Teachers' Perceptions and Challenges to the Use of Technology in Teaching and Learning during Covid-19 in Malaysia

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Abstract. The use of technology in education has been an ongoing debate among educators. Although educators are highly encouraged to integrate technology in the classroom, they are still sceptical to fully utilize them. This changed drastically during the COVID-19 pandemic in 2020 which forced educators and learners to rely heavily on the use of technology to support learning. This paper identifies teachers' technology usage in the classroom, their perceptions on the use of technology in the classroom and the challenges of integrating technology in teaching and learning. We employed a quantitative research approach with survey design and non-probability snowball sampling. To collect the data, a questionnaire was distributed to 78 primary and secondary school teachers. We found that teachers in that particular area mostly used smart phones to access internet and conduct lessons due to the limited availability of devices from the students' end, internet connectivity, and limited instructional time. Despite the challenges presented, they believed the importance of technology in education, and it helped enhance students' digital competence and responsible use. This research, thus, present an insight to the educational authorities in Malaysia of the general perceptions of teachers on the technology used during the pandemic and in turn, will increase digital access and awareness for a better quality of technology integration in teaching and learning.

Keywords: teaching and learning; technology integration; technology use; pandemic

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1. Introduction

The importance of the use of technology in education is widely spread. Following the Malaysia Education Blueprint, the education system has aspired Malaysia to better prepare Malaysian children for the needs of the twenty-first century to raise the international education standards in the country. Even in early childhood education, the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Centre for Early Learning and Children's Media agreed that children needed to be equipped with technological knowledge from a young age (Schomburg et al., 2012). By preparing them with the ethical and positive exposure, they could support learning and relationships.

The former education minister, Maszlee Malik encouraged teachers to utilize any available platform as it could enhance learning experience (Bernama, 2019). He also mentioned that teachers and school management should play their key roles as agents of change in this ICT-rich environment to keep up with the current changes (Bernama, 2019). The Malaysian education system has supported the use of technologies in the classroom to enhance students' learning experiences. Furthermore, ICT infrastructure, technology-based materials, and Internet connectivity have been broadly improved in certain areas in Malaysia mainly in the city and urban areas.

Although educators were highly encouraged to integrate technology in the classroom, teachers were sceptical to fully utilize them. UNESCO (2013) reported 80% of teachers in Malaysia used ICT less than one hour per week and mostly used it for word processing applications. Overall, there were 57% teachers who used technology for education and only 39% of them admitted to not receiving any training in using technology ((Ebrahimi and Yeo, 2018). However, this situation drastically changed due to the COVID-19 pandemic outbreak in 2020. On March 26, 2020, UNESCO announced 1.6 billion students from 165 countries were out of school (Wan, 2020). The ministry of education of the 165 countries decided to shut down school operations as a control measure to minimize the transmission of the virus. Education leaders had to resort to multiple strategies and the most effective mechanism to assure learning continues with the use of digital technology.

This situation forced teachers, educators, and learners to rely heavily on the use of technology to support the teaching and learning process. This was especially significant for lower education as it previously revolved heavily around face-to-face communication with some integration of technology. Meanwhile, for decades, some of Malaysia's technology-forward universities and higher institutions already have a rich online bank of teaching and learning materials. Furthermore, online learning posed less challenge to adult learners than to the children of lower education. Before the pandemic, lessons were in the form of hands-on learning with the integration of technology but due to the first school closure from March until July 22, 2020, technology in the form of online learning and classroom was used as the main medium of instruction and learning. In April of the same year, in response to the demand arising from concerns of the teachers,

neccessary steps were taken to ensure students can still learn despite not being able to come to school physically.

Covid-19 pandemic has changed educational perspectives in Malaysia. Most countries had to close educational institutions to prevent the spread of the Covid-19 virus (Md Shah et al., 2020). The effects of the pandemic make changes and shape new environments by contributing to the increased use of technology for teaching and learning. It has changed the use of technology among students and teachers when they were forced to use technology when the school was closed and there was no better, easier, and cheaper way to deliver education except through online teaching and learning via video, Facebook, Zoom, and other computer-mediated communication devices and platforms. In consequence, this posed challenges for the teachers to navigate coursework through online and remote learning. This study gives an insight to the education authorities and people of interest on teachers' perceptions as well as the challenges towards technology use in teaching and learning during the pandemic.

The research objectives are to (i) identify teachers' technology usage in teaching and learning during the pandemic, (ii) identify teachers' perceptions of their level of technology use in teaching and learning during the pandemic, and (iii) determine teachers' perceptions on the challenges of integrating technology in teaching and learning during the pandemic. The structure of the paper includes (i) a literature review revolving around four subtopics; technology in education to give an overview of how technology has become the go-to medium to continue teaching and learning; teachers' current perceptions in the use of technology in teaching and learning; the challenges of integrating technology in teaching and learning during the pandemic and; the situation where the pandemic covid-19 and school lock down has changes the use of technology in Malaysian education, (ii) the methodology in which this research has employed a quantitative research approach with survey design, (iii) the findings and (iv) a discussion revolving around the three research objectives.

2. Literature Review
2.1 How the Pandemic Covid-19 and School Lock Down Changes the Use of Technology in Malaysian Education

Malaysian citizens were not aware of how deadly the virus was as there was no intention of banning travellers from China on January 25, 2020 (Md Shah et al., 2020). However, the increase in the number of positive COVID-19 cases in Malaysia on March 8, 2020, caused Malaysians to panic and consequently, the government took various steps to calm the masses. On March 18, 2020, a Movement Control Order (MCO) was implemented resulting in schools' closure as a preventive and control measure of the virus that had hit the country (UNICEF, 2020) causing billions of students losing access to education (Wan, 2020). Malaysia was not the only country affected by this predicament. The Ministry of Education (MoE) of China had also closed all educational facilities to control the spread of the virus (Yang, 2020) alongside the MoE in the forty-six countries (as of March 12, 2020) resulting in disrupted classes (Huang et al., 2020).

Technology is indeed no longer a tool used to facilitate learning but has become the main medium of instruction and learning to support flexible online education in the event of school closure (Huang et al., 2020). In the period of crisis, the education system's solution to the most effective ways to keep going is by turning to technology and online education mediums (Mavrou, 2020). China being the most applauded country regarding their quick response towards the unfortunate event has disclosed a handbook on facilitating flexible learning during this time of concern. The ministry launched "Disrupted Classes, Undisrupted Learning" signalling that even through the crisis, the learning would still go on through flexible online medium to over 270 million students from their homes (Huang et al., 2020).

In Malaysia, amid the concerns for how the learning would take place, UNICEF has helped the MoE to consult with teachers on their needs to carry out the initiatives through a survey with 86% indicating they needed support to deliver distance learning. Thus, the ministry launched an online teaching and learning platform nationwide to equip teachers with the skills and knowledge of digital and distance learning. Furthermore, an online teaching and learning platform of the MoE's TV Pendidikan (EduwebTV), hosts on-demand content for Pre-Kindergarten to secondary school students. This platform has kept the continuation of learning for the three million children (UNICEF, 2020). The online platform consists of current updates from the ministry, digital textbooks for students across all levels, and most critically, the Teacher Digital Learning Community which assists and equips teachers with the skills and knowledge to deliver an effective and efficient distance class through a five-module online teacher training course (UNICEF, 2020). As of 8 July 2020, around 24,000 teachers from over 1,600 schools have participated in the online teacher training.

The sudden change of medium of learning through technology has increased the government and private sectors' awareness on the flexibility for teachers to choose the most suitable solution for a given context and maximize students' learning experiences. Teachers were no longer limited to use fixed tools and applications but rather they took consideration of the student's accessibility to the online learning platform, as it might not be available to all students with economical or technical constraints (UNICEF, 2020). The current situation has forced many parties to provide plenty of opportunities for teachers and educators to connect, interact and provide feedback. As the learning program was self-paced, it allows teachers to select modules according to their needs and schedules (UNICEF, 2020) and has created opportunities for Malaysian researchers to play their part by developing different technologies to help Malaysians face the pandemic (Md Shah et al., 2020).

2.2 The Challenges of Integrating Technology in Teaching and Learning during the Pandemic

Despite the abundance of strategies implemented to ensure the continuation of education during the pandemic, there were unfortunate setbacks affecting students and teachers likewise. For example, in a report by Masatienwong and Nongtrud (2021), the effects of the pandemic towards Thai children and youth were significant as the problems and challenges have increased significantly over

the two years of pandemic especially in less developed areas and countries where the discrepancies between people of different socioeconomics and geographical backgrounds were large. This include the high rate of poverty caused by the educational inequality, the closure of schools led to the trap of learning, more students were out of school, learning loss caused learning discontinuity, technological readiness, content readiness and educational disruption. They further noted the lack of accessibility to technological devices and internet played a role.

However, Sung et al. (2015) had mentioned that insufficient preparation of the teachers persisted as one of the largest obstacles to implement effective technology integration in the teaching and learning process. The OECD (2020) has also listed four challenges in implementing online teaching and distance education which are (i) Balance digital with screen-free activities, (ii) Keep a pulse on students' emotional health, (iii) Access to devices, (iv) Manage access to IT infrastructure.

Based on four challenges in implementing online teaching and distance education, teachers would need to balance digital with screen-free activities because if online lectures were to replace school hours, it would affect students' health either physically or mentally. They also pointed out that teachers would need to recognize the importance of keeping a pulse on students' emotional health as this crisis might be unsettling and disorientating for students. As students came from different socio-economic backgrounds, access to devices may vary for each student, and thus, teachers would need to consider the possibility of students not having the devices to carry on with the workload. Meanwhile, teachers would also need to manage access to IT infrastructure as having students connect at the same time and place may be a problem for certain students. Abdul Hamid and Khalidi (2020) state that the reality was quite different from what teachers, students, and parents were used to and everybody was still grappling with e-learning. While many parties in Malaysia have put an effort to support these abrupt changes, the responsibility fell heavily onto the teachers.

2.3 Teachers' Current Perceptions in the Use of Technology in Teaching and Learning

The teachers' world view towards digital technologies were influenced by their thoughts and beliefs about teaching and learning. Salavati (2016) noted that teachers would find it easier to adopt and use innovations if they believe that these integrations can help in the learning outcome. However, pre pandemic research showed that some educators were still sceptical of making full use of the available technologies even though students were showing readiness towards mobile learning with 70% showed a willingness to learn anytime and anywhere (Rahamat, 2019).

Rahamat (2019) in her studies of designing mobile learning in Malaysian secondary schools for students revealed that students wanted to use their own mobile devices as the learning tool such as laptops (75%), smart phones (14%), and hand phones (11%). This further supports Pine-Thomas affirmation that to remove the teachers' barriers to the integration of technology in the classroom and

for effective integration of technology to take place, teachers needed to develop a paradigm shift in their thinking (Pine-Thomas, 2017).

The pandemic acted as a catalyst to the change of mindset that teachers had towards online education when they were forced to adopt remote and distance learning and utilize any approach appropriate to continue teaching and learning. Gunjan & Priyamvada (2020) reported that 45% of schoolteachers agree online methods provide positive benefits to students compared to the traditional methods. 77% teachers believed that students were able to concentrate more and revise lecture at their own pace by doing it through online media teaching. Furthermore, educators also believed that the integration of technology in teaching and learning such as the usage of video in edutainment helped to improve student's concentration (Ab Razak & Din, 2020). This provides a positive outlook on teachers' perceptions of the use of technology in teaching and learning.

In China, as a response to the epidemic prevention and control, teachers exhibit a willingness to support online teaching with 52.12% of the 15,438 valid responses strongly supporting the initiatives (Yang, 2020). This can also be influenced by the teacher's readiness to deliver online teaching as the study found that most teachers already had experience with e-learning platforms, which makes the sudden change more endurable (Yang, 2020).

The COVID-19 pandemic has changed the course of our thinking about how the education sector need to be improved and operated (The World Bank, 2020). Educators all over the world had to carry the burden of the entire education and training system on their shoulders. They needed to cope with ministerial directives that were forcing and expecting the immediate result to end programs. They teach in abnormal contexts during this emergency and lacking adequate tools and resources in unfriendly ecosystems (Lifelong Learning Platform, 2020).

Without the support from the agencies around the education sector and the government, it was a toll on teachers' mental health as the idea of education going digital was not simple (Agnoletto & Queiroz, 2020). In this troubling predicament, going digital has complex ingredients as there was a sense of urgency, unprepared readiness to deal with Virtual Management System (VMS) and online teaching tools, digital fluency, and the requisite of dealing with fear and boredom of social isolation (Agnoletto & Queiroz, 2020).

3. Methodology: Procedure and Data Analysis
An instrument to measure the respondents' perceptions was adapted from various studies (Bailey & Lee, 2020; Vu et al., 2020; Gunjan & Priyamvada, 2020; Hoffmann & Ramirez, 2018; Loague et al., 2018; Aminu & Abu Samah, 2019; Rasmitadila et al., 2020; Vassallo & Warren, 2018). A content validity was done with a language expert, an expert in the field of measurement and technology, one in the field of resource and information technology, and a senior assistant of a secondary school. They were given information about the study aim and objectives with the instrument to review. The language experts also used technology in Teaching English as a Second Language (TESL) and was involved

in research in the subject area. Face validity was also conducted before the real study to ensure enough time were given to the respondents to answer the questionnaire and all items in the questionnaire can easily be understood. Appendix 1 has the first draft of the questionnaire.

We employed a quantitative research approach with survey design. The rationale for using this method was to have an efficient means of gathering data by asking a specific, concise question to obtain data that were measurable and observable on the variables (Creswell, 2012). The revised and validated questionnaire was used to collect data. The experts examined and verified the questionnaire to ensure that it fulfilled the aim of this study.

The questionnaire comprised 44 items divided into four sections; Section A (i) teachers' demographics profile; Section B (ii) technology usage; Section C (iii) perception of the use of technology and Section D (iv) challenges in integrating technology in the classroom during the pandemic. The participants answered the questions based on the 5-point Likert scale level of agreement: 1- strongly disagree, 2-disagree, 3- partially agree, 4- agree and 5- strongly agree. The questionnaire was originally adapted from English sources but given that the respondents may not have English as their first language, the researchers opted to translate and provide a bilingual questionnaire, which were in Bahasa Melayu (Malay language) and English to accommodate non-English speakers. It was developed and distributed through a self-administered web-based electronic data collection, Google Form.

The reliability test is a method for checking a scale's internal consistency. Cronbach's alpha is used as the indicator, the value of which should be above 0.7. The overall Cronbach's alpha value for the instrument was 0.70 indicating an acceptable internal consistency (Table 1).

Table 1: Reliability Statistics

Section	Cronbach's Alpha	N of Items
B	0.46	18
C	0.87	10
D	0.83	10

We employed snowball sampling, a non-probability sampling method. Polit & Beck (2006) described snowball sampling, also known as network sampling or chain sampling, as a convenience sampling variation. They explained that early sample members were requested to refer others who fit the eligibility criteria in this method. This strategy is most utilised when the population contains people who have difficult-to-identify features (e.g., people who are afraid of hospitals). It allowed us to continue to recruit participants until an acceptable number is achieved through a referral from one respondent to another. For this study, the population was Malaysian teachers and the sample consisted of 410,471 primary and secondary school teachers. Based on Krejcie & Morgan (1970), the sample size for population of 75,000 to 1,000,000 is 382 to 384 with a 95% confidence level and

5% on error estimate. The Figure 1 below show the Formula for determining sample size from Krejcie & Morgan (1970).

Formula for determining sample size

$s = X^2 NP (1 - P) \div d^2 (N - 1) + X^2 P (1 - P)$

s = required sample size
X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)
N = the population size
P = the population proportion (assumed to be .50 since this would provide the maximum sample size)
d = the degree of accuracy expressed as a proportion (.05)

Figure 1. Formula for determining sample size from Krejcie & Morgan (1970)

However, due to the constraint of time and resource, we surveyed only 150 teachers ranging from primary to secondary school. Even so, we were only able to collect 78 due to limitations in terms of time and resources. From the 78 responses, there were altogether 31 secondary school teachers and 46 primary school teachers with one teacher teaching in both schools. Although generalization could not be made with only 78 participants as opposed to 384 or even 150, the findings can still be used to infer same feature of teachers in Malaysia.

The questionnaire was distributed during Phase 2 of conditional MCO from 4th May 2020 to 9th June 2020 and Phase 3 of recovery MCO from 10th June to 31st December 2020 through Google Form to two teachers' community Facebook groups, TcherCollection - TC and CikguKongsi. However, reluctance of the members to participate in such survey was a limitation as there was little number of respondents from the groups. Hence, we distributed the questionnaire across private and public groups through messaging applications, WhatsApp and Telegram focusing on referral of respondents to gather more responses. To ensure that there was no double submission, the respondents had to sign into their email and were only allowed to enter one response. Afterwards, we screened through each response to ensure the data fulfilled the criteria. The recorded responses were fed into the IBM SPSS Statistics version 22 software to be analysed and coded through descriptive statistics. We measured the frequency and the central tendency mainly on the means and standard deviation to simplify the display of information in a data set in the form of graphs, charts and tabulation.

The method of distributing the questionnaire and analysing the data without any physical contact was good and applicable in the times of the pandemic but there were limited number of participants from our targeted groups. Since we used snowball sampling, there was no guarantee about the representativeness of samples as it was less possible to determine the actual pattern of distribution of population. Therefore, it was challenging to determine the sampling error and make statistical inferences from the sample to the population due to the absence of random selection of samples.

4. Finding
We first present the findings on the demographic profile of the respondents; then the extent of technology usage; followed by teachers' perception on technology use; and finally, the challenges of integrating technology in teaching and learning during the pandemic.

4.1 Demographic profile
Table 2 illustrates the demographic profile of the respondents. Most of the respondents are female and most have more than 10 years of teaching experience. The highest level of education is bachelor's degree and most respondents teach at primary school, compared to secondary school, while only two teachers teaching at post-secondary school. The respondents are allowed to choose more than one subject that they are currently teaching and many of them are teaching languages. Lastly, most respondents are teaching in rural area. The demographic profile helps in giving insight and understanding on the respondents' background.

Table 2: Demographic profile of respondents

Category	Item	Frequency	%
Gender	Male	15	19.2
	Female	62	79.5
	Prefer not to be disclosed	1	1.3
Teaching experience	Less than 3 years	4	5.1
	From 3 to 5 years	6	7.7
	From 5 to 10 years	14	17.9
	More than 10 years	54	69.2
Highest level of education	Diploma	2	2.6
	Bachelor's Degree	69	88.5
	Master's Degree	7	9.0
	Doctoral Degree	0	0.0
	Other	0	0.0
Grade level that they are currently teaching	Primary (Standard 1 to 6)	47	60.3
	Lower secondary (Form 1 to 3)	20	25.6
	Upper secondary (Form 4 and 5)	24	30.8
	Post-secondary (Form 6)	2	2.6
Subject that they are currently teaching	Languages	40	51.2
	Mathematics	11	14.1
	Sciences	15	19.2
	Vocational and Technical Subjects	6	7.7
	Health and Sport Sciences	3	3.8
	Domestic Science	0	0
	History	5	6.4
	Geography	0	0
	Islamic Studies	15	19.2
	Moral Education	7	9
	Other	14	17.9
Area of schools they are currently teaching	Rural	40	51.3
	Urban	38	48.7

4.2 Extent of technology usage in teaching and learning

This section reports the findings on the extent of teachers' use of technology. In this part of the questionnaire, respondents could choose more than one item. For the devices used to access the internet, teachers can use multiple devices ranging from laptops, smart-phones, tablets, Smart TV, and video game consoles although the findings in Figure 2 indicates that smart-phones are commonly use possibly due to the ease of conduct during the lesson as teachers mostly use messaging applications. Furthermore, the most used medium, teachers used to conduct the asynchronous lesson is WhatsApp and Google Meet for synchronous lesson.
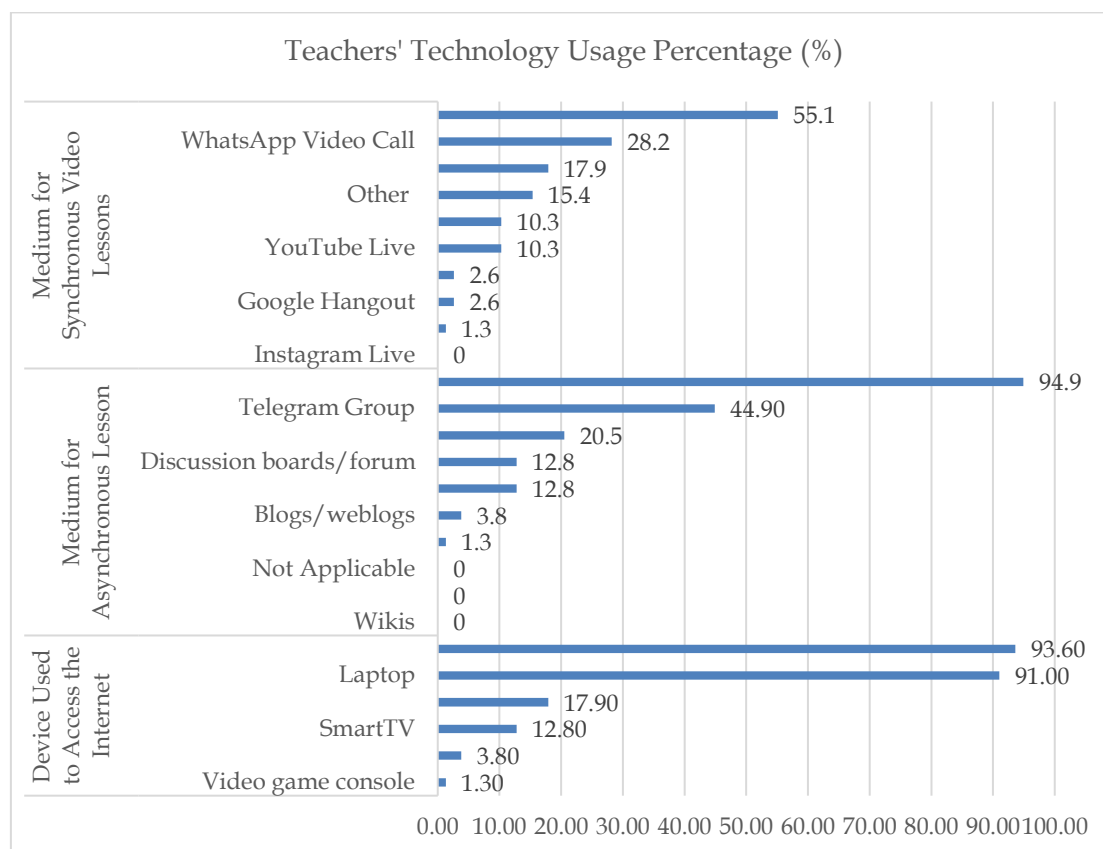

Figure 2. Percentage of Teachers' Technology Usage

Meanwhile, Figure 3 illustrates the platform teachers used to access digital resources and learning materials. The data reveals that most of them prefer to use Google classroom and Facebook over any other platforms.
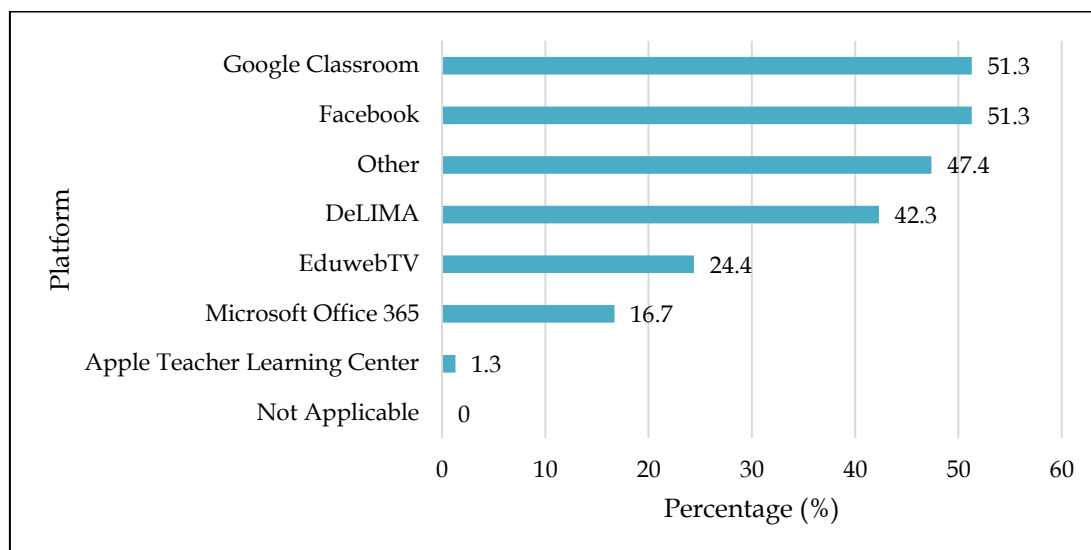
Figure 3. Percentage of Teacher and Platform for Digital Resources and Learning Materials

This research also shows the frequency of technology usage by purpose illustrated in Table 3. This is shown by how often they instruct students to use educational technology by giving specific purpose. The data reveals that technology is commonly used for entertainment ranging from daily usage and three to four times a week for specific skills and information purpose. Many of them used it for specific skills, creative and information purpose for once or twice a week. Besides that, for specific and entertainment purpose for two or three times a week. At the same time, most of them only used technology in classroom for creative activity once a month and less.

Table 3: Frequency (f) of Technology Usage by Purpose

Purpose	Daily		Three or four times a week		Once or twice a week		Two or three times a week		Once a month or less	
	f	%	f	%	f	%	f	%	f	%
Specific skills	6	12.8	12	25.5	11	23.4	10	21.3	8	18.0
Keyboarding	6	12.8	10	21.3	9	19.1	7	14.9	15	31.9
Creative	3	6.3	9	19.1	11	23.4	4	8.5	20	42.6
Entertainment	16	34.0	6	12.8	6	12.8	10	21.3	9	19.1
Information	7	14.9	12	25.5	11	23.4	8	17.0	9	19.1

Table 4 shows the frequency of technology usage by activity type, which are written text, graphics, basic skills, research, correspondence, blog/wikis, social, presentations and creative work. Significantly, most teachers used technology daily for correspondence activity and three or four times a week for basic skills. Many of them used it for social activities for once or twice a week and for graphics for two or three times a week. At the same time, most of them only used technology in classroom for creatice activity once a month and less.

Table 4: Frequency of Technology Usage by Activity Type

Purpose	Daily		Three or four times a week		Once or twice a week		Two or three times a week		Once a month or less	
	f	%	f	%	f	%	f	%	f	%
Written text	3	9.4	5	15.6	12	37.5	7	21.9	5	15.6
Graphics	3	9.4	6	18.8	11	34.4	8	25.0	4	12.5
Basic skills	4	12.5	9	28.1	10	31.3	8	25.0	1	3.1
Research	3	9.4	5	15.6	13	40.6	7	21.9	4	12.5
Correspondence	8	25.0	8	25.0	10	31.3	5	15.6	1	3.1
Blogs/ wikis	2	6.3	5	15.6	12	37.5	5	15.6	8	25.0
Social	3	9.3	7	21.9	14	43.8	6	18.8	2	6.3
Presentations	1	3.1	6	18.8	13	40.6	5	15.6	7	21.9
Creative	2	6.3	4	12.5	11	34.4	6	18.8	9	28.1

4.3. Perceptions of the use of technology in teaching and learning during the pandemic

Next, we present the findings on teachers' perceptions of the use of technology in teaching and learning during the pandemic to answer the second research objective. The findings have been categorized into (a) the technology use for the benefits of the students and (b) technology use for the benefits of the teacher. The benefits of the students include increase of student collaboration, academic achievement, enhance digital competence, active participation, prepare for future workforce, and encourage instructional and learning purpose. On the other hand, the benefits of the teacher include continuation of teaching and learning; enhance professional development, access to greater resources, and changes of role. In analysing the teachers' perception of the use of technology, data is analysed descriptively to determine the mean and the standard deviation.

Teachers have an average high level of agreement with the statements in this section of the questionnaire. It is found that the highest mean is recorded for the benefits of the teacher ($\bar{x}$= 4.42; SD= 0.629) as compared to the benefits of the students ($\bar{x}$= 3.73; SD= 0.700). The data in Table 5 reveals the statement which receives the highest mean ($\bar{x}$= 4.62) which is "Technology is essential to the continuation of teaching and learning during the pandemic" with 71.8% (56) strongly agree and 17.9% (14) agree with the statement. Nevertheless, 10.3% (8) partially agree while none disagree with the statement. In simple term, none of the teachers disagree that "Technology is essential to the continuation of teaching and learning during the pandemic.

Meanwhile, teachers have high level of agreement ($\bar{x}$ = 4.13) to the benefits of students in the statement "The use of technology in teaching and learning enhances students' digital competence and responsible use" 42.3% (33) strongly agree and 33.3% (26) agree with the statement. 20.5% (16) shows their partial agreement. Although, 2.6% (2) and 1.3% (1) shows their disagreement to the statement. In summary, only an insignificant number of teachers from the sample 3.9% (3) disagree that "The use of technology in teaching and learning enhances students' digital competence and responsible use."

Table 5: Level of agreement to the statement(s)

Item (Statement)	f	1	2	3	4	5	Mean	Level
	%						($\bar{x}$)	
Technology is essential in the continuation of teaching and learning during the COVID-19 pandemic.	f	0	0	8	14	56	4.62	High
	%	0	0	10.3	17.9	71.8		
The use of technology in teaching and learning enhances students' digital competence and responsible use.	f	1	2	16	26	33	4.13	High
	%	1.3	2.6	20.5	33.3	42.3		

4.4. Perceptions on the challenges of integrating technology in teaching and learning during the pandemic

This section reports the findings of the third research objective, which is to identify teachers' perceptions on the challenges of integrating technology in teaching and learning during the pandemic. The findings have been categorized into (a) the challenges of the students and (b) the challenges of the teachers. The challenges for the students include technology literacy, conduct of assessment, student's participation, and socio-economic background. The challenges of the teacher include lack of knowledge, instructional method, and unfamiliarity with the setting, providing corrective feedback, instructional time, and privacy issues. We found that the highest mean was recorded for the challenges of the students ($\bar{x}$= 3.88; SD= 0.748) as compared to the challenges of the teachers ($\bar{x}$= 3.35; SD= 0.681).

In Table 6, the statement which receives the highest mean ($\bar{x}$ = 4.13) is "Students from lower socio-economic strata whom teachers worked with cannot afford devices to participate in online learning". It illustrates that most teachers at 41% (32) strongly believe that students from lower socio-economic strata whom they worked with cannot afford devices to participate in online learning with 34.6% (27) agree to the statement. Furthermore, 20.5% (16) partially agree. Even so, 3.8% (3) disagree. Thus, this shows that 3.8% (3) disagree that "Students from lower socio-economic strata whom teachers worked with cannot afford devices to participate in online learning".

On the other hand, the statement that has the highest mean (($\bar{x}$ = 3.69) under the challenges of the teacher is "The instructional time during online learning tends to be short". Majority of the teachers 37.2% (29) agree and 21.8% (17) strongly agree to that the instructional time for them to conduct online learning was short

compared to face-to-face and physical classroom. In addition, there are 30.8% (24) partially agree to the statement but only 9.0% (7) and 1.3% (1) showing their full disagreement.

Table 6: The level of agreement to the statement(s)

Item	f %	1	2	3	4	5	Mean (x̄)	Level
Students from lower socioeconomic strata whom I worked with cannot afford devices to participate in online learning.	f	0	3	16	27	32	4.13	High
	%	0	3.8	20.5	34.6	41.0		
The instructional time during online learning tends to be short.	f	1	7	24	29	17	3.69	Slightly High
	%	1.3	9.0	30.8	37.2	21.8		

5. Discussion

We discuss the (i) The Extent of Teachers' Technology Usage in Their Teaching and Learning During the Pandemic; (ii) Teachers' Perceptions on the Use of Technology in Teaching and Learning during the Pandemic; and (iii) Teachers' Perceptions on the Challenges of Integrating Technology in Teaching and Learning during the Pandemic. However, readers should be aware of some limitations that we had to faced when conducting this research which are the limited time and resources. As this was conducted during a strict movement control order (MCO), we were confined to the resources limited to what was available via online and any interaction between researchers was only conducted through messaging app and video calls. Moreover, as mentioned in the methodology section, this research did not go as well as we had planned for. During the first three weeks after distributing the questionnaire to the two teacher community Facebook groups, there were little number of responses, and it did not achieve the expected number. The members of the groups may be reluctant to participate in such survey where most teachers were government workers, and this type of surveys might be private to the use within the sector. For future and more complete studies, researcher may want to consider looking into and adhere to the procedures set by the ministry to request permission to conduct research to the schools in order to gain more responses.

5.1. The extent on the use of technology in teaching and learning during the pandemic

Firstly, based on the findings, we found that the commonly used device to access the internet was smartphones. It was possibly because it was a hand-held design that was easier to carry around and access. Most students would likely to have smartphones nowadays and thus, have higher access to participate in the teaching and learning compared to other types of the lesson, which required other devices. Secondly, the commonly used medium to conduct asynchronous lesson were WhatsApp and Telegram which were both a type of messaging applications which could be installed in the smartphone. This was probably because it required less internet data and shared a similar reason for the choice of device.

Thirdly, the most preferable medium to conduct synchronous lessons was Google Meet but there was a significant number of teachers who were unable to conduct such lessons due to internet connectivity, having lived in a less developed area and students were not well-equip with devices and Internet at home. Fourth, teachers mostly access Google Classroom and Facebook for digital resources and learning materials. However, there was not much significant difference among the platforms possibly because teachers were open to using such platforms to suit their search for various learning materials. Fifth, technology was frequently used for entertainment purpose for primary school teachers and correspondence activity for secondary school teachers.

Based on the findings, we can see that the teachers were not reluctant to incorporate technology in the classroom albeit they had to adapt the lesson into mobile-friendly activities to suit their students' conditions. If there were only 57% of teachers used technology in education before the pandemic (Ebrahimi & Yeo, 2018), now all the respondents used them in their classroom. There were also 77% of teachers who believed that students were able to concentrate more and revise lectures at their own pace through online media teaching. This provided a positive outlook on teachers' perceptions of the use of technology in teaching and learning.

This was a shift in teachers' mindset compared to before the pandemic, as teachers were more motivated to use technology in their teaching. Despite the change of the mindset, there were other setbacks that could not be ignored. Although teachers may prefer to use elaborate mediums to conduct asynchronous and synchronous lessons, they were restricted by students' ability to join and participate in them. Abdul Hamid and Khalidi (2020) stated that in the times of pandemic, the level of e-learning adoption seemed to be linked to a country's level of development. This further pointed that Malaysia was still at a nascent stage with limited availability of devices to support such endeavour as 37% of the 900,000 students in Malaysia did not have the appropriate device. A study conducted by Gunjan & Priyamvada (2020) reported that there were 45% of schoolteachers who agreed that online methods provide positive benefits to students compared to the traditional methods.

5.2. Teachers' Perceptions on the Use of Technology in Teaching and Learning during the Pandemic

Most respondents agreed that technology was essential to the continuation of teaching and learning during the pandemic. Being that teachers were unable to meet physically and discuss students' learning developments, online meeting platforms have been the go-to medium to support the teaching and learning. Thus, they realized the difficulty to cope with working remotely with no or lack prior experience or skills to tackle online learning by using technological tools, media, and platforms and as such the ministry as well as the teachers' community in the social media, resorted to provide and share learning materials through such platforms for easier access. Other than that, by providing the opportunity to students to utilize the learning platforms enhances their digital competence and responsible use. With 42.3% teachers agreeing how technology had helped their

students in their digital competence, this was a step up compared to a survey of 1,647 primary Year 1 pupils which was undertaken by the MOE and Microsoft Malaysia in late 2005. They reported that the pupils displayed fundamental computer hardware and software recognition, which met the learning objectives for that age range but poor levels of skill in typing, voice recording, and drawing activities were discovered during the assessment (UNESCO, 2013). Students may not know how to record, make videos, or even use Google Classroom before, now they were equipped with the knowledge to handle simple or even complicated technology.

As technology has become essential in the current situation, it cannot be ignored. Teachers are forced to explore various types of approaches to continue teaching and learning despite. Emerging technologies in education such as cloud computing, mobile technology, Massive Open Online Courses (MOOC), games and gamification, augmented reality, and virtual reality needs to be explored and utilized (Hashim, 2018). If smartphone was the only device available to use, educators need to find other approaches to explore the potentials of the device. Research conducted by Che Murat et al. (2020) found that all their respondents owned a smart-phone and they showed high readiness towards mobile learning. They further stated that mobile learning could help stimulated students' motivation to learn independently because mobile devices such as smartphones were extremely easy to use, have attractive features, are flexible and thus, educations could be accessed anywhere and anytime.

Being thrown drastically into a situation that required all teachers to depend on and explore these various approaches, many has seen the negative and positive effects of using technology in the lesson. Teachers seem to have an affirmative to the positive effects of integrating technology in classroom and this further strengthen the need for our education system to have well-equip, up to date and re-invent environments to support more technological usage in teaching and learning. Hashim (2018) stated that the traditional teaching paradigm are challenged by today's new generation and due to the current event, it further escalated the need to accommodate the learners and to cater to their needs, the learners' capabilities, preferences, experiences, the frame of reference and familiarity with technology should be considered. Teachers already considered these criteria when they independently took initiatives to create the lesson materials. However, the curriculum and assessment for formal education were still quite rigid to accommodate them.

5.3. Teachers' Perceptions on the Challenges of Integrating Technology in Teaching and Learning during the Pandemic

Most respondents found that students from lower socio-economic strata whom they worked with could not afford devices to participate in online learning. Affordability to own a device to participate in online learning was a recurring concern and deserved to be investigated. Finance has always been a concern for many people from lower socio-economic backgrounds. While there was a low number of people who owned personal computers, laptops, and tablets, smartphones have a higher percentage of ownership at 46%, which was why it

was the most common device to be used by teachers to conduct their lesson (Abdul Hamid & Khalidi, 2020). Teachers were forced to choose the most suitable tools, platforms, and materials for all their students to be able to participate in class. If materials that are more complex were used, some students might be unable to participate due to limited devices and Internet connectivity. Thus, it would hinder their learning development during this remote learning environment.

Although it was a suitable alternative to not having any devices at all, it was still limited in terms of the instructional features among other criteria. Most likely, teachers would impart instructions to the parents and have the parents monitor and guide the students. This further supported the statement that not all students were technology literate. Some would have limited understanding and ability to navigate technology on their own, required parents, and family intervention, which was acceptable if it was for lesson development although it would bring another set of challenges for the parents. However, it may hinder fair assessment and evaluations on the students and thus, teachers would be unable to truly observe and analyse their students' understanding and learning growth.

On the other hand, teachers found that the instructional time during online learning tends to be short. Over the years, students were provided with information physically either teachers-students interaction, reading materials from books or unlimited access to the school's library (Balan et al., 2020). However, it has changed now with teachers providing virtual classroom or online materials to be reviewed in students' own time and it may affect student's attention span. There were many activities that teachers could do during physical classroom to help increase students' attention span, but online learning offered a different set of challenge. Hence, teachers chose short and concise materials and straightforward approach to conduct their lessons. While this may help to retain students' attention and focus on the topics at hand, it was a challenge for teachers to ensure the information was enough.

The momentum that was born out of necessity to change from traditional learning to advanced technology learning needed to be continued and further explored by the authority and people of interest. As stated in the literature review, the first difficult part to integrate technology was to shift teachers' paradigm and when that limitation was removed, the changes should be easier to follow. However, the lack of readiness of the system to support to such changes inhibit the motivation to do more. The schools in every area should provide better facilities to support technology. Not only that, but telecommunication service providers in our country also needed to upgrade as the current and immediate challenge was that the more populated area and rural area have difficulties connecting to the internet.

Furthermore, if the richer schools were able to provide enough facilities and devices to their students to support and accommodate online teaching and learning, why shouldn't less fortunate schools be provided the same especially in our centralized education system? By providing these incentives to the students, both teachers and students would have more time to focus in other areas to

expand on their experience and knowledge. Ease of conduct and freedom for teachers to experiment with their methods of teaching via technology depended on the time that they spent to prepare for these materials. Teachers should be given more time and training to enhance professional developments and be given the space that they need to explore and experiment maturely. Hastily implemented strategies were beneficial in times of emergencies but it was not substantial and stable enough to be the foundation of the educations in the new norms.

Teachers, educators, and trainers all over the world had to carry the burden of the entire education and training system on their shoulders. As they needed to cope with ministerial directives that were forcing and expecting the immediate result to end programs, teach in abnormal contexts during this emergency and lacking adequate tools and resources in unfriendly ecosystems (Lifelong Learning Platform, 2020). Without the support from the agencies around the education sector and the government, it was a toll on teachers' mental health as the idea of education going digital was not simple (Agnoletto & Queiroz, 2020).

6. Conclusion
This research reveals the extent of teachers' technology usage in teaching and learning during the pandemic in which teachers mostly used smartphones to access the internet and the preferred medium to carry asynchronous and synchronous lesson are through messaging application, WhatsApp and Google Meet respectively. Moreover, teachers would rather use Google Classroom and Facebook to gather resources compared to other platforms. Aside from that, technology is frequently use for entertainment purposes for primary school teachers and correspondence activity for secondary school teachers.

Furthermore, this research discusses the general perceptions of teachers on the technology used during the pandemic which proves their acknowledgement to the essential role of technology in the continuation of the education system and how it enhances students' digital competence and responsible use. This shows a shift in teachers' perceptions towards technology in classroom as they are more positive and motivated to incorporate it in their own class. Despite the positive outlook that teachers have towards technology in education, the most significant challenges that persisted were the limited availability of devices and the short instructional time which deters more frequent, and various use of technological media, platforms, and tools. These challenges need to be addressed and actions must be taken to absolve further implications.

In conclusion, technology has become an essential part of our lives and it is not limited to the education sectors. It has become a means of continuation for various sectors in our country. Teachers, educators, the government, and even students need to be aware and concern about the future of the education system. In the face of the current predicament of school closure and remote learning, it is important to note that students, as well as teachers, are affected in short and long-term implications. The challenges need to be addressed to provide more opportunity for students and teachers to use more and various types of technology, which can

support their specific and different needs. This research is hoped to give an input and a push to increase digital access and awareness in Malaysia for a better quality of technology integration in teaching and learning. Malaysia needs to be more prepared than what we have now to face the unexpected future to ensure that nobody was left behind.

7. Acknowledgment

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Appendix

INSTRUMENT VALIDATION FORM

FACULTY OF EDUCATION

UNIVERSITI KEBANGSAAN MALAYSIA

TITLE

TEACHERS' COMPETENCY IN INTEGRATING TECHNOLOGY IN THE CLASSROOM DURING LOCKDOWN DUE TO COVID-19 PANDEMIC
KOMPETENSI GURU DALAM MENGINTEGRASI TEKNOLOGI DALAM KELAS SEMASA PANDEMIK COVID-19

Research Objectives are/ *Objektif Kajian adalah*:

1. To identify teachers' technology use in the classroom during the pandemic.
   (Mengenal pasti penggunaan teknologi dalam bilik darjah semasa pandemik.)
2. To identify teachers' perceptions on the use of technology in the classroom during the pandemic.
   (Mengenal pasti persepsi guru terhadap penggunaan teknologi dalam kelas semasa pandemik.)
3. To determine teachers' perceptions on the challenges of integrating technology in teaching and learning during the pandemic.
   (Menentukan persepsi guru terhadap cabaran mengintegrasikan teknologi dalam pengajaran dan pembelajaran semasa pandemik.)

STUDENT NAME:

EXPERT REVIEWER NAME:

POSITION:

Please give marks for each item according to suitability and appropriateness of language and constructs. Comment from Prof / Assoc. Prof / Dr / Sir / Madam / Miss is greatly appreciated.

0: Not accepted, remove.
1: Accepted with correction.
2: Accepted without any correction.

PART II:
TEACHERS' TECHNOLOGY USE IN THE CLASSROOM DURING THE PANDEMIC. *(PENGGUNAAN TEKNOLOGI DALAM BILIK DARJAH SEMASA PANDEMIK.)*

	Item	Sources	0	1	2	Comment
1.	I access web information through: *Saya mengakses maklumat web melalui:* o Laptop/computer (*Komputer riba/ desktop*) o Smartphones *(Telefon pintar)* o Tablet/iPad o SmartTV *(TV pintar)* o Video game console *(konsol permainan video)* Other (please state). *Lain-lain (sila nyatakan)*: …………………………	Giovannella, Passarelli & Persico 2020				
2.	I conduct my asynchronous lessons through: *Saya menjalankan pelajaran tidak segerak melalui:* o Email *(Emel)* o Discussion boards/forums *(Ruang perbincangan/ forum)* o Blogs/Weblogs o Wikis o Podcasting *(fail audio digital)* o E-Portfolios o Telegram Group o WhatsApp Group Other (please state). *Lain-lain (sila nyatakan)*: …………….	Self-developed *(Dibangunkan sendiri)*				

| 3. | I conduct my synchronous video lessons (live teaching via video stream) through:
Saya menjalankan pelajaran video segerak saya (pengajaran langsung melalui aliran video) melalui:

    o Zoom
    o Google Hangouts
    o Google Meets
    o Microsoft Teams
    o WhatsApp's video calls*(Panggilan video WhatsApp)*
    o Instagram live
    o YouTube live
    o Other (please state). *Lain-lain (sila nyatakan)*: ……………..
    o None *(Tidak berkenaan)* | Self-developed *(Dibangunkan sendiri)* | | | | |
| 4. | I utilize the digital resources and learning materials through:
Saya menggunakan sumber digital dan bahan pembelajaran melalui:

    o EduwebTV
    o DeLIMA
    o Google Classroom
    o Microsoft Office 365
    o Apple Teacher Learning Center *(Pusat Pembelajaran Pengajaran Apple)*
    o Other (please state). *Lain-lain (sila nyatakan)*: ………………..
    o None *(Tidak berkenaan)* | Self-developed *(Dibangunkan sendiri)* | | | | |

PART III:
TEACHERS' PERCEPTION OF THE USE OF TECHNOLOGY DURING THE PANDEMIC.
(PERSEPSI GURU TERHADAP PENGGUNAAN TEKNOLOGI DALAM KELAS SEMASA PANDEMIK.)

	Item	Sources	0	1	2	Comment
1.	I am confident in my technological skills. *Saya yakin dengan kemahiran teknologi saya.*	Hoffmann & Ramirez 2018				
2.	Technology increases student collaboration in a classroom. *Teknologi meningkatkan kolaborasi pelajar di dalam kelas.*	Loague, Caldwell & Balam 2018				
3.	I do not face any difficulty in online teaching during COVID-19. *Saya tidak menghadapi sebarang kesukaran dalam pengajaran dalam talian semasa COVID-19.*	Cam-Tu Vu et al 2020				
4.	I encourage the use of smart phones in my class for instructional/learning purposes. *Saya menggalakkan penggunaan telefon pintar di kelas saya untuk tujuan pengajaran dan pembelajaran .*	Hoffmann & Ramirez 2018				
5.	Online teaching is best to replace face to face class during the pandemic. *Pengajaran dalam talian adalah yang terbaik untuk menggantikan kelas tatap muka semasa wabak.*	Cam-Tu Vu et al 2020				

6.	Students are actively engaged in online sessions. *Pelajar terlibat secara aktif dalam sesi dalam talian.*	Cam-Tu Vu et al 2020			
7.	I have a wide band access to the Internet. *Saya mempunyai akses jalur lebar Internet.*	Giovannella, Passarelli & Persico 2020			
8.	My school's ICT infrastructure is ready for transformation during COVID-19. *Infrastruktur ICT sekolah saya bersedia untuk transformasi semasa COVID-19.*	Cam-Tu Vu et al 2020			
9.	Teachers at my school are ready for transformation during the outbreak. *Guru di sekolah saya bersedia untuk menghadapi transformasi semasa wabak.*	Cam-Tu Vu et al 2020			
10.	My school's policy are ready for transformation during COVID-19. *Dasar sekolah saya bersedia untuk menghadapi transformasi semasa COVID-19.*	Cam-Tu Vu et al 2020			

PART IV:
TEACHERS' PERCEPTIONS OF THE CHALLENGES OF
INTEGRATING TECHNOLOGY IN TEACHING AND LEARNING
DURING THE PANDEMIC. *(PERSEPSI GURU TERHADAP CABARAN*
MENGINTEGRASIKAN TEKNOLOGI DALAM PENGAJARAN DAN
PEMBELAJARAN SEMASA PANDEMIK.)

Num.	Item	Sources	0	1	2	Comment
1.	Implementing technology in the classroom is challenging due to my lack of knowledge in technology. *Menggunakan teknologi di dalam kelas memang mencabar kerana saya kurang pengetahuan tentang teknologi.*	Rasmatadila et al 2020				
2.	It is difficult to create online lessons. *Adalah sukar untuk membuat pelajaran dalam talian.*	Bailey & Lee 2020				
3.	Setting of online systems are too complex. *Penyediaan sistem dalam talian adalah terlalu rumit.*	Rasmatadila et al 2020				
4.	Not all students are Internet literate. *Tidak semua pelajar celik Internet.*	Rasmatadila et al 2020				
5.	I cannot fairly conduct assessments due to parents' intervention. *Saya tidak dapat membuat penilaian dengan adil kerana campur tangan ibu bapa.*	Rasmatadila et al 2020				
6.	The instructional time during online learning tends to be short. *Waktu pengajaran semasa pembelajaran dalam talian cenderung untuk menjadi singkat.*	Rasmatadila et al 2020				
7.	It is difficult to track students' participation. *Sukar untuk mengesan penyertaan pelajar.*	Bailey & Lee 2020				

8.	It is challenging to provide corrective feedback. *Adalah sukar untuk memberikan maklum balas untuk pembetulan.*	Bailey & Lee 2020				
9.	The different socioeconomic strata of the society affects students' experience of learning. *Strata sosioekonomi masyarakat yang berbeza mempengaruhi pengalaman belajar bagi pelajar.*	Verma & Priyamvada 2020				
10.	I am reluctant to use online learning platform as privacy issue is a concern. *Saya enggan menggunakan platform pembelajaran dalam talian kerana masalah privasi adalah suatu kebimbangan.*	Self-developed *(Dibangunkan sendiri)*				

Remarks

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THANK YOU FOR YOUR EXPERTISE, HELP, AND COOPERATION