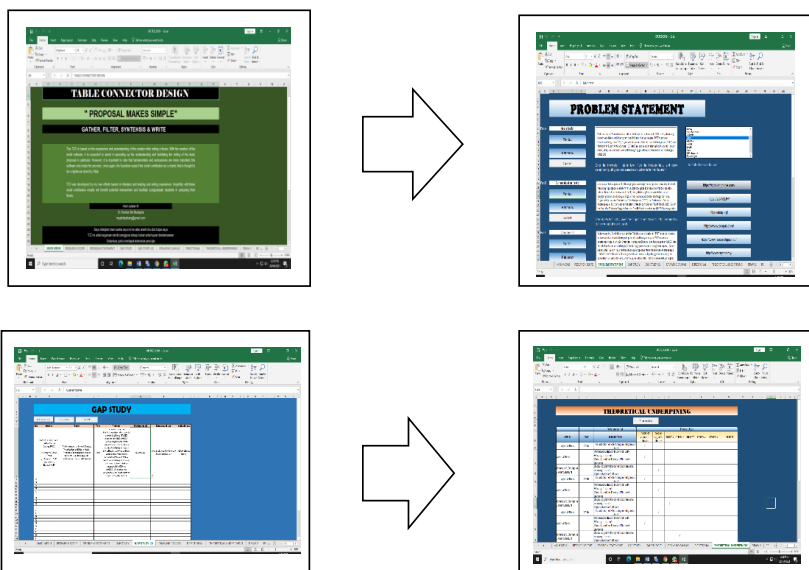
Third Phase: Development Phase

The third phase involves software development. Construction is based on flow mapping in advance, which contains the parts that need to be followed to use it correctly during the writing process.
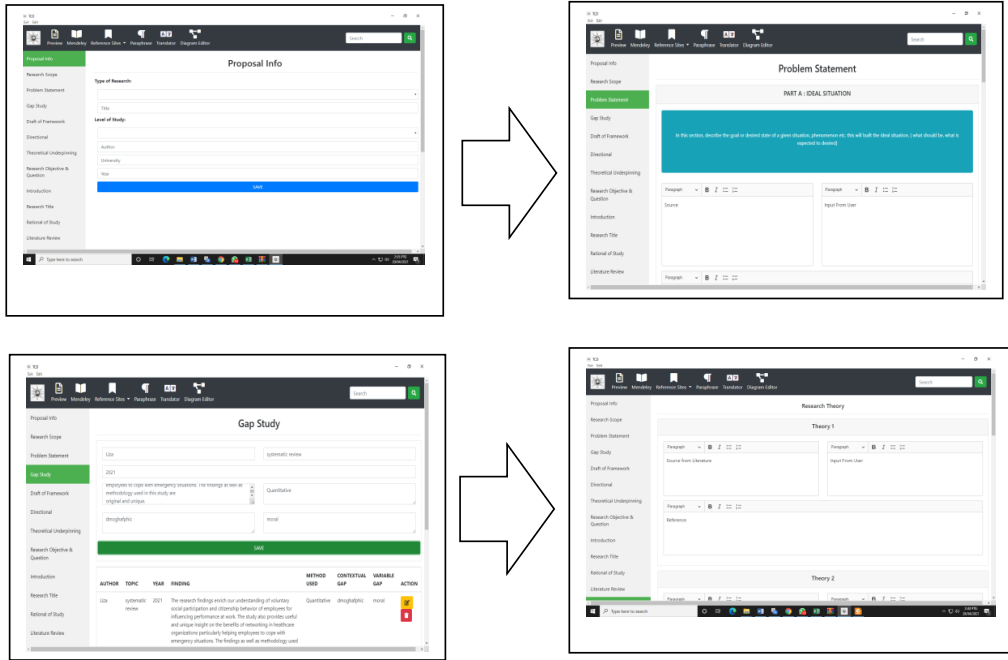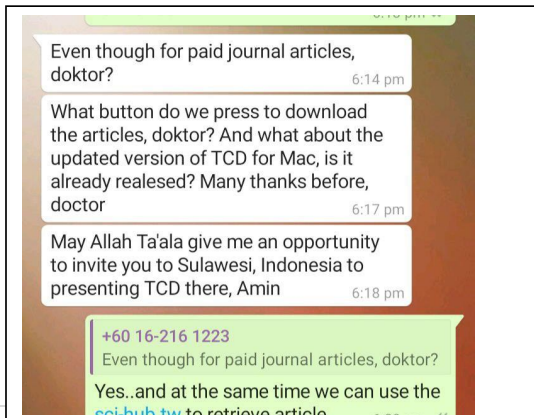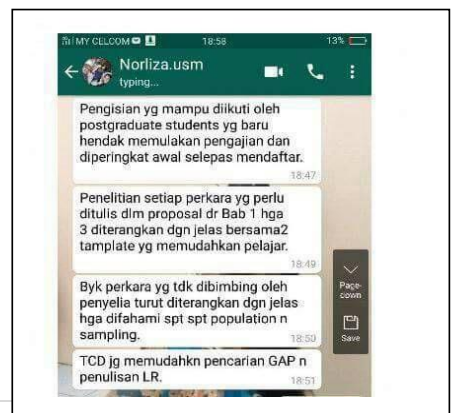

Example of development phase

Fourth Phase: Evaluation

The fourth phase evaluates the product. Researchers receive feedback from users obtained from interviews distributed via Google Forms about the product.
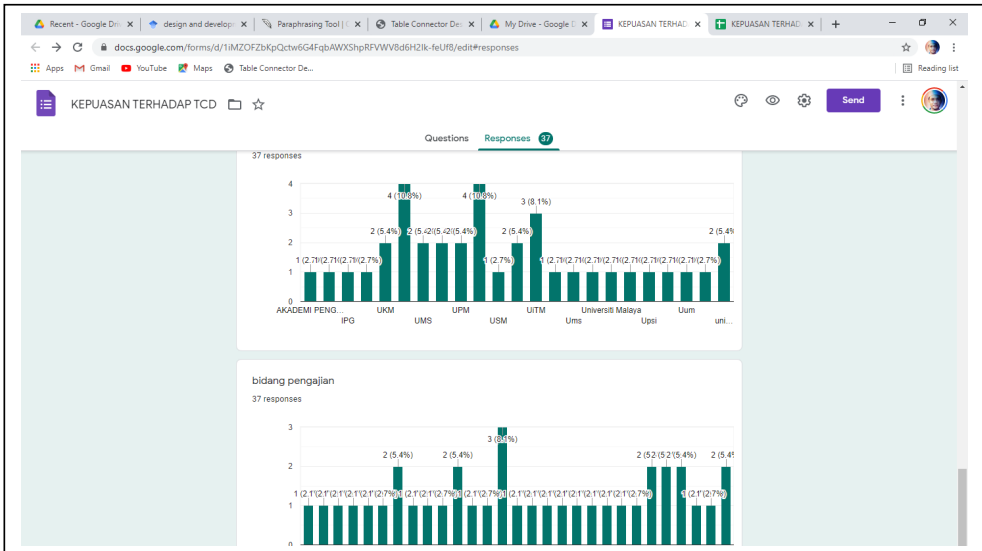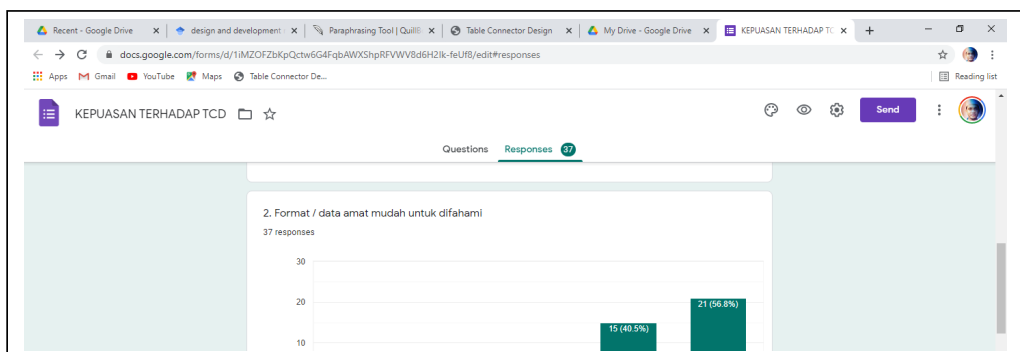
The Feedback from Indonesia   From Local User

Customer feedback data

User data (University)

Satisfaction data

The software is easy to use	75.5 %
The format / data is very easy to understand	56.8%
User friendly	85%
This software meets my writing needs	78.4%
The above data was obtained from a customer satisfaction questionnaire administered using google form	

Impact to the user

This software directly assists researchers, especially students, in preparing to write their research proposals. This innovation focuses on the understanding and skills in organizing important information necessary in academic writing. As an added value, this TCD software can improve users' skills and understanding of problem-solving in academic writing.

CONCLUSION

This software is a structured, innovative and systematic technological innovation project facilitating the process of academic writing, scientific journals and others. Systematic writing needs to be planned with a robust method to strengthen the writing in a structured manner. Therefore, this software is able to strengthen academic writing to be more structured, clear and systematic while educating the writer on the demands of writing for different purposes.

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SELF-PRACTICE RINGKASAN (SPRing): An Innovative Mobile Apps for Self-Practice

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ABSTRACT

Practice makes perfect is a proverb which tells us the importance of continuous practice or learning in order to become proficient in what we do. There is no alternate to hard work and success. As an educator, practice is the best approach to ensure all the knowledge is successfully delivered. The usage of technology such as computer, mobile phone, tablet and application are essential in the education process. In this era, the intention to ensure students engaging in the learning process become a big challenge to educators. They believed that with practice it helps student to build both their skills and memorization. Therefore, SPRing was developed to enhance the memorisation among students through effective and innovative learning approach. SPRing is specifically developed for students who are taking Executive Note-Taking (OBM200) in Diploma of Office Management and Technology. The main outcome for this subject it to ensure the students are able to master note-taking skills both in English and Bahasa Melayu. SPRing is the mobile apps focusedon Bahasa Melayu writing system known as RINTAS. *Ringkasan* is part of RINTAS. The ability to master this skill required students to give more effort by doing exercise, to understand differentrules and to memorize *Ringkasan*. The note-taking skills become the essential skills for office personnel. This mobile apps will help them revise *Ringkasan* and be efficient while performing their task. Self-practice is one of the best efforts that describes student centered learning environment. SPRing is developed due to conditions that there is no constraint for mobile phone. The use of mobile apps for learning is more sustainable compared to the traditional learning methods which include papers, pencils, and pens. A pilot study which was conducted among 15 students who currently taking this subject showed that most of them were satisfied and enjoyed using SPRing. It also revealed that most of them feel they need to have this mobile apps. In addition, it can improve the teaching quality and learning environment among new generations.

Keywords: *Ringkasan*, Rintas, Memorizing, Mobile apps

INTRODUCTION

In the office environment, taking note is essential to everyone. Even though we can rely on technology, sometimes, we still rely on human skills to write quickly. Having knowledge on this situation, a subject named as Executive Note-Taking (OBM200) becomes part of the syllabus for Diploma of Office Management and Technology in UiTM. Executive Note-Taking is an integration of office skills needed for information processing personnel. RINTAS is a Bahasa Melayu note-taking system designed for people who need to increase their writing speed. RINTAS was developed by Rufiah Rufee and Mornizan Yahya in 2003. There is a special section named as *Ringkasan* in RINTAS.

What is *RINGKASAN*?

Ringkasan is a group of common words or frequently used words in document processing around the office environment. *Ringkasan* do not apply the rules stated in RINTAS because the abbreviation are already assigned. In addition, the only methods to master *Ringkasan* is by memorizing all the abbreviations. According to the syllabus designed for RINTAS, students will be exposed with the abbreviations at the end of each unit. According to Rufiah and Monizan (2003), there were about 100 words for *Ringkasan*.

PROBLEM STATEMENT

The only method to master *Ringkasan* is by memorizing all the abbreviations. Hence, practice and drilling will help to improve the memory. Before the development of SPRing, the set of exercise given is in writing.

OBJECTIVE

To develop an effective platform for students in order to enhance the student ability to memorize all the abbreviations by doing self-practice. Next, the objective is to improve the teaching quality and learning environment among new generation of students.

PRODUCT DESCRIPTION

What is SPRing?

Self-Practice Ringkasan (SPRing) is a mobile application designed to accomodate mobile learning. SPRing is one of the platform to help students / user to revise *Ringkasan* by doing self-practice activities. There are two modes in this application; i. *Ringkasan ke Perkataan* (abbreviation to word) and ii. *Perkataan ke Ringkasan* (word to abbreviation). The user may choose one of the mode or test both modes to strenghten their memory on *Ringkasan*. All the words are categorized based on alphabets. The users just need to choose the alphabet and the questions will appear. Each question will have a multiple answer choices.

Figure 1. SPRing Interface

How does SPRing helps in teaching and learning?

This mobile application helps the lecturer to monitor the knowledge on *Ringkasan* effectively and efficiently. Furthermore, SPRing also aid as a tool for learning and practice *Ringkasan* or any short courses related to RINTAS.

How does SPRing benefits the users?

SPRing will help students to revise all the words and become expert in *Bahasa Melayu* writing system. It can benefit students who currently taking Executive Note-Taking (OBM200) and Office Simulations (OBM320). Due to the flexibility of mobile application, all students especially part-time students can also learn at their own pace by doing self-practice.

NOVELTY AND UNIQUENESS

SPRing is developed to help students learn Ringkasan effectively. There are plenty of tools and methods to learn and master SUPERWRITE (SW) but limited sources for RINTAS especially *Ringkasan*. According to Demir and Akpinar (2018); Yılmaz and Akpinar (2011), the use of mobile devices in the learning environments encourages students to participate in learning activities. Therefore, it can be said that mobile devices may eventually be a necessity for students and educators nowadays. SPRing is one of the efforts to accommodate the demand for students who are relying on technology in their learning process.

USEFULNESS

This apps will be valuable and useful to university students or college students, lecturers and office personnel. It can be used anywhere and anytime, immediately after being installed in the mobile phone. Futhermore, it can help students and users to do their revision.

COMMERCIALIZATION

SPRing can be commercialized for the office personnel especially those who work in the government sectors. As we know, in the government sector, all the document processing will be in *Bahasa Melayu*. It is necessary for office personnels to master their writing system and note-taking. This mobile app can act as a training method for office personnel. Everyone can just install the apps if they have mobile phone and Internet. When installed, it can be used anywhere andat any time.

This apps will not only be used by UiTM students. Other associate college and private colleges, that offer this course or subject will also gain the same benefits as UiTM students. This app will assist them to master *Ringkasan* in interactive ways.

PILOT STUDY

A pilot study was conducted to test the performance and functionality of SPRing. There were 15 students who currently taking Executive Note-Taking (OBM200) from UiTM Samarahan and become respondents for this study. The respondents tested the mobile application after they have finished learning all the units. The questionnaires which were adapted from Lund (2001), were used as the survey instrument to gain feedback from the respondents. The questionnaires consist of three sections namely Satisfaction, Usefulness and Ease of Use. Majority of respondents (62.5%) mentioned that this application is very useful. It was also learned from this study that most of the respondents (68.8%) were satisfied with the application. It was reported that most of the respondents (75%) said that the application is easy to use. In general, most of the respondents enjoyed using the application and they feel that they need to have the application.

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REVITALISING HERITAGE SHOPHOUSES OF KOTA BHARU KELANTAN

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ABSTRACT

This project highlights how the exterior facade of a heritage shophouse building, including their associated signage and advertising, as a crucial element in retaining and safeguarding the features of local and traditional cityscape. The focused concern is on maintaining the very few last remaining historical pieces of architecture in the old city of Kota Bharu by finding ways to fit them back into thechanging urban environment they are located in. Armed with city heritage guidelines provided by the local authorities of MPKB, twenty new design proposals of two rows of shophouses in Jalan Temenggung were presented as an alternative to the current existing sites by the second-year architecture students. The results showed a highly viable solution that would bring gains to many different stakeholders. Undoubtedly, the process for enforcement, application and continued maintenance of these heritage buildings will constantly be competing with factors such as private ownership, finances, and relevance of placement in its surroundings. This study reveals, however, how the intrinsic value of these historical pieces is more likely to go up when investments are made tocommunicate their worth.

Keywords: Shophouse Façade, Heritage Façade, Building Conservation History (maximum 5 words, 10 font size and separated with commas)

INTRODUCTION

The remarkable history of the past architectural style of a city is known to be shaped by the number of significant architectural heritage property which stands as a prominent artefact. These selected heritage assets owned their physical and spiritual strength, yet exists without the protection from urban growth and architecture interventions to uphold their qualities of heritage elements and property will deteriorate due to natural causes and other factors.An important part of Architectural Heritage studies is to highlight how heritage property has an intrinsic form and visual value of urban heritage pattern, which should be wisely sustained and conserved.

As appointed by Mohga (2014), to implement heritage conservation by considering cultural context and qualified planning and design, local traditional and cultural values of communities for future generations can be a great challenge for the construction and design team to take responsibility for that issues. The challenges of an abandonment of the inner city, urban growth pressure, scarce lawmaking, and poor implementation affect urban conservation nowadays (Ahmad, 2008). In addition, inappropriate design of new township, urban lifestyle changes, and poor awareness of society are also among the significant issues in sustaining the heritage value currently (Ahmad, 2008).

Recent rapid expansion and modernisation have put the heritage shophouses in isolation because of the emergence of new modern buildings in the surrounding study area. Also, the flawed characters of the shophouse façade image have not been maintained and well emphasised by the local authority and owners. The shophouse owners' deficiency of maintenance and preservation has caused an inadequate and inappropriate image of the heritage shophouses. This project seeks ways to educate the students about noticing and observing the changes of function in heritage buildings also has distracted the ambience of the heritage site. Not only have the aesthetic value of the shophouse façade also been ignored by changing the strait eclectic style façade to modern façade causing a discontinuity of heritage façade, but also that the shophouse façade has been renovated to modern architecture style irrespective of the existing strait eclectic architectural style. The outcome of this study shares beneficial information to a range of stakeholders which includes the shophouses owners, the local authority, as well as other the heritage conservation practitioners and scholars interested in Kota Bharu, Kelantan.

LITERATURE REVIEW

Studies suggest that rapid growth and urbanisation in Malaysia have put the heritage buildings in an endangered situation, which might cause further demolition of the area's historical value. Mohamed et al. (2008) pointed out that economic development and urbanisation in developing countries with heritage significance are under threat due to rapid population growth. According to The Getty Conservation Institute (2009), due to fast urbanisation and growth consequences of cities worldwide, urban heritage has been confirmed to deteriorate during the last decade. Chun et al. (2005) added that there was a conflict between urban change and heritage, and this situation is physically evident in all the towns and cities in Malaysia today.

A study by Hülya. Y (2005) informs that the conservation intervention within the field of conservation may occur at many levels (from preservation to redevelopment), at different scales (from individual building elements to entire sites). In targeting each building, the scope of interventions uses several "upgrading" terminology classifications such as "protection and maintenance", "repair" or replacement of existing features, replacement of missing components, alteration, completion of the missing part, new constructions behind the exterior retained façades, new additions to historic buildings, and destruction of ruined historic buildings which according to small scale interventions to significant scale interventions.

Observation by Guan (2011), however, highlighted how shophouses comprised a line of similar units construct alongside the existence of party walls been built on one side of a street or city block, which eternally envisage as being merged to form a terrace. Demolition and alterations of heritage shophouses facade towards urban demand become one of the threats in conserving the existing historical building in Penang. As Herzog, et.al (1982) mentioned, historical building facades are preferred more over new ones. Hence, the historical building facade plays an imperative role as they resemblance the identity and image of the district and placemaking. Destruction and insensitive alteration on the original building façade is still happening, even though some conservation support is struggling to conserve heritage buildings (Wan Ismail et al., 2005).

METHODOLOGY

This study was executed as one of the design exercises of the University Malaysia Kelantan (UMK)'s second-year Architectural Design Studio 3 project in the second semester of 2019. This task is in accordance with the devised learning outcomes combined with the UMK university niche of Heritage Arts and the Council of Architectural Education Malaysia framework consisting of the following learning objectives: 1) the process of understanding of the history of a selected case study area; 2) implementation of selected façade study and spatial typologies through the case study methodology in Fig 1 and Fig 2 below.
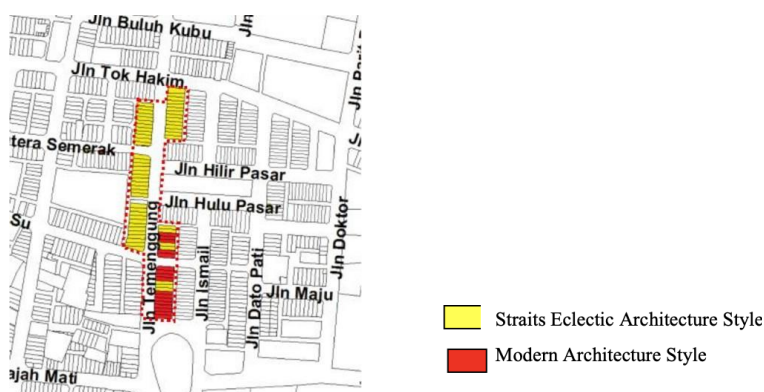

Figure 1. Location of identified Heritage Shop and Styles

Figure 2. Location plan of Jalan Temenggung's rows of selected shophouses
Source: Source: MPKB, Kaji Selidik Guna Tanah APUDG, 2005

This project also employed other means of qualitative methods such as interviewingthe local authority and shophouses' owner/tenants as respondents to gain data and information regarding research matter and to validify data through triangulation. Each respondent selected for the interview are selected based on the scope of the study to specifically address issues of urban development control in Kota Bharu, Kelantan. The interview groups are divided into levels of stakeholders – Authorities (The Majlis Perbandaran Kota Bharu, as the local authority of Kota Bharu) and Shophouse owner/ tenants' owners of the heritage buildings.

A vital part of this process in architectural design involves students understanding a client's design requirement, which, in this case, the MPKB's guidelines, and then to be able to apply them as part of their design consideration. This project also provided an important opportunity for students to advance their understanding of ongoing issues in heritage and conservation studies by employing this type of interpretive inquiry into their design work.

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SMART 3-WHEEL BIKE
"EMPOWER DISABLED ENTREPRENEURS WITH TECHNOLOGY"

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ABSTRACT

Technology is a crucial factor for starting a business today and it is an important factor for disabled entrepreneurs. Entrepreneurship has become one of the preferred fields of employment for disable people due to lack of other employment opportunities. However, the existing technology for disabled people is still insufficient to ensure that disabled people remain competitive in the entrepreneurship field. The Smart 3-Wheel Bike was developed with the aim of providing better facilities to entrepreneurs with disabilities. The process of developing this product is based on three phases, analysis phase, design and development phase and finally implementation and evaluation phase.

Keywords: Disable entrepreneurs, technology.

INTRODUCTION

The opportunity for disable people to be employed is lowered compared to the normal people. One of the main reasons is lack of the employability skills. Disabled people experience lower labor market participation rates than the non-disabled (Grammenos 2011). Statistics shows that only 0.31% disable person were employed from 68.7% total labor participation rate in 2019 and become lowest because of the Pandemic Covid-19 outbreak. This figure shows that, disabled people tend to be concentrated in lower-skilled, lower-paid occupations (Meager and Higgins 2011). One possible solution to problems of low participation rates lies in the potential for disabled people is to become self-employed or to start and run their own businesses. Promoting entrepreneurship constitutes an important part of national agenda. The 'National Entrepreneurship Policy' (DKN) was introduced as a guide to provide a holistic framework or ecosystem for the development of entrepreneurship in Malaysia, which today is seen to be growing rapidly. This is in line with OKU Action Plan 2016-2022, entrepreneurship is made the strategic thrust in empowering the economy of the OKU, through increasing the participation of the OKU in the open, inclusive and accessible job market to enable them to live independently and contribute to national development. Disabled people are often disadvantaged to handle a complex situation like business. The task is much more difficult for disabled people and in some cases even impossible compared to normal people. Due to their disability, they need (e.g., technology) which help them to grow the business. Either disable people of non-disable people, technology is an important factor to achieve and maintain self-motivation and self-esteem and to participate in social environment (Sans-Bobi, M. A. et al. 2012, Rozell et.al. (2010) and Norasmah (2002) and Rogoff et al (2004). Smart 3-Wheel bike

was developed with the aim of making business easier for disable people and to vanquish barriers to organize their business in a competitive manner.

PRODUCT DESIGN:

Smart 3-Wheel is designed using a modified motorcycle where it will be equipped with reverse gear transmission facilities, large basket/place to place the sales items, roofed and equipped with safety features. As compared to the available supporting facilities for disable people, Smart 3-Wheel Bike is more user friendly.

Prototype Specifications
Height: 66 inches (168cm)
Width: 42 inches (110 cm)
Length:102 inches (260cm)

Basket size:
Length: 52 inches (132 cm)
Width: 42 inches (107cm)

Product development: This product is a collaboration project between UMK and Deen Ironwork that fully funded by UMK Prototype Research Grant (UMK-Pro). In December 2020, the process of analysis, design and development has been started and currently achieved 85% of development progress.
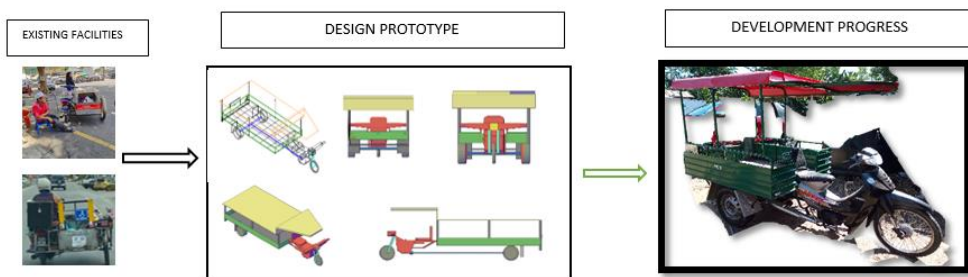
Process: There are three phases of the product development. First is analysis phase, where is to identify and solve problems. In this phase researchers clarify the problem, identify the source of the problem and determine the solution of the problem. Among the aspects that will be evaluated in the analysis phase are: Analyze, Evaluation, Development, Implementation and Design. Second phase design and development. The design phase aims to plan strategies in product development. Among the appropriate elements available in the design phase are: Formation of specific objectives, Construction of items for testing and Approach will used. Then followed by development phase. The development phase is the phase for developing a prototype. In this phase, product development will be developed in stages. This development phase is built based on the analysis and design phase. The last phase is Implementation phase. The implementation phase is the phase to determine the level of effectiveness and problems that may occur in the design and development phase. The improvement process will be carried out in this phase to achieve the objectives outlined.

Importance of Product

Smart 3-Wheel Bike will able to facilitate disable people in doing business and grow their business. In most cases, due to inappropriate technologies, people with disabilities have disadvantages to obtain independent individuality as well as necessary information for their business and to overcome barriers in order to organize their business in a competitive manner. Thus, in order to strengthen the entrepreneurship of disabled people, it is therefore essential provide technology support to them.

Advantages

1. Able to facilitates disable people to operate the vehicle easily because it is equipped with reverse gear transmission.
2. The vehicle had larger storage space
3. The vehicle is equipped with roof
4. The design and size are ideal
5. Equipped with safety features

Marketability

Smart 3-wheel Bike design to fulfill the need for disabled people. Besides, this product is seen to be able to meet demand other than the disabled people, where it can be used in the small-scale agricultural sector (such as palm oil farmers, rubber, vegetables and others), business (hawkers and petty traders) based on size, function, and as well as user-friendly.

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TAKAFUL SINAR IHSAN PLUS

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ABSTRACT

Takaful is a scheme based on brotherhood, unity and mutual aid that provides financial aid and assistance to participants when needed. Participants also agreed to give contributions for that purpose. Takaful is based on the origin of Ta'awun (cooperation) and Tabarru' where the hazard is bestowed collectively by members of a policy. Takaful is an alternative to conventional insurance, and its primary objective is to protect the participants based on the ethical and moral foundations. The purposes of this study are to help orphans and poor children who are under the care of private shelters to plan for a better future after reaching the age of 18 years old, as well as to introduce and encourage the community especially philanthropists with a new method in obtaining takaful plans for orphans and the poor. To achieve these purposes, researchers believe that both quantitative and qualitative methods are suitable and appropriate for this study. It is possible to combine quantitative and qualitative methods, although great care should be taken to ensure that the theory behind each method is compatible and that the methods are being used for appropriate reasons. The questionnaires were distributed to 40 public people as respondents within Selangor area. Moreover, the finding shows that three variables in which attitude, subjective norm and perceived behavioral control are related to the people's intentions to participate in orphans' takaful. This product is great to set up to help orphans get a better life after reaching 18 years of age. In addition, this product helps philanthropists getting a special platform to channel their donations. It is hoped that this Takaful Sinar Ihsan Plus plan can help philanthropists to make savings with a very lucrative return on investment in the hereafter compared to worldly savings alone. From this product, it actually can train the community to take care of the orphans' welfare and their right to get medical and education coverage. So, it is very worthwhile if takaful operators can create products to help the needy especially for the orphans.

Keywords: Takaful, Orphans, Tabarru', Medical, Education

INTRODUCTION

Nowadays, takaful is very important to face many unexpected events in the future such as during this pandemic. First of all, takaful is derived from the Arabic word "Kafalah", which means joint guarantee or guaranteeing each other. Takaful is formed by the takaful

contributors on the basis of mutual assistance and brotherhood to bear each other's risk in the event of calamity, in other word it was structured as a mutual fund. The Quran, al-Ma'idah, verse 2 states that: "Help ye another in righteousness and piety, but help ye not one another in sin and rancor, fear Allah, for Allah is strict in punishment."

In this study, we propose a family takaful product namely as Takaful Sinar Ihsan Plus because this plan is full of kindness towards the orphans and also to the contributors. It is introduced specially for the welfare of orphans in which any nobility or any corporate company owners can apply for this takaful plan. In Malaysia, there is no takaful coverage on the welfare of orphans and at the same time can also benefit those who contribute into this plan. Moreover, this plan is more likely a monthly sponsorship program to take care of welfare of the orphans.

Furthermore, in terms of takaful plan in Malaysia, most of the family takaful plan only focuses on education takaful for the child until maturity date which is until the child reaches 18 years old. In June 2019, Brunei Darussalam has already applied this kind of takaful plan known as "Fund Savings Account". However, this takaful plan only provides a form of protection to ensure the future of orphans when they (orphans) or their mothers/guardians are afflicted by disasters such as death, permanent disability and accidents (Majlis Penerimaan Sumbangan bagi Dana Pengiran Muda Mahkota Al- Muhtadee Billah untuk Anak-Anak Yatim dari Persatuan Fuzhou Shiyyi, 2019). In other words, it does not give any physical benefit to the contributors, hence we want to propose duo benefits from this Takaful Sinar Ihsan Plus which is to the contributors and to the covered person.

The sufficient fund is really needed for orphans when they move out from the orphanage care so that they will survive independently with all fund that they have benefited from this Takaful Sinar Ihsan Plus. Most of them hardly survived after moving out from the orphanage care since previously they were under the care and support of the orphanage. In Malaysia, family takaful has not developed any plan for orphans. In addition, while our country Malaysia is facing this hard time with Covid-19 pandemic, the spending of orphanage welfare has increased about 50%. The expenses involved for the orphanage include the payment of rent for accommodation, utilities, food, school necessities and other expenses. Thus, orphans and poor children whom are placed in the orphanage welfare are in urgent need for this kind of takaful protection to protect them and to secure a better future.

LITERATURE REVIEW

Takaful is derived from "takafala" which is literally translated as looking after one another (Hamid & Othman, 2009). According to Hassan, Kassim, Majdi, and Salman (2018), "Takaful is social and ethical insurance based on the principle of Ta'awun (cooperation) and Tabarru' where the risk is shared collectively by members of a policy. An orphan is a child whose father or both parents have died (Awang, Sayuti, Jamaluddin, & Chong, 2004; Zhao et al., 2009; The Faith to Action Initiative, 2014; UNICEF, 2015; Bani Ismail, Hindawi, Awamleh, & Alawamleh, 2018). According to UNICEF (2015), an orphan was traditionally understood to be a child who has lost one or both parents; however, based on extensive research and experience, they do not attest that an orphan should be understood in terms of factors such as poverty level, access to education and the family's ownership of property, irrespective of whether the parents are actually alive or deceased.

RESEARCH METHODOLOGY

As the purpose of this study is to help orphans and poor children who are under the care of private shelters to plan for a better future after reaching the age of 18 years old as well as to introduce to the community, especially philanthropists and encourage them with a new method in obtaining takaful plans for orphans and the poor, researchers believe that both qualitative and quantitative methods is suitable and appropriate for this study. It is possible to combine qualitative and quantitative methods, although great care should be taken to ensure that the theory behind each method is compatible and that the methods are being used for appropriate reasons. First of all, researchers used quantitative method by collecting the numerical data and analyzing it by using Statistical Package for the Social Science (SPSS) software. This study also applied descriptive analysis by distributing questionnaires and surveys to the targeted respondents who represent the research population of data sampling. Researchers used secondary research by collecting existing data in the form of texts, images, from sources in the internet, articles, journals, newspapers and many more that are related to the takaful, the orphans and the orphanage. Researchers reviewed, explored data and examined the data for patterns or repeated ideas that emerged.

RESULTS AND DISCUSSION

Novelty

Takaful Sinar Ihsan Plus is a new study under family takaful which provides the coverage or protection specially to the third party (the orphans that have been selected before by the contributor under private shelters). This product has not established in the market yet where this takaful plan just focuses on the orphans under private shelters to be covered in their medical and education purposes.

Commercial Value

In order to be commercialized, we manage to create apps which is available at Google Play Store and App Store for the ease of managing the takaful plan. Especially during this digitalized era, everything is just "at your fingertip". Moreover, from this apps, the takaful operator will list down the details of registered and trusted orphanage from private shelters. So, the contributors can directly do a research and survey on the private shelters before deciding which selected orphans that they want to subscribe for the takaful. Besides, the targeted community for this takaful plan is the contributors from the rich who want to give monthly contributions to the orphans for the sake of getting God's blessing and help the weak and poor people continuously not only just 'one-off'.

Social Responsibility

This product is basically to secure for better living towards the needy, especially to the orphans who also need the protection in the case of unexpected events. Hopefully, they can enjoy their medical cards and education benefits from the takaful plan just as how we are concerned and aware on the importance of the education plan for our own child in their future. From this also,

we can actually remind the community that there are some people who have lost their dependence from their parents before they mature or turn to 18 years old. It actually develops social responsibility towards the needy and poor as this has been encouraged by the Prophet Muhammad ﷺ that the person will be granted with special place in the heaven.

Design, Display And Packaging Of Study

Takaful plan of Sinar Ihsan Plus was designed special for the orphans in order to grab the special place besides the Prophet Muhammad ﷺ in heaven, in which this product plan's coverage is on their education and medical under the maturity period. Since this takaful plan involves the three different parties as mentioned before, the product structure is proposed as below. Figure 1 below shows the proposed model for this takaful plan, which we propose to use Wakalah bil Ujrah. This takaful model consists of a few contracts that involved such as Wakalah (agency) contract where the takaful operator is an agent for the agreement with the contributor to manage the fund and Tabarru' (donation) contract which is the fund will be used by takaful operator to be managed from the amount in that Tabarru' fund.
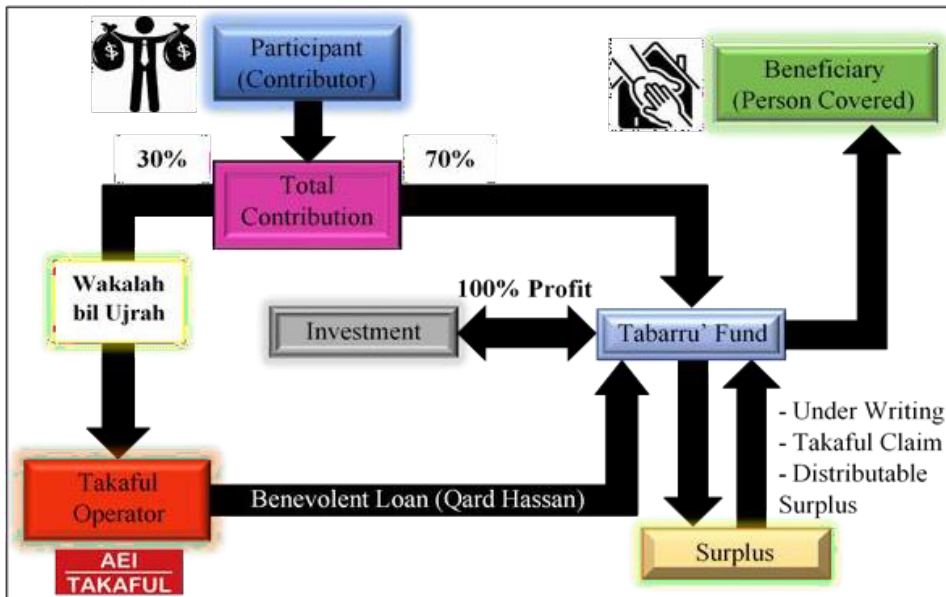
Figure 1: Proposed Takaful Structure

The contributor in this proposed takaful model refers to Dato'/Datin or any corporate company or maybe any noble person who wants to subscribe the takaful plan for the targeted orphans that they want. Meanwhile, the beneficiary refers to the person being covered by this takaful plan or known as to the orphans who have been targeted to be covered by this takaful plan.

Monthly Contribution Package		RM100 (2 in 1)	RM150 (2 in 1)	RM180 (2 in 1)	RM180 + i-medic (3 in 1)	RM200 + i-medic (3 in 1)	RM250 + i-medic (3 in 1)
Education and Savings Funds	Age 1-18 years old	RM28,400	RM43,904	RM53,414	RM44,976	RM49,925	RM61,925
					benefits of 36 critical illness.		

Death Benefit	In the event of death of the person covered before expiry of the term, the following will be payable: **Basic Sum Covered, and:** **Value of Participant Investment Fund (PIF)** ***Given to the orphan shelter**
Total & Permanent Disability (TPD) Benefit	The sum covered is payable in the event of TPD before the certificate anniversary date of the covered person's age 18 or before the expiry of the term, whichever is earlier.
Critical Illness	A lump sum amount upon the diagnosis of any covered critical illness.
Savings/Investment	Cultivate the habit of saving and investing regularly to the PIF which improves potential returns and increased cash value for the orphan.
Education Benefits	With education benefits, the beneficiaries will be rewarded with cash for their excellent achievement in the examinations (based on contribution amount to the fund).
Hospital income benefit	Daily benefit of RM100 for each day of hospitalization.
Benefits for contributors	Contributors will get tax relief from the contribution to the takaful operator.

CONCLUSION

Each takaful operator can create a special takaful plan for orphans to ensure future life. In fact, takaful operators can also create various takaful plans or any products which focus on orphans and the poor as beneficiaries. This is because they are one of the groups that are highly glorified by religion. From this product, it actually can train the community to take care of the orphans' welfare and their right to get medical and education coverage. So, it is very worthwhile if takaful operators can create products to help the needy especially for the orphans.

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SMART KEYCHAIN

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ABSTRACT

A Smart Keychain is a product that combines a number of cutting-edge technologies with artificial intelligence (AI). AI technology is very common nowadays in the production of modern technology to help users. This Smart Keychain includes AI technology. In addition, this Smart Keychain has a variety of other features to improve the capabilities of its facilities that includes Internet Wi-Fi, GPS tracker, data storage (pen drive),solar energy and USB chargers. The "Smart Keychain" is a very useful tool for travelers since it makes it easier for them to complete their tasks. The objective of this Smart Keychain is to allow users to only use Smart Keychain for certain functions, such as obtaining information about the users' locations by using GPS. The next objective is to provide internet network to users here it is easy to be taken anywhere and can be used to store travel records as well as files in data storage. The Smart Keychain was developed and built to be one of the things that users would benefit in accessing the internet and GPS. This smart Keychain has a number of functions that other ordinary keychains do not have where they could only be used as jewelry. Users of this Smart Keychain can use the Wi-Fi connectivity provided on the Smart Keychain without having to carry a Wi-Fi gadget with them. Users would be able to surf the internet more easily as a result of this. It is also fitted with a GPS device that can assist users with issues such as difficulties in finding locations. It also has a solar energy feature, which eliminates the need to charge the Smart keychain, despite the fact that it has a USB port for charging. Users can use solar energy power to charge the smart Keychain if their region does not have access to electricity. This Smart Keychain is also created specifically to save space and is durable, which means it can fit in a pocket where the exterior component is made of metal, which means it will not break if accidentally dropped. It is also ideal for users to use in all locations or areas without troubling them. Furthermore, this smart Keychain has a solar energy charge feature which allows users to charge the Smart Keychain even when there is no electricity. The result of using this device is that users would be able to access GPS from anywhere because it is fitted with a GPS feature that can assist users in finding locations. Next, since it has a Wi-Fi feature, this Smart key chain can provide Wi-Fi connectivity to its users, making it easier for them to access Wi-Fi and access the internet anywhere. Besides that, users can feel more at ease by using the Smart Keychain because it is powered by solar energy, which eliminates the needs for users to wear the Smart Keychain and makes it easier to use because it can be used at any time and any place. Moreover, since the Smart Keychain is powered by solar energy, users

will feel more at ease in using it because they do not need to bring batteries or look for electricity if they run out of power.

PROBLEM STATEMENT

Nowadays, the internet is a very important thing. This is because the internet network is needed by everyone no matter where they are. Not only that, people also need a multi-functional technology for their daily use. Most people also do not like to carry a large gadget because the large size and weight of the gadget make people feel tired when carrying the gadget for a long time. People also like to travel and need a device that is easy to carry anywhere and has various functions.

OBJECTIVE

1. Allow users to only use Smart Keychain for certain functions such as obtaining information about the users' location by using GPS.
2. Provide internet network connection easily and anywhere to users.
3. The Smart Keychain also can be used as a store travel records as well as files in data storage.

NOVELTY AND SPECIAL CRITERIA OF PRODUCT

Smart keychain which we designed is one of the products that users can use to make it easier for them to access the internet and GPS. This smart keychain is designed with a variety of functions that previously the keychain had no function and only as jewelry. In this keychain, users can use the Wi-Fi access available in the keychain anywhere without having to carry a Wi-Fi device. This will make it easier for users to surf the internet. Furthermore, it is also equipped with a GPS system that is able to help users who have problems such as difficult in finding an area. It is also equipped with a solar system function that causes users not to have to charge the smart keychain even though it has a USB port provided for charging purposes. With the solar system, users can use it if the user area does not have electricity supply to charge the smart keychain. This product has some special criteria like this product is one of the multi - functional keychain. This product has the ability to provide internet access to users to make it easier for users to surf the internet. The very user -friendly shape of the product makes this smart keychain can be taken anywhere by users to use it. In addition, this product is also equipped with GPS specifications that allow users to use this product as a direction indicator to go somewhere. users will be more confident to go somewhere because of getting directions through this smart keychain. Furthermore, users will also be able to use this smart keychain as a power source tool for worn gadgets such as phones and others. This product is equipped with a USB port that can provide a power source because this smart keychain has a solar energy specification that allows this device to store and extract its energy source for the use of consumer gadgets in times of emergency or the absence of electrical power.

IMPACT OR USEFULNESS

This smart keychain helps the users to be able to access GPS from any area of place because this device is fitted with GPS features and this can assist the users to find any location that they want. The next impact is, this device has a Wi-Fi feature, which means this Smart Keychain can provide Wi-Fi connection to the users and this can make the user can access the internet network easily also anywhere. Not just that, this device is powered by solar energy and this can make the user more easy to use this Smart keychain anywhere because the user don't have to worry if they stay in place that don't have any electricity also don't need to look for batteries if the user run out of power. Solar energy is also a power that is easy to get, this will make the Smart Keychain easier to get power to operate. Besides that, this Smart Keychain will be able to help users in their daily activities such as when travelling to places that do not have an internet network, this device will able to provide an internet network for users to use. After that, the lightweight and small design also makes it easier for users to carry this Smart Keychain anywhere compared to other gadgets. For the outer design, the Smart Keychain is created using iron or metal. This will help to protect this device from crack when the user drops the device.
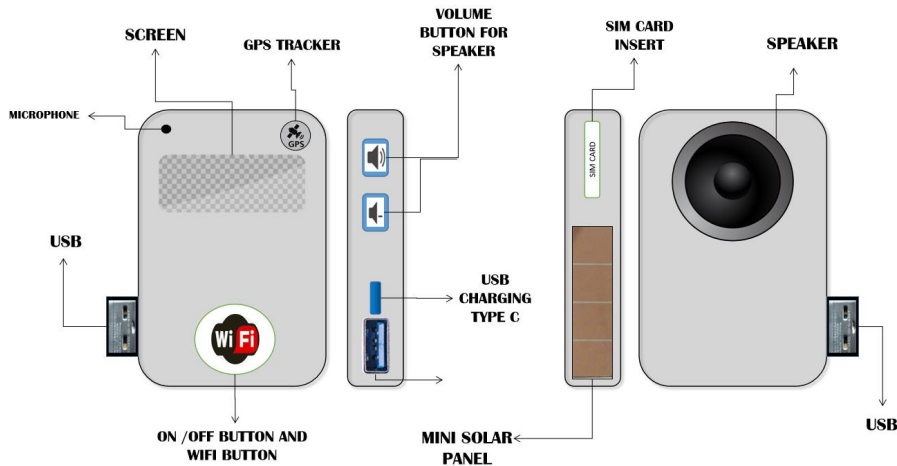
Figure 1. Process of Consuming the Product or Specification

Below are the product specifications of Smart Keychain:

1. "Smart Keychain" can be used to identify the user's location with the GPS facility installed on the device.
2. "Smart Keychain" has Wi-Fi that allows users to get internet access anywhere.
3. For charging, users can charge the "Smart Keychain" by using solar energy and a USB charging Type C.
4. "Smart Keychain" provides AI technology to make it easier for users to communicate with the tool.
5. Users can also access their travel data stored in data storage. In addition, users can also store any file in the data storage.

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SECURED MULTI DOOR ACCESS SYSTEM AS A WEB APPLICATION

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ABSTRACT

In the era of Internet of Things (IoT) nowadays people are connected through many mobile devices remotely. Internet connectivity has provided major benefits to modern society in terms of sharing and accessing information. Increasing numbers of mobile devices operating worldwide, has shown that people use mobile devices for many activities in their daily lives. Mobile devices are used in many IoT appliances and systems. Our previous study has focused on smartphone utilization as a tool to unlock doors, where we create a secured door access system on smartphones, and use it as a key to unlock doors connected through secured Wi-Fi connection. However, since there is a limitation on mobile applications that is dependent on the type of operating system, we create a new system which is a web application where it is multi-platform and can be accessed with any mobile devices. Users can unlock the door using their registered accounts where admin is able to set the authorization of the user to which door they can unlock.

Keywords: IoT, secured access, door locks, mobile devices

INTRODUCTION

Common secured door access techniques applied nowadays involve the use of magnetic cards, smart cards or tokens for door access control. However, there are problems with these techniques:
1-   People always leave their key/cards everywhere or forget where they left it.
2-   Security issues involving stealing of the keys/cards/tokens or password cracking.
3-   Needs many kinds of keys for one person to keep.

Many smart home and door access technology use IoT technologies to remotely control access to a room or appliances. A number of research has been done for smart door access control using Bluetooth technology and a smartphone such as (Shao et al., 2018) that created BLEDoorGuard, a wireless, invisible, and robust door access system which controls received signal strength indicator from Bluetooth low energy (BLE) beacons to identify a person who accesses a door. Hadis et. al. (2018) has designed a lock system using Bluetooth technology that operates a door without a control to open or lock that can be used for all kinds of human's physical conditions. Abdullah (2018) has created a Jaro Winkler algorithm to compare the registered password security with android phones using Bluetooth connection. Husni et al. (2019) has designed an integrated smart doors system using GSM and bluetooth technology to control the doors. There's also some research on door access control techniques which use biometrics devices to unlock doors. Patil et al. (2020) has developed an Arduino nano based adaptable working device that provides physical security utilizing the biometric sensor which is available in a smartphone. Sarika et al. (2019) has designed a door lock system using biometrics interfaces with a biometric reader that is a fingerprint scanner. Pawar et al. (2018) used face recognition techniques for smart home security system. Mecke, Pfeuffer, Prange & Alt (2018) has done a survey on user perception in using biometrics solution for unlocking doors. These techniques are quite good but still in Malaysia, biometrics has issues of maintenance and reliability, for example, it cannot read some of the thumbprints for certain people.

According to a statistic by Statista (n.d.) there are almost 15 million mobile devices operating worldwide, up from just over 14 billion in the previous year. By the year of 2025, the number of mobile devices is expected to reach 18.22 billion, an increase of 4.2 billion devices from 2020. As smartphones are one of the most used mobile devices, in our previous study we had focused on smartphone utilization as a tool to unlock doors. We had created a secured door access system on smartphones (Copyright No.: LY2019005699), and used it as a key to unlock doors connected through a secured Wi-Fi connection. However, since there is a limitation on mobile applications that is dependent on the type of operating system, we created a new system called Secured Multi-Doors Access System (SMDAS) as a web application. It is multi-platform and can be accessed with any mobile devices such as smartphones, tablets or laptops. With SMDAS, authorized users can unlock the door using their registered accounts where admin is able to set the authorization of the user to which door they can unlock. This research focuses on providing secured access to multi doors such as computer labs in universities or vault rooms for storing sensitive documents, which require authorized access from multi-users.

PROBLEM STATEMENT AND OBJECTIVES

From our observation in Kolej Universiti Poly-Tech MARA (KUPTM), there are problems with computer labs' access management. KUPTM has 16 computer labs. Most lecturers will have classes in a few labs within a semester. Current lab access management is done manually where lecturers have to go to the Information Technology and Communication (ICT) office to get and return the lab keys. This is time consuming because lecturers need to get those keys at the ICT office and then return back to labs which are located on different floors. Tracking the location of the key is also a problem when for example lecturers did not return the key immediately after class. And when the key is missing, it takes some time to locate the duplicated keys. Duplicated keys arose another security problem. Most room access systems

use an electronic touch card to open the door. These cards can easily be duplicated. Other issues are, most tokens can be lost or stolen. The objective of this research is to develop a system that can identify many authorized users who can access a room securely by providing authentication and verification through a web application.

METHODOLOGY

The SMDAS server (RPi4) is placed at level 3 in KUPTM building where the server is connected to Local Area Network via Ethernet cable. Server admin should be given to an authorised member of staff to physically guard and maintain the server. The IoT client (ESP32) is connected to the network over Wi-Fi via wireless access point. The RPi4's and ESP32's dynamic IP addresses are established to preserve TCP connectivity between them. Relay Module will then receive a signal from ESP32 in order to lock or unlock the door. Users and administrators can also connect to the SMDAS web application interface using their own mobile data or the KUPTM network. Figure 1 shows the framework design of SMDAS.

SMDAS FRAMEWORK DESIGN
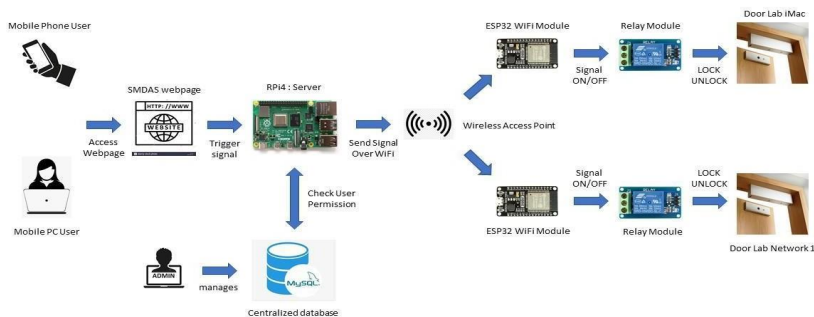
Figure 1. SMDAS Framework Design

All users that require access to the computer labs are registered by the admin. They will be given an access credential to log into the system. Users will only be given access to the rooms that they are permitted to. The rooms can be accessed according to specified time and date.

RESULT

We developed a prototype of the system and tested on a dummy door as shown in Figure 2, which used common electromagnetic locks. From the testing that we conducted, the ESP32 can trigger the Relay by sending a signal voltage of 3.3v to change the relay switching mode whether mode NO (Normally Open) or mode NC (Normally Closed). The Relay Module is directly controlled by ESP32 to control power of 12V from getting into Electromagnetic Door Lock. The input power of Electromagnetic Door Lock is connected to the NC mode of switch power from the Relay Module. The NC mode will always power up the load until it gets a signal from ESP32 to change mode to NO. NC means the current always flows where NO means the current always cuts, so The Electromagnetic Door Lock will always grip and stay locked until the user sends a command to unlock. The Electromagnetic Door Lock will get power from Relay where its magnet will grip once powered up and will lose grip once power cut.

Figure 2. SMDAS Dummy Door

We have also tested the front end where users can be registered and assigned to which doors that they can open.

CONCLUSION

It has to be agreed that the internet allows users to have any information at their fingertips. Since mobile devices have been widely used nowadays, we utilize its functions to make our life easier. Looking from an organization perspective, where access to a room requires strict rules, it is essential for us to think of a smart way to make easy and secured access, where we can monitor the security of the rooms with only authorized users in it. One of the advantages of this system is that it can be applied to any existing electromagnetic or electronic doors. This system can be applied in many organizations that need secured access to rooms.

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STANDARD OF CARE FRAMEWORK FOR OCCUPIER DURING PANDEMIC COVID-19 (SOCO): A FACILITATION FOR UNDERSTANDING LAW RELATING TO TOURISM INDUSTRY

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ABSTRACT

COVID-19 had severely impacted the industries in Malaysia, especially tourism sector. This outbreak has adversely impacted Malaysia's tourism industry. Nevertheless, government is started to re-open various industries with strict adherence to rules and regulations as provided by the government. The main objective of this product is to impart legal knowledge and awareness on tourism industry players on duties and standard of care to be observed in line with SOP provided by the government. The novelty of this product is from the unified legal framework in which it eliminates the difficulty in learning and understanding the laws by integrating the standard of care as enshrined under the law, coupled with latest SOP ordained by the government. This unified framework is very useful as a reference for tourism sectors in operating their business in averting future litigation. This framework is easily marketed as it is in the form of e-brochure containing up-to-date legal information on recent issue during this unprecedented event of Covid-19.

Keywords: standard of care, framework, occupier, understanding law, tourism industry

INTRODUCTION

The World Health Organization had declared Covid 19 as a global pandemic and affected the world population since 2019 (Chen et al., 2020). Generally, the tourism industry also suffered due to pandemic and many sectors underneath this industry directly affected such as hotels, transportation, entertainment such as theme parks, food and beverages and other related sectors (Gabe, 2020). In Malaysia, Ali et al. (2018) found that Malaysian people having a trend in loyalty to visit local tourism locations and premises. Sadly, because of the Covid-19 pandemic, many of these sectors need to be closed. Malaysia taken an action to allow the industries to re-open their business as an effort to rescue the tourism industry. Malaysia government had introduced the National Economic Regeneration Plan (PENJANA) valued at RM35 billion in

June 2020 (Dezan Shira & Associates, 2020) and Malaysian Economic and Rakyat's Protection Assistance Package (PERMAI) valued at RM15 billion to accelerate the reopening process (Dezan Shira & Associates, 2021).

Standard Of Care Framework for Occupier During Pandemic Covid-19 (SOCO)

Product Description

Standard Of Care Framework for Occupier During Pandemic Covid-19 (SOCO) is developed containing rich presentation for subject-matter of innovation namely the duty and standard of care of an occupier towards the entrant. A legal framework is used as a design tool because it suits the objective of the product in imparting the complex knowledge of law pertaining duty of care and legal obligation of an occupier. It aims to facilitate the reader to better understand the law by clarifying types of entrants as recognized by law and the different types of standards of care that need to be observed by the tourism players as occupiers and owners of premises. The product also aims to educate the industry players on the legal liabilities faced by them should they fail to observe the legal requirements and standard as provided by laws.

Novelty and Uniqueness

Standard Of Care Framework for Occupier During Pandemic Covid-19 (SOCO) is devised to reconstruct the difficulty of learning and understanding laws in much lighter method. The product provides a platform for learners to comprehend the complexity of law in a simple and effortless method. Thus, the novelty of this product can be seen in the framework development where it tries to eliminate the difficulty in learning and understanding the laws which require references to a lot of documents. The uniqueness of this product is it is the first unified framework that integrate the standard of care as embodied under the law, coupled with latest SOP ordained by the government to be used as a reference for tourism sectors in operating their business. It is very useful reference as it simplifies the legal information that need to be adhered by tourism players in reopening the business.

Benefit To Mankind

Standard Of Care Framework for Occupier During Pandemic Covid-19 (SOCO) is very useful reference for tourism players because it simplifies the legal information that need to be adhered by respective parties in reopening the business. It is easy to understand, effective, simple, and engaging especially to laymen. The product is powerful tool to comprehend private law as the information is easily digestible. In addition, this product can assist the respective parties to adhere to correct procedure of laws to avoid future litigation.

Potential commercialization

In term of commercialization, the product has huge potential to be used as a legal guidance for tourism industries in operating their business during this unprecedented event. This framework is easily marketed as it is in the form of e-brochure containing up-to-date legal information

pertaining to standard of care towards entrants of business premise and standard operating procedures to be adhered as to avoid litigation during this pandemic.

LITERATURE REVIEW

According to OECD (2020), the tourism industry is taking steps to be ready for the restart. In response, industry actors have been proactive in proposing new operating standards and protocols, which seek to protect workers, restore travelers' confidence, ensure social distancing, and put in place the necessary cleaning and hygiene standards. In advance, U.S. travel industry had provided detailed guidance for travel-related businesses to help keep their customers and employees safe as the country emerges from the COVID-19 pandemic since 4th May 2020 known as "Safe Travels", a new global protocol to restart tourism.

METHODOLOGY

This paper used a legal methodology called the doctrinal method. This method is used because it involves reading and interpreting the laws, statutes and decisions of courts. For this study, cases were chosen based on the keywords ***negligence***, ***occupier liability***, ***standard of care* and *duty of care* which** they lead to the discussion on the standard of care on the occupier. The searching process for cases was done using two different sources; the first website search is The Malayan Law Journal and Current Law Journal. The second source referred to is from the books; the Law of Torts in Malaysia 3rd Edition and the Book Nathan of Negligence and the Book Law of Tort in Malaysia 3rd Edition. For the website search, 143 hits are found pertaining to the subject matter but only 6 cases were selected. Whereas 41 hits are found, and 11 cases were selected from the book sources.

DISCUSSION

It is a trite law that, the occupier owes a duty of care towards entrants of his premise. Therefore, an entrant who suffers injury due to negligence on the part of occupier in failing to provide a safe premise or failing to observe standard procedures in operating his business may face litigation under civil action. An occupier is defined as someone who has sufficient degree of control over premises and need not have an absolute control over it (Wheat v.Lacon & Co. Ltd [1966] 1 All ER 582,HL). Even though he has no actual possession of the premise as he might be renting the premise, if he has power to give permission to someone to enter or forbid someone from entering, he is considered as an occupier and thus owes a duty to use reasonable care toward visitors (Harris v. Birkenhead Corporation [1976] 1 WLR 279, [1976] 1 All ER 341, CA). Similarly, a person who has parted with possession of the premise is no longer liable to the visitors but if he retains the right to control over the premise, he still owes a duty of care towards the person visiting the premise (Shanta Manickam v. Teik Joo Chan Sgn Bhd & Anor, 2015). In Malaysia, the duty of care of an occupier is based on common law principles.

According to the common law, the standard of care required by law differs in accordance to types of entrants to the premise. They are **contractual entrants, invitees, licensees,** and **trespasser**s. However, for the purpose of developing the legal framework, a focus will be made on standard of care to be observed by an occupier for only three types of legal entrants namely contractual entrants, invitees, and licensees. For **contractual entrants**, the law divided it into

two categories namely main purpose entrant and ancillary purpose entrant. Under these types of entrants, an occupier must exercise care and skill in ensuring the premise is safe for habitation of main purpose entrants (MacLenan v. Segar,1917). On the other hand, for ancillary purpose tenant, the occupier owes a duty to ensure the premise is reasonably safe for that particular purpose (Hall v Brooklands Auto-Racing Club,1933). As contractual entrant is someone who has paid for the right to enter the premises, the standard of care is higher compared to the other types of entrants.

The second type of entrant is an invitee. An **Invitee is** someone who entering the premise with the consent of the occupier. He is also someone who comes onto the premise to provide the occupier with economic benefit. They are also divided into two, namely, legally authorized entrant and business visitor. The law requires the occupier to warn and use reasonable care for both categories of entrants as to any probable and unusual danger of which the occupier knew or ought to have known that might cause injury to the invitee (Stampark Place Sdn Bhd v. Liu LI(f),2017). To safeguard the safety of the invitee, a reasonable precaution must be taken especially on the conceal danger that the occupier knew or ought to have known. Nevertheless, the law does not impose a duty on the occupier to prevent all dangers that might be lurking around the premise as his liability is only to ensure that the premise is safe and is least dangerous as it reasonably be (Lau Tin Sye v. Yusuf bin Muhammad, 1973).

For the third category of entrant name **licensee**, a licensor is not liable for injury sustained by the licensee if the injury caused by dangers of which the licensor ought to have known. This is because a licensee is one whose whose presence is not a benefit to the occupier but to which the occupier has no objection. The standard of care required for the occupier to be observed is not to expose the licensee with the dangerous condition and to warn him on the danger that known to the occupier (Sutton v Bootle Corporation,1947). In this respect, the licensee cannot expect that the occupier has ascertain that his premise is free from any dangers. Therefore, if the licensee who has suffered injury during his stay at the premise, he may institutes legal action if it can be proven that a reasonable man would have appreciated the risks of the danger even if the occupier does not appreciating it (Hawkins v Couldson & Purely Urban District Council,1953).The duty of care owes by the occupier towards a licensee thus is slightly lower compared to duty of care owes by him towards the contractual entrant and an invitee. **Figure 1** summarizes the standard of care based on the cases that have been reviewed in the present study.
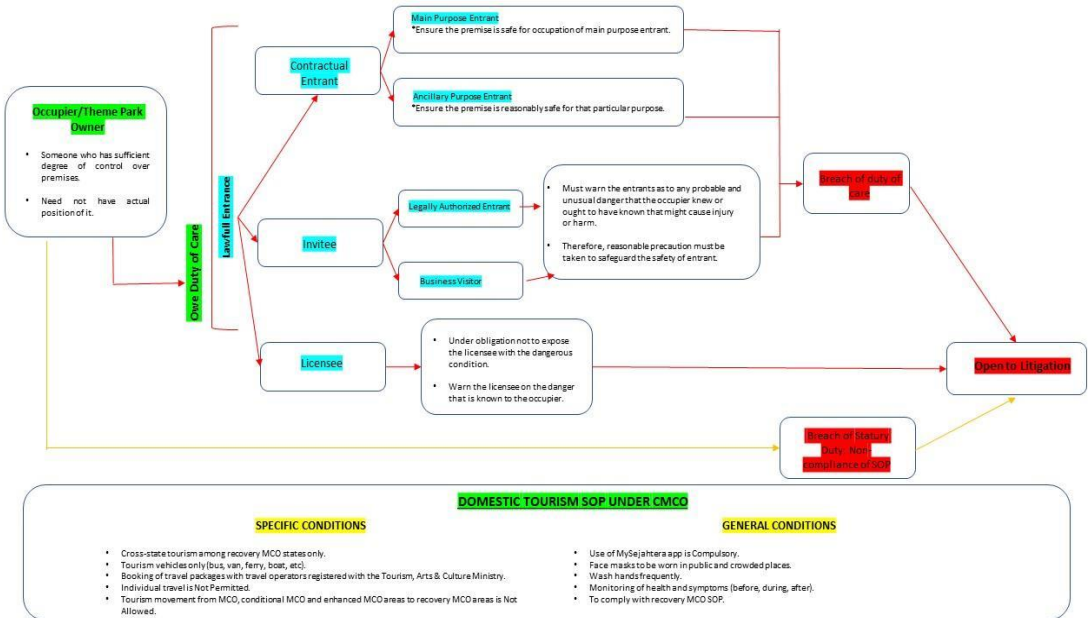
Figure 1. Standard Of Care Framework for Occupier During Pandemic Covid-19 (SOCO)

CONCLUSION

The tourism industry has re-opened to visitors in the era of COVID-19 with strict compliance to the SOPs provided by the government. Compliance with the SOPs, it is necessary to ensure the safety of the visitor and to instill visitors' confidence for visiting the respective premise. The Standard of Care Framework for Occupier During Pandemic Covid-19 (SOCO) will be a useful guideline to adopt among tourism industry actor during the process of re-open especially in Malaysia. By doing so, the occupier able to run their businesses without much adversity.

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DEVELOPMENT OF SOUND SYSTEM LEVEL TOOLS
"SoQMeT"

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ABSTRACT
Noise level of sound system is needed to comply and achieve the minimum recommendations of Malaysia Standard. The objective of this project is producing the SoQMeT which is an Excel basis system. The SoQMeT is developed to provide instant and easy monitoring tools of noise level. The scope areas of the measurement of noise level were at various places in the building and also infrastructures. The noise levels for the selected places were obtained and the result was analyzed by using the SoQMeT in order to comply with the Malaysian Recommendation Standard. The colour zoning of low, moderate and high of noise level are shown in SoQMeT. As the result, there are places complying with the standard and some places failed to follow the minimum recommendation level. Result obtained from this project, there are several places that need to give attention and do fast correction action and maintenance especially for walkways and waiting areas for a better hearing comfort to the people. The noise level for these places was considered high and exceeds the minimum requirement of the standard.

Keywords: SoQMeT, noise, measurement tool, sound system

INTRODUCTION

The definition of sound is pressure, stress, particle displacement, particle velocity, and other oscillations propagated in a medium having internal forces for examples elastic or viscous, or the superposition of such oscillations. The oscillation described in elicited an auditory experience. Sound may be thought of as a wave motion in air or another elastomer. Sound is a signal in this situation. Sound may also be thought of as an excitement of the hearing system that causes sound perception. Sound is a sensation in this scenario.

Properties and Characteristics of Sound Waves

The two essential constituents of sound are pressure and time, as demonstrated by a pressure over time graph. Sounds may be described as a combination of Sinusoidal waves of various frequency. All sound waves are made up of these fundamental constituents. They may be used to characterize any sound we perceive in absolute terms. A complicated wave, such as the one displayed in a blue backdrop to the right of this paragraph, is frequently divided into its component elements, which are a mixture of several sound wave frequencies, to better comprehend the sound and noise. (Handel, S.,1995).

The Ability to Perceive Sound

Noise is a phrase that is frequently used to describe an annoying sound. Noise is an unwanted component in science and engineering that obscures a desired signal. However, it is a crucial component of sound perception and may be utilized to identify the source of a sound in sound perception. Many creatures utilize sound as a signal since it is received by one of the five senses. It is utilized for sensing danger, navigation, predation, and communication. There are few disadvantages of excessive loud sound. Loud sounds have a way of really getting under human skin. People might want to put hands over ears just reading such sentences. They may be a source of aggravation as well as having a negative influence on health. An increasing quantity of noise, according to a recent research from Germany's Mainz University Medical Center, might really knock human heart out of rhythm. This abnormal heartbeat, known as atrial fibrillation, can cause blood clots, strokes, and even heart failure.

Problem Regarding The Excessive Sound Exposure

In the era of globalization today, in accordance with a recent publication by World Health Organization figured out that noise pollution is actually increasing, and it has ranked second among a series of environmental stressors for their public health impact. A recent study by Neitzel, Gershon, Zeltser, Canton and Akram (2009) state that among the environmental noises, the noise of public transit systems has been recently subcategorized as urban disturbance. Public transit or also known as public transportation is rapidly expanding in growing cities as to fulfil with increasing demand. There are some examples of public transit which include buses, trams, light rail, heavy rail and ferries. Many people are choosing public transit to travel from one destination to another destination due to its convenience, avoid congestion which provides quicker travel and can save money as the fee to commute using public transit is cheaper. Despite its benefit towards the passengers, public transit system may/concern us regarding potential health effects. High level of noise exposure at public transit

infrastructure can affect the passengers or the workers who have been in the area for a long duration of time or frequently commuting the public transit. In normal practice, they must be thinking that the sound that they have been hearing is normal as they have been heard it every day as if it does not mean so much for them. However, they may not know that the sound that they have been receiving might exceed the noise limit that has been recommended. The noise limit is designed to protect people against any hazardous noise level that may lead to noise induced hearing loss. Instrument used to measure noise level at source is sound level meter. Sound level meter is designed to react with sound is like reaction human ear. The difference is that the sound measured by this instrument will be processed and exchanged into numbers for interpretation purposes (Ibrahim and Richard, 2000). To know the sound level, receive in the certain place in the case study we need to measure the sound level hence compare it to the noise limit recommended by WHO whether the sound level received hazardous to the people or not.

METHODOLOGY

The purpose of this study is to achieve the objectives which are to measure the sound level at public transit infrastructure (Keretapi Tanah Melayu Berhad, Pangkalan Sultan Abdul Halim Ferry Terminal and Penang Sentral Temporary Transportation Terminal) and to evaluate the sound level at public transit infrastructure with the noise exposure limit recommended by World Health Organization (WHO). To achieve the objectives, there must be a methodology that will guide the sequence in obtaining the data needed. SoQMeT is an Excel-based system which is developed to provide instant and easy monitoring tools of noise level. Initially, direct measurement of the noise is done by using sound level meter. The handy and user friendly of sound level meter allows for quick and easy collection data at any places and time. Then, the data are keyed-in into the excel-based system. Finally, the system will provide the users on the noise level. On the other hand, it can reduce be sustainable innovation which can reduce the usage of papers to obtain the data.

Figure 1. Figure Header
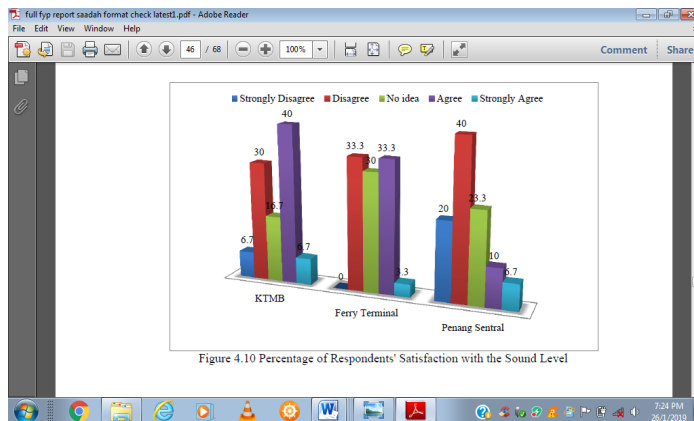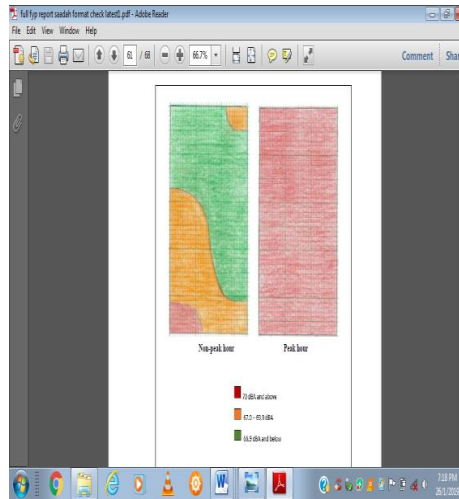
Figure 2: Percentage of Respondents' Satisfaction with the Sound Level

NOVELTY AND UNIQUENESS

SoQMeT has uniqueness because it is a tool to help in determining the noise level and directly determine the compliance of Malaysia Standard. It is provide an instant and easy tool to analyze the data from the scratch. SoQMeT produce different contour of noise zone so that it clearly shows the low and high noise level of the area. Based on the contour we will determine the critical loan and quick maintenance to have a hearing comfort for specified area. In the other hand, it can reduce be sustainable innovation which can reduce the usage of papers in order to obtain the data. This SoQMeT tools also can be applied for subject that related to building services where one of the sub-topic is to measure the sound system level of rooms in the building.

BENEFIT TO MANKIND

Continuously working under high noise level may bring health hazard in the long term.

Therefore, this system will help to assess noise level at working place as an indicator for the hearing comfort. SoQMeT is very useful to the place like factory and power plant which running 24 hours, academic block which teaching and learning during day and night and others. This is because they need to maintain a good sound quality received in daily life while working, teaching or even learning. Corrective action can be done to minimize the bigger problems in future such hearing loss or deaf.

POTENTIAL COMMERCIALIZATION

Based on physical appearance, SoQMeT is practically useful to the maintenance department which makes them easier to know whether the sound quality is poor or good. A part of that, SoQMeT can be used for other department, industries and also universities to monitor the illumination level at their work place and can be apply for building services subject.It helps them to take early corrective action to make sure the works can be continued and lead to the cost saving due to maintenance and sustainable development.

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STACKABLE PINEWOOD PALLET STORAGE KEEPER (SPPiKe)

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ABSTRACT

Modern and compact design furniture has gained popularity lately due to the small and limited living or office spaces found in metropolitan and sub-urban areas. The increasing population and high cost of living has made the consumers try to conserve their living space, thus choosing simple yet functional furniture. The rising trend on acceptance of wood-based furniture among the consumers has urged the researchers to produce an innovative multifunction stackable storage keeper from softwood species known as pinewood pallet (*Pinus spp).* Apart from the issue of material shortage, the use of recycled pinewood pallets supports the notion of environment-friendly furniture as well as in support of the government's effort towards sustainable development of the furniture industry. In extending the innovative idea, this study was conducted to further investigate consumers' market acceptance on the upgraded design and use of pinewood pallet in the production of a storage keeper. A total of 213 respondents completed the questionnaires randomly distributed online to the potential buyers who are also the residents of Bandar Jengka, Pahang Darul Makmur. IBM-SPSS version 24 software was used to analyse the survey data including the frequency and descriptive analysis. The results show that the proposed upgraded design and the use of the pinewood pallet have received very good responses from the respondents. On average, they also agreed that the multipurpose stackable storage keeper is suitable to be commercialised. It is hoped that the findings provide further understanding and better picture on the consumers' acceptance and preferences on wooden pallet furniture, thus providing the booster to encourage commercialisation of wood pallet furniture in the furniture industry.

INTRODUCTION

The increasing population and high cost of living in limited spaces have made those who have to deal with the issues to be more creative in making the areas more comfortable by saving or conserving the available spaces, thus choosing simple yet functional furniture to maximise the spaces (Kawiaka and Windham, 2003; Yi Xie, 2016). Previous research has also shown that among the most recurring issues of compact living or office spaces are storage areas (Fhilcar, Faunillan and Davidson, 2015) and in line with that, the supply and demand of modern and compact design furniture has off late seen an increase especially in the metropolitan as well as sub-urban areas. As mentioned by Velázquez-Blázquez, Silva-Quituisaca, Nieto-Martínez, Sáez-Gutiérrez, Cañavate & Parras-Burgos (2020), the conceptual design of a new line of modular and stackable furniture used indoors must follow ergonomic, functional, safety and easiness of assembly. Modern furniture still focuses on the basic function of furniture, but with the addition of multipurpose and adjustable furniture concept, which is one piece of furniture can serve two purposes at once, thus greatly increased the high demands and meet the needs of users.

The shortage of natural resources and its high price have been of concern in furniture making. Thus, the increasing awareness of the public to conserve the environment by choosing furniture made from non-conventional materials has urged the researchers to produce an innovative multifunction stackable storage keeper. Market trends have shown that wood-based furniture has been receiving more favourable acceptance among the consumers due to the increased improvement of people's living standard (Kaputa, Barcic, Mat'ova & Motic, 2018; Wu & Feng, 2019). However, the issue of material shortage has led to the reason of alternating the usual hardwood to softwood species known as pinewood pallet (*Pinus spp*). The light colour and natural defects of the pinewood are the reasons why it was chosen as they give aesthetic value to its appearance. Pallet is a wooden material used for handling, storing and stacking objects or goods and has rigid horizontal platforms and easily carried by machine (Buehlmann, Bumgardner and Fluharty, 2009). The recycled pinewood pallet was used as the alternative material as it costs less than the usual hardwood and the use of recycled materials is in line with the effort to conserve the environment. In tandem with Ratnasingam, Ark, Mohamed, Liat, Ramasamy and Senin (2017), this product innovation is more inclined towards cost reductions and in finding alternative raw materials rather than applying new processes or implementing a new design scheme. Meanwhile, the idea of using pallets is based on concepts such as recycling and self-construction (Ganea, 2019).

In support of the innovative idea, this study was conducted to further investigate consumers' market acceptance on the upgraded design and use of pinewood pallet *(Pinus spp)* in the production of a storage keeper which was made to complement confined spaces yet functional and attractive enough to be marketed to the mass. It is hoped that the findings of the survey would provide a better picture on the consumers' acceptance of wood pallet furniture as knowing the preferences of the consumers could benefit the production and business results of the related industry (Dušak, Jelačić, Barčić & Novakova, 2017). The findings could also assist the researchers for future research project that would benefit the wood furniture industry through the effort of promoting the use of recycled materials. The effort was taken in support of the government's effort for green environment as well as in promoting sustainable development of the wood furniture industry.

METHODOLOGY AND DATA ANALYSIS

Methodology (Manufacturing Process)

The issue of material shortage highlighted earlier has led the researchers to come up with an innovative idea of producing storage keeper from softwood species known as pinewood pallet (*Pinus spp)*. In the manufacturing process (Figure 1), the wooden pallets with different thicknesses were fed into the thickness gauge to obtain a good finish and similar thickness. Then the wood was cut into similar widths with a table saw. After cutting to the required size using the rip saw, all parts of the pinewood pallet were gathered with Polyvinyl acetate (PVAc) glue and clamped together and nailed using the nail gun. The hinges were installed for the doors and then, the keeper went to the completing procedure known as sanding procedure. The predominant motive of the sanding procedure is to get rid of mill marks, which has been the result of woodworking machines and to get rid of different flaws inclusive of dents and gouges that were induced all through handling. The sanding technique started with coarse sufficient grit sandpaper and once the sanding procedure was completed, timber clear gloss was sprayed. The finishing process was repeated three times to get a good final product. The spraying process must be conducted in open area and during daylight in order for the timber clear gloss to dry easily.
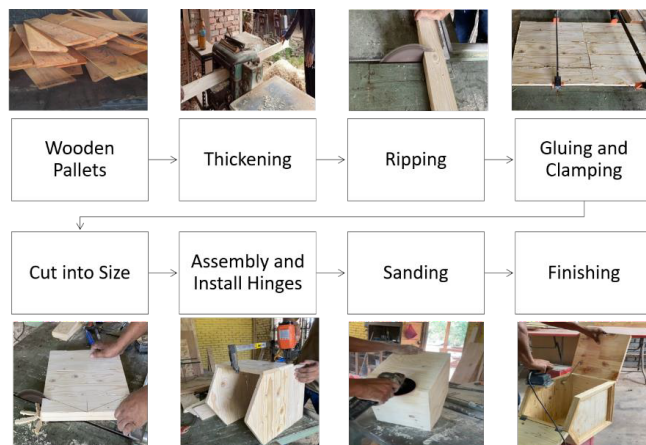
Figure 1. Manufacturing Process

In response to the comments received during the first introduction of the keeper to the market, the door of the keeper has been given a "facelift" by maintaining its natural colour and wood finishing was added as a frame to the door. A "see through" mini window has also been incorporated to enable easy observation of the insides of the keeper (Plate 1).

Plate 1. Old Version versus New Version

Data Analysis

Due to the restricted Movement Control Order of Covid19, the introduction of the stackable pinewood pallet storage keeper to the potential market in Bandar Jengka, Pahang Darul Makmur was only done through online sharing of its images. Selected respondents from various backgrounds were given a set of questionnaires to fill out via Google Form which was distributed primarily through the social media applications. The questionnaire was divided into six sections; Section A consists of Respondents' Background, Section B consists of Design (six items), Section C consists of Material (three items), Section D consists of Function (five items), Section E consists of Price (three items) and Section F consists of Commercialisation (three items). The questions of Section B, C, D, E and F are in a seven Likert-scale format ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). The completed questionnaires were tested for its reliability using Cronbach's Alpha at the minimum value of 0.7 (Awang, 2015). The results show that all the sections met a minimum value of requirement (Design = 0.944, Material = 0.869, Function = 0.891, Price = 0.914 and Commercialisation = 0.937).

A total of 213 potential buyers responded to the questionnaire and achieved the minimum requirement total number of respondents based on Hair, Anderson, Tatham and Black (2010). The data was analysed using the IBM-SPSS version 24 software including the frequency and descriptive analyses in order to achieve the objective of the survey that is to investigate the consumers' market acceptance on the upgraded design and use of pinewood pallet in the production of a storage keeper.

FINDINGS AND DISCUSSION

In total, 93 (43.7%) males and 120 (56.3%) females aged more than 18 years old were involved in the market survey of stackable pinewood pallet storage keeper (SPPiKe) product. The majority of them (106, 49.8%) have less than RM2,000 monthly income which suited to the recommended price range of SPPiKe. A total of 209 (98.1%) respondents owned wood furniture and 175 (82.2%) have wood storage keeper either in their home or office.

The upgraded design of the SPPiKe product had received a very good response (M = 5.73) including its recommended size and shape which directly led to space saving. The issues of limited space in home or office as highlighted by Kawiaka and Windham (2003), Fhilcar et al. (2015), and Yi Xie (2016) made the storage keeper as the recommended product. The average response from the potential buyers indicates that the upgraded design is more acceptable compared to the previous design. The result is supported by the most important factor of the upgraded design of SPPiKe which is material used (M = 5.84). The finding proves that the usage of pinewood pallet in the SPPiKe production is in very good recommendation and could

also reduce production cost as stated by Ratnasingam et al., (2017). The natural beauty of natural wood colour makes the product look more attractive. Besides that, the multipurpose concept of SPPiKe indicates that its function and suitability for home or office also has received very good responses (M = 5.81) which is in line with Velázquez-Blázquez et al. (2020). Their study found that the criteria to be considered to produce stackable furniture are ergonomic, functional, safety, and also easiness of assembly. This survey also shows that the product attracted the interest of the respondents very much as their opinion towards product commercialisation is in very good response (M = 5.64) and it is competitive enough to be marketed with other existing storage keepers. The recommended price range proposed by the researchers also received positive feedback among the respondents since it has been classified as affordable and the product as worth buying (M = 5.38).

CONCLUSION

In conclusion, the findings of the study have shown that stackable pinewood pallet storage keeper (SSPiKe) proved to be a good alternative solution to the issue of material shortage and problem of storage keeping for confined and limited living and office spaces faced by the majority of people today. It is hoped that the findings would provide further understanding and better picture on the consumers' demand and preferences of wood pallet furniture, in particular, the wooden storage keeper, thus providing the booster to encourage commercialisation of wood pallet furniture in the furniture industry. The researchers believed that upon commercialisation, the industry could maximise the use of the wood waste, thus help conserve the environment. It is hoped that the effort of promoting the use of recycled materials would further support the government's effort for green environment, thus creating sustainable development of the wood furniture industry in Malaysia.

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SUSTAINABLE HYBRID G-W FILTER

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ABSTRACT

Abundance of agricultural waste namely rice husk and non-biodegradable glass waste from food industry contributing to the landfilling problem. In addition, burning of the agricultural waste contributing to the air pollution problem. This study provide alternative to the reduction of the abundance of agricultural waste as a filter media in treating greywater namely ablution water. Recycling and treating the greywater solve problem related to water stress issue. This study involves the application of Hybrid Greywater Filter (HGF) in a pilot scale arclic square reactor consist of several layers of filter media; rice husk, sand, glass beads as alternative to crushed glass, and crusher run. The selected water quality parameters namely Turbidity and Chemical Oxygen Demand (COD) were tested in this study. The removal effectiveness for COD and Turbidity are 42% and 14%, respectively. Obtained result show that the Hybrid Greywater Filter is suitable for greywater treatment as it is reducing the selected parameter values. The treated greywater can be used for general usage such as toilet flushing and general cleaning. In addition, the proposed hybrid filter system is essential to be considered as a low-cost greywater treatment system where the usage is waste and low cost materials.

Keywords: Ablution Water, Hybrid Greywater Filter, Greywater Treatment, Adsorption, Filtration.

INTRODUCTION

Rising number of populations contribute to the increasing demand on clean water sources. Wastewater recycling has been practiced for many years to ensure the availability of the water sources. Greywater is known as the low strength wastewater which can be recycled and treated thus be an option to the clean water source. Light greywater namely ablution water

had been produced from the ablution ritual. Furthermore, it contains low pathogen and the production is very higher (Suratkon et al,2014). Instead of wasting by discharging into the drain or receiving environment, this greywater can be recycled and reused for general usage in mosque such as for toilet flushing and general floor cleaning. This low strength wastewater require simple treatment. A lot of research has been conducted to study on the greywater treatment method but some of the treatments is costly (Fountoulakis et al., 2016). Thus a related and low cost treatment is essential to be considered to reduce the cost and at the same time effective in treating the light greywater.

Increment and abundance of the agricultural waste namely rice husk and non-biodegradable glass waste from the food industry had raises some issues related to the environmental and waste management problem by the Authority. The increment of glass waste give burden to landfill as it cannot be degraded for many years. A lot of previous studies on rice husk and crushed glass application such as added materials in the civil engineering activity including construction. Rice husk ash has been used as a replacement of cement which improve the compressive strength up to 20% due to the presence of silica contains in the rice husk ash (Zareei, et al., 2017) and glass waste has been used as a concrete brick and the compressive strength was improves up to 20% (Warnphen, et al., 2019). According to De Souza Rodrigues, et al., (2010), rice husk ash contained amorphous silica about 20% which is good in adsorption. According to Warnphen, et al., (2019), the characteristic of the crushed glass can be achieved if it has greater surface area. This shows that agricultural waste namely rice husk and non-biodegradable glass waste has good potential to be used as a filter media in treating the light greywater. The objective of this study is to determine the effectiveness of hybrid filter arrangements in treating the grey water and in comparison with the Standard as listed by the DoE (Department of Environment) and MoH (Ministry of Health).

MATERIAL AND METHOD

This study involved field-based activity and laboratory-based activity. The details explanation for each of the works were conducted in the following section.

Sample Collection (Grey-water/ablution water, filter materials: rice husk, sand, glass beads and crusher run)

The sources of Greywater used in this study is ablution water. The ablution water was collected via grab sampling method from Pusat Islam, UiTM Cawangan Pulau Pinang, Malaysia. Raw rice husk was obtained from Kilang Beras Bernas, Sekinchan, Selangor. The glass beads, sand and crusher run were collected from the Heavy Structural Laboratory at UiTM Cawangan Pulau Pinang, Malaysia.

Experimental Design (Hybrid G-W Filter)

The preparation of Hybrid Greywater Filter involves adsorption and filtration mechanism where it was involves the arrangement of several filter media materials namely rice husk, sand, glass beads, and crusher run. The collected raw rice husk was treated by applying washing methods at a several times with boiled water to remove the impurities. Glass beads with size of 3mm diameter were used as an alternative to crushed glass and it was made from the recycled glass. Sand and crusher run were collected based on the effective size of 0.91mm

and 4.1mm. **Figure 1**. shows the proposed Hybrid Greywater Filter arrangements.
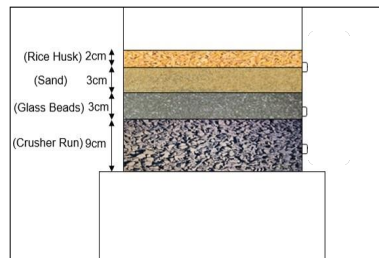
Figure 1. The hybrid greywater filter arrangements

Experimental Procedure

The research was carried out in the Environmental Laboratory at UiTM Cawangan Pulau Pinang, Malaysia. In this study, the 12 liters of greywater sample (ablution water) was flowed directly into the pilot scale Hybrid Greywater Filter system as shown in **Figure 1.** in the previous section. Rubber cork were installed at the bottom of the Hybrid Greywater Filter for sampling extraction purposes. **Figure 2.** shows the flowchart of the experimental procedure.
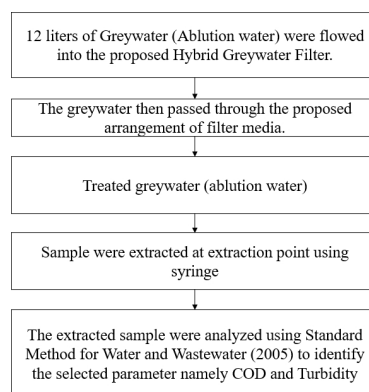
Figure 2. Flowchart of Experimental Procedure

RESULT AND DISCUSSION

Table 1. shows the obtained result in term of removal effectiveness of COD and Turbidity. The obtained results shows that the proposed Hybrid Greywater Filter is effective in removal of COD and Turbidity of greywater namely ablution water with 42% and 14%, respectively. This shows that the Hybrid Greywater Filter has potential in treating greywater for general

usage such as toilet flushing and general washing purpose.

Table 1. The removal fffectiveness of COD and Turbidity

Selected Water Quality Parameter	COD	Turbidity
Initial Value (mg/L)	24	6.41
Final Value (mg/L)	14	5.53
Percentage Removal (%)	42	14

CONCLUSION

In conclusion, the obtained results shows that the proposed Hybrid Greywater Filter is effective in the removal of COD mainly for light greywater. In a nutshell, the proposed greywater hybrid system considering the combination in between adsorption and filtration mechanism which make it one of the best option for treating low strength wastewater. Further study is recommended mainly in conducting test related to e-coli contents to be able for portable usage (reused for ablution).

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TAKAPHONE TAKAFUL

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ABSTRACT

The Malaysian Takaful industry has continued its upward trend in promoting and enabling more Malaysians to obtain new Takaful protection. Takaful is an alternative to conventional insurance because conventional insurance includes interest, uncertainty and gambling, all of which are prohibited in Islamic law. In order to enhance its position in the sector and grow its market share over the conventional insurance industry, Takaful has adopted a variety of product available to the general public. As the technology is rapidly changing, phone manufacturer companies become innovative to ensure competitiveness in the markets. Despite of increase of the new innovations, the survivability of smartphones such as armored phone casings and tempered glass, there isn't much that can be done in order to improve the human aspect. Therefore, Takaful plan focuses only on smartphones. Hence, this study aims to gain knowledge and awareness as well as propose new Takaful product related to protection of smartphones. This study has applied both qualitative and quantitative methods in which 40 questionnaires have been distributed to respondents via online survey to anyone who owns smartphones and prioritizes the Klang Valley area. As a result, the innovation of TakaPhone in order to protect smartphones is the best solution instead of warranty given by the vendor and manufacturer for smartphone users.

Keywords: TakaPhone, Knowledge, Acceptance, Awareness

INTRODUCTION

The whole world is currently struggling to deal with the Covid-19 virus. Covid-19 has affected many in terms of economic, social and health. People in the entire world now need to suit with pristine environment in which FinTech or digitalize are applicable to prevent the spread of Covid-19 virus. In Malaysia, total cases have tremendously increased that the Malaysian Government declared to establish MCO 3.0 to break the chain of Covid-19 infection among Malaysians. Among the strategies used by the Malaysian Government is to direct the introduction and implementation of every government or private sector to work from home. Besides that, this pandemic also affects the education system whereby many universities and schools must be closed and implement Online Distant Learning as another option to ensure that

the education system in Malaysia continues to run as usual. Prior to that, electronic gadget becomes an essential good and tool as medium for performing daily activities. According to statista.com, in Malaysia alone, the number of smartphone users is expected to reach 18.4 million in 2019. Smartphone use is one of the defining forces in technological progress as the globe becomes increasingly interconnected. The percentage of people in emerging markets who own and use a smartphone has steadily increased over the last few years. Smartphone adoption has been boosted in the Asia-Pacific region by the proliferation of low-cost mobile phones and lower cost service options. In 2017, the number of smartphone users in Asia-Pacific had exceeded half a billion, bringing the total number of smartphone users in the area to approximately 1.5 billion. In August 2015, ABN Impact conducted a survey to better understand the habits of smartphone consumers in the region and their views regarding smartphone damage. The results revealed that 75% of Malaysian smartphone users have damaged their devices nearly three times in the last five years. Minor scratches and scuffs to more major difficulties like screen cracking and water damage can all be caused by the impairment. Malaysia, out of the four nations surveyed (Singapore, Taiwan and Hong Kong) has the greatest number of damaged phones in the market with a total market of 10 million smartphone users and a penetration rate of 140 percent.

PROBLEM STATEMENT

There are some issues related to smartphone users as mentioned by Kumar and Hiranandani (2015). They found that some customers seem to have negative stereotype on the service quality provided by the dealers or phone companies when their product failed during the warranty period in terms of time consumption and the originality of replacement part. Besides that, the cost to repair a modern smartphone is frequently close to the price of purchasing new device. (Nature of Complaint, 2019)

OBJECTIVE

The objective of this product is to create awareness among smartphone users in protecting their smartphones and secure them with financial protection on the cost of repair.

LITERATURE REVIEW

Legally, Takaful is defined as "an arrangement based on mutual assistance under which Takaful participants agree to contribute to a common fund providing for mutual financial benefits payable to the Takaful participants or their beneficiaries on the occurrence of pre-agreed events" (BNM, 2013).

Manufacturer's warranty, extended warranty and phone insurance

- A manufacturer's warranty is a promise to repair or replace smartphones within specific timeframe. The dealer or seller typically covers electrical and mechanical failure. If the phone doesn't work like it should, a warranty will be covering it.
- An extended warranty gives the client same amount of coverage plus some extra times but for a longer period of time.
- Insurance is different in which it offers much more comprehensive coverage including

physical and liquid damage and you are covered if your phone is lost or stolen.

METHODOLOGY

This study is conducted using both qualitative and quantitative methods based on a theory test, measured by numbers and analyzed using statistical technique and it highlighted the main objectives. The result of design will be illustrated by frequency and percentages in the descriptive manner. Primary data collections are used to gain the data in this study by handing out 50 questionnaires to the potential respondents.

RESULT AND DISCUSSION

Table 1: Observation of respondents related to Takaful for smartphone

	Yes	No
Knowledge Do you know about Takaful?	100%	0%
Awareness Do you know that Takaful protection for Smartphone comply with Shari'ah?	92%	8%
Acceptance Do you think this particular Takaful product will interest you?	90%	10%

Based on the respondents' knowledge, it shows that majority of the respondents have basic general knowledge of Takaful. Looking further into respondents' awareness, it indicates that majority of respondents are aware that Takaful protection for smartphones complies with Shari'ah, while result on product acceptance shows that respondents may be interested to participate in TakaPhone Takaful product.

Features of the Product

This product is offered to individuals who own technological device, in order to secure the safety of their device. As per discussion of product, we offer three plans under this product which completely will protect any individual from all kinds of mishaps (e.g. damage and theft). Monthly payments depend on what plan to subscribe, allowing customers to replace the device for far less than the retail price. Most of the cases will be depending on the device retail value. To describe more we separated this product into three parts, which are plan A, B and C. Each plan will cover accidental damage, attended theft and mechanical and electronic malfunction. The differences between all those plans are the sum of coverage and benefits which totally reflect on the retail price of their devices. Our product is fully Shari'ah compliant as it applies the concept of *tabarru', wakalah, ju'alah* and *qard*. This product can be subscribed for a person above 17 years old who will be known as certificate holder, and this certificate will eventually end when their devices reach their limitation of lifespan which is 5 years.

TAKAPHONE TAKAFUL

Novelty and originality

This product's novelty and originality is where it offers protection to all kinds of devices. The Takaful structure for this Takaful plan are differed where there is a cash back for every participant whom never made any claim within the period of the certificate in the Wakalah model.

Usefulness and application to specific field

This product is mainly offered to any individuals who know the value of their devices protection. The usefulness and application of this Takaful product thoroughly focus in providing protection of devices from accidental damage, attended theft and mechanical and electronic malfunction for a better usage and experience in technology utilization.

Commercialization value

The commercial value of this product is to determine by how much an industry and clients are prepared to pay for a product that meets a demand and allows organisations to create more income, boost efficiency, and lower expenses.

CONCLUSION

The protection of device plays an important role in current daily activities since the advancement of technology. For an individual who is concerned of being exposed by this problem might consider subscribing to this product. This kind of protection will help contributor to secure the protection of their gadget thus helping others who might happen to stumble upon this issue regardless how persistent a contributor can be in taking care of their own gadget. The existence of this product will help the community ease the burden of the expensive compartment of devices or losses.

ACKNOWLEDGEMENTS

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STAY@RURAL APPLICATION

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ABSTRACT

Rural tourism has grown quite significantly in Malaysia and the advent of COVID-19 pandemic has fueled more demand for domestic travel to rural areas. However, travelers usually face difficulty in finding and booking their accommodation in rural areas as there are very few websites or applications that promote accommodation especially at local rural areas. Therefore, our group presents *Stay@Rural* application (an app), to ease travelers' problems when searching and booking their place to stay in rural areas. Besides giving out information about accommodations in rural area, *Stay@Rural* also provides other information such as places of interest, and activities. The important feature is travelers can make their booking via this app. In addition, users can locate their accommodation easily and that they can rate the accommodation they used. As for the accommodation provider, they will also benefit where they can use this app to promote and sell their rooms and tourism activities. Basically, there are two parties involved in this app – the travelers and the owner of the accommodation. Another important feature of this app is that it promotes security where both travelers and accommodation owners will have to register their personal details in the app, thus ensuring peace of mind to both parties. Overall, this app will provide opportunity to all accommodation providers in rural areas in Malaysia to promote their services thus making more rural communities share the benefits of tourism. Finally, *Stay@Rural* app can potentially be expanded to other Asian countries, or other countries in the world.

Keywords: Technology, mobile application, rural area, accommodations

PRODUCT DESCRIPTION

Stay@Rural is a mobile app that can be used by visitors to find and secure their accommodation and other tourism activities in rural destinations in Malaysia. *Stay@Rural* app that is compatible with all mobile devices and their operating systems. This application also provides information about the accommodation (e.g., type of room, room price, room photos, etc.), the accommodation facilities and services, tourism activities for visitors, navigation and maps, payment information and more importantly, feedback from customers. These features are very important for visitors know and evaluate when choosing which accommodation to opt for their vacation at rural destinations. Like any other apps, users will also be given points for every purchase they made, and these points can be used to pay for their future purchase of rooms or tourism activities. This app also allows users to rate and give feedback of the services they experienced. This will be good for other visitors as they can view the comments by previous customers about the services of a particular service provider. On the other hand, this app will be used by accommodation providers to register their rooms and tourism activities. This will be an important platform for accommodation providers to promote and sell their rooms and other tourism activities.

PICTURES/ SCHEMATIC DIAGRAMS/ FLOW CHART
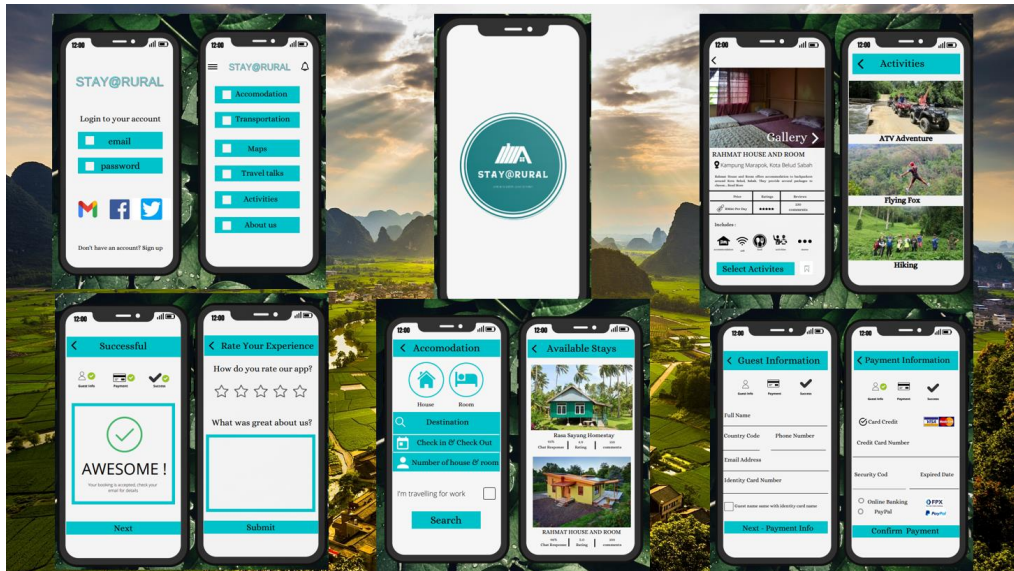
Figure 1. Stay@Rural Application

NOVELTY AND UNIQUENESS

Stay@Rural app is considered a credible service which both parties – the visitors and the accommodation owners will have to register their personal details in the app. This procedure is important and provide a sense of security and trust for both customers and the service providers. In addition, accommodation providers must be certified before they can start providing their services and this is very important to ensure that the service is safe and comply

to the general rules and regulations concerning accommodation provision in Malaysia. Since this app is free, accommodation providers can reduce their marketing budget and yet it can reach out to many potential visitors. As the app can be shared easily via all social media platforms, so visitor prefer can plan and purchase their travels via online. It is an easy platform compared to tourism service providers.

BENEFIT OF MANKIND

Stay@Rural app enables rural community to participate in the lucrative tourism industry. It gives them the opportunity to earn additional income. Since tourism is about visiting destinations (e.g., rural areas), rural communities will certainly ensure that their culture and natural resources are protected and conserved, not only for their visitors, but for their future generations. Once, tourism has established in rural areas, other type of businesses and services will soon flourish and support the tourism industry in the rural areas. Basic facilities and utilities will also be made available for the local community. Later, the image of rural destinations will surely thrive in line with the development of tourism. As for the visitors or users of the *Stay@Rural* app, they will be motivated to visit other rural destinations and to gain more knowledge of their local rural destinations.

POTENTIAL COMMERCIALIZATION

Stay@Rural app is one of the first travel mobile app specifically promoting accommodation and tourism activities in rural destinations in Malaysia. We strongly believe that many would be visitors, accommodation providers and those engaged in providing tourism activities in rural areas will use this easy-to-use service. *Stay@Rural* app can be extended to other destinations such as sub-urban areas or even in urban areas. It can also be extended regionally or even globally. In addition, local tourism destination management (e.g., Tourism Malaysia, Sabah Tourism Board, Sarawak Tourism Board, etc.) and local tourist providers can use this app to promote their rural tourism destinations.

ACKNOWLEDGMENT

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SAJADAH PILLOW

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ABSTRACT

This product is called Sajadah Pillow. It is a multi-functional Muslim praying mat that serves as a praying mat as well as a pillow. Pandemic or not, Muslims are obligated to fulfil their five times daily prayers whenever and wherever they are. With the current situation, what was normally provided in the public Muslim prayer room or at the mosque are no longer provided. The product design concept is developed to serve as a convenient yet hygienic carry-on praying mat that could also be used as a pillow for short naps. Physically, the Sajadah Pillow is lightweight and flexible. Storing the product will not post a problem as it can be folded flat into 36cm x 30cm and secure with a buckle. The ultimate design is genuinely clever and utterly convenient even to those using backpacks. Careful consideration was taken in selecting the type of fabric for this product. The nylon fabric will be used for the mat and PVC flocking material for the pillow. These fabrics are lightweight, washable, flexible, and durable and come in various colours and textures. When it is time to use the Sajadah Pillow as a praying mat, all it takes is to release it from the bag, stretch, and flatten it on the floor. To use it as a pillow, transform it by folding the Sajadah into its' bag, fasten it with the zip and blow air through the pin on the corner side of the bag to inflate it. A pillow cover with ripstop nylon is provided to protect the pillow and the Sajadah from dirt, spill, water, and others. In conclusion, the main purpose behind this creative idea is to propose a multi-functional product and useful, especially to accommodate demand from more than one billion Muslim travellers.

Keywords: Sajadah, Pillow, multi-functional, folded, hygiene.

PRODUCT EXPLANATION

The Sajadah Pillow is the innovation of Sajadah (Praying Mat) and a pillow where the user can bring together 2 in 1 thing when travelling. The idea to innovate this device came after realizing the problem that Muslim travellers faced in complying with the Standard of Procedure (SOP) for COVD-19 pandemic prevention, mosques today do not provide the praying mat anymore. Therefore, the user has to bring their own when joining the congregation.

In the making of Sajadah Pillow, we carefully choose the material with consideration to cost-saving, space-saving, and care, which make the product convenient and easy for users. The Sajadah pillow has three parts as specified design, which includes the praying mat, the pillow, and the cover. For the praying mat, the material that we use is nylon fabric. Nylon fabric is an excellent abrasion and wears resistance because it has a high tensile and compressive strength fabric, and it is known for its low coefficient of friction, which means it lasts longer and makes it worth buying. Furthermore, it is also a lightweight material which makes it easier to clean and wash. As for the pillow, the material that we choose is the PVC flocking fabric. The purpose of using this type of fabric is because the flocking fabric can make the enlightened hard object feel soft to the touch. Lastly, for the pillow cover, ripstop nylon fabric is used to protect the bag against dirt and debris and maintain hygiene and cleanliness. We use these materials not just because of their durability and cost-saving but also water-resistant, waterproof, and easy maintenance. Since the product is a carry-on item that will be frequently exposed to the external environment, the right selections of fabric materials are essential. Besides that, these materials are available in various colors and textures, which make them versatile and fun to work with. Other than that, we are also adding a pin to function as an air pit at the corner of the Sajadah Pillow to inflate it and deflate it after use. Last but not least, some details are added into the design to secure the Sajadah Pillow when it is folded into a pillow. A velcro tape and a plastic buckle are included to ensure a smooth transition between the Sajadah and the Pillow.

PRODUCT UNIQUENESS, BENEFITS AND TARGET MARKET
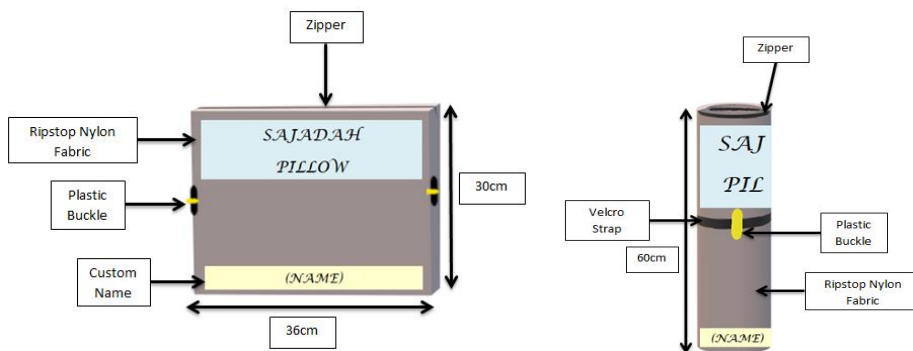
Figure 1: Sajadah Pillow Bag

The uniqueness of this product lies in the design of the product and its carry-on concept, plus flexibility. The user can roll the sajadah pillow to make it smaller in size. Figure 1 shows the 3D illustration of the Sajadah Pillow bag that is covered with ripstop nylon. The extra accessories such

as name customs make user easier to identify their sajadah pillows. Besides, the product looks trendy for both genders, male and female without any limitation of age. This is the first Sajadah that can transform into a pillow for travelling. Other sajadah designs on the market focus on the size and lightweight material. Hence this product is truly one of a kind.
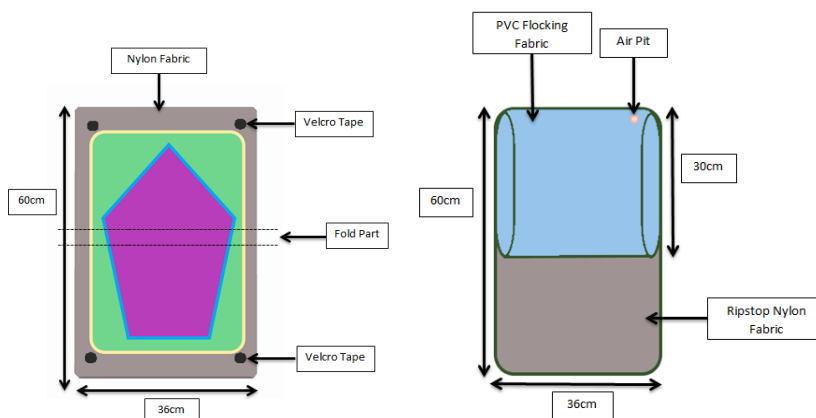
Figure 2: Sajadah Pillow before fold

The benefits of this product are a convenience. The user can save their money by purchasing this product because they will receive two things at one price. Figure 2 shows the illustration of the sajadah pillow before the fold. From the left side, it represents sajadah, and the right side is the pillow before fold and blow. Moreover, this product indirectly delivers a message regarding solah and the requirement of five times a day is absolute. On the other hand, it also calls to realize that the need to rest comfortably to maintain good health and vitality is vital. No other product can deliver the need of a Muslim traveller as such,the Sajadah Pillow has the capacity to do so.
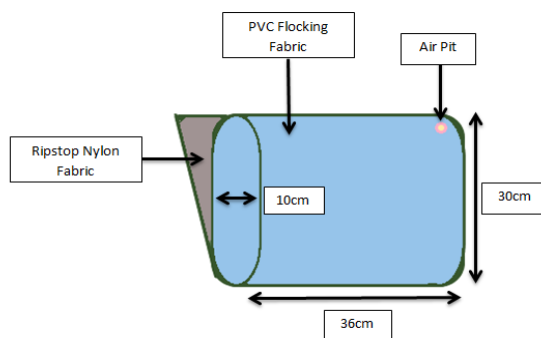
Figure 3: The Pillow From Side View

The target market of this product is for any kind of traveller without limitation to gender, age, and it's for all types of Muslim traveller. The new target market is frontliners and hospital patients. More frontliners have to work for a long period of hours. Therefore, this product helps them

because they will not be able to bring with them the sajadah. Thus, the Sajadah Pillow might be the answer, they can use the pillow for their naps anywhere. Even the doctor can use it while taking a nap on the chair because it is only 36cm x 30cm when it is folded. Hospital patients could also benefit from this product since the item is stored with a cover for hygiene purposes. Besides that, users can be among Muslims attending Friday congregation, travellers on road-trip, school children at school, university students and lecturers.

ACKNOWLEDGMENTS

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PEPPER CASENITIZER

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ABSTRACT

Crimes in Malaysia are always a serious subject matter. Crime in our society such as sexual assault is known worldwide hence it increases the level of fear. Therefore, Pepper Casenitizer is a one-step solution or prevention product in ensuring the safety of users from being a victim of assaults and protection from germs. The objectives of creating this product are to protect your phone from scratch, to act as a protection from any threats, and to ensure users have their carry-on hygienic equipment. The idea of this product is an innovation combining 3 items, which are the pepper spray that acts as the defense mechanism, hand sanitizer that acts as the hygiene purpose, and a phone casing that acts as the phone holder. The speciality of this product is it can be customizable to suit the user's personality and has refillable pepper spray and hand sanitizer. This phone case is convenient as it is attached to the phone case, and the users do not need to worry about bringing it anywhere as the product is 3in1. The users can pull out the phone case to use it as protection when they are facing danger. It is also convenient to have this phone case as it has hand sanitizer to keep your hands clean. The target market is for any gender as every individual needs to be aware of safety and hygiene on a daily basis. The users need to insert both pepper spray and hand sanitizer inside in the spray compartment. The mist has to be activated by pressing the activator button to release the mist. With all three elements combined, this product can provide good protection from dangers and germs.

Keywords: 3 in1 phone case, pepper spray, hand sanitizer, safety, hygiene

ISSUE

The issue of sexual harassment has been broadly highlighted among Malaysians. Sexual harassment can happen anywhere and anytime in the workplaces, campuses and public places (The Asean Post, 2019). Both gender, men and women can be the victim of being assaulted in Malaysia, however, women encounter being assaulted more than men. According to the Royal Malaysian Police (PDRM), from the year 2013 to 2017, there were 1,218 has been reported on sexual harassment cases, 79% that were involved as victims were women and 21% were male victims. Chief ACP R. Munusamy (2018) stated that it is not illegal to carry pepper spray as it is used for personal safety. Therefore, the use of pepper spray can help a victim who is being attacked.

Furthermore, the global pandemic of Covid - 19 has hit the world and the use of hand sanitizer has become a new norm (Dastider et al., 2020). Hand hygiene is essential because hands get easily contaminated directly by coughs, sneezes and touches. According to the World Health Organization (WHO), hand sanitizer could kill 99.9% of germs, bacteria and viruses. Therefore, billions of people worldwide use them daily to keep their hands clean and safe (Dastider et al., 2020). This hand sanitizer contains alcohol that could kill the germs on the skin. Therefore, the use of hand sanitizer could help an individual to prevent getting affected by any illness.

Both issues are in the midst of widespread discussion by the public. Therefore, the team takes the business opportunity when developing suitable 3in1 product used daily which is a phone case with pepper spray and hand sanitizer called Pepper Casenitizer.

ABOUT PEPPER CASENITIZER

Pepper Casenitizer is a prevention phone case that could ensure the safety of users from being a victim of assaults and protection from germs. The team chose to put it on a phone case because individuals would grab their phones first when an emergency situation happens. In addition, individuals do not have to bring pepper spray and hand sanitizer separately with them, as this phone case comes with those two items.

OBJECTIVES

The main objective is to protect the phone from any damages and scratches. The phone casing that acts as the base of the product. Our phone contains valuable items, information, and data that can be stored for a long time. To avoid negligence of phone damage, the case is essential for every mobile phone. Despite its functional purposes, it can also increase the aesthetic appeal of the phone case. Next, the key ingredient of the pepper spray is capsicum oil which has an impressive rating on the Sconville Heat Units (SHU) scale. It is an instant way to protect consumers from danger as once it is exposed to danger, the danger will lose temporary eyesight and consciousness. Therefore, it gives some time for consumers to further away from the danger. It provides a powerful substance type of protection from danger. Lastly, this 3-in-1 product is convenient and on-the-go to take anywhere, making it an accessible hygiene equipment. The hand sanitizer cleans and reduces the spreading of germs. Since the pandemic Covid-19, it has stirred uncomfortable norm and this product can be a practical way to reach hygiene equipment quickly.

NOVELTY

Crime like sexual assault is a concerning issue that happens around the world which made one's need to seek a solution as prevention. Next, due to the current pandemic, hygiene practices have become significant. Hence, the idea of the product is to combine three items into one product. The pepper spray is a necessity for protection that acts as a defense mechanism to decrease the number of crime issues. The hand sanitizer acts as a germs killing liquid for hygiene purposes where people can easily use it anytime and anywhere. Lastly, the phone case acts as a phone holder where the consumer can simply bring it everywhere. With this product, consumers do not have to worry if they forget to bring one of the items.

SPECIAL CRITERIA

Pepper Casenitizer has a variety of designs in terms of colors and patterns. The customer also can customize their phone case depending on what design they want. The customer can send their desired design to the Pepper Casenitizer team. Even though the customer can send their own design, the team also provides sleek, unique and trendy designs for the future customer. The team decided Pepper Casenitizer can be customized so that it can attract more customers regardless of age and gender. This customizable casing can unleash one consumer's creativity to create their aesthetic design on the casing. Other than that, Pepper Casenitizer also comes with a refillable spray compartment for the customer to refill. The button for hand sanitizer and pepper spray has a responsive button to activate the mist. This phone case can be used multiple times as long as the customer refills the hand sanitizer and pepper spray.
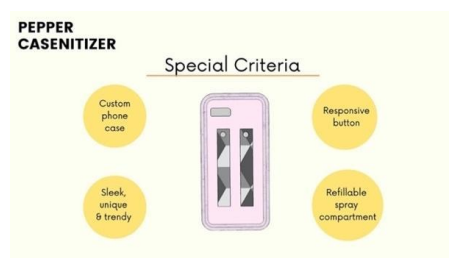
Figure 1. Pepper Casenitizer's Special Criteria

IMPACT & USEFULNESS

This phone case can bring benefits to the economy. It helps phone case entrepreneurs see opportunities to gain more incomes during Covid - 19. In Malaysia, phone case designers have business opportunities to create colors and trendy phone cases. These trendy designs can attract future customers. Companies such as CasesbyWF, CaseLook and Casebook have launched and come out with unique, stylish and extra protection to the phone. This can help phone case entrepreneurs to create job opportunities for designers who can design phone case.

In addition, the usefulness of this phone case is that it is built to be convenient because it is a 3in1 product that comes with pepper spray and hand sanitizer. The pepper spray feature could save an individual's life and it has been proven that it saves thousands of women's lives from

being attacked or assaulted by random strangers – male or female. Moreover, it is practically useful when pepper spray is attached to a phone case. People always carry their phone with them and when any circumstances occur. The users can take immediate action as they grab the phone first. It is a common sense that most people would not put their phones in the bag and instead would carry their phones. The faster the action is taken, the higher chance to save a life.

Other than that, hand sanitizer that is attached with a phone case is convenient. Some people find it hard to use their hand sanitizer and end up using the one provided to the public. Individuals can avoid using the public hand sanitizer when they carry it on their own which is attached to their phone's phone case. Some of the hand sanitizers provided to the public does not follow the required amount of alcohol to be put in the hand sanitizer. An alcohol-based hand sanitizer should contain between 60% to 95% of ethyl alcohol or isopropyl alcohol to effectively kill any germs (Dastider et al., 2020). Carrying own hand sanitizer could avoid getting affected by the virus.

PEPPER CASENITIZER FEATURES

The Pepper Casenitizer has three prominent features of a 3in1 phone case which are phone case, pepper spray and hand sanitizer. The features can be referred to Table 1.
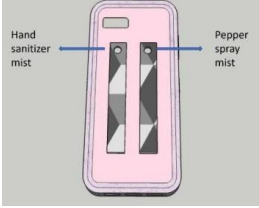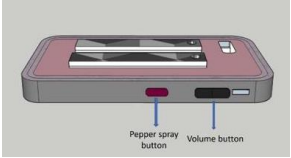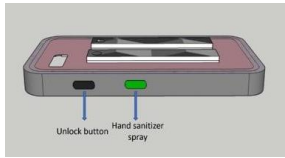
Table 1. Features of Pepper Casenitizer

Feature	Description
Phone Case	Protective and durable phone case is to protect the smartphone from damages such as phone fall when escaping from attackers and phone slip when using hand sanitizer.
Pepper Spray	Pepper spray contains OC (oleoresin capsicum) spray which is legal in Malaysia for self-defense purposes (Chief ACP R. Munusamy, 2018). It can spray up to 3 meters and it is 15 ml of liquid.
Hand Sanitizer	Hand sanitizer contains 60% Isopropyl Alcohol, Aloe Barbadensis Leaf Juice and essential oil and it is 15 ml of liquid.

PROCESS OF USING PEPPER CASENITIZER

Our product aims to protect people from any dangers or threats that may cause trauma to them and as an accessible hygiene equipment. In Table 2, the team has explained in detail the process of using Pepper Casenitizer.

Table 2. Process of Using Pepper Casenitizer

Figure 2. Phone Case	1. Insert the liquid inside by pressing the spray compartment. 2. On the right: pepper spray 3. On the left: hand sanitizer
Figure 3. Pepper Spray Button	1. Press the activator button on the right to release pepper spray mist. 2. Spray to the attacker when being assaulted or attacked.
Figure 4. Pepper Spray Button	1. Press the activator button on the left to release hand sanitizer mist. 2. Rub on hands until dry.

PRODUCT COMMERCIALIZATION

As stated by Kostsyk (2012), the marketing aspects are one of the influential factors to commercialize a product. The target market for this product can be focused on the demography of the target market. The targeted consumers' age range for this product are Gen-Z that starts with the aged 13 to 21, Millennials (aged 22 to 37), and Gen-X (aged 38 to 53). It is suitable for both female and male consumers, as danger can be exposed to both genders. The selected target market is fitting as based on a statistical analysis by Heromyth in 2020, 98% of Gen-Z and 92% of Gen-X grant at least one mobile phone.

Suggested platform to commercialize Pepper Casenitizer is by social media. Due to the limitation of Covid-19 restriction, social media such as YouTube, Facebook, Instagram, Twitter, TikTok are the easiest way to commercialize the product because every person with a smartphone will have at least one social media platform. On these social media as well, there are website traffic tools which can be recognised as 'featured', 'suggested', 'sponsored' features for businesses to market their products and services. According to Pew Research Center (2018), the usage of social media supports Pepper Casenitizer's product commercialization because majority of the online community uses their preferred social media at least once in a day. In February 2021, a survey conducted by Pew Research Center authors, Auxier B and Anderson M, reported that 7 out of 10 Facebook users will visit Facebook several times a day. While 73% of Gen-Z and Millennials visit Instagram on a daily basis. Therefore, possible customers can view Pepper Casenitizer on social media and discover more of this product.

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MY_WATCH - CHANGING THE WAY WE USE WATCHES

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ABSTRACT

The demand for QR codes in this digital era has increased as we need to scan for QR codes everywhere we go. Due to Covid-19 pandemic, the usage of QR code is to comply with the current Standard Operating Procedure required by the Ministry of Health in Malaysia. Hence, My_Watch aims to foster convenience for everyone by enabling QR Codes to be scanned by using only our smartwatch and eliminate the hassle of using your phones and decrease the chances of contaminating it. This product is designed to encourage the contactless method, especially where it is mostly the new norm of our current lifestyle, and it also efficiently saves time especially speeding up the queuing line and process of checking in at entry points of a place. Not to forget that technology is constantly evolving, and we should strive to stay updated. We can keep up with the current technology by integrating the use of My_Watch into our daily life. The current smartwatch available on the market still features limited perks and does not allow scanning of QR Codes whereas My_Watch highlights its added camera and other smart features to enable face recognition, voice recognition, QR Code Scanner, and simplify the use of e-wallet all the while to be more sustainable by using a solar-powered battery. This improved smartwatch changes our daily regimen for the better as it can simplify our life and add convenience to the whole community. Time spent on trivial matters also decreases and furthermore it can assist us in coping with the new norms and catching up with the latest technology advancement. Everyone utilizes a watch therefore it will be easier to integrate the use of this product into our daily life.

Keywords: Smartwatch, Code Scanner, E-Wallet, Lifestyle, Solar

INTRODUCTION

Over the past years, numerous smartwatches vendors have entered the market with large ranges of appliances and gadgets that differs in the design qualities they offer. According to Choi, J (2016), with a new type of Information Technology device, smartwatch has becoming more popular for their wide dissemination of wearable devices. After several eras of technological development, the smartwatch has become a viable gadget that broaden the functions of smartphones to a more intimate level (Rawassizadeh, Price, & Petre, 2014). Mostly, smartwatches have been focused on how they can be utilized for various reasons such as fitness tracking, healthcare, biometric sensors and many more (Chan, Estève, Fourniols, Escriba, & Campo, 2012; Lymberis, 2003). According to Cecchinato, Cox, & Bird, (2015), this wearable device has been extensively accepted as the next big thing that will have major impact on our daily lives and routines.

PRODUCT DESCRIPTION

My Watch is designed to ease the new norms during this Covid-19 outbreak. This watch operates with Wear OS by Google which is available for both Android and iOS users. This innovative watch is at an average size of adult wrist, 1.78 inch with E-Ink Display that consumes less power. This touchscreen watch has the hard-to-break layer of security, implemented via face and voice recognition capabilities. For sound detection, this watch has a loudspeaker and microphone to detect voices and vibration to alert notifications. The Off-body IR sensor base helps to save power, and the PPG Heart Rate sensor helps to monitor the user's current body state. The lithium-ion battery is paired with a solar panel component to extend the battery's life.

With sporty design, the watch is suitable for both male and female adults. It comes in different colors that easily match with any outfits. My_Watch innovation is water-resistant up to 50 meters which withstand splashes, showers, and swimming. The strap is made from *Piñatex* whereby the base material is biodegradable (made from 80% pineapple leaf fiber, 20% PLA). There are two lengths of straps, which are 40MM and 44MM long. Other essential of the watch also comprises the health variable readings that include heart rate monitoring, sleep cycle monitoring, stress level monitoring, and body energy monitoring (Refer **Figure 1 and 2**).

Figure 1. The Features of My_Watch

Figure 2. The Strap Colors Choices of My_Watch

NOVELTY AND UNIQUENESS

Considering the current Covid-19 pandemic, all premises demand us to scan the app called *MySejahtera* via our smartphones with the goal of quick self-identification before entering any premises. Now you could just use My_Watch to scan without having to take out your smartphone (Refer **Figure 3**). With this smartwatch, it offers plenty health benefits as it can monitor the changes of the user's feeling, mental health and stress level. The watch can notify the user whether he/she is *very calm* or *very stressed*. Both of their reflections and Stress Management Scores will be able to provide them a holistic picture of how well they are handling stress. It also monitors your vital signs 24/7 and you can sync all your data with your phone using Bluetooth. In addition, My_Watch also features built-in GPS location detector to detect the user's location in real-time using the company's mobile app on smartphone or through the web platform on personal computer.

Figure 3. Scanning *MySejahtera* using My_Watch

This innovative watch also allows contactless payment which makes paying fast and convenient. Users will spend less time waiting at the register by just scanning the smartwatch. Contactless payment is also more secure as the smartwatch contains NFC technology and has layers of security, using encrypted data to transmit a unique transaction number. Since users would not need to swipe, they can avoid fraudsters who collect data from gas station pumps, ATMs, and other public terminals. By continuously wearing My_Watch, users would benefit from the available functionalities, many of which are only possible because of the physical proximity and even skin contact.

These features have been built into this device in order to make users' daily activities better and easier. **Table 1** shows the functions of My_Watch and its technical specification.

<p align="center">Table 1. The Functions of Technical Specification Built in My_Watch</p>

QR Code	To scan *MySejahtera*/*Selangkah*
NFC	To pay using e-wallet instantly and securely
MIFARE Chip	To pay highways, public transports, selected parking, retail shops and theme parks
GPS	To receive call and reply text
Bluetooth	To connect with smartphone
My_Watch apps	To sync details via smartphone

BENEFITS TO MANKIND

Here are the advantages of having a computer on your wrist. First, it makes things convenient; people would be able to do most of the things you do on a smartphone without having to pull out your phone to do them. Another essential function, My_Watch shows notifications so users can have quick access. After reading the notification, you can decide whether to take further action or just ignore it. It is very convenient, especially if you are in a meeting or doing something really important.

Next, the function of My_Watch is the voice support that enables you to communicate with someone miles away just from your wrist even if your phone is not nearby. Thirdly, it has the quality of being discreet. There are some places where phones are inappropriate and My_Watch makes it easier to check messages on the fly. My_Watch helps to reduce your screen time and be more present. It helps you stay connected and up to date, even allowing you to respond to messages. As a result, you can put down your phone and enjoy the world more around you.

PRODUCT COMMERCIALIZATION

My_Watch is not a regular smartwatch; it fulfils the needs to obey the new norms during this

cautious season of Covid-19 pandemic. It supports the contactless measure to avoid spreading germs and viruses, as well contaminating the smartphones when going outside. This smartwatch offers reasonable price with the new added features, and it is designed to fit with most adults' wrist size. The highly secured feature in this is vital to sync the e-wallet and avoid fraudulent purchases. It is recommended to use My_Watch at crowded places like grocery shops and LRT. This can minimize the time around many people as this pandemic is still happening.

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MYECO APPLICATION

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ABSTRACT

Global waste production is projected to increase 70% by 2050 (World Bank, 2018). The international waste issues have worsened exponentially due to various factors such as rapid population and aggressive development. Department of Statistics Malaysia (2019) stated that more than 23 000 tonnes of trash are produced each day in Malaysia alone. The amount of waste keeps on towering as the population and development keep on increasing. In 2019, the recycling rate is only 28.1% despite having a high amount of trash. Moreover, there are various diseases such as typhoid, malaria, and gastroenteritis caused by overflowing waste. Hence, the idea of the MyEco app may solve this detrimental problem. MyEco is an innovative recycling company aiming to make recycling accessible for people with only a click away. The main objective is to promote environmental awareness by encouraging the local community to apply 6R practices: Refuse, Reduce, Reuse, Recycle, Revive, and Responsible (UiTM Green Centre, 2021). This App will be the first 6R awareness application introduced in Malaysia to assist local communities in picking up their reusable items. This 6R awareness App will help locals be active mobile application users to support environmental awareness initiatives and practising a '0' waste lifestyle. Using this application, it will be more convenient because MyEco provides the pick-up service and collects the reusable items at the customer's place instead of sending them to the recycling site by themselves. This application will encourage many people to recycle daily and indirectly to reduce overflowing solid waste. The 6R concept and waste minimisation will also educate youth to be more responsible whilst cultivating a caring attitude to protect the environment. The application is available for both iOS and Android users.

Keywords: eco-friendly, recycle, education, awareness, delivery

INTRODUCTION

MyEco application is based in Kota Kinabalu, Sabah, Malaysia, and it operates as a plastic trash collector and recycled plastic pellet factory. MyEco application is working hard to achieve a pollution-free global policy by converting waste plastic into reusable plastic products. This awareness App aims to be a waste strategy supplier for local and overseas companies by consistently providing efficient services in the recycling plastic sectors. This App is a recycling application that specialises in plastic bags, plastic bottles, and other recyclable garbage. Moreover, it is an innovative recycling company aiming to make recycling accessible for people with only a click away. MyEco application goes along with the Go Green concept to save the earth from pollution and trashes. This application can benefit people by making it easier to send their reusable items to the recycling site. In using this application, people need to pin their location, and the staff will pick up the reusable items in the area.

OBJECTIVE

The objectives of the MyEco application is to minimise excessive levels of plastic pollution and reduce the demand for producing a new plastic item. This method conserves resources and keeps plastic out of landfills and unanticipated locations. Apart from that, MyEco hopes to be known in Malaysia as the most efficient and ecologically responsible waste management business, with regulated, cost-effective, and end-of-life plastics. Many potential customers are known as recycling target audiences for the MyEco application, including homeowners, apartment dwellers, and households. This App also provides exceptional and highest customer services, creates customer loyalty, and provides the best possible quality delivery services available.

NOVELTY

MyEco is a location-based mobile app to increase recycling awareness and overall recycling rates in Malaysia. This application highlights the purpose of picking up the recycled items from the users and sending them to the recycling site. The novelty of this application is that using this application can provide pick-up services and self-delivery to a nearby recycling centre. This App offers one of the most comprehensive recycling databases. It also contains a news section that keeps users up to date on the newest environmental issues and information and recommendations on what can and cannot be recycled.

MyEco app displays the map of nearby recycling centres, instructions, hours of operation, contact information, and other related information. The uniqueness and difference from other applications are that MyEco follows the latest technology using Chatbot. The role of Chatbot in industry 4.0 is likely to involve human and machine intelligence working together toward the same shared goals. Chatbot provides a fantastic 24/7 customer service experience, and an intelligent conversational support platform gives direct answers to customers. It can offer prompt and accessible support to customers by automating up to 75% of inquiries.

SPECIAL CRITERIA

One of the unique features of the MyEco app is that it offers both pick-up service and self-delivery to a nearby recycling centre. MyEco application programme includes a map that allows users and MyEco employees to pin and follow the pick-up position. This App helps users keep track of bin collection days and encourages Malaysians to recycle by giving an alphabetical list of materials and advice on how to dispose of, recycle, and compost them properly. The App also offers practical ways to promote sustainable tourism for a greener future, including recycling knowledge and recommendations and practical ways to promote sustainable tourism for a greener future. MyEco application provides users with a map of nearby recycling centres and the hours of operation, and contact information. Moreover the users can follow the news section that keeps users informed about the latest environmental challenges and communication and advice on what can and cannot be recycled. This application also has a news section with the most up-to-date information on the waste and recycling industries and recycling ideas that users may share with their family, friends, and social networks. Thus, this application is compatible with iOS and Android, and it can instantly access iOS and Android users.
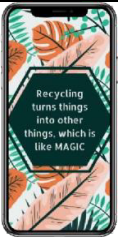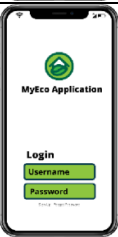
IMPACT

MyEco application has a significant positive environmental impact. Plastic is one of the most polluting materials on the planet. Recycling solid waste can help to reduce waste and prevent contamination of the environment. Burying plastic in the ground is not a long-term solution since it may pollute the soil and water. With the support of MyEco application, it can help make the environment safer and prevent individuals from pollution-related sickness by using recycling techniques. Besides that, recycling helps prevent environmental disruption and damage, which means fewer trees will be cut down, rivers will be diverted, wild creatures will be damaged or relocated, and pollution will be reduced. Manufacturing things out of recycled materials often uses less energy than making them out of new raw materials – sometimes by a significant amount. Recycling saves energy by reducing the amount of energy required to source and process new raw materials; it also creates fewer carbon emissions, which can mitigate global warming. It keeps waste that could release methane out of landfills. Reducing greenhouse gas emissions is critical to reducing carbon dioxide and other greenhouse gases emitted into the environment. Recycling can also stimulate the economy in multiple ways by enhancing employment opportunities. In sum, both the recycling delivery and recycling manufacturing industries benefit from the MyEco application.

PROCESS OF CONSUMING THE APPLICATION

MyEco application will come in handy and make it easier for people to recycle their waste. Since our application is designed to contact us whenever the users want to recycle their waste, it will encourage more people to practice recycling as a habit. This application allows users to contact us to collect their recyclable materials at their respective locations and is available on Android and iOS. The process of consuming the application is shown in Table 1.

Table 1. Process of Consuming the Application

STEP	PICTURE	REMARKS
1		Download MyEco application on and open the Android/iOS
2		Random quotes about recycling will appear while loading the application
3		Click "log in"
4		Click "Set my location" and pinpoint your exact location
5		Click "Select Materials" on the main page
6		Choose the type of materials to be recycled, click on the "selection icon" to proceed with the pick-up items

PRODUCT COMMERCIALISATION

ACKNOWLEDGEMENT

We want to express our special gratitude to our advisor and the i-SPIKE organisers. This innovation competition is our golden opportunity to participate, which also it has helped us to brainstorm innovative ideas, constant research, increase self-knowledge and enhance our learning experiences. A special thanks to the team members who are consistently committed and have contributed significantly to this competition.

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MULTIPURPOSE PUSHCART

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ABSTRACT

Shopping activity without doubt is fun and enjoyable. A survey in the UK was conducted in April 2020 found that shopping is the best therapy to reduce stress. During shopping, consumers consume tons of plastic or shopping bags to carry their shopping items. This leads customers to have too many shopping bags on hand and that has bothered them. There are times when they unintentionally had left their shopping bags at the mall due to their full-handed hands. Some countries are going green and they have restricted the usage of plastic during shopping, and these have forced consumers to take their shopping bags along with them when going out for grocery outings. Understanding the consumers' needs and helping them to enjoy their shopping experience, *Multipurpose Pushcart* is invented. This pushcart is unique; it combines a few features to enhance its functions to the users. It is a pushcart that has branches of the holder to hook the shopping bags. An umbrella is attached at the core of the pushcart, making it useful during rainy days. This pushcart was also designed to understand the elderly needs during shopping. With a chair function attached, it enables the elderly to sit down and take a short break during walking. Other than that, this cart is enhanced with battery-operated light making it useful when used during night time. This item is a must-have item for everyone as it is handy, compact, stylish, and a great assistant to be used in any situation!

Keywords: Multipurpose Pushcart, Shopping Bags, Elderly

OBJECTIVE

The objective of Multipurpose Pushcart is to reduce people's burden and stress when doing grocery shopping. It is a portable shopping trolley cart that uses creative techniques to give functions in many ways. The second objective is to create a pushcart that can ease the burden of heavy load when one is shopping.

PROBLEM STATEMENT

Shopping is an activity in which customers buy necessities at the business places. It is a fun and enjoyable activity. In fact, according to a survey conducted by Laura et al. (2020), it shows that shopping is the best therapy to reduce stress. However, shopping can sometimes be an exhausting activity especially during the pandemic where people are required to go shopping for necessities alone. According to the 2000 census report, approximately 7% of the 1.4 million people aged 60 and over in Malaysia live alone (Yahaya, Abdullah, Momtaz & Hamid, 2010). This situation forces them to go out for groceries shopping without any assistance. Some countries such as the United States (US), China, Canada, and Australia have banned the use of plastic bags which causes customers to bring their own bags from home. Having your hands full with shopping bags while shopping can be quite troublesome at times. Sometimes, people accidentally left their belongings due to the struggle of putting everything into the car. Besides that, the no seating policy in shopping malls is very common which causes several customers especially the elderly complains that there are no places to rest. A study conducted by Dagmar, 2016 has found that 35% of the elderly are unsatisfied with the prohibition of sitting in shopping places. Hence, their shopping experience has become unenjoyable as they are unable to rest their feet. It is also undeniable that standing in queues for long periods can be exhausting regardless of age.

IDEA CONCEPTUALIZATION

Multipurpose Pushcart seeks to help those who need assistance while shopping. This Multipurpose Pushcart is convenient, compact, and stylish, and it is created with four distinct features that can assist people while shopping to ensure a pleasant shopping experience. This Multipurpose Pushcart is developed to withstand weight up to 100kg including the weight of the pushcart. It has strong support and a well-developed structure made from high-quality material. The main body is made from aluminium alloy material which is known for its durability. At the same time, it is also lightweight, anti-corrosion, and pressure resistant. The color used for the whole body is matte-black to make it look more appealing. As for the core stick, a high-quality non-slip rubber is used as the tip to ensure stability and for safety reasons. The pushcart comes with two wheels made from black rubber. Not only that, but it also comes with a battery-operated light that uses a triple-A battery that can be easily found on the market. The light is bright and is very handy especially during night times, and it is also furnished with a comfortable foldable seat for seating purposes. It is made of latex to avoid any liquid absorption and can hold up to 70kg. The seat is also foam padded to give a comfortable feeling when in use. The color used for the seat is a bright mustard-yellow to create a good and stylish look. In addition, this Multipurpose Pushcart comes with a foldable shopping bag holder with sturdy hooks. This shopping bag holder can hold up to 30kg. Another feature that comes with this Multipurpose Pushcart is an umbrella. This umbrella is beneficial during rainy or even sunny days, and it also comes with a compartment to store the umbrella. This umbrella is foldable, and the size of the umbrella is 70 cm in diameter and 15inch long. Meanwhile, the stick is adjusted up to 50 cm long. The outer color of the umbrella is black whilst the inner color is silver.

IMPACT/USEFULNESS

The Multipurpose Pushcart is instrumental handy as it is designed to be fully equipped with consumer needs and to ease their shopping experiences. This pushcart can be particularly helpful if you deal with a heavy load during shopping. By using a pushcart to move your groceries around, you can make things a whole lot easier for yourself. Plus, it can help prevent the users from being injured while doing some grocery shopping. The plus point, the product does not consume too much storage space as it can easily be stored in their car.

Table 1: The Features of Multipurpose Pushcart

Foldable seat	The seat is foldable and can be used whenever they need to take a quick rest, and it is foam padded to provide comfort.
Umbrella	An umbrella is connected to the pushcarts, making it beneficial on rainy days, and it also comes with a compartment to store the umbrella.
Foldable shopping bag holder	This branch-looking holder is used to hang shopping bags.
Battery-operated light	A battery-operated light is attached to the pushcart, and it comes in handy during night time.

SKETCHES OF THE PRODUCT
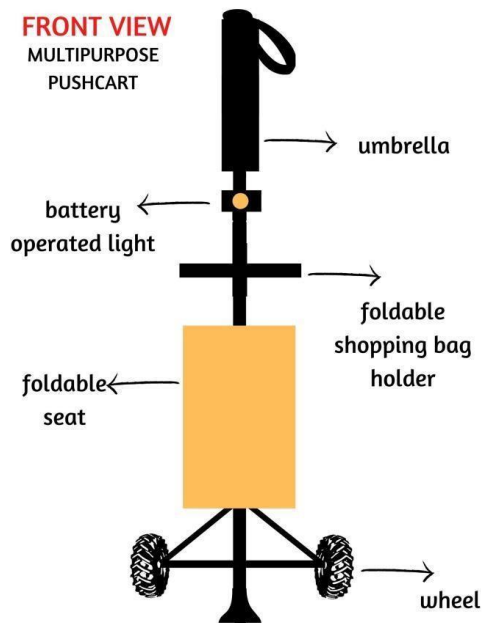
Figure 1. Front view - Multipurpose Pushcart
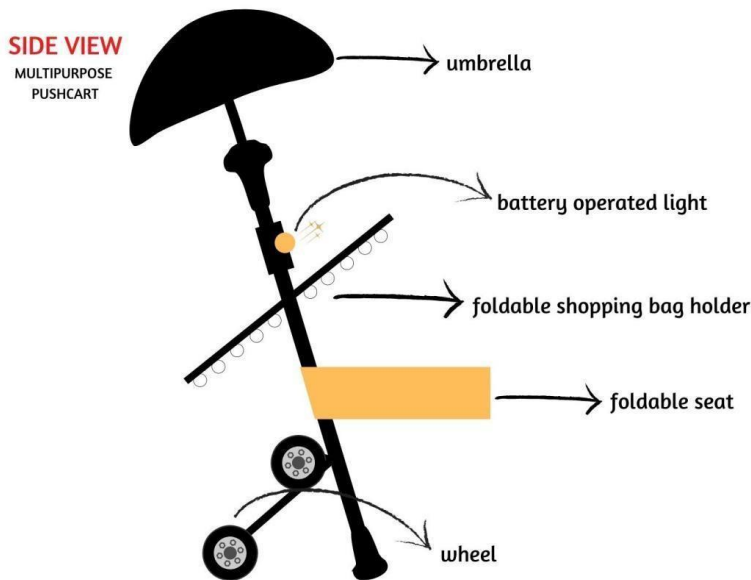
Figure 2. Side view - Multipurpose Pushcart

PRODUCT NOVELTY

Most foldable shopping carts in the market are only equipped with shopping bag storage only. However, this Multipurpose Pushcart is complete with multi-function features that will help to lessen consumers' hassle. It is instrumental handy as it is designed to be fully equipped with consumer needs and to ease their shopping experiences. It also has a strong frame and sturdy structure which makes consumers worth using it. Two wheels are attached to keep the cart's moves smoothly. This item is complete with a foam padded foldable chair that enables the consumers to sit on to relieve discomfort from standing and walking too long during shopping. This cart is sturdy, attractive, and folds up easily for consumers' storage. The other interesting component about this Multipurpose Pushcart, it comes with an umbrella. It is attached at the core of the pushcart to keep them dry and clean during rainy days while shopping. This cart offers an 'extra hand' for the consumer to carry the shopping bags, as it has eight hooks that can carry up to 30 kg. After all, this Multipurpose Pushcart is a must-have item for people who live with back pain, arm pain, shoulder pain, or disabilities when carrying your own groceries.

ACKNOWLEDGEMENT

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MULTIPURPOSE HANDLE STABILIZER – TO HELP YOU HANDLE YOUR LIFE

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ABSTRACT

Hand tremors or shaky hands from mild to severe can affect anyone and have impacts on daily activities which cause struggles in writing, drawing, and handling tools or utensils. Hand tremors can be caused by a number of reasons but commonly caused by neurological conditions such as Multiple Sclerosis (MS), traumatic brain injury, or Parkinson's disease. A report by the Department of Statistics Malaysia in 2018 stated that the number of patients with Parkinson's disease is expected to increase by five times from the current approximate 20,000 to 120,000 by 2040. The Multipurpose Handle Stabilizer product aims to help people with mild to severe shaking hands in their daily activities. It focuses on assisting affected people in holding and using tools with handles and intending to make their life more convenient. Currently, products with stabilizing features on the market are only focused on cameras and detachable eating utensils whereas our product intends to be more multipurpose which adds convenience and is more efficient. The specialty of our product is that it features non-detachable utensil handle head with size adjustable opening to ensure that it is suitable to be used with any type and size of handles; it is also equipped with flashlight and stabilizing tech as well as a long-lasting rechargeable battery. This product would be able to assist those affected with hand tremors and their caregivers as this product gives them the ability to hold tools such as kitchen utensils, makeup brushes, and stationaries. This product's innovative feature is it is straightforward and easy to use; any tools that wished to be used can directly be inserted into the Multipurpose Handle Stabilizer. With this product, victims of hand tremors and neurological conditions can gain confidence in being more independent and carrying out their daily activities from applying makeup on their own to cooking simple meals.

INTRODUCTION

Persons with crucial tremor suffer frequent shaking that tends to be worse when in motion. The shaking cannot be self-controlled and mostly frequently occurs in the hands, arms, head, and vocal cords. Many people associated shaky hands with neurological and degenerative conditions such as Multiple Sclerosis (MS), Huntington's disease, Cerebellar disease, overactive thyroid, traumatic brain injury, or Parkinson's disease.

Having hand tremor illness is not life-threatening, but it can create our life much more challenging. As the condition evolves, symptoms like shaking, rigid muscles, slow movements, and problems with balance can affect your daily chores such as writing, cleaning, cooking, eating and many more. Today, technology gives us many assistive devices to help patients with crucial tremor to have a normal life and make daily activities easier and convenient. Various of these devices also assist to keep them safe around the home, preventing from falls and injuries. Numerous vendors have entered the market and launched different devices and tools to support and assist these patients independently prepare their own meals and eat them without the fear of having an accident in the kitchen. There are many special appliances with larger, weighted, and detachable handles, sensors, and other characteristics that mostly make cooking and eating a better experience.

PRODUCT DESCRIPTION

The Multipurpose Handle Stabilizer is a device that is small in size with 11.9 cm height and 5.1 cm width which can easily to carry around. This innovative handle stabilizer is designed with flashlight, and non-detachable utensil handles head with size adjustable opening, which allows any type and size of handles to fit in. It comes with an adjustable hand strap to help to ensure and fasten the hand while using it. It also has sensors in the handle that can detect variations from the desired hand movement (Refer **Figure 1 and 2**). Furthermore, it has the ability to assist people in doing any daily tasks that might otherwise be difficult due to tremor. This device is very much needed for those senior citizens or people who have difficulties to stabilize their hand while using any tools. It also equipped with useful technology that are made to help mild to extreme hand tremors to use any kind of tools such as:

1. Adjustable Size Opening – The opening can be adjusted to fit any types and size of handles such as kitchen knives, vegetable peelers, brushes, pen, toothbrushes, cutleries and many more that make this task easier and safer.
2. Adjustable Hand Strap – Help to fasten and ensure the position of the hand and can accommodate any sized hand. By adjusting the position of the device on the hand, users can hold or write smoothly and with control.
3. Camera Stabilizing Technology - Used to counteract any undesirable movement and recorded the motion of the tools.
4. Rechargeable, Fast Charging and Long-Lasting Battery - A rechargeable battery in the handle provides the power to use the device.
5. Flashlights – To provide light in darkness or an emergency light source during a power-outrage.
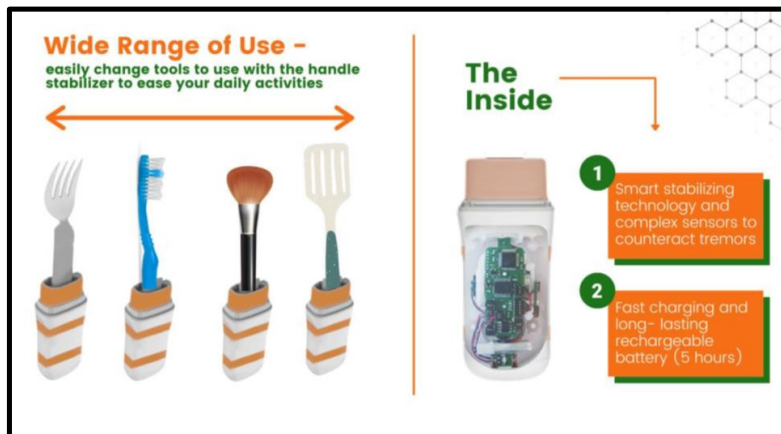
Figure 1. Multipurpose Hand Stabilizer Features

Figure 2. Multipurpose Hand Stabilizer Specifications

NOVELTY AND UNIQUENESS

Most of the handle stabilizers that exist in the market are only applicable for certain attachments. Generally, handle stabilizer in the market is specialized only on eating utensils consists of a handle and detachable utensil head such as soup spoon, fork, normal spoon, or spork options. However, the Multipurpose Handle Stabilizer is designed with a compact and light feature that can be carried easily. This device is furnished with non-detachable handle with adjustable size opening, hand strap, flashlights, camera stabilizing technology and rechargeable battery. For the adjustable size opening, it can be attached with tools that have several types of different sizes and types.

This handle is easier to grip and fit which can be used with other round tools or items such as a cutters, ladle, pen, toothbrushes, brushes, or mascara applicators. Besides, it also has a hand strap that may be used to secure or fix the position of the hand while using it. The best part of this device is, it is equipped with a camera stabilizing technology which is used to prevent any

unwanted movement and to record the action of the tools so that instead of worrying about the work at hand, you may relax and enjoy the company of people around you. The battery is also rechargeable, fast-charging and on a single charge, the battery can last for at least five-hours of continuous use or for about three meals. All these features have been built into this device to make it easier for people with difficulties to use it.

BENEFITS TO MANKIND

The multipurpose handle stabilizer is designed and aimed to assist those with living difficulties due to hand tremors, especially people who are diagnosed with Multiple Sclerosis (MS), Parkinson's disease or any other neurological disease-causing hand tremors. This item is remarkably beneficial to these people and allows them to carry out their daily routines and overall help patients and their caregiver. Daily activities such as cooking, grooming and mealtime are easier and give chances to patients to be more independent (Refer to **Figure 3 and 4)**.

PRODUCT COMMERCIALISATION

The multipurpose handle stabilizer is a specialized tool which is portable, straightforward, and designed to help ease the life of people with hand tremor problems including helping to lessen the burden of their loved ones. Hand tremors may also affect seniors which means this item is suitable to be commercialized because every household may benefit from this tool. Other than that, commercialization of this item will provide easier access for people to own this item and moreover the design of this tool, which is compact, light, and easy to use gives it an advantage. Especially since its multipurpose which means it is not limited for mealtime only such as the spoon stabilizer available in the market. This item aims to be more functional as it is multipurpose and provides the user to use it for other daily tasks such as doing office works, cooking, or grooming by using the handle stabilizer for makeup brushes or hairbrushes. Hence, this product is able to help their target market immensely and change their life for the better, which is why it should be commercialized.

Figure 3. Multipurpose Hand Stabilizer For Mealtime

Figure 4. Multipurpose Hand Stabilizer For Grooming

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THE TRAVEL AMENITY POD

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ABSTRACT

Plastic waste is becoming an alarming concern around the world. In our daily life, plastic use has been very common, and it is inevitable while travelling. Beauty products, food and beverages and cooking necessities are some of the most used amenities by travelers that use plastic packaging. Due to this, many tourist destinations such as heritage sites, beaches and conservation areas are badly affected by the tremendous amount of plastic. Therefore, the main objective of The Travel Amenity Pod is to introduce a water-soluble travel amenities packaging that will help reduce the rate of plastic consumption made by travelers during a trip. The novelty of this product can be acknowledged as it comprises pre-measured travel amenities like sunscreen, lotion, hand sanitizer, shaving cream and personal care in a water-soluble pod that can dissolve in water after use. This product is made from Polyvinyl Alcohol (PVA) synthetic polymers that are proven non- toxic, biodegradable and water soluble. It is also an effort to create portable travel amenities in small size that does not take up large space especially for solo travelers or campers. With the existence of The Travel Amenity Pod, we believe that this product will be a game changer to the packaging industry as it has great potential to be commercialized as a sustainable product especially to eco-conscious tourists and suppliers.

Keywords: plastic, traveler, pod, amenities, packaging

OBJECTIVES

Plastics are lightweight and durable. This characteristic has made them one of the most utilized materials but also hard to decompose. The main objective for Travel Amenity Pod is to innovate an environmentally-friendly packaging for travel amenities which can be dissolved in water after use. Using technology similar to laundry pods, Travel Amenity Pod aims to create pods for travel amenities like personal care products and food containers using Polyvinyl Alcohol (PVA) biodegradable polymers that are proven non-toxic, has high biodegradability and unique

water-soluble features (Mitrea et al., 2020). It is an initiative to help reduce the rate of single-use plastic consumption made by travelers during a trip and to create portable travel amenities in small size that does not take up large space especially for solo traveler or camper. Other than that, this product is also an effort to promote sustainability and green tourism especially in Malaysia.

NOVELTY

The Travel Amenity Pod is different from other plastic packaging. The usage of Polyvinyl Alcohol (PVA or PVOH) has initiated a new way to dispose and decompose plastic. With its water soluble, edible and biodegradable features, it helps to mitigate the single-use plastic crisis. Travel Amenity Pod are designed to contain travel amenities like sunscreen, lotion, hand sanitizer, shaving cream and other personal care products in water-soluble pods. While travelling, not all hotels or accommodations prepare such travel amenities for their customers. It is a hassle to bring multiple bottles of those especially on shorter trips. Although laundry pods are already in the market, there are limited or minimal products focused for travel amenities, which expand from personal care products to food.

SPECIAL CRITERIA

The most prominent feature that can be seen is the size and uniqueness of the packaging. Travel Amenity Pod is intended to be compact and smaller in size in order to make it more portable compared to the traditional packaging and most importantly to save space. Other than that, this pod is a one-time use product which does not leave any leftovers, unlike the traditional packaging which needs proper storage once unsealed. As these pods contain liquid-based travel amenities, the amount of the ingredients is pre-measured to ensure less waste and leftovers. It helps the user to determine how many pods to use according to their preferences every single time. Lastly, as mentioned before, these pods dissolved in water and are very environmentally-friendly towards the ecosystem. Figure 2 below shows the special criteria of Travel Amenity Pod.

Figure 1. Special Criteria of Travel Amenity Pod

IMPACT/USEFULNESS

If we can reduce single-use plastic packaging, we can reduce at least a quarter of the amount of plastic produced. This will also diminish the cases of beach littering and river pollution. According to Our World in Data (2015), 86% of rivers in Asia suffered from plastic pollution with Yangtze River in China deemed as the most polluted river in the world (Hannah & Max, 2018). With the water-soluble and bio-detechnology instilled in Travel Amenity Pod, this will be an effort to lower down annual global plastic inputs from river to oceans worldwide. In addition, as per the report of future travel trends by Booking.com (2020), travelers are predicted to have a more eco-conscious mindset with over 53% of global travelers wanting to travel more sustainably (Donovan, 2020). We believe that Travel Amenity Pod will serve the growing personal care market with a grab-and-go convenience and provide perseverance to the ecosystem.

PRODUCT SPECIFICATION

Table 1. Product Specification of Travel Amenity Pod

SPECIFICATION	
Product Name	THE TRAVEL AMENITY POD
Colour	Pod cover is transparent. Users can see and the color of the ingredient.
Size	3.5cm (L) x 2.5cm (w)
Volume	24ml
Material	Polyvinyl Alcohol (PVA) Biodegradable Polymer
Quantity	This package of selected travel amenities (sunscreen, hair care products, body wash etc) contains 20 pods each.
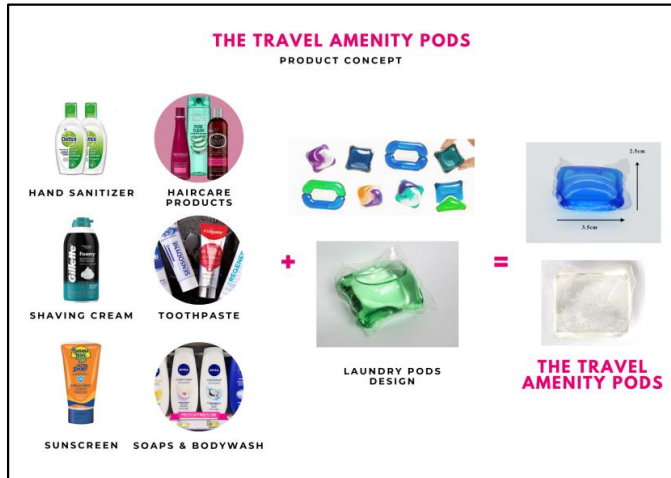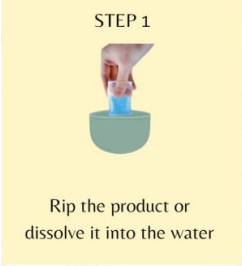
Figure 2. Product Concept

PROCESS OF CONSUMING THE PRODUCT

Process of consuming can vary according to the product's function and consumer preferences. Table 1 explained in depth the process on how these products can be used to help the future customer to understand.

Table 2. Process of Consuming - Travel Amenity Pod

STEP 1	STEP 2
Rip the product or dissolve it into the water	Use the product according to its functions
1.　　Rip or dissolve the pod onto your hands/into the water	1.　　Apply the product evenly to your hand, onto your face or the area you wanted 2.　　Rub the fills for about 20 seconds to make sure all areas are applied
STEP 3	**STEP 4**
If it is soap or shaving creams, wash your hand after use	Wipe your hand and you are done

1. Rinse your hands with running water (warm or cold) or wet tissue 2. For sunscreen, lotion and hand sanitizer, wait until it is dry. No need to rinse	1. Wipe your hands after rinsing to make sure it is clean

CONCLUSION

Presently, plastics are universal and have long been under environmental scrutiny. Many industries are responsible for the plastic consumption but the tourism industry is undeniably one of the most significant contributors to single-use plastic waste, yet it is also the one at disadvantaged. Therefore, the Travel Amenity Pod is a product that consumers need. It has huge potential commercialization as it can mitigate the single-use plastic crisis with its environmentally-friendly features. Other than that, it is also an effort to support the cleanliness campaign held by many countries in order to preserve the ecosystem from severe pollution.

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TOOTHBRUSH 2-IN-1

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ABSTRACT

The innovative 2-in-1 toothbrush is served both the functions of toothbrush and toothpaste. These two items are some of the items we use in our everyday life and when we travel. When traveling, we tend to pack mundane items such as toothbrush and toothpaste. We often overlook, and sometimes we even feel stressful. We can easily purchase these items at the destination if we forget to pack them, but that it will be an unnecessary additional expense and another task to accomplish upon arriving at the destination. Another option is to pack the large tube of toothpaste we have in the washroom and use in our every life, plus our regular toothbrush, but then there are the 3-1-1 liquid rules to consider (particularly for international travel). When travelling or hiking for days, we pack other important items first. Later, we pack toothbrush and toothpaste separately, and it consume space in our in the hiking backpacks. It can be a huge annoyance when one could not find toothbrush or toothpaste hidden among clothes, pants, jackets and other trekking necessities after a long trek. Thus, it would definitely be nice to have 2-in-1 toothbrush that can be easily stored in one specific section of the backpack. For long flights that involve long airport layovers, a convenient access to toothbrush and toothbrush can be useful to make us feel refreshed and clean in the mouth. Travel-sized toothpaste and toothbrush are widely available at the supermarkets and pharmacies. While the size is convenient, the the innovated product of 2-in-1 toothbrush can be beneficial. The following sections will present the objectives, novelty, special criteria, impact/usefulness and product specification of the proposed 2-in-1 toothbrush.

Keywords: smart toothbrush, functional toothbrush

OBJECTIVES

The objectives of this product are:
1. To provide a convenient, lightweight, small-sized, and safe toothbrush-and-toothpaste for travelers.
2. To be more environmentally friendly by incorporating the features of durability and

reusability as it can be used multiple times.

NOVELTY

The 2-in-1 toothbrush has yet to be offered in the market. It is an innovated version of toothbrush and toothpaste. Teeth brushing is a routine and we repeat at least twice in a day (when we wake up and before we go to bed). With the adoption of the 2-in-1 toothbrush in our daily routine, we can eliminate the need of having to repeat the action of pressing toothpaste onto our toothbrush. Although the act of pressing toothpaste onto toothbrush takes only several seconds, those seconds will be saved if we can have such a product as the 2-in-1 toothbrush where toothpaste can be filled/re-filled beforehand.

Moreover, as previously mentioned in the Introduction, the 2-in-1 toothbrush can also be beneficial within the context of traveling, when criteria such as easy-to-carry, lightweight, safe, and small-sized are essential. The 2-in-1 toothbrush will be an innovated travel product, surpassing travel-sized toothbrush and toothpaste that are currently being offered to travelers, and which are sold separately.

SPECIAL CRITERIA

The special criteria of the 2-in-1 toothbrush are as the follows:
1)   Lightweight: the 2-in-1 toothbrush weighs about 18 grams
2)   Small-sized: the size dimensions of the 2-in-1 is 14 cm in length and 10 cm in width.
3)   Battery can be recharged using USB in a short period of time, and, based on an average usage of brushing teeth twice a day (2 – 3 minutes each tooth brushing session), the battery can last up to 2 weeks.
4)   Safe: the materials used to construct the 2-in-1 toothbrush are safe: rubber and plastic for the casing, and DuPont Tynex for gum-friendly bristle. Moreover, the 2-in-1 toothbrush is waterproof.
5)   Easy to clean: the compartment to fill/re-fill toothpaste can be detached from the toothbrush for easy cleaning. The bristle is easily replaced.
6)   Affordable: the 2-in-1 toothbrush will be priced reasonably RM45.00. It can also be used by children to the elderly. Travelers may find it financially affordable as it is beneficial and convenient.

IMPACT/ USEFULLNESS

The 2-in-1 toothbrush will be useful for everyone because everyone brushes his/her teeth at least twice a day. It will also be beneficial for travelers such as trekkers, air passengers on a long flight or being stuck in a long airport layover.

Moreover, the 2-in-1 toothbrush will have a positive impact on the environment because of its features of durability and reusability. Thus, it will reduce the amount of plastic used to make regular toothbrushes and the toothpaste tubes.

THE PRODUCT SPECIFICATION

Figure 1. Illustration of Toothbrush 2-in-1

PROCESS OF CONSUMING

How to use the product:
Step 1:   Open/ Unlock the toothbrush cover at the bottom of the handle.
Step 2:   Squeeze the toothpaste into the toothbrush body and close the cover.
Step 3:   Then press the button in the middle of the toothbrush body, the toothpaste will be discharged from the brush.

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TORCH BOTTLE

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ABSTRACT

A torch bottle is a product that combines a torchlight and a bottle, which makes it easy for people to carry both items at a time. Since the Covid-19 pandemic, it has become a trend for people to do recreational activities such as jungle trekking, hiking, night walk, night patrol, and camping. Torch Bottle is specially designed for those people who like to do recreational activities. The objective of this torch bottle is to make it easier for people who want to bring a water bottle and torchlight at the same time especially adventurous hikers who love taking night walks in the jungle, and patrol guards to use during their night patrol. The function of the product is to help consumers to see better at night while still allowing them to drink water from the bottle. The torch bottle can be used by four different age group generations such as Baby Boomers, Generation X, Millennial, and Generation Z. The product is designed in a cylinder shape with a portable torchlight under the bottle. The novelty of this product is the torchlight can be removed when the bottle is washed. Besides, the torchlight from the bottle can be turned on using batteries or a thin-film solar panel. Thus, the product is sustainable because it saves energy by using solar panels. It is also coated with stainless steel which makes it environmentally friendly, durable, safe, and corrosion-resistant. This innovation is a great way of reducing the cost of the product since the production cost of the two products which are water bottles and torchlight is higher.

Keywords: Torch Bottle, Water bottle Torchlight, Ez Water bottle Torchlight

PRODUCT DESCRIPTION

Torch Bottle is a specially designed product for commercial purpose in Malaysia. This product makes it easier for users to travel, or doing adventurous activity, especially for hikers. This is because, they can minimize items to bring while climbing by carrying a Torch Bottle which is equipped with light at the bottom of the bottle. The product offers a wide range of product from various companies available in Malaysia. Not only that, this product also gives many advantages to climbers as they buy and use it as their equipment when doing extreme activities such as hiking or camping. They no longer need to carry many items such as bottle and torchlight separately, as this product is a combination of both items. Besides that, the package is available with many options and provide opportunities for hikers. Furthermore, the sale and

purchase of the product is also simple with several ways such as via online web, hypermarket, or hotline.

OBJECTIVES
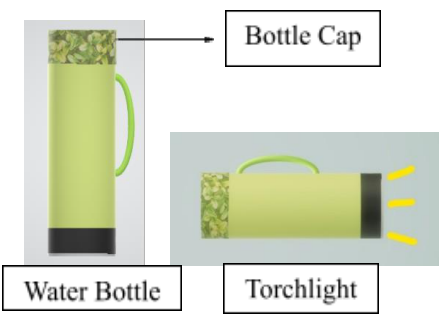
1. To introduce new innovative products into the market.
2. To provide high quality and useful product to consumers.
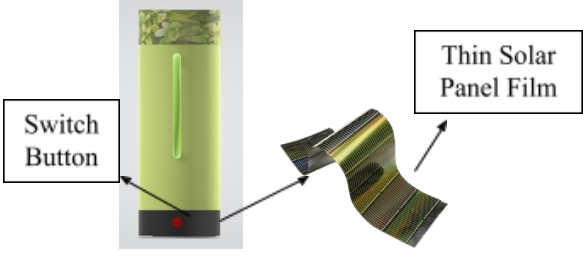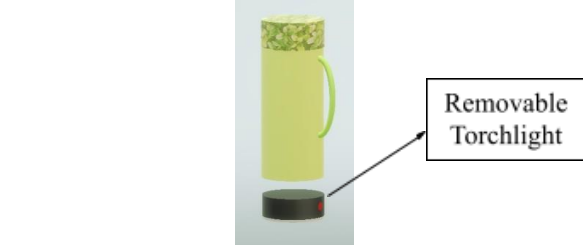3. To reach the target market with an eco-friendly product.

NOVELTY AND UNIQUENESS

"Torch Bottle" is the first bottle in Malaysia that includes a torchlight that is easy for consumer to use it, cost-effective, and price guaranteed. Electricity was not used to create light until the nineteenth century. Joshua Lionel Cowen, the founder of the American Eveready Battery Company, introduced the modern battery-powered flashlight in 1898 (Ahmstead, 1997). Over the last century, technological advancements have resulted in hundreds of distinct styles and functions for torchlights. Torchlights, for example, are now available with rechargeable batteries that may be used repeatedly. Other lamps are made for specific tasks, such as operating underwater or in extreme temperatures. A torchlight is a battery-operated light source that may be carried around. One or more dry cell batteries are stacked in a line inside a battery compartment that forms the light's handle in a typical configuration. A switch mechanism located between the batteries and the lamp controls the flow of electricity from the batteries to the bulb at the front end of the light. Based on our research, we conclude that torchlight have many benefits to people doing daily activities. In this case, we have come out with one product to innovate into a multi - purpose product. This product is combined with bottled water, with a light bulb placed at the bottom of the bottled water. This bottle can be used by hill climbers, and they no longer have to carry heavy bags because the bottled water is equipped with a lamp underneath. It can make it easier for them if the weather gets dark, especially in the forest. In this case, they no need to worries to bring more equipment for hikers.

DESIGN OF THE PRODUCT
Table 1. Product Design

NO.	DESIGN	EXPLANATION
1.		Consists of two items: i. Water bottle: Can fill the bottle with any types of water such as mineral water, juice and many more. ii. Torchlight: Can be used as a light source.

2.		The torchlight is covered with thin solar panel film. The thin solar panel film can be used to replace the battery and save the battery's energy. The switch button is placed on the torchlight so the torchlight can still be used if it was removed from the bottle.
3.		The torchlight is removable. It is to avoid contact with water when washing the bottle.
4.		There is a battery compartment on the torchlight.

SPECIAL CRITERIA

1.   User-Friendly.

Torch Bottle is a user-friendly product. This is because Torch Bottle is easy to use by all generations. Furthermore, the Torch Bottle has a button that the users can easily press to switch on the torchlight. Aside from that, the torchlight may be removed if the user needs to wash the bottle.

2.   Eco-Friendly.

Torch Bottle is an eco-friendly product. This is due to the Torch Bottle's thin-film solar panel, which may conserve energy and serve as a battery substitute. Not only that, but the Torch Bottle is also a sustainable product because of its stainless-steel coating, which is more ecologically friendly, durable, safe, and corrosion-resistant.

3. Unique Design.

Torch Bottle has a unique design. This is because the Torch Bottle is a combination of a water bottle and a torchlight. It also has a thin-film solar panel that covers the torchlight and serves as an energy saver for the batteries.

USEFULNESS AND IMPACT

Torch Bottle is a combination of a water bottle and a torchlight. This indicates that the product may be used as a water bottle in which users can fill their beverages, as well as a torchlight in which users may use as a source of light at night. Not only that, but the Torch Bottle is made of stainless steel and is lighter in weight, making it ideal for travel, hiking, sports, and other activities. The impact of this Torch Bottle is that it may assist users to reduce bag weight, especially when engaging in recreational activities. As a result, it is an ideal product for people of all ages to use.

ACKNOWLEDGEMENTS

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TOURISM APPLICATION - TOUCH

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ABSTRACT

Sustainable tourism has become a major focus in the tourism industry. This product can help and improve the tourism industry by the consumer making better purchase decisions and the wholesalers can maximise marketing and operations. The objective of this travel application is to educate, improve user experience and manage booking in a systematic environment. This application combines booking and socializing into one application. The newly designed prototype is a showcase of attractions in Malaysia that help travellers to find interesting places to visit, learn more about it and make bookings to the attractions, extending the booking to other service-related activities such as accommodation, transportation and food and beverage. Users can utilise the application and take the experience to the next level where they can connect, converse and discuss with others on the place of interest, as well as view feedback and ratings. This application aims to ease the process of a trip before, during and after. This platform will also showcase for wholesalers to provide their package under the selection of an attraction to ease the users in finding the perfect package for their holiday.

Keywords: Travel, Lifestyle, Booking, Itinerary, Place of Interest

FUNCTIONALITIES

Since mobile devices will be utilized during travel, we would like to integrate all the functionalities that users can perform in one application called TOUCH. The application named TOUCH is originally inspired by the idea of putting multiple functions into one place thus easing users to just 'touch' to search for information. The functions are developed based on the current demands and how an application should function to ease the process of finding information, connecting, and buying.

Informing, Socializing and Managing

The purpose of creating a tourism application that is called TOUCH is to make sure this mobile application will ease the users in their daily life, especially during travelling. The emergence of mobile devices is one of the technological opportunities to produce innovative products such as tourism mobile applications. The tourists can check current tourist information on the go using their smartphones, making travel easier and more fun because they get instant satisfaction (Moon & Backman, 2016).

The second objective is to inform users of a wide variety of functional and hedonic information needs (Wang et al., 2012, as cited in Benckendorff et al., 2019). The information provided by this specific application includes marketing and information about the attractions, accommodation, and bookings.

Other than that, as a result, recovering the tourism industry which was one of the most affected industries during the COVID-19 outbreak, requires some innovative approaches (Bulchand-Gidumal, 2020). Hence, the innovative technology of tourism mobile application is an ideal innovative approach for travellers to join the tour and it will help the users to socialize and engage with a lot of people around the world. Besides, it also helps to increase their experiences and knowledge towards places around the world with their mobile application called TOUCH.

Moreover, this tourism application has its own novelty and speciality. This mobile application is focusing on the novelty-seeker through digital platforms. The concept of this tourism mobile application enables users to manage accommodation for their stay during the holiday, can have a mobile tour guide such as a live tour through their mobile device, and explore holiday photos of places around the world and all of these can be found in one app. In addition, this tourism mobile application helps users to explore a wide variety of destinations and experience themselves through digitalization.

Purchasing and Personalizing

Personalization of the TOUCH apps is much more dynamic, and it allows the modification of the experience of the specific users to meet their needs. For example, this app includes push

notifications, recommendations, suggestions, tips, discounts, and special offers that drive engagement with the users.

Based on this TOUCH application, it will collect the user's detailed data such as age, gender, location, user preferences, purchase history and app activities in a quick and simple process for login purposes. After that, users can choose the interface features in the apps to discover the destinations offered and the activities provided. The variety of interfaces in the apps can help the users to customize the activities for their experiences. For example, there is a live session in the app that allows users to join the tour virtually with a guided tour. Therefore, the users need to choose and purchase the package to join the tour.

Moreover, the growth of mobile applications will influence people to use mobile devices anywhere and it helps people to practice sustainable purchase decisions. The customers can purchase travel products based on personalization (if they prefer a more exclusive TOUCH) which can give maximum satisfaction while enjoying the application during their travel. Moreover, mobile applications are more convenient to find information besides offering lower prices for the customer to buy the packages at travel destinations as it directly connects the customers with the travel operator.

Lastly, payment methods are made easier for users with a variety of choices. Customers can pay directly on the application and choose between payment by credit or debit card, online banking (FPX) or for international customers, they can choose PayPal to save transaction costs and time.

INTERFACE: How the app works

In this section, the process of consuming the product and product specifications are briefly explained. There are three (3) sections in these applications that are Home, Feeds, and Profile. For
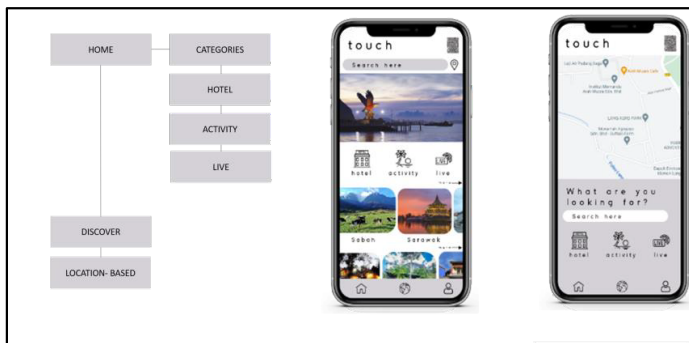
Home, the user can discover the interface of the Categories and the Discover. Under Categories there fall another 3 sections, Hotel, Activities and Live. For Discover, there is a related search based on regions and the daily discover. Users can search the place using location-based features that have been included in this app.

Figure 1. The process, interface and location-based interface

In Figure 2, the Hotel section can be used to find Destination and choose the destination, users can also choose Check-in and Check-out date, and how many people will stay in the hotel. It's just like an online booking system but the speciality for this app is it provides other features. This figure shows the interface for the Hotel section.
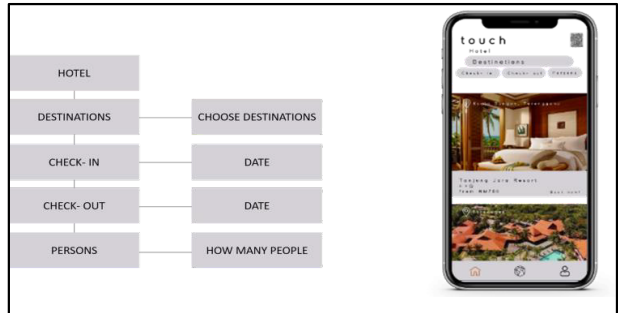

Figure 2. Hotel and hotel interface

Travellers that want to travel but cannot come to the destination that they want to go to for certain reasons, can join the live session in this app. They need to choose the destination in Feeds in this app and choose the package that they want to join. Some travellers want to gather information about that place before they go to that place (Figure 3). For this section, users need to pay to join the tour because the tour guide will guide them to the destination. Users need to click the package that they want and proceed with the payment that they have set in the setting.
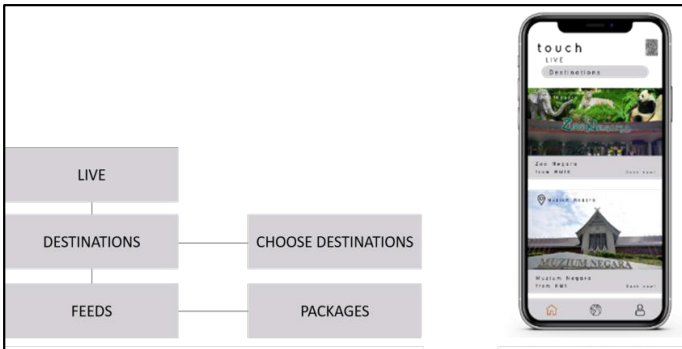
Figure 3. Live and live interface

Figure 4 shows the Feed. The users can see other users posting about the destination. They can see photos and videos captured by other users. Through video and photos, it will attract people to go and visit the recommended destination. This figure shows the Feed interface.
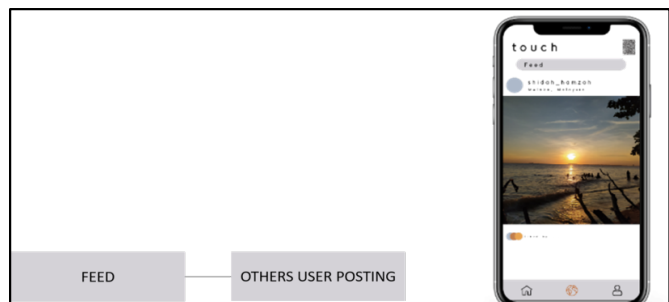
Figure 4. Feed and feeds interface

Profile interface is about a user account, it includes Setting, their Post and Personal Feeds. For My Purchase features, users can manage their purchase through Manage My Purchase, users can set payment methods and make the payment through Paypal, Credit or Debit Card and Online Banking. Through this feature, users can look at their Purchase History. Help Center button
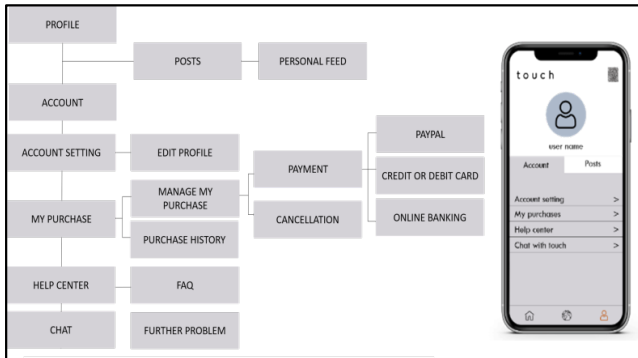
Figure 5. Profile and profile interface

includes in this app for Frequent Asked Question (FAQ) and they can Chat to clarify enquiries or further questions. This section makes it easy for users to log in and find Other Menu.

CONCLUSION

TOUCH can inform users on information needs, socialize with other users, manage bookings, personalization like push notifications and suggestions, and help to make better purchase decisions. The functions and approach of the applications can transform the tourism business. Concerning its ease of use and the reachability to connect between the customers and business providers.

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LOCALLAH

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ABSTRACT

According to Datuk Seri Nancy Shukri, Minister of Tourism, Arts and Culture Malaysia (2021), the sales of Malaysia handicraft products have decreased from RM519 million in 2019 to RM200 million in 2020. Furthermore, Pasar Seni had a lesser visitor every day and hit the lowest due to the COVID-19 pandemic (Bernama, 2021). This has caused economic and social disruption to the handicraft business owners. To counter this issue, we innovated an application called Locallah. It is an application related to the tourism industry which acts as intermediaries between handicraft business owners and customers. The objectives of Locallah are 1) to help handicraft business owners in promoting their products, 2) to increase profit by eliminating excessive intermediaries' cost, and 3) to educate local entrepreneurs and the users. The novelties of Locallah are to promote handicraft products from rural areas, to facilitate handicrafts business owner in sustainable business, and to educate in the importance of selling and buying from local handicrafts market. This application brings an impact on 1) **the economy** as it helps handicraft business owners to gain more profit and helps in job creation, and 2) **the social** as it educates the seller and buyer on importance in local handicrafts market. Lastly, the potential of commercialization can be seen in the ease of use of the application. In addition, the Malaysian Communication and Multimedia Commission (MCMC) (2018) stated that there are 26.7 million Malaysian use smartphones and 15.3 million people use the internet for online purchase and booking. This number indicates the significance of using smartphones and applications to which the travel and tourism industry is proceeding.

Keywords: Handicraft market, handicraft business owner, application.

ISSUE

According to Datuk Seri Nancy Shukri, Minister of Tourism, Arts and Culture (2021), in 2019 Malaysian handicraft items had sales volume of RM519,74 million. In 2020, it dropped to RM200 million. Additionally, Pasar Seni, which was once known as the Kuala Lumpur Central Market having fewer visitors every day and hit the hardest due to the COVID-19 pandemic (Bernama, 2021). Furthermore, this pandemic affects the business owner as they have lesser income. To counter this issue, we come out with an application known as LocalLah. LocalLah is a platform for local business owners to market their handicraft products.

INTRODUCTION

LocalLah application is an application for local entrepreneurs where they can sell local products such as kain songket, bakul anyaman buluh, tembikar, batik, baju kurung, baju melayu, and to name a few. Each handcraft comes with detailed description which will be helpful to assist potential customers. Therefore, this application is a suitable for small medium enterprise to promote their products efficiently and widely.

OBJECTIVE

This application aims to promote and help the local entrepreneur especially those who have affected and lost their customers due to the Covid-19. The following objectives of LocalLah are 1) to help local entrepreneurs in promoting their products and services. 2) to increase profit by eliminating excessive intermediaries and 3) to educate local entrepreneurs and the users. It educates in terms of making local people aware of the importance of supporting local product. So it is important for entrepreneurs to sustain their practices even though it is a challenge as entrepreneurs must be well-versed with all business strategies such as establishing long-term value, considering how a company operates, and understanding in the environment's ecological, social and economic factors.

NOVELTY

The novelties of LocalLah are promoting, facilitating, and educating handicraft business owners and customers. In the promoting aspect, LocalLah helps in promoting the handicraft and eliminate evasiveness intermediaries cost as the prices of the handicrafts will be clearly stated in the application. While in the facilitating aspect, this app helps handicraft business owner on providing ample employment opportunities even with low capital investments and become a prominent medium for foreign income. As for the education aspect, LocalLah provides information that educates customers regarding the local products such as region of origin, history, the process of making the handicrafts, etc. What makes this app different from others is that it focuses on helping entrepreneurs especially in the outskirts area to sell their products and services. This can benefit in reducing poverty as it is proven that due to COVID-19. It has caused a higher unemployment rate and also financially fragile to the handicraft entrepreneurs. Besides that, LocalLah application eases the payment transaction and helps in promoting a cashless society. This application also is a user-friendly application and provides a navigation system so that it will be easier for customers to keep on track.

IMPACT

This application brings an impact on 1) the economy as it helps handicraft entrepreneurs to gain more profit due to the COVID-19 pandemic. During this pandemic, digitalization is increasingly helpful for handicraft entrepreneurs to improve efficiency and competitiveness. Hence, most of them gain more orders due to this process of adaptation. This also helps to create job opportunities for handicraft entrepreneurs because they need manpower. This manpower is a crucial cycle as it builds business codependency. For example, those local entrepreneurs who produce local foods eventually they need more riders to send the orders to their customers later. If local entrepreneurs produce more foods, they will need more riders to help them send the orders. When the customers get their orders, eventually, they will order more products. During the pandemic, entrepreneurs must be extra aggressive virtually; as customers become passive physically. Thus, the entrepreneurs will have many advantages if they maximize this virtual opportunity. 2) Social as it can help educate the buyers by providing information about the uniqueness and quality of an original batik to feel more confident in their decision abilities. For example, the application can explain the differences between **the original Batik** (natural color, vibrant and solid) or **the printed Batik** (not natural, not solid colors and an opaque) and 3) environment as it helps to reduce paper waste. It can reduce the necessary resources and personnel to complete transactions because all receipts will be sent to the customer through the internet. This can also reduce deforestation and carbon dioxide emissions. This can provide a healthy competitive environment. Small businesses can compete successfully with larger firms because smaller businesses can provide more personalized products and services to their customers. They can also provide products and services where smaller orders and projects are required and fill unique customer needs, which larger companies do not provide.

PRODUCT COMMERCIALIZATION

According to the Malaysian Communication and Multimedia Commission (MCMC) (2018), there are approximately 28.7 million internet users, 93.1% using smartphones and 53.3% using the internet for online purchases and booking. Hence, it is a good platform for them to purchase local products at one application. Besides that, consumers who purchase the products through the application are not only supporting the business owners, but they are also contributing to the community at the same time. By contributing to society here, the consumers will feel empowered, and they will want to purchase the product again. Moreover, by supporting local products, it will help to keep the money circulating in local communities. It helps to boost the local economy when the business owners support other business owners by purchasing product supplies, working on a marketing plan, and creating a cycle of support. In fact, it will create job opportunities for local people thus reducing the unemployment rate in Malaysia. Other than that, it creates diversity in business ownership. It will allow minorities, women, university students, and others to start their businesses. A profitable business will generate a large amount of revenue, implying that it can pay more taxes. This money is then distributed to local hospitals, colleges, and other organizations.
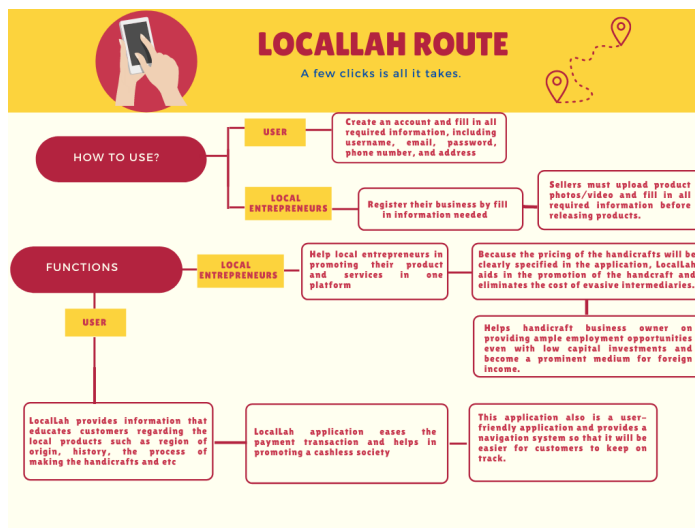
Figure 1. Process of using LocalLah Application

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EZ-TRAIN MOBILE APP

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ABSTRACT

"Ez-Train Mobile App" is an application which is specially created for train users such as KTM, LRT, MRT and Monorail. Ez-Train's objectives are to introduce an E-wallet system for consumers to purchase the ticket online and scan the QR code to enter the train, facilitate consumers to find the closest station around them, and ease consumers to arrange their time accordingly the train's schedule. The most significant novelty is that no one has yet created such an application for the use of train users that can gain a variety of uses. This is because up until now, there is still no use for an application for the train users that are multi-purposes like this mobile application. This application special criteria, as what we have mentioned above it is not just can be used by users who only want to use KTM, in fact it can also be used for the LRT, MRT and Monorail services. The usefulness of the Ez-Train's is the top-up can be done by using online banking system that will be linked with this application where you can put an amount of money. Plus, when they top-up their account, they will collect loyalty points and discounts. Other than that, users can track the train through the map and they will get all the information about the train's location live, including the tracking number on which the train is arriving, the scheduled arrival times, the expected departure times, next upcoming stop, the train's intended destination and all intermediate station updates. Users also can check the availability of the train's seat and choose their seat. This product specification allows new users to register and sign in with multiple social media such as Facebook, Instagram, Twitter and Email.

EZ-TRAIN MOBILE APPLICATION

"Ez-Train Mobile App" is an application that can be downloaded from Apple and Android users. This mobile app is specially made for the train users who will likely use the train as their primary public transportation wherever they go. We named this mobile application as "Ez-Train Mobile App" because of its ability to provide an online ticket booking service for various types of trains available in the Klang Valley district. The word for 'Ez' is referring to the word 'easy', which means this mobile app can ease the users to catch any trains via this application.

The creation of Ez-Train Mobile App would make the train users ease their purchase of train's ticket pass only by using the E-wallet because, up until now there is still no such application that can be an E-wallet service for the train consumers who wanted to use various types of train services in Klang Valley district such as KTM, LRT, MRT and Monorail. KTM stands for Keretapi Tanah Melayu, LRT stands for Light Rapid Transit, while MRT is known as Metro Rail Transit. The top-up for the E-wallet can be done by using an online banking system, where it will link with this application and users can put such amount of money to top-up. Users can also use their credit and debit card to top-up the E-wallet.

Ez-Train aims to facilitate the train users by providing all the information about the train that they want to use. This is where the services contained in this application is not only an E-wallet, in fact, it also includes other services. For example, there will be the features of the services such as to track the train's route, to know the train's schedule, to check for the seat availability, to look into their booking history and allows the users to connect this application with their social media account.

Hence, Ez-Train Mobile App is indeed a multi-purpose application that specially created for the train users who use train services as their main public transportation for various purposes. In addition, the services provided by this application may also facilitate tourists who want to travel and explore the beauty in Malaysia while using the train service in the Klang Valley district.

OBJECTIVES

1)   To introduce an E-wallet system for consumers to purchase the ticket via online and scan theQR code to enter the train.
2)   To facilitate consumers in finding the closest station around them.
3)   To ease consumers in arranging their time accordingly the train's schedule.

THE NOVELTY OF EZ-TRAIN MOBILE APP

Before we go further with our innovation product which is the 'Ez-Train Mobile App' for train users for KTM, LRT, MRT and Monorail, it is not enough to just do something right in order to be considered innovative. It is just a matter of doing things in a new way. Often the variations are minor, but other times they are massive, with innovations of Ez-Train Mobile App and developments that are entirely different from those that come before or access to available trains seat availability for any location to help the users prevent any last-minute inconveniences. The important thing is it allows the users to arrange or book train tickets with ease.

By using Ez-Train Mobile App allows new users to register or sign up with multiple applications where they can connect the main KTM, LRT, MRT and Monorail social media to secure user's account. Certain apps ask people to register before using the app, while others do not require signing up. By doing so, users could see the many capabilities that an app provides, which allows them more aware of the services that can become accessible after registering (Wallwood, 2019).
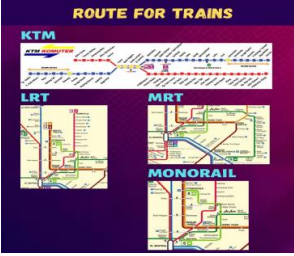
THE IMPACT ON THE COMMUNITY AND ECONOMY

The primary impact of this app is that the users can use Ez-Train Mobile App to reduce their wait time. For example, they can use Ez-Train Mobile App to know the time of their walk to a stop or station. According to Brakewood (2021), the more people can get to those multi-modal, real-time transportation apps, the better informed the user will be and the better choice they can make. So, by using Ez-Train Mobile App, people can choose their better journey transportation by selecting which transportation station they would use and allows to purchase the ticket via online and also the users just need to scan the QR code to enter the train.

Other than that, mobile apps have played a more serious role in economic growth as well. Economists and other researchers have been discussing this for the last few years, an application in the economy driven by the surge of mobile applications and their role in growth. Therefore, by having Ez-Train Mobile App, it can generate a lot of money for the developers. When people are aware of the development of this innovation and the uniqueness of Ez-Train Mobile App that it has to offer, it will attract people to download this application.

PROCESS OF USING EZ-TRAIN MOBILE APP

Table 1. Ez-Train Mobile App Process

Process of using Ez-Train Mobile App	Description
 Figure 1: Register	Step 1: Firstly, users need to install the mobile application. Ez-Train Mobile App can be download by android or Apple users. Then, users can sign up and log in using their social media sites such as Facebook, Twitter, Instagram or through their Gmail.
 Figure 2: Service Types	Step 2: Secondly, after completing the registration, user will proceed with this page. This is where the user will be able to see the services provided in this application.
 Figure 3: Schedule	Step 3: Thirdly, after the users select buy ticket, users will go to this page where they can select a ticket and manage their train schedule.
 Figure 4: Select A Seat	Step 4: Fourthly, Ez-Train Mobile App will ask the user to select a seat. Users are free to choose the coach and select any seat they want depends on the seat availability.

 Figure 5: Route for Trains	Step 5: Fifth step, after completing the schedule page, users can identify the route they will take based on the train that they will use. This also allows users to know which station is the closest to them.
 Figure 6: QR Code	Step 6: The sixth step, this is the QR code page where users need to scan the QR code at the gate counter to have access entering the train. This can make it easier for users not to have to queue long if they only use cash to buy tickets.
 Figure 7: E-wallet	Step 7: The next step is E-wallet (top-up). In this part, users can top-up their E-Wallet with any amount they prefer, which is the minimum of RM 10 or RM50, RM 100 until RM 200. For thepayment method, there are two methods that user can use, which is via onlinebanking or credit/debit card.
 Figure 8: Notifications	Step 8: The Ez-Train Mobile Apps will notify the users to keep them in theirminds and enhance their experiences andadd value to the services they used. The mobile apps include Booking History, E-wallet updates and Ez-Train Updates.
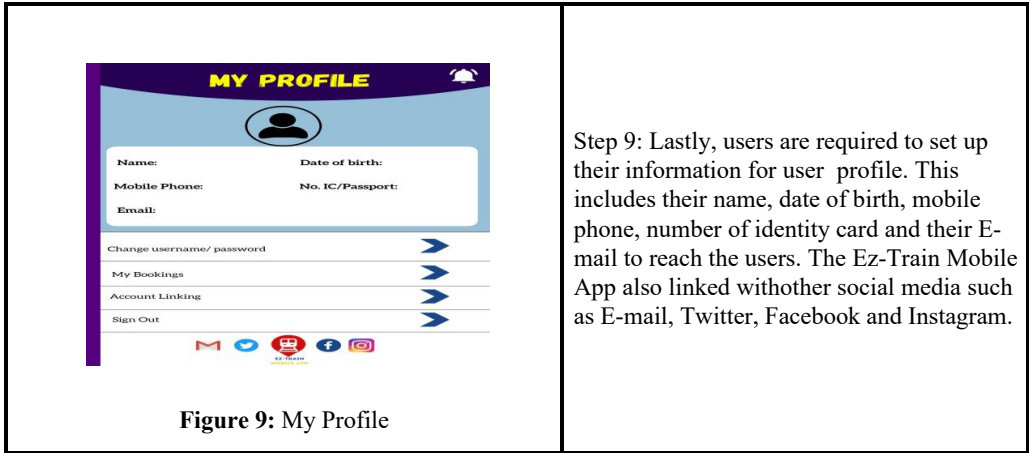
	Step 9: Lastly, users are required to set up their information for user profile. This includes their name, date of birth, mobile phone, number of identity card and their E-mail to reach the users. The Ez-Train Mobile App also linked withother social media such as E-mail, Twitter, Facebook and Instagram.

Figure 9: My Profile

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EVENTGO

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ABSTRACT

Planning an event is a stressful and challenging task requiring many hours and days spent researching and calling various vendors to check on availability and pricing. On the other hand, event vendors would often have difficulty reaching their target market as there are potential customers who are not aware of their existence. Due to the current Covid-19 pandemic that hit globally in 2020, many event vendors, especially local vendors, have experienced a severe sustainability issue due to cancellation and lack of business. According to the Bureau of Labor Statistics (2021), the job growth for meetings and event planners is expected to grow at 11%. The EventGO application is an e-commerce platform that acts as an online intermediary between host event management vendors and customers. This one-stop center allows vendors to showcase and sell their services. Simultaneously, it eases customers in planning their events as it has many options to choose from various vendors under one "roof."   It features filters for users to choose and find specific services that fit their desired criteria, such as location, pricing, popularity, and ongoing promotions. The application also features a chatting platform that allows users and vendors to communicate and inquire about their services. Furthermore, it provides trending event styles, blogs on recommended services, and a reviews platform according to the users' liking, where they can refer to it and plan their events easily. Not only is EventGo a game-changer in the event industry, but it also helps to make planning for an event a stress-free experience.

Keywords: Events, Service Providers, Service Application

OBJECTIVES

- To provide a safe and secure platform for vendors to sell and showcase their products.
- To create an easy-to-use application that simplifies event planning.
- To provide a wide variety of event planning services in a single application.

NOVELTY

There are a few notable novelties to this application that we intend to produce. First is that this application is designed to follow the trends of online shopping. It is a fact that these days, everything can be done online, especially on purchasing products and services. According to GlobalData's E-Commerce Analytics (GlobalData., 2020), Malaysia's e-commerce market is estimated to register 24.7% growth in 2020. The market is expected to reach MYR51.6bn (US$12.6bn) by 2024, increasing at a compound annual growth rate (CAGR) of 14.3%between 2020 and 2024. Therefore, this application will be an easy to access online platform exclusively for event planning. Other than that, it is also an application that can create a community of industry players. Thus, it is possible to do networking with other businesses in the same industry. Next, this application also provides a catalog of services from multiple categories of event planning and provides a platform to post and read reviews of businesses in the application.

SPECIAL CRITERIA

1. Easy and simple to use interface for both advance and beginner event planning.
2. Enables users to find services needed for their events based on specific categories such as catering, décor, venue, and even event planners.
3. Allows users to filter different vendors to match their criteria, such as prices from low to high, high to low, popular vendors, vendors that have promotions or discounts, and vendors who are nearby to customers.
4. Provides a platform for users and vendors to communicate via chat to enquire regarding their services and negotiate.
5. Allows users to pay directly to the vendors via FPX payment, credit cards, and Paypal.
6. Acts as a platform that allows less-known vendors to promote and showcase their services and products.
7. Acts as a review platform for future and potential users to refer.

IMPACT/USEFULNESS

EventGo is a multifunctional application that makes event planning simple and easy in terms of impact or usefulness—boasting multiple functions such as showcasing multiple vendors that range from many different categories. The apps also contain filters that enable users to search for their desired services, a place for users to read reviews and write reviews and provide them with a platform for accessible communication and inquiry between user and vendor. The application is for professional event planners and beginner-friendly. Its easy-to-use interface helps planners oversee all aspects of their event while also helping them to be more organized. Not only is EventGo a game-changer in the event industry, but it also helps to make planning for an event a stress-free experience.

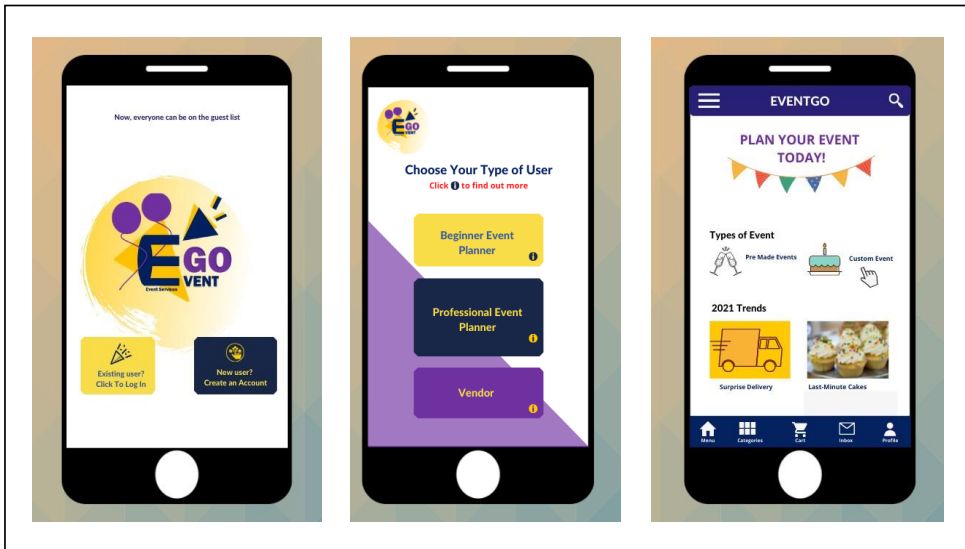## PROCESS OF CONSUMING THE PRODUCT/ PRODUCT SPECIFICATION

Figure 1. Registration of EventGo

As shown in Figure 1, the first stage of using EventGo allows users to select "New User" to create an account or "Existing User" to log in to an existing account. Before registration, users must choose their type of user:

a) Beginner Event Planner
b) Professional Event Planner
c) Vendors

Beginner Event Planner and Professional Event Planner has the same features in customizing events, but the only difference is that helpful tips and tutorials will be provided for beginners while professional is recommended for industry player users. They will have the advantage of building a community among the industry players.
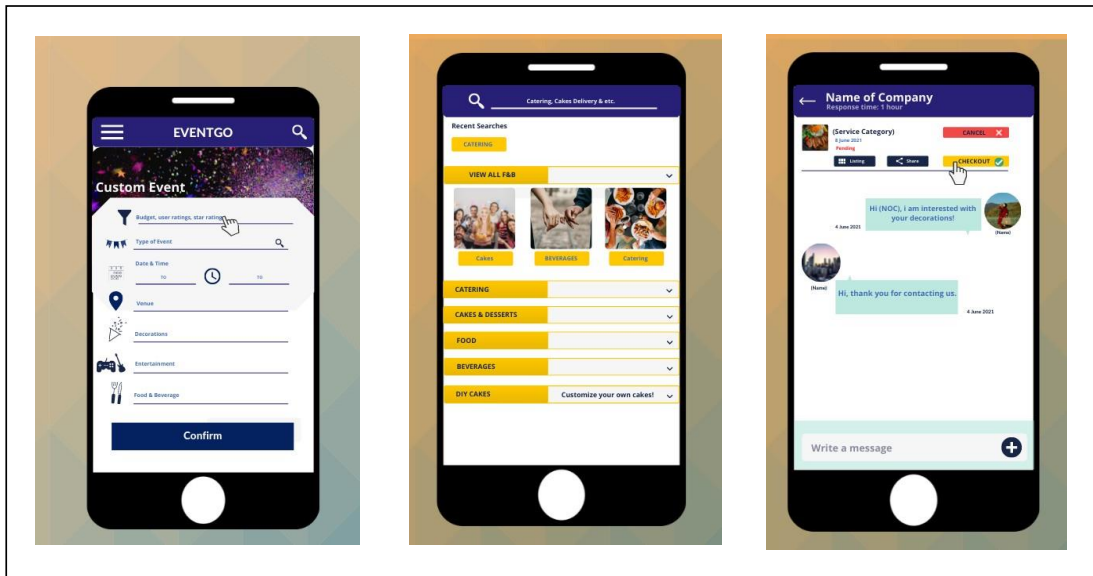
Figure 2. Event Planner users can create an event based on the categories of event services.

As shown in Figure 2, event planners will have the option to select the categories. Each category will have sub-categories, and images of event services will be displayed. For examples:

a) Budget, user ratings, star ratings
b) Type of Event
c) Date & Time
d) Venue
e) Decorations
f) Entertainment
g) Food & Beverage

After choosing the categories, the event planner clicks on confirm, and an auto-generated message will be sent to the event service providers. They will discuss further the event details, and the event planner will give details to the event service provider once they have negotiated the terms and conditions. The event planner can proceed to check out and make payment.
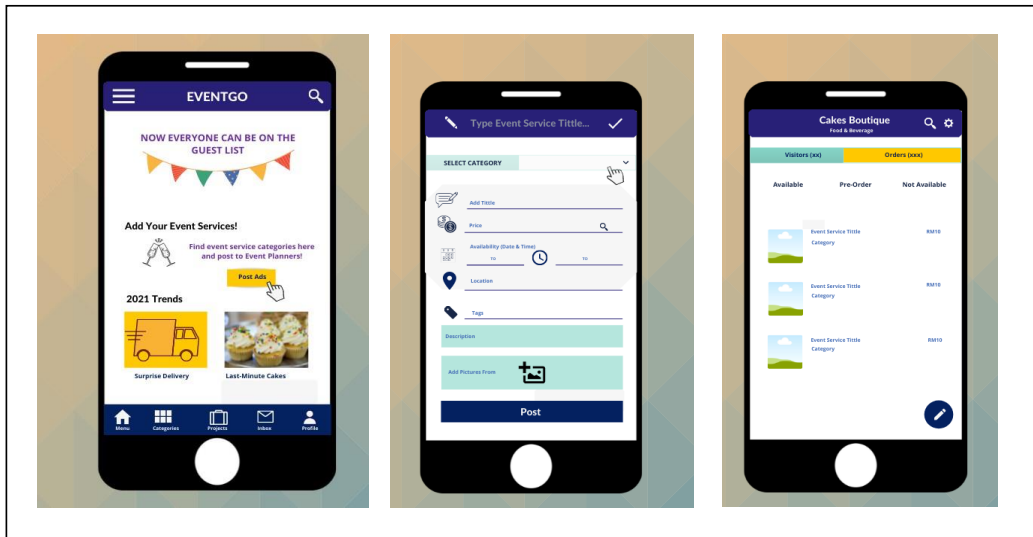
Figure 3. The process of posting event services for Vendor users.

As shown in Figure 3, vendors will have the option to select the category. The categories are:

b) Type of Event
e) Decorations
f) Entertainment
g) Food & Beverage

Once they have selected the category, they can give further details about their event service and add some pictures. After they post, they can check their listings in the profile and check how many orders they have received and proceed to chat with the event planners. The vendors can also manage their listings and check the availability of their services or products.

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DUO-BOTTLE

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ABSTRACT

Duo-Bottle is a bottle that can do both heating and cooling process for liquid such as water and other types of drinks. This bottle will be made of plastic polymers such as polypropylene and co-polyester, which makes them light and durable. Heater and cooler system will be placed at the bottom of the bottle. The main aim of this product is to ease the difficulties of heating and cooling water during camping or hiking, as well as to reduce environmental pollution. Novelty of Duo-Bottle is that it uses fingerprint instead of buttons, to switch on or switch off the heater or cooler. Besides that, Duo-Bottle has 2 ways to charge which the first one is using cable (electricity) and second one is using solar power. Traditionally, we need to set up campfire to heat water during camping, which could cause air pollution and reduce the quality of the water. With the existence of Duo-Bottle, we are not only reducing air pollution, but also save power source (electricity usage). As mentioned, Duo-Bottle is chargeable, so consumer can unplug the charger when needed to use it without need to worry about its source of energy because it is also chargeable using solar power.

Keywords: Duo-Bottle, Solar Bottle, Hiking Bottle, Camping Bottle, Cooler Heater Bottle

OBJECTIVE

1. To identify the manufacture of new products.
2. To ensure that this product can be used well by users.
3. To ensure Duo-Bottle has the highest quality in the market.

NOVELTY

Based on Andrew Collett's experiment in 2016 on a normal flask durability, the water temperature is still hot after 7-8 hours of the experiment. However, this depends on what

material is used to make the flask. Most flask have inner chamber that is made of two layers of glass or stainless steel with a vacuum in between to separate the outer part of the flask that is made of plastic or metal (Chris Woodford, 2019). Hence, that ordinary flask can only hold heat for few hours, which could be a problem to the target market, especially the hikers and campers. In that case, we have come up with the idea to invent the Duo-Bottle which can be used to heat and cool liquids. Thus, users do not have to worry about building a campfire to heat their drinks or bring ice to cool it, after hiking for few hours or during camping because Duo-Bottle is the solution.

SPECIAL CRITERIA

1. Easy to repair and warranty provided
   Duo-Bottle product is made from parts that are available in most countries such as solar panel and wirings. In case there is a damage or malfunction, user can easily change its part or repair it at any nearby electrician store, plus they can claim the warranty as well.

2. Affordable price
   The price for Duo-Bottle will be reasonable for all ages of customers. The affordable price can encourage young hikers to purchase it and use it during hiking or camping.

3. Has minimum weight and size.
   Duo-Bottle has a size and weight that is suitable to be carried anywhere, especially when engaging with sports activities. In addition, this product will not take much space of consumers' bag packs.

4. Unique and durable design.
   Duo-Bottle is unique as it is produced from high-technology materials as well as eco-friendly. Its durability allows consumers to use it for a long time and reduce wastes.

IMPACT/USEFULNESS

Duo-Bottle can heat and cool water or any liquid just by pressing a fingerprint button. This can save consumer's time and costs, plus it is very convenient to be used during outdoors activities.

Besides that, Duo-Bottle is also an eco-friendly product because it has high durability and consumers can reuse it for a very long period of time. Thus, this can reduce the waste of plastic bottles as well as preserving the wellness of environment.

PROCESS OF CONSUMING THE PRODUCT/ PRODUCT SPECIFICATION

Table 1: Process of Using the Duo-Bottle

NO.	STEPS	EXPLANATION
1.	Charge Duo-Bottle before filling it with liquid	i) Power logo turns green when it is fully charged.

		i) Power logo will be blinking in red as a signal the battery is low ii) Power logo will be in a static red light when it is charging during low battery and turn into green when it is fully charged.
2.	Fill the bottle with liquid (hot/cold/normal temperature)	
3.	Long press hot (red) / cold (blue) button to heat/cool liquid	i) Long press the button until it blinks. ii)Button will blink during the heating/cooling process. iii)Button will stop blinking when heating/cooling process is done.

CONCLUSION

Duo-Bottle is essential for users' needs because it is a water bottle that has two functions where users can take it anywhere, especially when doing outdoor activities. Consumers who travel can also bring this bottle since they do not have to spend on buying mineral water, as well as reducing the wastes of plastic bottles. This product has special criteria that can satisfy users' need. It is very simple to use Duo-Bottle and it is not only beneficial for consumers, but also can preserve our environment. Duo-Bottle is potentially great to be existed in the market as it gives a lot of benefits to the users in the future.

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4 IN 1 SAFETY KIT

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ABSTRACT

Numerous of us have that on-edge feeling which runs through our bodies on a regular basis especially when we are alone. In reality, we do not feel secure most of the time and the lack of safety is a major concern that triggers us. Therefore, travellers often feel scared of travelling alone or even travelling in groups. The main objective of this product is to provide a solution to solo travellers to prepare themselves if any unwanted scenarios were to happen. It is also to encourage the traveller to travel in less fear. 4 in 1 Safety Kit is a product that comprises safety tools like pepper spray, hand sanitiser, torchlight, and safety alarm. Many self-defence tools promote safety, but most are sold individually according to their purposes. The novelty of the product can be recognized as it provides four different functions of safety packed in one simple product. The idea of innovating this product is to make solo travellers feel safe when travelling alone. We aim to innovate a product that is convenient for people to bring and easy to use. This product is made with a combination of polyvinyl chloride and metal, which can be considered light in terms of weight. The colour of the product is black with a neon colour lining that glow in the dark and comes in a size of 15 centimetres. The uniqueness of this product is it's eco-friendly as it uses high-efficiency solar panels, which can transform solar energy to electric energy that is rechargeable for the safety alarm's speaker and led lights. Also, as for the hand sanitiser and pepper spray, we decided to make it refillable which can save a lot of money.

Keywords: safety, safety kit, travel, solo travellers, innovate

OBJECTIVES

In today's world, solo travelling has grown in popularity every year. Hostel World (2018) indicates that there has been a rise of 42% in bookings from solo travellers over the past year. The data shows that the market for that sector has been growing, and even females can be considered part of it. According to Travel Weekly (2019), women have been more concerned about their safety when taking a leisure holiday or business trips. Based on Figure 1, it appears that the percentage of each chart relating to the safety of female business travellers is high. The figure proves that women have to face the safety risk and always prioritize their safety concerns whenever they are travelling.

Figure 1. Female Business Travelers Safety Concern

One of the basic needs of mankind is to feel safe and protected. According to Hamarneh and Jeřábek (n.d.), an unintended bad encounter that affects essential elements could lead to a tourist motivation crisis. The main objective of 4 in 1 Safety Kit is to provide security and insurance to those who feel insecure when travelling, especially solo travellers. Besides, the product also aims to provide solutions and add safety elements to one's travel experience. Travelling alone is often associated with exposure to danger. However, travellers also feel scared of travelling alone or even travelling in groups since the risk of travelling could occur to everyone. Extra precautions should be taken and purchasing the 4 in 1 Safety Kit could provide solutions and benefits to the consumer. Other than that, encouragement of solo travelling is also one of the objectives to lessen the fear for a good sense of satisfaction while travelling. The product could assist and influence traveller's motivation to be more involved in tourism activity as part of the risk can be eliminated due to the product.

NOVELTY

Each of these products is usually sold separately or individually. We invented a product that comprises four different safety functions shaped into a single and easy to carry around product. Not to forget our product is also eco-friendly which comes with refillable pepper spray and sanitiser, and rechargeable battery using a solar panel for safety alarm that can be considered as cost-saving for our customer. We all have seen the emergency aid or treatment kit for an individual; however, it is rare to find a multiple function product that will help you during emergencies or unwanted incidents. Hence, this is one of the best products for a traveller to own and it can assist them when emergency happens, especially when they are alone. Plus, it creates the market newness for safe travelling. This product is different where we offer different types of precautionary measures that liaise with our aim and goals, which targeting solo travellers and female travellers where their safety is always a concern, and this could reduce

the feeling of being scared and worried.

SPECIAL CRITERIA

Our safety kit contains pepper spray, hand sanitiser, window breaker and safety alarm all in one form. It is very convenient for people to carry on-the-go and use it well for their safety. As shown in Figure 2 below, these are the special criteria about the product that we invented including the functions of each safety concept. This figure will show a clear view about the specialty of the products to our future customers:

Figure 2. 4in1 Safety Kit Special Criteria

IMPACT & USEFULNESS

This product will change the game of travelling for everyone, especially for solo travellers. They can feel safe everywhere because they know that our product is one of the best qualities and will give them the safest way to travel. This will impact most travellers and encourages more people to travel and explore the world. According to the solo travel demographics survey in 2018, there are a total of 1,340 responses in which informs us the Solo Travel Society Facebook page which has over 162,000+ fans recorded that there are 63% of those fans are women and only 36% of the fans are men. Moreover, the highest age category for solo travellers that wants to travel between the ages of 25-34. Meaning that more women in their middle age are more likely to solo travelling, which will create a new market for women solo travellers. Not only will it create a new market for solo travellers, demand for products will also increase. This product has four useful safety tools such as pepper spray, safety alarm, window breaker and sanitiser. For example, if we are travelling and someone tries to cause any harmful actions, we can use the pepper spray and sound the alarm as a self-defence mechanism to let people know where we are, and it will revolutionize the new way of solo travelling. Not to mention, the product is also lightweight, and easy to carry around, making it much more convenient for travellers to carry around even in their handbags or travelling bags. Therefore, this product has a meaningful impact on travelling especially to encourage women to travel more and also in the tourism industry, as it has many benefits of carrying this safety kit when travelling.
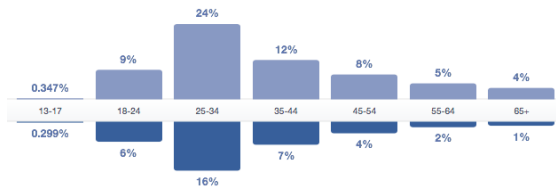
Figure 3. Demographics by Facebook

PRODUCT SPECIFICATION

Figure 4. 4in1 Safety Kit Product Design

Table 1. 4in1 Safety Kit Product Specification

Product name	:	4 IN 1 SAFETY KIT
Colour	:	Black & green neon colour lining
Size	:	15 cm
Shape	:	Cylinder
Material	:	Polyvinyl chloride & metal
Features	:	Pepper Spray, Hand Sanitiser, Window Breaker, Safety Alarm
Extra features	:	Solar Panel for Rechargeable Battery, Silicon Grip Tape, Silicon Grip Window Breaker Cover, LED Lights & Speaker, Carabiner Hook + Single String Keychain, 2 x 30ml Refillable Container.

PROCESS OF CONSUMING THE PRODUCT

Table 2. Process of Using 4in1 Safety Kit

PEPPER SPRAY	HAND SANITISER
Hold the product in upright position. Using thumb finger, wrap other four fingers and palm around the product to form a secure grip. Then push the darker red button down and spray directly into the attacker's face.	Hold the product in upright position. Using index finger, push down the light red coloured button and spray or apply the sanitiser to the palm of one hand. Thoroughly rub both hands together until both hands are dry.
WINDOW BREAKER	SAFETY ALARM
First, press the button placed at the bottom of the product to pull down the window breaker. Second, remove the silicon cover. Third, point the sharp tip towards the window and smash the window.	Press and hold the button for 3 second to trigger the alarm. A loud high pitched sound together with blinking lights will start to show once its activated. To deactivate the alarm, simply double press the button.

CONCLUSION

Tourism can be associated with fun experiences, meeting new people and enjoying the moment but the safety aspects of the whole trip need to be emphasized. The biggest challenge to assure great satisfaction of travelling is to monitor and keep one's safety in the meantime. Therefore, this innovative idea has sparked in order to create a safety travelling kit that caters not only solo travellers but tourists particularly. We hope that this production, the 4 in 1 safety kit can assist more tourists who are facing some unwanted scenarios in self-defence and creates a safer environment. After all, tourism activity has its own risks, and ensuring safety is one's own responsibility.

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AUGMENTED REALITY DESIGN:
THE STUDY OF PROPERTY DEVELOPMENT MARKETING TOOLS

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ABSTRACT

My research focuses on the yet unknown subject of growing reality (AR) usage in immobilization. Previously, printing ads are used to help businesses sell the goods or services they deliver to their clients. In the home market, the brochures have had a huge effect on the degree of buyer satisfaction in the housing offered. Some developer using a scale model is a required architectural design to reflect the design outcomes as a physical model by architects. Making a scale model requires components that cost some money and not practical nowdays. Augmented reality (AR), state-of-the-art technology for superimposing knowledge onto the physical world, has recently begun to influence our everyday lives. Applications from AR are becoming mature and flexible. Augmented Reality (AR) is an technology that integrates 3-dimensional simulated objects into real-time real-time settings. Creation of this technology based on User Centered Design at each stage of the design process, usability goals, user characteristics, environment, activities, and workflow of a product, service, or process are given considerable consideration. It aims to provide a clearer visual understanding of the structure of the house displayed in 3-dimensional form. In addition, it will raise the demand of buyers of houses sold and reduce the expense of producing miniature models. Its runs on the Android smartphone platform and uses the Vuforia SDK to view augmented objects in 3-dimensional format. Systemic protocols are used to clarify the process of the two studies aimed at developing a system that can be implemented, modified or adjusted to better fit the requirements of any particular research project in this area.

Keywords: *Augmented Realit, Real Estate, Marketing tools, Architectural design, Smart phone, User Centered Design*

INTRODUCTION

Augmented Reality (AR) as a direct or indirect real-time view of a physical real-world environment that has been enhanced / increased by adding to it virtual computer generated information. Augmented reality offers a visual of the real world where elements are superimposed on computer-generated images, such as graphics, sounds, videos, or digital content. From the first AR head-mounted display developed in the 1960s by Ivan Sutherland at Harvard (Sutherland, 1968) to the enhanced HD4 AR and Mobile Augmented Reality System (MARS) developed by Golparvar et al. (Bae et al., 2012), augmented reality technologies have been used in various disciplines and arenas, e.g. engineering, entertainment, aerospace, medicine, military and automotive ind. AR is both interactive and tracked in 3D as well as integrating actual and virtual objects. 3D Modelling will continue to play a key role in virtual regulatory environmental activities. It is because the intersection of technologies and human are between models.

Research Question

1. What is the most efficient approach to promote a real estate property using marketing kits?
2. How important a marketing kits for property development may aid in the sale to potential buyers?
3. What are the advantages of using augmented reality application in marketing strategies through user-centered design?

Research Objective

1. To identify an effective way to market a real estate property using augmented reality in their marketing kit
2. To analyze Augmented Reality Application for property development which helps them in selling the current and future properties to prospective clients.
3. To develop an augmented reality-based navigation system based on user centered design by bridging the gap between imagination and reality, augmented reality helps companies increase brand awareness, create a loyal consumer base, and engage with their audience.

Research Problems

1. To build a marketing property miniature, developers require more trained workers, and the model itself might produce surplus tonnes
2. Some housebuilders are assuming suburban marketing imagery. Furthermore, most real estate investors avoid creating new ideas.
3. Lack of knowledge some marketing personnel are still using traditional way to promote they property to potential client.

METHODOLOGY

User-centered design (UCD) is a set of procedures that puts users at the centre of product development and design. When a researcher creates digital goods, it considers the needs, goals, and feedback of the users. User requirements and desires become a top concern, and every design decision is assessed in terms of whether it adds value to the user. Image 1.0 shows that how the process of design thinking

Ideate phase

According to A. Gerstenfeld's remark from 1976 , innovation also refers to the process of developing new goods and methods, as well as the culmination of all previously produced inventions. According to Thom , 1980, he devised a straightforward scheme. He separates the product development process into three stages: concept generation, concept acceptance, and concept realisation. Individual sub-phases and/or subtasks are grouped into these primary stages. Table 1.0 summarises Thom's approach.

Table 1. Summarises Thom's approach

Stages of the innovation process		
Main Stage		
1. Idea Generation	2. Idea Acceptance	3. Idea Realisation

Prototype phase

Prototyping is a crucial step in the development of interactive systems (Rogers, Sharp, & Preece, 2011). In interface design, prototypes serve a variety of functions. They're utilised to communicate with designers as well as users, developers, and managers, for example. Prototypes are also used to broaden the design area, create ideas, and conduct feasibility tests.

Test phase

With continuous iterations and user omnipresence - and the time and expense that entails - Frohlic and Sarvas, 2011 defend the User-Centred Design method, even if they realise that this practise weakens the urgency of the technology and innovation market. Support statement by ISO 9241-210 This method improves efficacy, human well-being, accessibility, and sustainability while also taking into account the many implications that interactive systems might have on health, safety, and user performance.
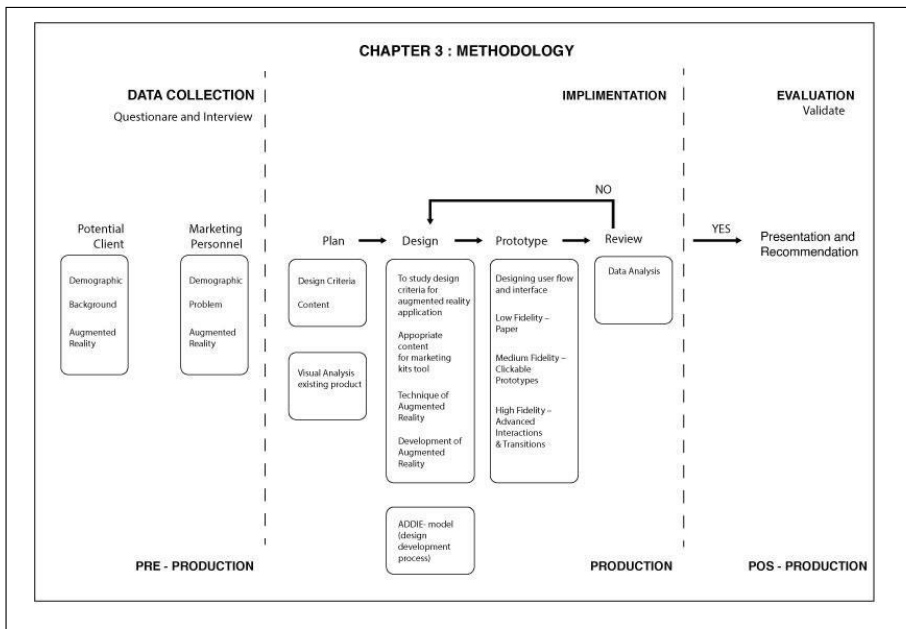

Figure 1. Methodology workflow

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SMART Hygiene Kit

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ABSTRACT
The new norm has pushed forward the practice of 3Ws (wash, wear, warn) introduced by the government to the public to prevent the further spread of COVID-19 (KKM, 2020). The COVID-19 virus spreads via droplets released when someone infected with the virus sneezes or coughs. Although there are various sources of information to educate the public about the importance of the 3W practice, there are still existing concerns on the improper wearing of face masks and hygiene practices. Thus, experts emphasize the importance of wearing face masks in public, proper personal hygiene, and disinfection practice to reduce the risk of virus infection. Many products related to COVID-19 protection, such as masks, sanitizers, and disinfectants, are sold in the market separately. It can be inconvenient, especially for having to carry many things at once. Therefore, a potential solution to reduce these worries is a new innovative product called 'SMART Hygiene kit', which combines the necessary mask protectors, hand sanitizer, and surface disinfectant. The interesting part is the compact size, and it comes in many colors which suit the preferences and personality of the users. The product is also equipped with a ring to hang it on their bag for the convenience of users. The novelty of this product is the convenience of bringing one product, 'SMART Hygiene kit', which provides all we need to prevent the spread of COVID-19. This innovation is useful for everyone by easing them to bring one product instead of getting all these necessities separately.

Keywords: COVID-19, Hand Sanitizer, Surface Disinfectant, Mask, Mask protector

INTRODUCTION

COVID-19 has purportedly spread from China's Hubei province to over 100 countries, prompting a worldwide pandemic since December 2019 (Duddu, 2020). People are encouraged to wear face masks in public, to wash their hands or use hand sanitizers every time they put on and take off their masks. Since masks are considered a critical step to prevent the spread of

COVID-19, it is important that proper wearing of face masks is practiced while in public places. For example, face masks should not be worn below the chin or neck because it will pose risk for contamination. Additionally, disinfection practices are also important to reduce COVID-19 virus contamination. High-touch surfaces such as door handles, handrails, bathroom surfaces, sinks, toilets, taps and touchscreen personal devices need to be disinfected. One can easily be infected when touching surfaces that have been contaminated by the virus, when touching our eyes, nose or mouth without cleaning our hands. There may be dried droplets of sputum in a public area resulting from anyone sneezing or coughing. Therefore, disinfection by wiping or spraying is the ideal means of surface disinfection. While sanitizers and disinfectants are commonly referred to interchangeably, the two types of products are actually different, and should be used in different situations. In short sanitizers reduce bacteria on a surface by at least 99.9% while disinfectants kill a wider range of microorganisms (than sanitizers).

COVID-19 virus transmits largely through saliva droplets when an infected individual is coughing or sneezing (Butt, 2021). Hygiene is fundamental to making human progress. Personal hygiene is important as it prominently protects people from certain dangerous diseases (Zain and Shehu, 2018). Personal hygiene has become even more vital for everyone considering the current state of the COVID-19 pandemic. According to Govindan et al. (2020), individuals need to protect themselves and others from infections by thoroughly washing their hands. Handwashing reduces the risk of disease transmission; however, it can be difficult to wash hands in public properly. In addition, many products related to COVID-19 protection, such as masks, sanitizers, and disinfectants, are sold in the market separately. It can be inconvenient, especially for having to carry many things at once. Therefore, the potential solution to address this problem is a new innovative product called the SMART Hygiene Kit, which combines the necessary mask protector, hand sanitizer, and surface disinfectant.

Objective

The two major ways to protect ourselves during the COVID-19 pandemic is by washing our hands regularly, sanitizing them and cleaning commonly touched surfaces. Therefore, the objective of this project is to ensure users' convenience of keeping hygiene while in public places and avoid the spread of the virus COVID-19 using the SMART Hygiene Kit. The SMART Hygiene Kit is a game changer in regular, detailed cleaning or sanitation practices amidst this COVID-19 pandemic.

RESULT AND FINDINGS

The result of the project is "SMART Hygiene Kit". The main objective of SMART Hygiene Kit is convenient for the users to bring one product at one time.

Figure 1 shows the product components. This will solve the problem of people having trouble or find it a hassle to bring different types of hygiene products separately during this Covid-19 pandemic.
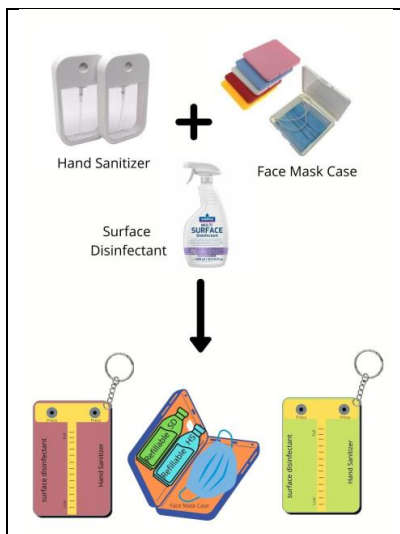
Figure 1. SMART Hygiene Kit components

SMART Hygiene Kit components

SMART Hygiene kit combines multiple products into one complete and convenient product, the combination of hand sanitizer, face mask protector and surface disinfectant makes it perfect for everyone to own it. SMART Hygiene Kit is eco-friendly because it has a refillable container and it is economical. It is also made from biodegradable plastic, which is not only durable but also safe for the environment.
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Figure 2. Multiple choice of color and natural fragrance

Potential Commercialisation

SMART Hygiene Kit has a good potential for commercialization since there is no such product

that is similar in the market today. SMART Hygiene Kit is an innovative product with a complete combination of all the necessary functions for sanitation, protection and maintaining cleanliness. The interesting part is the compact size, easy to carry and it comes in many different colors and natural fragrances which suit the preferences and personality of the users as shown in Figure 2.

CONCLUSION

In summary, the objective of this project is accomplished where the project is capable of providing a convenience to the users. This project will benefit users as it will ease them to bring one product instead of getting all these necessities separately.

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