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Online Learning Engagement Among Malaysian Primary School Students During the Covid-19 Pandemic

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COVID-19 had completely changed the landscape of Malaysia's education system. The pandemic had led to severe closure of schools and a shift to an online teaching and learning mode. In response to this, The Teaching and Learning at Home (PdPR) programme was introduced and implemented. In view of the circumstances, it was necessary to find out how Malaysian students were coping with this change and how effective was this new mode of teaching and learning. Exploring issues pertaining to the online learning engagement of primary school students is vital in addressing a gap not investigated before. This concern spurred the current study which was designed to explore Malaysian primary school students' perceptions of their online learning engagement, focusing on behavioural, cognitive, and emotional engagement. Its relationship with student background characteristics, i.e. school types, gender, and levels of schooling was also examined. To this end, a questionnaire was administered online to 436 primary school students from various parts of Malaysia. The students were required to answer a four-point Likert scale ranging from strongly agree to strongly disagree. A quantitative approach was used to analyse the data descriptively and inferentially. The inferential statistics tool used was a one-way ANOVA. The findings revealed that the students generally had a favourable view of their online learning engagement, however, there was a general preference for classroom learning. The main problems they faced were teachers and schools not providing the necessary materials and support and a lack of social interaction. The study contributed to a better understanding of Malaysian Primary school students' online learning engagement during the current COVID-19 pandemic. It also suggests the need to come up with measures to address the issues concerned, such as,

implementing more project-based learning and introducing Learning Management System (LMS) in schools.

Keywords: *online learning, online learning engagement, pandemic, primary schools, Malaysian students*

1.0 INTRODUCTION

Even with a high literacy rate among its citizens, Malaysia still faces numerous constraints with regard to online learning. In 1997, Malaysia's Ministry of Education (MoE) mooted the Malaysian Smart School Initiative (MSSI) in an effort to promote online learning and the use of technology in learning. However, studies have shown that the initiatives have not been very successful due to a number of factors such as the lack of Information and Communication Technology (ICT) support and Internet connectivity in some schools (Abdul Halim et al., 2016; Thang et al. 2010, 2015), and teachers' inability to embrace the use of technology (Thang et al., 2010). Hence, even though Internet penetration has soared in recent years in Malaysia, the traditional classroom teaching approach remains the primary method of teaching and learning in Malaysian schools and this has not been a serious problem until recently.

Due to the devasting effects of the COVID-19 virus on every aspect of human life, there is a need to rethink suitable education approaches to replace conventional face-to-face learning at all levels. Countries around the world have risen to the occasion and have implemented immediate measures not only to curb the spread of the virus but also to provide uninterrupted learning to their students. In Malaysia, the pandemic has led to the closure of schools starting in early 2020, and the schools were instructed to offer online classes instead. Most, if not all were caught off guard. In response, the MOE has taken efforts to promote online learning as the "new normal" for schools through improving Internet access for schools and speeding up infrastructure development and telecommunication network upgrades. In addition to that, the Teaching and Learning at Home (PdPR) programme was implemented as an alternative learning model. PdPR was offered online, offline as well as off-site. Teachers could conduct PdPR lessons through online learning platforms like Digital Educational Learning Initiative Malaysia (DELIMa), Cikgootube, EduWebTV, and social media platforms. Online meeting applications such as Google Meet, Google Classroom, Google Hangouts, Microsoft Teams, and Zoom (Arumungam, 2020) could also be used alongside gamification, recorded videos, audio clips, and eBooks. On top of that, students who had no Internet or suitable devices for online learning could still access PdPR via a daily television show named Kelas@Rumah. According to The American Academy of Child and Adolescent Psychiatry (AACAP, 2020) and the World Health Organization (WHO, 2019), the suggested screen time for primary school students is only one to two hours per day. Hence, offering a mixed-mode was a good move.

However, these efforts were not accompanied by relevant training to upgrade teachers' ICT skills. To what extent are these initiatives effective in helping students adapt to "this new normal" is the key concern of this research paper. A survey of Malaysian studies on the effectiveness of online learning in Malaysia on students during the pandemic revealed that most of the articles published focused on the learning experiences of students in universities (Nur Salina et al., 2020; Chung et al., 2020b) except for a notable qualitative study by Jan (2020) on two sisters at an international primary school and a study reported by Datuk Dr. Mah in The Star (2020). Since Malaysia is still embroiled in the pandemic, and no one knows when schools can revert to their normal mode, more research needs to be undertaken on issues related to online teaching and learning in schools. Hence, the current quantitative study is both timely and crucial as it is exploring primary school students' perceptions of online learning – a research area not investigated before.

Student engagement, which is also investigated in this study, is the key to all types of learning, not just online learning. However, the investigation into the students' perceptions of their online learning engagement is especially vital because these students no longer have access to classroom teaching and their teachers' roles are reduced to that of an online facilitator. Another main concern about online learning is the readiness for online engagement. Readiness can be affected by the lack of necessary technology such as students not having reliable Internet connectivity (Chung et al., 2020a) and electronic devices for learning to take place. Other demographic factors like home and gender may also have an impact on online learning. All these factors have been identified as predictors of technology use and learning engagement. Hawati and Jarud (2020), for instance, found that students from low-income households did not have adequate devices to engage in online learning. Regarding gender, female university students were reported to be more focused on e-learning portals compared to their male counterparts (Shahzad et al., 2020). Teoh et al. (2013), in an earlier study, found female students in a public university to be significantly more engaged than male students The same result applied to "active learning" and "experience with diversity" indices.

Effective online learning engagement, therefore, depends on a variety of factors. However, it is not possible to investigate all of them, hence, the present study will concentrate on investigating primary school students' perceptions of their online learning engagement during the current COVID-19 Movement Control Order (MCO) period in Malaysia. Students' emotional, cognitive and behaviour engagements (Fredricks et al., 2004) in online learning will be the determining variables in the theoretical framework of this study. In addition to that student's external support together with several student background characteristics, namely school types, gender, and schooling levels, will also be considered. The study is guided by the following research questions.

(1) What are the primary school students' perceptions of online learning engagement?
(2) To what extent do emotional, cognitive, and behaviour engagements and external support affect primary school students' online learning engagement?

2.0 LITERATURE REVIEW

2.1 Readiness for Online Learning in Malaysia

The biggest challenge in implementing online learning in Malaysia would be in terms of infrastructure as not all students have access to reliable Internet connectivity and electronic devices for learning to take place. According to Jalli (2020), although Malaysia has over 80% Internet penetration, there is a huge infrastructure gap between West and East Malaysia. Hence, the impact on students in East Malaysia is more severe due to poor Internet connectivity (Sia & Adamu, 2020).

A survey conducted by the MoE involving around 900,000 students found that 36.9% of them do not own any electronic devices, 46% have a smartphone, 9% have a laptop, 6% have a personal computer and only 5.8% own a tablet (Yeoh, 2020). Moreover, some of the students have to share their devices with other family members. Inadequate electronic devices and unconducive environments make the adoption of home-based online learning even harder for students (Hawati & Jarud, 2020). Hence, the resources that the students have at home, like Internet access, the performance of their devices or tools, and how competent the educators are with the technology itself in delivering the lesson, are also crucial issues that need to be considered.

Other than infrastructural issues, it is also necessary to examine how the students themselves feel about online learning. It was reported in earlier studies that although students regarded the Internet as an essential source of information and were aware of its importance, they seemed to take the facility for granted. Abidin et al. (2011) found that students from rural schools in Malaysia accessed digital materials mostly for entertainment, and not educational purposes. Yunus et al. (2009) and Thang et al. (2015) also found similar findings among urban school students. They revealed that these students did not spend much time using ICT for language learning despite perceiving themselves as having high positive attitudes toward using ICT.

During the pandemic, students in Malaysian institutions of higher learning also reported facing internal barriers to learning online (Nur Salina et al., 2020; Chung et al., 2020b). For example, Chung et al. (2020b) who examined the readiness of Malaysian students for online learning at Universiti Teknologi MARA (UiTM) reported that the students were only slightly to moderately ready for online learning. Factors affecting their readiness include lack of learner control and not possessing sufficient self-directed capacity and online communication efficacy. As mentioned earlier, most of these studies were conducted on tertiary-level students. An exception was a study undertaken by Jan (2020) on two sisters studying at an international primary school. A phenomenological approach was used to investigate the sisters' experience with synchronous online learning during the pandemic. The experience of their parents was also explored. Through observation and unstructured interviews, the author listed a number of difficulties faced by the children, parents, and teachers. The sisters found their experience

stressful and frustrating as they had to install numerous applications, faced many technical and network issues. and constantly had to look for materials and resources to complete assignments and tasks. Furthermore, student-teacher and student-student interactions were very limited.

Hence, they had no opportunity to develop social skills. Their parents were also affected physically and mentally as they had to continuously monitor, guide, and tutor their girls. They were also concerned that overexposure to the computer screen would become a hazard to their children. The teachers also had their fair share of technical and network problems. They also faced difficulties in maintaining discipline when teaching. Thus, it was not surprising that the sisters expressed a strong preference for classroom learning.

Sidek et al. (2021) in their study on teachers from rural and urban areas revealed that teachers used a variety of methods to teach online to overcome students' fatigue. However, Thannimalai and Baloh (2021) discovered that rural teachers were not ready for this mode of teaching as they did not possess the necessary skills and knowledge to engage students online. A case study conducted by Hamidon (2021) on challenges and solutions in conducting PdPR discovered two key issues from the teachers' perspectives: students' engagement and attendance. They reported that these were caused by low Internet connectivity, external distractions (e.g. having to perform house chores), and a lack of personal computing devices.

Differences due to school types were also considered in this study. Studies from other countries had generally shown that studying in private schools was more beneficial than studying in public schools. For example, Sherafat & Murthy (2016) in a study on 625 students in Mysore, India using stratified random sampling techniques, found that students from private schools had better critical thinking skills and study habits than those in public universities. This was supported by earlier studies by Elias & Kress (1994), Shepherd (1998), and Coughlin & Castilla (2014), among many others. Some of these studies also found higher academic achievement among private students.

With regard to learning engagement, Tyner and Howell (2018) reported that forty-six percent of public charter students, and 60 percent of private school students at American high schools, met their definition of "engaged." They suggest this means that private schools generally provided more engaging learning environments than traditional public high schools. This view is accepted by many educated Malaysian parents and may be influenced by the numerous online articles that claimed that studying in private schools is better than studying in public schools. The research team has not come across a Malaysian study comparing studying in Malaysian private and public schools, but there is an article comparing studying through the distance mode between public and private universities (Hamid & Yip 2019), which revealed that students' perceptions of service quality were higher in public universities (in that they were more equipped and prepared) than private universities.

2.2 Engagement in Online Learning

Apart from technology readiness, there are many other factors that affect the effectiveness of online learning. Student engagement is one of the major challenges in online learning, and it has been identified as a strong predictor of achievement and personal development (Oncu & Cakir, 2011). According to Axelson and Flick (2011), student engagement refers to "how involved or interested students appear to be in their learning and how connected they are to their classes, their institutions, and each other" (p.50). Under the Pandemic situation, teachers are faced with the daunting task of engaging their students effectively online so that students not only acquire the relevant knowledge and skills but also derive satisfaction and enjoyment from the learning process (Pilotti et al., 2017). Student engagement is the key factor investigated in this study, and more specifically, the study aims to examine to what extent students are willing to invest their resources, such as time and effort to optimise and enhance their own learning.

Engagement in the present study is operationalized according to three interlinked elements: Behavioural, Cognitive, and Emotional Engagement (Fredricks et al., 2004). Behavioural Engagement refers to the extent of students' willingness to participate in the learning activities. It, therefore, entails active participation and involvement of the students, for example responding to the instructors' questions or submitting tasks on time. It is considered one of the important factors to attain positive academic outcomes and prevent students from quitting (Fredricks et al., 2004).

Whilst behavioural engagement centered around students' involvement in academic and extracurricular activities, Cognitive Engagement draws on the idea of students' investment in their learning; the extent that they are willing to comprehend complex ideas and master different knowledge and skills as opposed to just "simply doing the work" (Fredricks et al., 2004, p. 64). One example of cognitive engagement is when learners try to understand and explain a concept that they have learned in-depth. It was reported that the depth of discussion of a lesson is positively related to students' cognitive engagement (Pilotti et al., 2017).

Emotion plays a crucial role in keeping students engaged with their lessons. Emotional Engagement entails students' feelings or affective reactions to their teachers, classmates, learning institutions, and towards learning in general, regardless of whether it is positive or negative (Fredricks et al., 2004). The attachment or sense of belonging to their learning institutions or class, for instance, is a good example of emotional engagement. When students feel like they are a part of learning, they are more willing to invest their time and effort towards learning, resulting in a better grade or performance (Pilotti et al., 2017).

In the online learning context, student engagement is reflected through their responses to the online learning materials and activities, and their reactions to peers and instructors. For instance, cognitive engagement in online learning environments is reflected by students' effort

in analysing and synthesizing readings, seeking, interpreting, analysing, and summarizing information; critiquing and reasoning through various opinions and arguments; and making decisions (Zhu, 2006). Meanwhile, behavioural engagement is reflected in the manipulation of the interface through actions such as clicking, scrolling, navigating, and submitting (Kennedy, 2020). Students' emotional engagement in online learning can be observed through their attitude, enthusiasm, interest, anxiety, or enjoyment of the learning process (Redmond et al., 2018).

The three above factors will be utilised as the determining variables in the theoretical framework of this study. In addition to that, external support will be considered as it is an essential component of the online learning context. Examples of external support include support from home given by parents, condition of the home environment, and support from schools and teachers. All these variables will be framed by the following students' background characteristics, namely school types, gender, and levels of schooling.

3.0 METHODOLOGY

3.1 Context of the project

The students for this project came from three types of primary schools: the National Primary schools, the National Type Chinese schools, and Private schools. These schools are in the following states: the Federal Territory of Kuala Lumpur, Selangor, Malacca, Perak, Penang, Johor, and Kelantan. Table 1 provides a summary of the characteristics of the three types of schools generally found in Malaysia.

Table 1: Characteristics of schools

Types of school	Medium of instruction	Ethnicity of students
National Primary	Malay language	A mixture of Malay, Chinese, Indian, and others
National Type Primary (Chinese)	Chinese language	Mostly Chinese, some Malay, Indian, and others
Private	Chinese/Malay/English language	A mixture of Malay, Chinese, Indian, and others

3.2 Research Design

This study adopted a quantitative approach involving the use of a questionnaire to elicit information regarding students' online learning engagement during the Pandemic. The items in the questionnaire were derived from questionnaires obtained from online sources and related studies (e.g. Hart, Stewart & Jimerson, 2011; Borup, Graham, & Drysdale, 2014) and modified

according to the needs of the study. A Likert scale comprising four choices: 4=strongly agree, 3=agree, 2=disagree, and 1= strongly disagree was used to elicit responses from the students. Items that were negative, were recoded before mean scores were calculated, i.e. 1= 4, 2=3, 3=2, and 4. The original version was in English and this was later translated to Bahasa Malaysia and Chinese. All three versions were made available to the students. It was up to them to choose the language they preferred. The data were analysed quantitatively with the use of descriptive statistics and inferential statistics (a one-way ANOVA).

3.3 Research Instrument

The questionnaire has three sections:
a) Section A elicits demographic information of the students.
b) Section B elicits information regarding students' online practices
c) Section C comprises 32 items that elicit students' online learning engagement. The items developed were based on the following four categories: Emotional Engagement, Cognitive Engagement, Behavioural Engagement, and External Support.

3.4 Research Procedures

The convenience sampling approach was used. Teachers from schools in various states of Malaysia, who were contacts of the research team members, were approached to help in obtaining permission from their Head of School to allow their students to respond to the questionnaires. After permission was granted, students in their schools were asked to go online and answer the Qualtrics Survey Questionnaire and submit them virtually. The data collection process took four months (from February to May 2021). Two gentle reminders were sent out to teachers involved, and when it was evident that no more questionnaires were coming in, the data collection process was closed.

4.0 FINDINGS

4.1 Baseline Data

The base data were derived from Section A and Section B of the questionnaires. The overall breakdown of students is given in Table 2. Lower Primary comprises Standard 3 and 4 students and Upper Primary comprises Standard 5 and 6. Since Standard 1 and 2 students would have difficulty answering the questionnaire, they were not included in the study. A total of 441 students responded to the questionnaires. However, 5 questionnaires were removed because they were incomplete, leaving 436 questionnaires for analysis. As shown in Table 2, there is a good balance of male and female students from each school type. Regarding ethnicity, the students from the National schools who responded to the questionnaire were mainly Malay, those from the National type (Chinese) schools were mainly Chinese and those from the private schools were all Malay. The number from the two private schools is the lowest as the researchers faced difficulty in getting permission from the Head of Schools to conduct the

survey. As for levels of schooling, it is acknowledged that the number of respondents is not equal for the different school types. However, generally, the number of respondents from each category was sufficient for statistical analysis.

Table 2: Breakdown of students according to types of schools, gender, types of students, and ethnicity

Background characteristics	**School type**				
	National	National-type	Private	Total	
Gender				No	%
Male	103	94	24	221	50.5
Female	111	78	26	215	49.5
Total	214	172	50	436	100
Ethnicity					
Malay	204	6	50	260	59.5
Chinese	3	163	0	166	38.0
Indians	4	2	0	7	1.6
Others	3	1	0	4	0.9
Total	214	172	50	436	100
Level of schooling					
Lower primary	71	81	37	189	43.3
Upper primary	143	91	13	247	56.7
Total	214	172	50	436	100

Key: *Percentage is rounded up to the first decimal place

Table 3 gives a breakdown of ICT use for all primary school students. It is found that the majority of the students had access to Smartphones and Laptops and a small number had access to desktops and tablets. About 50% of the students used devices they owned and about 40%

had to share their devices, probably with family members, and only a small number had devices that were not working properly. The findings suggest that generally access to devices for online learning was s not a problem among these students.

Regarding the amount of time spent on online learning more than 50% of the students spent more than three hours per day learning online. The extreme number is low: only 6.6% spent less than one hour, and 20% spent more than five hours learning online. These figures suggest the majority of the students spent a considerable amount of time learning online. However, the amount of time they spent interacting with friends online is very low. About 80% of them spent less than three hours per week interacting with their classmates. It is possible they have other friends with whom they interact, hence a follow-up on this should be undertaken in the future. The amount of time they spent interacting with their teachers is also limited with almost 60% saying they spent less than three hours per week interacting with their teachers. Thus, it appears that a lack of social interaction is a problem in the online learning mode. Finally, regarding skills in handling online devices, the picture is rather positive as less than 20% said they were not good.

Table 3: Breakdown of ICT use among all primary school students

1. What device do you use to learn online?	Laptop	Desktop	Tablet	Smartphone	
	192 (31.8%)	59 (9.7%)	94 (15.6%)	259 (42.9%)	
2. Do you own the device	Yes	Yes, but it does work well	No, I share with others		
	214 (48.5%)	63 (14.3%)	165 (37.2%)		
	Less than 1 hour	1-3 hours	3-5 hours	5-7 hours	More than 7 hours
3. How much time do you spend each day learning online?	29 (6.6%)	167 (37.9%)	133 (30.2%)	88 (20%)	24 (5.4%)
4. How often do you talk to your classmates online each week	216 (49%)	127 (28.8%)	49 (11.1%)	29 (6.6%)	20 (4.5%)

(including outside class hours)?					
5. How much time do you talk to your teachers online in a week?	155 (35.1%)	109 (24%)	55 (12.5%)	53 (12%)	69 (15.6%)
6. Are you good in online devices?	Not good	Quite good	Good	Very good	
	77 (17.5%)	144 (32.7%)	176 (39.9%)	44 (10%)	

4.2 Internal consistency

Before analysing the data, it is necessary to measure the internal consistency of the data. This was done using Cronbach's coefficient alpha (Cronbach & Shavelson, 2004) which uses the Alpha value as an indicator of the degree of reliability; the higher the Alpha value, the closer the true scores will be to the observed scores, hence the higher the reliability of that items in that category (Gliner & Morgan, 2000). The literature demonstrates a range of acceptable alpha levels from .60 $\leq$ a $\leq$ .90 (Gliner & Morgan, 2000). The acceptable coefficients for this study were set at a $\geq$ 0.60.

This study measures two types of internal consistency: (a) internal consistency of all 32 items and, (b) internal consistency of the items in each category: Emotional Engagement (8 items), Cognitive Engagement (8 items), Behavioural Engagement (8 items), and External Support (8 items).

(a) The Cronbach's Alpha value of all items was 0.86 (α=.86) which is acceptable as it is above the accepted value of 0.6 (a $\geq$ .60).

(b) With regard to the four categories, it was found that the Cronbach's Alpha value for Cognitive engagement was 0.629 (α=.629) and the value of Emotional Engagement was 0.675 (α=.675). Both these values are above the acceptable level (a $\geq$ .60), and they were utilised for the ANOVA analysis in section 4.5. However, the Cronbach's Alpha value was 0.488 (α=.488) for Behavioral Emotional and was 0.530 (α=.530) for External Support. Both these values are below the acceptable level (a $\geq$ .60), hence both of them were not utilised for the ANOVA analysis.

4.3 Ranking of Top-ten and Bottom-ten Students for All Items

The findings from this section (4.3) and the following section (4.4) would be used to answer Research Question 1. The range of scores for the items in the questionnaire is from 1 to 4 with 1 being strongly disagreed, 2 disagree, 3 agree and 4 strongly agree. For the item analysis,

mean scores above 2.5 are taken to indicate "agreement" with the item, and mean scores below 2.5 are taken to indicate "disagreement" to the item.

The rankings of top ten and bottom ten items were undertaken to examine the primary school students' general preferences regarding online learning, Table 4 presents the top ten items and as can be seen, there are seven negative items and only three positive items in the list. All ten items have a mean score above 2.5, indicating a general preference for these items. Thus, it would appear that the primary school students had a greater preference for classroom learning as seven of the top-ranking items were negative. However, the students also indicated that they preferred to learn at home (item 20), they remembered better when they learned online (item 27), and they preferred online learning to continue when school goes back to normal (item 16). This seems to contradict their responses to earlier items. It is plausible to say at this stage that these students had a stronger preference for classroom learning, though they did appreciate certain aspects of online learning.

Table 4: Ranking of the top ten items

	Engagement	Mean score	Standard Deviation (SD)
10. I prefer teachers to teach in classrooms like before. (-ve)	External support	3.48	.680
24. I learn better when I am with my friends in real classrooms. (-ve)	Emotional	3.38	.645
14. I miss elective classes (such as art, music and PE). (-ve)	Behavioural	3.25	.715
20. I find learning at home better than learning in school. (+ve)	External support	3.11	.787
26. I find it tiring looking at the monitor for a long period of time. (-ve)	Behavioural	3.08	.830
25. I find it difficult to concentrate during my online classes. (-ve)	Cognitive	2.88	.852
28. I need to work harder to understand the online lessons. (-ve)	Cognitive	2.87	.701

27. I remember better when I learn from online classes. (+ve)	Cognitive	2.87	.701
16. Online classes should still continue when we go back to school(+ve)	Cognitive	2.79	.876
30. I find it difficult to take down notes during my online classes. (-ve)	Cognitive	2.76	.787

Key:
(-ve) = negative items
(+ve) = positive items

Table 5 lists the bottom ten items and as indicated, there are seven positive items and three negative items in the list. All items have mean scores below 2.5, indicating a general lack of preference for online learning as seven positive items rank lowest. The problems the students faced covered the four types of engagement. However, it is good to know that their problems did not arise from a lack of home support (item 15), an inconducive home environment (item 17), and a preference for no teacher's presence when learning (item 12).

Table 5: Ranking of the bottom ten items

	Engagement	Mean	SD
21. I read up on materials given by my teachers before my online classes. (+ve)	Cognitive	2.26	.702
15. I have no one to help me with my online schoolwork. (-ve)	External support	2.26	.855
17. My house is very noisy so it is very difficult to learn online. (-ve)	External support	2.24	.855
7. I can plan my time well when learning online. (+ve)	Behavioural	2.22	.743
1. I am excited to attend online classes. (+ve)	Emotional	2.21	.800
5. I find the activities in my online classes interesting. (+ve)	Emotional	2.18	.717

18. My school gives me a lot of things to help me learn online. (+ve)	External support	2.17	.753
12. I like online classes because teacher is not there to see what I am doing. (-ve)	Behavioural	2.13	.847
6. My teachers do many things to make my online classes interesting. (+ve)	External support	1.97	.664
11. I work hard on my schoolwork from my online classes. (+ve)	Behavioural	1.88	.661

Key:

(-ve) = negative items
(+ve) = positive items

4.4 Analysis of the Influence of Student Background Characteristics (BC) on their Online Learning Engagement

A one-way ANOVA can be used to determine whether there are any statistically significant differences between the means of two or more independent (unrelated) groups. Hence, it was used in this study to make the following types of group comparisons on student online engagement:

- Comparison across school types (National vs National type vs Private schools)
- Comparison across gender (Male vs Female)
- Comparison between levels of schooling (Lower primary vs Upper primary)

Before describing the data analysis in detail, it is deemed necessary to declare that the distribution was found to be normal and in the analysis of findings no marked violation of the assumption of ANOVA analysis occurred. A cut-off of 5% which is a p-value of less than 0.05 was used to identify differences in mean scores that are statistically significant.

Table 6 presents the mean and standard deviation of the three school types. As shown in the table the mean scores of all three school types hover slightly above 2.5 which borders on positive perceptions of their online engagement.

Table 6: Descriptive table of the three different school types

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Primary	National	214	2.61	.325	.022	2.57	2.66
	National Type	172	2.54	.361	.028	2.49	2.60
	Private	50	2.56	.323	.046	2.47	2.66

A one-way ANOVA was performed to compare the differences in mean scores of the three different school types. The ANOVA revealed that there was no statistically significant difference in mean scores between the three groups (F(2, 433) = [2.032], p = 0.132). This suggests that the student's perceptions of their online experiences are inclined to be positive, irrespective of what type of school they were studying in.

Table 7 shows the mean and standard deviation of the male and female school students. As shown in the table the mean scores of both groups hover slightly above 2.5 which borders on positive perceptions of their online engagement.

Table 7: Descriptive table of the male and female students

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Primary	Male	221	2.544	0.358	0.028	2.489	2.599
	Female	215	2.598	0.317	0.028	2.544	2.653

A one-way ANOVA was performed to compare the differences in mean scores of the male and female school students. The ANOVA revealed that there was no statistically significant difference between the mean scores of both groups. (F(1, 434) = [1.898], p = 0.169). This finding suggests that both groups' perceptions of their online learning engagement inclined to be positive but there was no significant difference between their perceptions.

Table 8 displays the mean and standard deviation of the students from two levels of schooling. As shown in the table the mean scores of both groups hover slightly above 2.5 which suggests that both groups' perceptions of online learning engagement inclined to be favourable.

Table 8: Descriptive table of the two levels of schooling

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Lower primary	189	2.618	0.326	.026	2.567	2.669
Upper primary	247	2.527	0.338	.035	2.459	2.595

A one-way ANOVA was performed to compare the differences in mean scores of the Lower primary school and Upper primary school students. The ANOVA revealed that the mean score of the Lower Primary school students was more significant than that of the Upper primary school students ($F(1, 434) = [4.379]$, $p = 0.037$). This finding suggests that the Lower primary school students' perceptions of their online learning engagement were more favourable than that of the Upper primary school students.

4.5 Analysis of the Influence of students' BC on two categories of student engagement

The findings from this section will be used to answer Research Question 2. The findings focused on only two of the four categories. The category of Behavioral Engagement and External Support were excluded as their Cronbach's Coefficient alpha values were below the acceptable level of 0.6.

Category I : Cognitive Engagement

Table 9 presents the mean and standard deviation of cognitive engagement across the three types of background characteristics (BC): school types, gender, and levels of schooling. The findings in the table indicate that mean scores are above 2.5 for all types of BC which suggest reasonably favourably perceptions by all types of BC.

Table 9: Descriptive table of students for cognitive engagement across three types of BC

					95% Confidence Interval for Mean	
		N	Mean	Std Deviation	Std. Error	Lower Bound	Upper Bound
School Types	National	14	2.718	0.361	.028	2.662	2.773
	National Type	172	2.656	0.462	.031	2.594	2.717
	Private	50	2.642	2.647	.058	2.528	2.756
Gender	Male	221	2.624	0.426	0.034	2.558	2.691
	Female	215	2.719	0.396	0.034	2.653	2.785
Levels of schooling	Lower primary	189	2.726	0.440	0.034	2.664	2.788
	Upper primary	247	2.622	0.435	0.042	2.540	2.705

A one-way ANOVA was performed to compare the differences in mean scores across the three types of background characteristics (BC). The ANOVA revealed that there was no statistically significant difference between the mean scores of the three school types. ($F(2, 433) = [1.383]$, $p = 0.252$) and of the two levels of schooling ($F(1, 434) = [1.941]$, $p = 0.145$). The only significant difference was for gender. The mean score of female students was significantly higher than that of the male students ($F(1, 434) = [3.928]$, $p = 0.048$).This suggests that the female students had higher perceptions of their own personal cognitive engagement with online learning than the male students.

Category II: Emotional Engagement

Table 10 displays the mean and standard deviation of emotional engagement across the three types of background characteristics (BC). The findings in the table indicate that mean scores to be above 2.5 for all types of BC which suggest reasonably favourably perceptions by all types of BC.

Table 10: Descriptive table of students for emotional engagement across three types of BC

						95% Confidence Interval for Mean	
		N	Mean	Std Deviation	Std. Error	Lower Bound	Upper Bound
School Types	National	14	2.624	0.444	0.030	2.565	2.683
	National Type	172	2.541	0.429	0.033	2.475	2.607
	Private	50	2.570	0.435	0.062	2.448	2.691
Gender	Male	221	2.578	0.458	0.360	2.507	2.649
	Female	215	2.579	0.416	0.360	2.508	2.649
Levels of schooling	Lower primary	189	2.619	0.440	0.034	2.553	2.686
	Upper primary	247	2.529	0.435	0.045	2.441	2.617

A one-way ANOVA was performed to compare the differences in mean scores across the three types of background characteristics (BC). The ANOVA revealed that there was no statistically significant difference between the mean scores of the three school types (F(2, 433), = [1.744], p = 0.176), between the mean scores of the male and female students (F(1, 434), = [0.000], p = 0.989) and between the mean scores of the two levels of schooling (F(1, 434), = [2.612], p = 0.107).

5.0 Discussion of findings

The findings of the study will be discussed in line with the two research questions.

(1) What are the primary school students' perceptions of online learning engagement?

(2) To what extent do emotional, cognitive, and behaviour engagements and external support affect primary school students' online learning engagement?

In response to Research Question (1), the ranking of top-ten and bottom-ten items showed that generally, the students had a stronger preference for classroom learning. This is in line with the findings of earlier studies undertaken on Malaysian students which showed that they preferred learning in the classroom (Chung et al., 2020b; Selvanathan et al., 2020). A more in-depth investigation revealed that their reasons for preferring classroom learning covered the four types of engagement and resulted from personal reasons like lack of interest and effort which seemed to have been caused by teachers and schools not providing the necessary materials and

support required. However, the students did not have problems like lack of home support and poor home environment in general.

The study further revealed that the students had limited social interaction with their teachers and classmates, which could be a highly probable cause behind their preference for classroom learning, like in the case of Jan (2020). Thus, these problems, particularly the issue of lack of social interaction, need to be addressed, as online learning is now a very important aspect of these students' daily lives.

Despite that, there was some evidence of students showing appreciation for certain aspects of online learning such as preferring to learn at home and stating that they learned better online, and indicating that they would like online learning to continue when school goes back to normal. These aspects need to be explored further to gain a better understanding of them.

A comparison across school types and gender revealed no significant differences in perceptions of online learning engagement. The findings suggested that the students' perceptions of their online experiences overall inclined to be positive, irrespective of what type of school they were studying in and their gender. However, a comparison between levels of schooling indicated that the Lower primary school students' perceptions of their online learning engagement were more favourable than that of the Upper primary school students.

However, it has to be pointed out here that although the mean scores for all three background characteristics were positive, they all only hovered around 2.5, which means that their perceptions of online learning engagement were only "inclined to be positive" and not "highly positive". The reasons for the borderline approval of online learning may have been caused by Malaysian students being distracted at home by household chores (Hamidon, 2021), and Malaysian students' general preference to use ICT for entertainment rather than for learning (Thang et al., 2015, Abidin & Pour-Mohammadi, 2011). However, it cannot be attributed to problems like lack of electronic devices and the lack of necessary technology (Chung et al., 2020a; The Star, 2020) as well as problems like an unconducive home environment (Hawati & Jarud, 2020; Shahzad et al., 2020).

The finding that indicates that the Lower primary school students display significantly more positive behaviour than Upper school secondary student is a bit surprising as we expected higher mean scores for Upper primary school students as they were more IT savvy. We would like to suggest the possibility that younger students are more receptive to new ideas, hence, they find online learning more novel and interesting than older children. Further investigation on this needs to be undertaken in the future.

In response to Research Question (2), the effects of the Emotional, Cognitive, and Behaviour Engagements and External Support, were investigated. The analysis was done on only two

categories: Emotional and Cognitive engagements, as the Cronbach's Coefficient Alpha values of the other two categories were below the acceptable level of 0.6. It was found that the mean scores for both categories hovered around 2.5, which means that the students, in general, had reasonably favourable perceptions of both categories. The comparison of mean scores revealed that for Cognitive Engagement, the female students' perceptions were more positive than that of the male students. As for Emotional Engagement, the comparison of mean scores revealed no significant differences across all BC.

Some interesting conclusions can be deduced from these findings. First, it confirms the findings that the students were generally favourable towards online learning, and this seems to extend to their perceptions of their involvement in the different types of engagement and in the External Support provided except for some differences in the case of gender for cognitive engagement. The finding that female students were more cognitively engaged supports the finding of Shazad et al. (2020).

5.1 Implications and Conclusion of the Study

The findings are generally very encouraging. It shows that the primary students were receptive to learning online although they did face some problems. These problems were not major and did not result from a lack of the necessary electronic devices, lack of the necessary technology and unconducive home environment. It could have stemmed from the general perceptions of Malaysian students that classroom learning were better and, also from personal reasons like lack of interest and effort, which could have resulted from teachers and schools not providing the necessary materials and support required.

This issue of social interaction was evident, but this is not something that can easily be rectified in an online learning environment. It is proposed that teachers could consider introducing more project-based learning that requires students to work collaboratively. This will encourage students to at least interact with each other within their group when attempting to complete the assigned tasks. Furthermore, the teachers could consider getting students involved in the project(s) that can be carried out offline to cater to students who reside in areas not equipped with reliable internet connectivity. Vlogging and digital storytelling, for instance, are good asynchronous options.

In addition to that, it was found that younger students were more receptive to online learning than older students due to the novelty of learning online. This suggests that efforts need to be put in by teachers to make their online classes more innovative and stimulating to attract the attention of all students. This will hopefully also overcome the problems of lack of interest and effort among the students resulting from teachers and schools not providing the necessary materials and support. This can be achieved by introducing a Learning Management System (LMS) in schools where all lessons are stored on one online platform. LMS is commonly used

in universities in Malaysia, but not yet widely implemented at the school level. Having the ability to monitor the students' own progress and exploring all the interactive functions provided in LMS will hopefully help teachers motivate students to learn. Furthermore, LMS will make the lesson more organised, make it easier for the students to keep track of their own learning, and for teachers to plan their lessons and assessments. It is found that Malaysian teachers tend to use the WhatsApp application to communicate with their students and even to conduct their lessons. Although this method allows easy access, it is limited in terms of its functionality, and in the long term, the LMS needs to be incorporated.

As mentioned earlier, the biggest challenge in implementing online learning in Malaysia is not lack of technological infrastructure, but lack of support, both physically and emotionally. Since students have very limited time with their teachers, parents should be more engaged and available, particularly since many parents are working from home during this pandemic. According to Sarjeant (2020), one of the most important elements to improving students' attainment levels lies with the parents, not with the school. In a study on parental engagement in children's online learning during the COVID-19 pandemic in Indonesia, Novianti and Garzia (2020) found that the students perceived their home not as a place to study, but as a place to rest, play, and spend time with family. They appeared to be less motivated to focus on their study and were easily distracted. Many parents also have the misconception that teaching their children is the sole responsibility of teachers and the schools. These misconceptions need to be addressed. Parents need to realise that their support, particularly during the pandemic, is essential for their children's mental and physical development. They can support their children by undertaking the function of a teacher, i.e., by helping their children with their school lessons and incorporating fun playtime like in school. This will provide the much-desired face-to-face social engagement that their children are so used to in the school environment.

The issue of female students being more intellectually engaged when learning online is not something that can be easily addressed. However, by making the assigned tasks cognitively more challenging, teachers may be able to draw the attention of the male students and get them more intellectually engaged too. According to Roush (2017), it is wrong to assume that male students are lazier and more problematic in class. He explained that male learners tend to be more visual and spatial compared to female learners. Hence, they are less engaged in language-oriented lessons. This suggests the need to introduce more action-oriented activities such as project-based learning and problem-based learning that involve problem-solving tasks that challenge them cognitively. These tasks can be incorporated into online lessons without difficulty in view of the availability of a variety of software.

This study has offered insights into the issues faced by Malaysian Primary school students that resulted from the sudden shift from a full classroom learning mode to an online learning mode, due the COVID-19 pandemic. However, the study has certain limitations that need to be acknowledged and addressed in future research. Firstly, the current sample size is not

sufficiently large for the researchers to claim that it is representative of the population of Primary school students in Malaysia. However, it is not easy to get a large sample size without the cooperation of the MoE. Thus, in the future, concerted efforts should be made to get the MoE to collaborate in a large-scale study, that allows exploration of a variety of factors affecting these students' online learning engagement. In addition to that, there is a need to triangulate the data by adding a qualitative dimension to it. For example, the use of s" that are worthy of future exploration.

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