

EMERGENCY REMOTE TEACHING (ERT) AND TEACHERS'
OPINION TOWARDS MOBILE PHONES INTEGRATION IN
SECONDARY SCHOOLS OF KUALA LUMPUR

FELICIA CHEN XIN EN

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ABSTRACT

This research aimed to study teachers' opinion on mobile phones integration within the classroom. Specifically, it investigates whether teachers' perception on this issue has changed after going through Emergency Remote Teaching (ERT) during the Covid-19 pandemic. 53 secondary school teachers from Kuala Lumpur, Malaysia participated in this study through a self-administered quantitative questionnaire, where their opinion was rated through a 5-point Likert scale. The data collected were analysed using a dependent *t*-test to investigate the change in teachers' opinion before and after ERT. Teachers' response was also analysed to determine the difference in opinion according to teachers' gender, level of academic qualification and number of years of teaching experience.

Overall, it was found that teachers remained slightly supportive on the incorporation of mobile phones in classrooms before (mean = 3.66, s.d. = 1.00) and after ERT (mean = 3.30, s.d. = 0.93), although there was a significant decrease in interest after ERT ($t(52) = 2.56, p = 0.01$). Teachers also expressed that banning policies on mobile phones was inefficient to overcome issues of cyberbullying (mean = 4.13, s.d. = 0.98). Based on this result, it is recommended that these banning policies be replaced with guidelines and awareness to encourage healthy usage of mobile phones.

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Chapter 1: Introduction

1.1 Background of Study

Major unexpected events occurred in 2020, one of it being the COVID-19 virus, an airborne virus which can lead to lethal effects (Martines *et al.*, 2020). First found in Wuhan, China, the virus had failed to be contained within the region and managed to spread globally. On 30th January 2020, the Director-General of the World Health Organization (WHO) declared COVID-19 as a public health emergency of international concerns. Countries that are facing the virus outbreak are advised to implement a lockdown to contain the spreading of the virus (WHO, 2020). In Malaysia, the announcement of the lockdown was made by the prime minister, where the lockdown began from 18th March, 2020 until the pandemic is controlled nationally (Sukumaran, 2020). The unpredicted circumstances have left no time for various sectors to be prepared. Education sector was not left out too, where schools were to immediately shift 100% face-to-face classroom teaching to remote teaching and learning. In this event, schools were left with no choice but to adapt and improvise using available resources found online. The short timeframe was not enough to prepare and accommodate for proper transition and formal training to be designed and carried out. Instead, teachers and students maximised every resource found online to conduct classes and facilitate instructional delivery. Academic staffs also did all effort to minimise the impact of the pandemic on students' learning progress, especially students who are registered as candidates for key stages examinations (e.g. PMR, SPM, STPM).

It was a challenging phase as teaching and learning resources, activities and instructional tools which were designed for a classroom setting may now be ineffective during the events of Emergency Remote Teaching (ERT) (Hodges *et al.*, 2020). For example, worksheets used for the purpose of formative assessment are now inaccessible as students cannot physically receive those worksheets from their teachers. Classrooms which were used to carrying out discussions using physical white boards now have to look for alternatives to conduct collaborative work.

The beginning phase was difficult for both teachers and students, as they have to adapt to the remote learning environment immediately to avoid any delays on their academic progress. But as the lockdown progressed, both teachers and learners have begun to adapt to the remote learning environment better, and developed effective measure to mitigate the impact of the circumstances. Many useful online tools have also been discovered, created and implemented in regular teaching and learning, most of which were unexplored prior to the ERT caused by the Covid-19 pandemic.

With the applaudable efforts of healthcare providers and all citizens, the spread of the Covid-19 was controlled (Abdul Rashid, 2020), and schools were finally allowed to reopen at stages after three months of strict lockdown, with priority given to candidates sitting for key stage exams (Lee, 2020). Many teachers have maintained the online tools that have benefited learning during the virtual learning period and integrated them into regular classroom teachings. The importance of technology and internet access has widened the range of tools that help make education more accessible. Online learning if implemented properly, can be a new era of education, and offer a greater flexibility to students to learn regardless of their location. The World Bank Education Global Practice

(2020) also published a guidance on remote learning during Covid-19, where the organization calls for policy makers and schools to reconsider the rules and regulations of using devices in schools, as well as allocating budget to prioritise the establish of a strong and secure internet connection. Stakeholders are also urged to make technology devices and internet more affordable and accessible in order to ensure academic continuity. These recommendations are suggested as preventive measures in preparation for future unexpected events, and will aid in the transition between classroom teaching and remote learning in the future.

Class recordings are one of the examples of online tools that were beneficial and effective, and has continued to be implemented even in the face-to-face classroom. Recordings of teaching and classroom activities has proven to aid in revision as students can access and revise on the material repeatedly (Prodanov, 2012). Teachers can also pre-record their teachings to provide students with the flexibility to conduct self-learning, especially for students who might not be able to attend classes or are faced with technical issues and disruption during the period of Emergency Remote Teaching (ERT) (Waqar, 2020). This has helped to accommodate students of all learning abilities (Frontiera, 2013). Secondly, tools like Nearpod allowed teachers to monitor the progress of all students, even when the teacher to student ratio is high (Hakami, 2020). There are also various mobile applications, which teachers have used to conduct interactive formative assessments and self-directed learning (Onodipe and Ayadi, 2020). It was also found that students adapt well when using their phones as a new tool for learning, since they are already familiar with mobile phones as a communication tool.

Despite the benefits that mobile phones offer in education, there are also concerns regarding the incorporation of mobile phones within the classroom. One of it being the distraction it may cause to students as they can easily access to social media, mobile games, and access to social media while teaching and learning is ongoing in the classroom (David et al., 2015). The small screen size can also be an obstacle for students to learn, especially when they have to go through large amount of texts (Kim and Kim, 2012). Security issues were also raised, as there is risk in the leaking of personal details. Not to mention the potential of cyber bullying if mobile phones are being misused (Keengwe, Schnellert and Jonas, 2012).

The society is also aware about the effect mobile phones have on the cognitive development of students, especially students in secondary schools, typically aged between 13 to 18 (Hadlington, 2015). Long term exposure to social media has also sparked mental health issues, as individuals may compare themselves with others on social media, and can lead to detrimental effects on the self-esteem of teenagers. The constant exposure to vast amount of information is also linked to the overstimulation of the brain, which is commonly associated with issues like anxiety, depression, and insomnia (Gao et al., 2020). Lastly, students are less physically active if they are occupied with their mobile phones. This may lead to diminished social skills, as the opportunities to communicate face to face is also lessened.

Overall, this study investigated the perspectives of teachers in secondary schools of Kuala Lumpur on mobile phones integration in classroom, and whether their attitude has shifted after the experience of Emergency Remote Teaching (ERT). The reasons and rationale behind their stand were also investigated. This study also explored if the shift in

perspective is correlated with the different pedagogical approaches that teachers took during and after ERT.

1.2 Problem Statement

Education technology has been an increasingly popular trend throughout the whole education sector (Saba, 2009). Teachers are constantly proposing new ideas on integrating technology within the classroom. With internet becoming increasingly accessible, more opportunities are created as resources are made available. It is common nowadays for teachers to include online resources in classroom teaching and learning. For example, YouTube videos showing an advance scientific equipment used in a university research laboratory would provide students in the secondary schools with an eye-opening experience of how advance the scientific community is (Lab Xchange, 2019). The correct use of technology has definitely improved learning process and efficiency as students have showed to be more engaged and attentive in the classroom, as well as having a better understanding of concepts and knowledge taught (Mosca, Paul and Skiba, 2006).

In Malaysia, 88.7% of the population are internet users (Internet World Stats, 2020). Commonly known devices where one can access the internet are computers, laptops, mobile phones and tablets. In a survey conducted by the Malaysian Communications and Multimedia Commission (MCMC) in 2020, mobile phones have been ranked to be the most preferred device to access internet, with a near saturation point of 98.7%. The survey also suggested that on average, internet users in Malaysia spend 5 to 12 hours every day browsing the internet (MCMC Internet Survey, 2020). Apart from communication

purposes, mobile phones users also mainly utilize the internet to visit social networking platform and to obtain information. 61.8% of the internet users have shared content online, where educational content ranked the highest. However, among all the places to access internet, places of education were ranked at the bottom, with only 8.2% of internet users access internet from educational institutions. Since most students have access to mobile phones and internet access, why is it not utilized in the classroom education?

Several researches have suggested a few possible explanations for this phenomenon. Although technology integration in the classroom has showed promising benefits, a large population of teachers are still comfortable conducting classroom activities without technology. It was found that these teachers shy away from technology integration as no proper training was provided (Spencer, 2012). Teachers who wish to incorporate technology in their classroom often have to purchase their own devices on their own expenses, and spend time learning those new technology and techniques in order to integrate it efficiently in the classroom (Spencer, 2012). The amount of preparation work to learn a new tool is also avoided since technology incorporation remains an optional tool in education (Spencer, 2012).

Another possible explanation is also that mobile phones was originally invented for communication purposes and was not intended for educational purposes (Heathman, 2017). Teachers who planned their lessons did not consider mobile phones as an educational tool. In results, the possession of mobile phones in the classroom was regarded as a distraction tool to the classroom teaching and learning (McCoy, 2016). This phenomenon has then led to banning policies (France-Presse, 2018), where students are

not allowed to bring their mobile phones to schools, especially in primary and secondary schools.

With the increasing advancement of technology, the function of mobile phones has extended beyond communication (Heathman, 2017). Together with the access of internet, this palm size device can be easily carried around and enable users to conduct a large range of online activities that facilitate our everyday life regardless of the location (Heathman, 2017).

The education sector has not kept up with this pace of advancement. Today, technology is still on debate on whether it should or should not be integrated within the classroom. In Malaysia, technology is currently an optional tool to be integrated in classrooms, with only 57% of teachers in secondary schools of Malaysia are utilizing technology to conduct classroom activities (Ebrahimi and Yeo, 2018). In most cases, teachers are the only person who have access to the device and internet in the classroom. With the implementation of banning policies of mobile phones, students have no access to devices and the internet when they are in the classroom. This has result in the inefficiency to conduct classroom teaching and learning, especially activities that encourage intrapersonal skills such as active learning and research methods (Oxford Learning, 2019). For example, when students in the classroom are instructed to search for information about a new topic, they can only refer to the textbooks available, or have to conduct the research after school when they have access to the internet at home. This has limited classroom learning within the four walls and reference books, since students have limited resource to explore and look for answers and case studies.

Excluding mobile phones and access to internet in classrooms also possess another threat to students' learning. Most students today are proficient users of mobile phones. However, as the implementation of mobile phones caused students to be punished when found in possession with their mobile phones in school, students have conditioned to exclude mobile phones when it comes to learning and studying their subjects in school (Woollard, 2010). Despite the vast amount of resources available online, students lacked the skills and initiative to look up for new information and research online using their mobile phones whenever they faced an academic issue (Song *et al.*, 2013). In contrast, they rely on teachers for subject knowledge. This will result in students to view their mobile phones as an entertainment and communication tool, excluding the possibilities of utilizing their mobile phones for educational purposes. This practice has shaped students who do not consider utilizing their mobile phone as an approach to facilitate academic learning (Oxford Learning, 2019).

Students also lacked skills in overcoming obstacles, especially during impromptu events and unexpected conditions. One great example is the recent COVID-19 pandemic. The pandemic has infected 45.5 million people globally, and has caused a death toll to 1.19 million people as of 31st October 2020 (Wikipedia, 2020). Due to the virus' airborne nature, countries have shut down educational institutions temporarily as a measure to curb the spreading of the virus.

In Malaysia, with only two days of prior notice, traditional face-to face learning are transitioned to Emergency Remote Teaching (ERT) entirely to ensure education continuity (Arumugam, 2020). With such a short timeframe, students and teachers have to transition online without any prior training and experience. According to Chung,

Subramanian and Dass (2020), Malaysian students have expressed that they are not ready for online learning, despite being at the tertiary education level. Teachers who taught at the secondary level faced more detrimental effects, where it is common for students to be absent during the virtual lessons due to the lack of interest and frustration resulted by a lack of infrastructure and digital literacy (Arumugam, 2020).

There are minimal studies that have examined the benefits of incorporating mobile phones among classrooms in secondary schools as an educational tool, especially in the local context. With the rise of mobile phones applications, mobile phones can be utilized as an educational tool for revision (Feddern *et al.*, 2018), formative assessments, and even as a tool for better visualization of concept during teaching (Budiman *et al.*, 2017), as well as serving a tool for teachers to track the academic progress of individual students (Méndez-Coca and Slisko, 2013).

Previous research done on technology incorporation in classrooms has focused on the teachers' perspectives, in the situation where the teacher is the only person that have access to the device and internet (Sabzian *et al.*, 2013). Minimal research attention has been directed towards the investigation of the benefits when both teachers and students have access to their mobile phones and internet access in the classroom. It would be beneficial to examine the opinions of present-day teachers, on whether mobile phones are still deemed as a distraction tool or should it be considered to be incorporated within the classroom. It will also be interesting to examine the benefits and opportunities that mobile phones provide in comparison to traditional classroom teaching, especially after experiencing the transition from traditional face-to-face learning to ERT due to school closures caused by the Covid-19 pandemic.

Quantitative investigations will be able to provide teachers' point of view on whether mobile phones should be considered as an educational tool, even when face to face teaching resumes once the pandemic is in control. The quantitative data would also obtain the reasons behind teachers' stand in mobile phones incorporation within the classroom (Creswell, 2012).

By examining the advantages and disadvantages of mobile phones integration in classroom activities, using quantitative approaches involving teachers, we can better understand the learning efficiency of integrating mobile phones in recent classroom teaching. With this understanding, researchers can better develop models about learning when mobile phones devices are used as part of classroom activities. Policy makers such as the Ministry of Education can review and consider developing strategies for training to improve readiness for teachers and students to incorporate mobile phones in classroom teaching and learning. This research will also provide school administrators and teachers with some insights to plan for strategies to incorporate mobile phones in classrooms of secondary schools, as well as the interventions to prevent the misuse of mobile phones in the classroom.

1.3 Research Objectives

This study had the following four objectives:

1. To investigate the integration and proficiency of mobile phones in classroom learning among teachers of secondary schools prior to ERT
2. To investigate the benefits of mobile phones that secondary school teachers appreciated during ERT
3. To investigate the aspects of mobile phones integration that can be used to overcome weaknesses in traditional classroom learning after ERT
4. To recommend areas for improvements that should be prioritised for learning to be implemented effectively when mobile phones are integrated into the classroom

1.4 Research Questions

1. What are the opinions and proficiency of teachers on mobile phone integration in classrooms before ERT?
2. What are the opinions of teachers on the efficiency of mobile phones in facilitating ERT?
3. Which aspect of learning has been enhanced and facilitated when mobile phones are integrated in the classroom environment?
4. What are the opinions of teachers in encouraging mobile phones integration in classrooms among students of secondary schools?

1.5 Operational Definitions

Mobile Phone – A mobile device which is used mainly for communication and online activities. This device is also commonly known as a smartphone.

Technology in Education – Digital equipment which allows the access to internet to facilitate teaching and learning. Technology integrates digital learning tool into the classroom environment, providing more opportunities for a well-rounded education. Technology has been integrated as a tool to conduct formative assessments, class discussions and has been found to increase class participation and engagement (Baytak *et al.*, 2011).

Emergency Remote Teaching (ERT) – A mitigating strategy used by educational institutions in the event of an unexpected circumstances where schools are closed. ERT is used where lessons and instructions designed for face to face teaching and learning are carried out online (Hodges *et al.*, 2020).

Movement Control Order (MCO) – Lockdown restrictions announced by the Malaysian Government, where non-essential economic services are closed temporarily to curb the spread of COVID-19. Educational institutions were remained close throughout this period.

Coronavirus Disease (COVID-19) – A novel virus that emerged during late 2019. This virus is highly infectious and is mainly transmitted through droplets, which are expelled when an infected person coughs, sneezes or exhales. People who are infected with this

virus may experience mild to moderate symptoms, and have to rely on their immune system to recover as there are currently no effective drugs to cure the infection of this virus. Individuals aged above 60, as well as people with existing medical conditions are considered as high risk since their immune system are at a higher risk of being compromised. This group of individuals are among those at a greater risk of developing severe illness and symptoms when infected with the virus, which can lead to lethal effects (CDC, 2020).

Independent variable – The independent variable of this study is teachers' perspectives of integrating mobile phones in teaching and learning before the Emergency Remote Teaching (ERT) period, as well as teachers' perspectives on the same issue after ERT was implemented.

Dependent variable – The dependent variable would be the shift in teachers' perspective on mobile phones integration in the classroom environment, and whether the shift is statistically significant before and after ERT was implemented.

1.6 Conclusion

This chapter has discussed the problem statement, objectives of study and research questions. In addition, it has discussed the operational definitions. In Chapter 2, the section will discuss related studies regarding the topic.

Chapter 2: Literature Review

2.1 Introduction

Mobile phones were first invented for communication purposes. First invented in 1973, mobile phones have allowed a new revolution of communication that is not limited by location (Goodwin, 2020). As technology advances, the function of mobile phones has expanded beyond communication. The function of this palm size device has progressed and expanded compared to its first ancestor. Nowadays, mobile phones have in built cameras that can produce professional photographs and videos (Schoon, 2019). Combine with the availability of internet, mobile phones today can be used to pay bills, make an appointment or dinner reservation, browse social media and also conduct online research (Heathman, 2017).

Mobile phones have also become increasingly accessible and common to own among the Malaysian society. A survey conducted in 2020 revealed that 88.7% of the Malaysian population has access to their personal mobile phone (MCMC Internet Users Survey, 2020). Policy makers are also working hard to make mobile phones more affordable to the society. As a governmental effort to increase the accessibility of mobile phones to the citizens of Malaysia, tax payers are given tax relief of up to RM5000 when purchasing new mobile devices (Wong, 2020).

The same survey also revealed that mobile phones has become the most preferred device (98.7%) to access internet among Malaysians (MCMC Internet Users Survey, 2020). The survey, which was mainly participated by teenagers in their 20s, suggested that most internet users spend between 5 to 12 hours every day browsing the internet, taking up the majority of their day. Surprisingly, the survey also revealed that educational institutions were ranked at the bottom when it comes to the places where teenagers access internet. This comes as a surprise, since the respondents are mostly full-time students who spend an average of 8 hours in school. Despite spending a large amount of time browsing the internet, the survey suggested that these browsing activities happened after school hours.

2.2 Mobile phones in Education

In education, decades of research has been done to investigate the benefits of mobile phones in classroom teaching and learning (Robertson, 2017). There are many mobile phones applications that were developed as a revision tool or teaching aid, and has been known to improve the productivity and efficiency of the teaching and learning process (Sharma, 2019). For example, Seneca Learning is a software that provides free learning resources and revision guides delivered in small pieces, with images as visual cues. The information is also spaced out with repeating questions to enhance the retrieval of information in learners. This type of content delivery which is able to optimise information retrieval, interleaving, spacing and visual cues has been proven to improve test performance.

In a study conducted by Feddern, Belham and Wilks (2018), the academic progress of 1,120 students aged between 13 and 14 were monitored through three different revision

and learning methods. Before the study, all students were given a six-minute pre-test. The students were then randomly assigned into one of the three groups: the software group, which uses the approach of spacing, interleaving, retrieval and the use of visual cues delivered online to learn the material; the spacing group, using the same approach with the software group but the material were delivered through a PDF; as well as a massed practice group, where learners revise using a printed version of the material. The results of the post-test revealed that learners in the software groups scored significantly higher, compared to students in the spacing group and massed practice group. This suggests that incorporating technology in the classroom enhanced learners' performance regardless of their background.

However, despite all the benefits it offers, mobile phones remain as an optional tool for teachers to be integrated within their classroom. Most teachers who integrate technology in face to face classrooms have high digital literacy and recognize the benefits that technology can offer. Often times no extra support is given, where these teachers have to take the self-initiative to seek for extra digital tools that can enrich their classroom teaching and learning (Spencer, 2012), and learn to incorporate in their teaching effectively (Purcell *et al.*, 2013). Although effective, the large amount of extra time required to plan and revise the existing pedagogy on top of existing workload is a major impact for teachers to incorporate technology in the classroom (Purcell *et al.*, 2013). In the classroom, teachers are also the only person who have access to their mobile phone. This limits the amount of learning that can be conducted by students in the classroom, especially when the activity requires students to participate using their own device (Sabzian *et al.*, 2013).

Despite studies showing that students performed better with mobile phones incorporated regularly as an educational aid (Sung *et al.*, 2016), mobile phones remain as a debatable topic on whether it should be integrated in regular classroom teaching and learning (Oxford Learning, 2019). Most teachers have not received formal training on how to incorporate mobile phones effectively within the classroom environment, resulting in the underutilization of this device and the potential mobile phones has in improving teaching and learning (Purcell *et al.*, 2013). Classroom teaching and learning today still remains the same as the pre-technology era, where the teacher still conducts classroom activities found in textbooks and reference books, and students refer to their textbook and the teacher as the primary source of knowledge.

The insufficient effort to incorporate mobile phones in classroom has led to several disadvantages faced by the students. Schools that allowed students to bring their mobile phones allows it for communication purposes and not as part of the curriculum pedagogy. In return, teachers and schools often feedback that mobile phones serve as a distraction in the classroom (Gilroy, 2003). In schools, each lesson normally ranged between 45 to 60 minutes. On a normal school day, a typical timetable would include 7 to 8 lessons every day, with only an average of 1-hour break time in between. Each class is mentally demanding, and each teacher demands full attention from the student.

Most of the teachers would approach learners using the same pedagogy as how they were trained. The presentation of contents from the textbook using PowerPoints and slideshows, and then using worksheets to assign homework as formative assessments is a classic sequence that the learner experience in school. The large amount of time of repeated pedagogical approach will no doubt bore learners in the classroom. As the day

progress, they get increasingly unstimulated and unchallenged, resulting in the feeling of boredom in the classroom (Bryner, 2007). In contrast, mobile phones where contents are more visually stimulating and interactive captivate students better (Prensky, 2005). From the teachers' perspectives, mobile phones have then become a distraction in the classroom (David *et al.*, 2015; McCoy, 2016). The result of this phenomena has led to banning policies in schools, where mobile phones are prohibited within the school compound (France-Presse, 2018). Despite studies showing that banning mobile phones has no impact on students' academic performance (Kessel *et al.*, 2020), in Malaysia, mobile phones are prohibited completely in secondary schools (Rajaendram *et al.*, 2017). Students who were found in possession with their mobile phones on school compound will have their device confiscated and face serious disciplinary actions.

2.3 Current classroom teaching and learning practices

Researchers have also been arguing about the efficiency of existing classroom practices. Prensky (2005) describe students nowadays as “Digital Natives”. Contrast with their teachers and parents, students nowadays grew up with technology, and is used to the fast-paced environment, as well as the access to a large amount of information. These students lean towards interactive technology, and showed better achievements when learning actively. The author has also raised a concern, whereby excluding technology and mobile phones in teaching and learning activities might not be the most effective for this generation of learners, and could even lead to a disadvantage in learning. The following section will discuss the existing classroom practices from several point of view: primary references used in learning, conducting formative assessments, as well as classroom management practices.

2.3.1 Textbooks as primary reference

Among secondary schools in Malaysia, the primary reference of learning content is the textbook. While textbooks are informative and serve as a good guideline, there are limitations on the learning process (Teacher Vision, 2007). For example, subjects like science consist of a large number of abstract concepts. Students learn better when they are able to visualize the concepts. Textbooks often provide a large amount of descriptive texts, hoping that the description is detailed enough for learners to obtain the precise visualization. When describing the processes, textbooks provide images which are 2 dimensional and static. These images do not represent the real process and concepts. While the textbook is helpful to aid students in visualization, students that have difficulties visualizing concepts will feel demotivated and lose interest in the subject easily. The situation is worsened if learners misunderstood or are unable to visualize and understand fundamental concepts and processes that serves as a prerequisite for advanced concepts taught later in the course. As the course progress, learner without the strong fundamentals will become increasingly confused and frustrated, leading to poor academic performances.

2.3.2 Worksheets as formative assessment tool

Conducting formative assessments effectively in the classroom is also essential to monitor the progress and achievements of students. Most teachers still distribute worksheets as a method to conduct formative assessment. Decades of studies have revealed that the consistent use of worksheets is counterproductive for students' learning, and does not aid the learner in building up higher order thinking skills, such as

implementation of the theory and knowledge (DeVries and Sales, 2011). It is also proposed that worksheets discourage learners to practice their creativity and problem-solving skills (Kohn, 2011). The questions found on worksheets often assess information retrieval from theories, hindering students' ability to connect their knowledge with their daily life experiences and the world. It is also common for worksheets to have correct and incorrect answer options. These activities are not challenging enough for learners to improve their cognitive abilities. Learners who understood the material will be able to complete the worksheet without any trouble, whereas learners who have not mastered the material will struggle to complete the worksheet. The worksheet is also viewed an inefficient tool since there are no instructions and opportunity provided to aid learners in mastering the skills and answer the worksheet better (Ransom and Manning, 2013). This resulted in learners who has low self-esteem in the subject because they did not perform well on the worksheet.

Since students are not allowed to bring their mobile phones to school, the application and examples of a theory taught during class is limited to examples provided only by the textbook. Students are losing out on opportunities for active learning (Kamii and Rummelsburg, 2008). Banning mobile phones in the classroom also limit the chances for students to conduct online research, where they could research on situations and examples that are recent and applies the theories and concepts learn in the classroom (Purcell *et al.*, 2013). Without mobile phones, the teacher has more responsibility in achieving these learning outcomes, often require more effort to come up with instructional activities, especially activities that help to build higher order thinking skills like application, analysis and evaluation within the learner.

The pedagogy approach discussed so far relies on textbooks as primary reference and utilizing worksheets to conduct formative assessment. Both approaches consist of texts that are printed on paper. While it is still used as the primary academic reference, textbooks and worksheets only provide visual stimulus, and does not accommodate students of all learning abilities (Reid, 2005). Students of varying learning abilities may face disadvantages with these mode of classroom practices. For example, students who are diagnosed with dyslexia or those who are visually impaired will face obstacles understanding the texts (Reid, 2005). These learners are often at a disadvantage and score poorly because they cannot understand the texts, not because they do not understand the concepts taught. The effect of this form of teaching and assessment will cause a low self-esteem in learners, and discriminate the learner since they do not achieve academic excellence due to their barriers to learning (Reid, 2005). Malaysia has recently introduced the Zero Reject policy which advocates inclusive education. To move towards this initiative, there are definitely methods which can be taken to remove the obstacles faced by students, and support students in participating in their studies positively (Chin, 2020).

2.3.3 Classroom management

The current practices of classroom management also did not include technology. Teachers in this day and age still track attendance, analyse grades and record curriculum resources on pen and paper. With the advancement of current technology, teachers can definitely move past word processors and spreadsheets, utilizing technology to increase the efficiency of administration duties and paperwork (Bolick *et al.*, 2014). Technology can be utilized to streamline the administrative process, releasing more time for teachers to focus on planning their lessons effectively.

2.4 Emergency Remote Teaching (ERT)

In March 2020, as an emergency response to the Covid-19 pandemic, Malaysia imposed a nationwide lockdown, where schools were closed until it is safe for learners to be back to school compound (Sukumaran, 2020). Planning documents and pedagogy meant for face to face teaching and learning now has to be implemented online as a mitigating measure to prevent a delay in the learner's academic progress. This is known as Emergency Remote Teaching (ERT) (Hodges *et al.*, 2020). Different from online courses, ERT is an immediate measure taken to conduct classes virtually when classes are unable to be carried out face to face under extreme circumstances. Within the months where ERT is imposed in Malaysia, researchers found that students' level of online readiness is surprisingly low, even at the tertiary level (Chung, Subramanian and Dass, 2020).

The situation is worse at the secondary level. Despite having access to their own device, the attendance for classes conducted during ERT is very poor. There were cases where a teacher even experienced 0% attendance for their classes (Nazari, 2020). Teenagers nowadays have a high level of technology literacy when compared to their teachers. Therefore, it is expected that learners will be proficient in using digital tools for academic purposes (Purcell *et al.*, 2013). However, the turnout rate for classes remain at a very low level (Goldstein *et al.*, 2020).

This can be due to several factors. Some students were struggling due to the poor internet connection, while some are affected due to the pandemic (Goldstein *et al.*, 2020). Mobile phones were also not a familiar tool for students to use for education purposes. Previously, students were penalized for bringing their mobile phones to school. When ERT took place,

students are then expected to immediately utilize their mobile phones, and to be fully committed to ERT (Benjamin, 2020). The sudden change and expectation towards students did not allow sufficient time and assistance for students to adapt. While schools are carrying on ERT following the usual timetable to avoid academic delays, students are demotivated due to the large amount of pressure and expectations for them to cope academically (Goldstein *et al.*, 2020). In an effort to ensure students' learning is not affected by the pandemic, this measure has also brought multiple negative effects that increased the burden of students.

2.5 Benefits of implementing mobile phones in learning

When face to face classes resume, it is important to learn the lessons from ERT, and try to cultivate online readiness among learners. Mobile phones can be integrated through several methods to improve learners' literacy in using their mobile phones for education purposes.

2.5.1 Utilizing mobile phones as visual aids

Firstly, mobile phones can be used to access visual aids related to the subject content. This include videos, animations and 3D reconstructions. For example, students learning about human anatomy can learn better when they have a 3D model or visual tool that can help them to learn the anatomical parts correctly, and then apply that information on how the body systems function. Studies have also found that learning is improved when the pressure to visualize is removed from students (Budiman *et al.*, 2017). Students showed a greater understanding to the concepts and the chances for misunderstanding the concept

has reduced. Students also reportedly took more initiative in discussions extended from the concepts, and were able to demonstrate the connection with overlapping areas of knowledge (Shabiralyani *et al.*, 2015).

2.5.2 Mobile phones for formative assessments

Mobile phones can be utilized to conduct formative assessments more effectively. Applications nowadays allow the teacher to insert questions together with the answers, as well as the feedback when students select the incorrect answer (Fritz-Palao, 2014). The self-assessed tool would be able to provide instant feedback when students submit their attempt (Onodipe and Ayadi, 2020). The real-time feedback provides an opportunity for both the teacher and learner to locate the areas that needs more attention, thus allowing the teacher to improvise classroom practices and address those issues immediately. This practice will no doubt heighten the efficiency of learning within the classroom. On top of that, the teacher will also have access to analytical reports of the students' progress (Hakami, 2020). This allow the teacher to track the progress of all learners, and can provide a targeted and personalized feedback to cater students' progress individually. Students who are shy to participate in classroom discussion can also utilize their mobile phones in asking questions and engage with the classroom content (Fritz-Palao, 2014). Since most students do own a personal mobile phone, these devices can be incorporated to conduct fun and dynamic quizzes, which helps to improve students' engagement and participation within the classroom.

Conducting class activities and formative assessments on mobile phones applications can also accommodate a larger range of learners compared to printed version of the material.

Various tools for accessibility are made available to aid students' understanding of the questions (Frontiera, 2013). For example, the text-to-speech dictation enable learners with dyslexia and visual difficulties to understand the questions and answer the questions accordingly (Reid, 2005). Learners can also change the size and colour of fonts to accommodate them better in understanding and answering the questions. For example, Word Talk is a free extension for Microsoft Word, and is programmed to read out any written documents. Learners can also create audio files that can be saved (Kirkman, 2016). Tools like these can definitely enhance the learning experience especially for learners who face visual challenges, or have difficulties navigating a mouse or type on a keyboard effectively (Forgrave, 2002). With the incorporation of mobile phones in classroom, formative assessments can evaluate students' performance in a fair and accurate manner (Reid, 2005).

2.5.3 Mobile phones in shaping classroom environment

Integration of mobile phones in the classroom can also encourage active learning among students (Ransom and Manning, 2013). Task could be given where students research on recent news or real-world examples as a way to reinforce the theories and concepts taught. The process would encourage learners to also gain critical thinking skills, where they learn how to cite sources of information, and also evaluate the reliability of information and news obtained (Mansbach, 2015). Eventually, this practice encourages learners who are able to associate and apply theories learned with their daily life, a skill which not only makes learning more relatable, but is also highly requested by employers in the current society.

While learning a topic which contain ethical issues, students can also use their mobile phones to research on evidences to justify their perspectives and opinions. This practice allows students to be independent learners, as well as building up their confidence and shaping their character (Mansbach, 2015). As they progress in their research, the different examples and news will also expand their horizons, thus not limiting students within examples found in the textbook. Debatable topics and concepts can also be turned into an open group discussion. Students can conduct further research to understand the rationale behind the decisions and values that are made by people of different cultural background (Menten, 2021). This will broaden students' horizons, where they are able to understand and accept the differences in a multicultural society. Students can also use their new perspectives to respect and appreciate the various cultures in the world, thus being able to co-exist in harmony despite their different values. This encourage a culture of global mindedness among students and is a great step in becoming a global citizen (Kefalas, 2018).

The above discussion has suggested ways that students can utilize their mobile phones to aid their studies. Mobile phones can be incorporated to conduct classroom activities and formative assessments. Apart from increasing students' level of online readiness, students are also encouraged to be active learners and take ownership for their learning. Opensource platforms like YouTube and Khan Academy allow users to access videos and contents of all levels and curriculum standards. Students can utilize these videos for revision, or even extend their knowledge and learn new skills (Olson, 2017). This practice can eventually create a norm of active learners where they can continue to learn even outside of the classroom.

2.6 Behaviourism in the classroom

The American psychologist B.F. Skinner is well known for his theory on operant conditioning (McLeod, 2015). He experimented on mice which were placed individually in a confined box with a responsive lever, which was also known as a Skinner box. While moving around in the Skinner box, the accidental pushing of the lever by the mice leads to several possible outcomes. The first type results in the delivery of food in response to light. Obtaining food is a desirable outcome for the mice. It was then observed that the mice quickly learned to press the lever only in response to light. Skinner named this as positive reinforcement, where an added stimulus increased the likelihood of a repeated behaviour.

In the second condition, mice were placed in Skinner box that constantly had a loud noise coming from the speaker. When these mice press on the lever, the loud noise immediately stopped. These mice quickly learned to press on the lever in order to remove the disturbance. This is known as negative reinforcement, where a behaviour is enhanced in order to remove an unpleasant stimulus.

The third type of condition consist of mice that were placed in the Skinner box, which will cause an electrified floor to be activated when mice press on the lever. After several accidents of pressing on the lever and being shocked electrically, mice have learned to avoid pressing on the lever. The addition of an undesirable stimulus has decreased the likelihood of a repeated behaviour, which is known as positive punishment. Skinner's experiment on mice lead to his theory of operant conditioning, suggesting that learning

can occur in response to different environmental context. Figure 1 summarizes Skinner's theory on operant conditioning.

Figure 1

The theory of operant conditioning by B.F. Skinner

	Stimulus is added	Stimulus is removed
Likelihood of repeated behaviour increases	Positive reinforcement	Negative reinforcement
Likelihood of repeated behaviour decreases	Positive punishment	Negative punishment

In the context of this study, students' level of online readiness can be heightened if mobile phones are integrated in the classroom on a daily basis. Before ERT, students were penalized and punished when bringing their mobile phones to schools (Pauff, 2009). Figure 2 illustrates the theoretical framework of the theory of operant condition on learners' attitude towards utilizing their mobile phones as an education tool.

Figure 2

Illustration of operant condition on learners' behaviour towards using mobile phones as an educational tool

Operant Condition	Stimulus → Effect
Positive punishment	Students faced punishments for bringing phones to school Students do not view mobile phones as an educational tool, leading to low level of online readiness during ERT
Positive reinforcement	Incorporating mobile phones in classroom teaching and learning Students are familiar with using their mobile phones for educational purposes, leading to higher level of online readiness during ERT

In schools, students were warned repeatedly on the prohibition of mobile phones, and faced stern disciplinary actions when caught in possession with their phones within school compound. Common disciplinary actions include the confiscation of phones and detention, all of which are unpleasant stimulus from the students' perspective (Pauff, 2009). These punishments have decreased the likelihood of students to bring their phones to school. As time passes, the environment has conditioned students to eliminate the association of mobile phones for education purposes (Woollard, 2010). The likelihood of students to reach out for their phones during studies has greatly decreased, resulting in students to miss out on utilizing mobile phones as a study aid.

Under the extreme circumstances when Emergency Remote Teaching (ERT) had to take place, students struggle a lot while transitioning between face to face classroom environment and ERT (Goldstein *et al.*, 2020). The poor response of students toward ERT can be a result of the conditioned behaviour, where students' experience has eliminated their mobile phones as a tool for study purposes. During the period of ERT, most students only utilized their phone to access online conference platforms and connect with their teachers (Benjamin, 2020). Their progress is greatly affected when there are technical difficulties, such as poor internet connection, poor video and sound quality. Students get demotivated easily, resulting in the low attendance rate of virtual classes (Goldstein *et al.*, 2020).

It was also reported that students lack the initiative to utilize technology for their studies. Despite having access to platforms like YouTube or Khan Academy, which released great content related to their studies, students still rely on their teachers for syllabus content. It was also reported that students lack the ownership to their academic progress (Yates *et*

al., 2020). The majority of students did not take the initiative to utilize their mobile phones for academic purposes, mainly relying on their teachers to provide them with the necessary resources. A survey conducted on 382 respondents also showed that 76% of students uses their mobile device for ERT. Despite that, the majority of students revealed that the lack of support caused them to have a negative perception towards ERT (Abbasi *et al.*, 2020).

This situation can be changed by implementing mobile phones in classroom teaching and learning in schools (van der Spoel *et al.*, 2020). Students who already have a high level of technology literacy can adapt to learning better using their mobile phones. Thus, creating an environment of learning that can take place anytime, anywhere. Students that are encouraged to utilize their mobile phones for learning will possess the skills and tools to look for reliable information, utilizing the resources that already have (Figure 2). These students will be cultivated to take initiative and conduct their own research, and thus encourage learners to utilize their mobile phones to expand the limit of gaining knowledge, shaping independent learners that are proficient in utilizing mobile phones to explore their curiosity in education (Song *et al.*, 2013).

2.7 Implementing mobile phones in classrooms

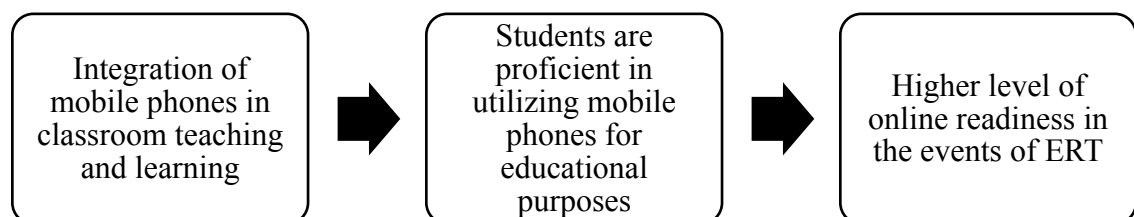
The period of ERT has prompted schools and policy makers to realize the importance of preparing the resources necessary in case of similar situations in the future. Schools are prioritizing their budgets to enhance the hardware, software and establish secure internet connection within the school community (van der Spoel *et al.*, 2020). Government

officials and organizations are also making the efforts to provide a wider range of citizens with strong and secure internet connection.

Figure 3 shows the conceptual framework of this study, suggesting that technology like mobile phones should be incorporated in classroom teaching and learning to enhance both teachers' and students' level of online readiness (Hadar *et al.*, 2020). This can be introduced through the use of mobile phones in classroom teaching and learning (van der Spoel *et al.*, 2020). Policy makers and schools should reconsider the banning policies for mobile phones, and revise it to allow mobile phones for education purposes in the classroom. In future situations where ERT has to be implemented, students with high level of online readiness will be able to utilize the various resources online to aid their study. Thus, cultivating learners who are more independent, self-motivated and responsible towards their academic progress, as well as shaping a positive learning experience during ERT.

Figure 3

Conceptual framework of this study



This research would like to obtain teachers' perspectives on mobile phones integration in classroom teaching and learning, particularly teachers in secondary schools of Kuala Lumpur. For teachers who have experienced both face to face teaching and ERT, this research would like to investigate the likelihood of integrating mobile phones in the

classroom when face to face classes resume, as well as to understand the reasons behind their attitude. This research would also like to investigate how mobile phones can be integrated in the classroom more effectively.

2.8 Conclusion

This chapter summarized the main ideas from existing literature and has reviewed the current state of research in this field of study. Gaps in the existing knowledge was identified, which led to the purpose of this research. In Chapter 3, the section will discuss the methodology and instrument used to investigate the research questions.

Chapter 3: Methodology

This study utilized a quantitative research methodology based on the aims of the study, which was to gather the perspectives of teachers on how the period of Emergency Remote Teaching (ERT) has changed their attitude towards mobile phones integration within the classrooms. Previous researches have demonstrated success by adopting a quantitative research methodology due to the investigatory nature of this study. Creswell (2012) and Fraenkel *et al.* (2011) also affirmed that quantitative data would act as a reliable source of data in addressing the research objectives of this study. A cross-sectional survey design was conducted as the study intended to collect data about the current attitude of teachers on implementing mobile phones in their classrooms, and the ways mobile phones integration can encourage the level of online readiness among students.

One of the objectives of this study was to investigate teachers' perspectives of mobile phones integration among secondary schools prior, during and after the period of Emergency Remote Teaching (ERT). To achieve this objective, research instruments were designed with the incorporation of items quantified on a Likert scale as it allowed the opinion of the participants to be collected via quantitative data. The questions adopting this scale were scored using the same numbering system, where respondents rated their opinion on a 1 to 5 scale.

There were several advantages in adopting the survey questionnaire design. Firstly, data collected in numbers enabled a large amount of data to be collected and summarized in a short amount of time. The volume of responses would also be sufficient for the trend observed from this study to be generalized to the whole population. Therefore, the results

from this study would be reliable to serve as a source of reference for policy makers and stakeholders when evaluating the current policies on mobile phones implementation among secondary schools. The survey can also be easily replicated and conducted on different populations and sample groups, and will be useful for the educational sector to innovate and improve the existing educational practices post-pandemic.

3.1 Sample and Sampling Procedures

As of 31st January 2020, there were 2,439 secondary schools and 179,770 teachers in Malaysia (Education Statistics, 2020). The population identified were teachers teaching in secondary schools among Kuala Lumpur. Based on the most recent statistics, there were 104 secondary schools and 7,842 secondary school teachers in Kuala Lumpur (Ciecdata, 2016). This include teachers from public, private, as well as international secondary schools. Referring to the Kregcie and Morgan (1970) table, a sample size of 367 responds is required in order for the results to be generalized to the population. However, it was scaled down to 100 responds due to the travel restrictions imposed during the period of conducting this research. The research period that took place during the pandemic also acted as an obstacle while collecting data.

As the participants of this study were made up of individuals with a wide range of characteristics, the population was stratified before sampling. The characteristic identified were gender, level of academic qualification, as well as the number of years of experience teaching in a secondary schools. Teachers in secondary schools were selected and categorized according to the characteristics prior to the participation in this study to ensure that they are well represented in the sample. Adopting the methods of stratified

sampling allowed data that were gathered from the sample to represent specific subgroups or strata. This allowed a deeper insight and analysis of the trend observed, and to determine the differences between the different groups according to their gender, academic qualification level, and number of years teaching in secondary schools. The homogeneity or heterogeneity between strata would then allow precise measurement and actions to be taken.

For gender, the participants invited were made up of 50% male and 50% female. The samples from each stratum was then selected in a random manner so that the chances for bias was minimized. For level of academic qualification, the respondents were separated into subgroups according to their highest academic qualification. The total sample was represented by the subgroups of Bachelor's degree, Post graduate Diploma, Masters and Doctorate (PhD), each constitutes 25% of the total responds. Lastly, teachers who were invited to participate in this research were divided into subgroups depending on the number of years teaching in secondary schools. The sub-groups available were less than five(5) years, five(5) to ten (10) years, ten(10) to twenty(20) years, and more than twenty(20) years. Equal number of respondents from each category were invited to participate in this study.

On the other hand, there were also risk associated with the application of stratified sampling. The requirement to identify the strata membership prior to the study was an obstacle in this research, where it elongated the research process due to the extra stage in the sampling procedure. It was also an obstacle do identify equal number of respondents from all strata, as teachers from a certain subgroup, such as teachers with twenty years of teaching experience, might not be familiar with a web-based survey questionnaire. Their

proficiency of using mobile phones was also lower compared to the other strata. This obstacle may possess a risk of lowering the validity of the results obtained. However, in this study, the advantages of stratified sampling outweighed the disadvantages, therefore was adopted in this research.

3.2 Instrument

In order to obtain a better insight into the attitudes of teachers on mobile phones integration in their classroom, a web-based survey questionnaire was implemented as the instrument for this study. The software programme Google Forms was chosen to design, administer and gather the data from the survey questionnaire due to its accessibility and user-friendliness. Survey questionnaire as an instrument also brought several advantages that was suitable to achieve the aims and objectives of this research. Compared to paper survey and telephone interview, the use of a web-based survey questionnaire allows data to be gathered extensively in a relatively short period of time. The instrument also utilized the fact that participants are proficient in using web-based devices such as mobile phones and computers. The survey questionnaire can also be administered through sites of social and professional networking, which allows the instrument to be distributed to a larger amount of sample within the population. Last but not least, this research was conducted in the midst of the pandemic and lockdowns, thus a web-based survey questionnaire was suitable as it minimized in person contact between the researcher and respondents, and allowed the data to be collected while minimizing the risk of the viral infection.

Primary data was collected and analysed to address the research objectives. A 40 items self-administered quantitative questionnaire was utilized in this study. All items and scales used in the instrument were developed after a review of related literature. The 40 items were separated into sections which were described in the Table 1 below:

Table 1

Sections of the research instrument

Section	Number of items	Aim
A	4	This section aimed to obtain the consent and socio-demographic information of participants. The information from this section was also used to conduct the stratified sampling procedures.
B	12	This section aimed to obtain the perceptions of teachers in mobile phones integration prior to Emergency Remote Teaching (ERT), as well as the reasons behind their opinion.
C	16	This section aimed to obtain the attitude of teachers in mobile phones integration during the period of ERT, when lessons planned for face to face lessons were conducted online. In addition, the reasons behind their stand were investigated, locating the aspects of mobile phones that were found useful during the period of ERT.
D	4	This section aimed to obtain the attitude of teachers in mobile phones integration in the post-Covid era. Participants were encouraged to express their interest and reasons in integrating mobile phones when face to face classes resume.
E	4	This section aimed to obtain the overall perception of teachers in mobile phones integration. As mobile phones were known to be a distraction tool in classrooms, most secondary schools currently implement a banning policy for mobile phones. Participants were encouraged to express their opinion on the effectivity of banning policies particularly towards cyberbullying. Investigations were also made to find out teachers' opinion on the need to revise and reconsider these banning policies. Lastly, teachers were asked to provide the areas that should be taken into consideration if educational institutions were to incorporate mobile phones in classrooms.

From 28th January to 7th February, a pilot test of the questionnaire was conducted with 10 teachers in secondary schools around Kuala Lumpur. The purpose of conducting the pilot test was to identify whether the sample were able to understand and complete the survey questions without any difficulties. The participants involved also made sure that all questions can be understood clearly without any ambiguity.

Each teacher was invited to a 60 minutes session, where they began by answering the questionnaire provided on paper. They were required to mark any questions that were not worded clearly and suggestions were made to improve the questionnaire. The items raised were revised and rephrased during the evaluation of the instrument. The items revised are listed down as below:

Item 5

Original item:

Does the school you are currently attached allow mobile phones?

Revised item:

Does your current educational institution allow students to bring their mobile phones to school?

Item 13

Original item:

What is your opinion about the resources provided in aiding mobile phones integration within the classroom?

Revised item:

How do you feel about the resources (e.g. hardwares and softwares) provided to aid mobile phones integration within the classroom?

Item 25

Original item:

What were the most used function of mobile phones in your lesson?

Revised item:

What were the most used function of mobile phones in your lesson? Please select all applicable options.

Items 3, 5, 8, 9, 19, 20, 21, 24, 25, 31, 35, 36, 40, were also revised from closed-ended questions into semi-closed-ended questions. Initially being closed ended questions, the list of options provided might not fit into the participants' beliefs. It was advised to be converted into semi-closed-ended questions, where respondents were provided with an additional option where they can express their answers if their beliefs did not fit in the list of response choices provided. While the list of options provided will encourage responses from the participants, semi-closed-ended questions would also provide the respondents with some flexibility to responds without being limited by the researcher. An example is illustrated as below:

Item 3

Original item:

Academic Qualification Level

- ☐ Secondary education
- ☐ Diploma
- ☐ Bachelor's degree
- ☐ Post graduate diploma
- ☐ Masters
- ☐ Doctorate (PhD)

Revised item:

Academic Qualification Level

- ☐ Secondary education
- ☐ Diploma
- ☐ Bachelor's degree
- ☐ Post graduate diploma
- ☐ Masters
- ☐ Doctorate (PhD)
- ☐ Other: _____

The feedback from the pilot test also included the need to rephrase the language used in the questions. Items such as items number 37 to 39 were advised to be reworded in order to avoid directing participants' responds to a yes or no answer. The items were rephrased so it was presented as a neutral question, where participants can provide their opinion without being directed. An example is shown below:

Item 37

Original item:

Do you agree that it is important for schools to consider integrating mobile phones in face to face lessons?

Revised item:

To what extent do you think that it is important for schools to consider integrating mobile phones in face to face lessons?

After the pilot test, the responds of the teachers were also recorded and used to calculate the Cronbach's alpha in order to determine internal consistency. Results of the pilot test revealed a Cronbach's alpha of 0.887. The value of Cronbach's alpha that lies between 0.8 and 0.9 indicated that items of the instrument had good internal consistency. The items of the survey questionnaire can thus be classified as reliable and consistent.

3.3 Data Collection Procedures

The survey questionnaire included a total of 40 items divided across four sections. Among the 40 items, 21 items were designed using a 5-point Likert scale. These items were used to obtain the perspectives and attitudes of participants on the integration of mobile phones in the classroom of secondary schools in Kuala Lumpur under different conditions of teaching. In order to determine the possible reasons behind teachers' opinions, 13 items were designed using semi-closed-ended questions. A list of possible reasons behind teachers' attitudes were provided, where respondents were required to select all that were applicable. Items on the lists were selected after a review of literature, gathering all the possible explanations of teachers' perspectives based on previous

researches. Teachers were also provided with an option to fill in their own answer in the event where the response categories did not fit into the beliefs of the participant.

The first section aimed to collect demographic information. This section acquired respondents' age, gender, level of academic qualification, and number of years in the academic field as a secondary school teacher. The latter item provided for "less than five(5) years" to "more than twenty(20) years" of teaching experience. The information required for stratified sampling were obtained in this section.

Section B consisted of twelve(12) items which was used to obtain the perspectives of teachers in mobile phone integration prior to the period of ERT. Teachers also evaluated their interest and proficiency of technology integration, as well as the main factors that influenced the decision to integrate technology and mobile phones within the classrooms. Overall, this section focused on participants' experience with mobile phones in education prior to ERT.

Section C consisted of sixteen(16) items, where participants' reflected on their experience during ERT. Participants' evaluated the support given by the attached institution during the period of virtual classes, as well as the response received from students when classes were conducted online. Teachers also reflected on the digital tools that were discovered during ERT which were used to increase efficiency of learning. The different aspects of mobile phones that were useful to overcome the shortcomings of virtual classes during the period of ERT was also investigated. Overall, this section focused on participants' experience with mobile phones in education during ERT.

Section D consisted of four(4) items, where participants expressed their lessons learnt during the pandemic and interest about innovating the classroom environment post-Covid. Teachers were also provided with the reasons behind their stand on whether mobile phones should be incorporated as part of the curriculum in order to increase the level of online readiness for both teachers and students, building up the skills needed for future events of ERT.

Section E contained four(4) items. These items intended to obtain the perception of teachers in mobile phones integration within their classrooms, specifically whether banning policies of mobile phones was effective to overcome the disadvantages of mobile phones in classrooms. As most secondary schools still implement a banning policy of mobile phones, participants were encouraged to evaluate the implementation of mobile phones, on whether it serves as a useful tool in the classroom, or remained as a distraction tool. Teachers were also invited to express their opinions on the different methods to incorporate mobile phones to overcome the weaknesses found in the traditional classroom setting. They were also asked to recommend areas for improvements that should be prioritised for mobile phones to be implemented in order to improve learning effectively. Obtaining the opinions of teachers would be valuable since they are the stakeholders who are directly involved in facilitating learners' journey, and would be able to provide valuable insights on how to improve on this educational topic.

3.4 Implementation of Instrument

The survey questionnaire was conducted using a web-based fashion, and administered using Google Forms. A copy of the questionnaire can be found in the Appendix section

(see Appendix 1). Participants were approached using email and through social and professional networking sites such as LinkedIn. The participants who agreed to participate were given two weeks to respond, and required approximately 30 minutes to complete the survey.

3.5 Ethical Issues

The study was exempted from a review by the institutional review board as it does not address sensitive topics. The participants were not made up of minors and individuals from the vulnerable populations. No incentives were provided by participating in this study, therefore this study excluded the possibility that the participants might chose to participate due to individual benefits. Attention were also paid closely where the benefits of participating in this study were stated based on previous research. The benefits of participating in this study were not overstated nor guaranteed to teachers.

The main ethical consideration that arose from conducting a survey questionnaire was to ensure participants' confidentiality of data. All participants responded the survey questionnaire anonymously, where there was no information that could identify the participants. The data collected was also held securely, and was not shared with anyone other than the researchers involved. The data gathered from respondents were also used solely for education and research purposes only, and will be stored in the researchers' hard drive for a period of one(1) year. After the conclusion of the study is made, the survey instrument will also be destroyed.

Research ethics were also closely followed in this study. Participants were required to learn about their rights before participating in the research. The consent of all participants were obtained prior to the study, and contact details of the researcher was provided to allow participants to clarify their rights regarding their participation in this study. Once consent was obtained, the survey questionnaire was made available to the participants, where they answered all the items in the research instrument. All consented participants also retained their rights to withdraw from the study at any point of the survey. On top of that, there was no known harm identified by participating in this research.

3.6 Data Analysis

The data gathered were sorted using Microsoft Excel prior to the analysis of data. The dataset was then checked for incomplete data. Any incomplete response indicated that the respondent withdrew from participating in the study. Once completed, the data was then analysed quantitatively using the statistical software SPSS. Descriptive statistics such as frequency, percentage, mean, and standard deviation was calculated to summarize the data from all participants. The data was presented with the aid of figures, tables and graphs whenever applicable.

Inferential statistics was conducted by analysing the data using a dependent *t*-test at a significance level of 0.05%. By comparing the mean scores between the variables, the result from the dependent *t*-test was used to conclude whether the change in teachers perspectives is statistically significant. Dependent *t*-test was also chosen as the opinion on mobile phones integration in classroom before and after ERT was obtained from the same sample.

3.6.1 Research Question 1

This research question intends to identify the opinions and proficiency of teachers on mobile phone integration in classrooms before Emergency Remote Teaching (ERT). Item 7 and item 12 from Section B from the questionnaire provided the necessary data to answer this research question. The mean and standard deviation was calculated and used to analyse the data. This study also investigated the difference in opinion of teachers according to their gender, academic qualification level, as well as the number of years of experience teaching in secondary schools.

3.6.2 Research Question 2

This research question intends to identify the opinion of teachers on the efficiency of mobile phones in facilitating the Emergency Remote Teaching (ERT), when the Movement Control Order (MCO) was implemented in Malaysia. Item 22 in Section C was used to collect data. The data collected was then analysed for mean and standard deviation to identify whether the opinion of secondary school teachers is statistically significant. This study also analysed the attitude of teachers in mobile phones integration based on their gender, academic qualification level, as well as the number of years of experience teaching in secondary schools.

3.6.3. Research Question 3

This research question intends to identify the aspect of learning that has been enhanced and facilitated when mobile phones were integrated in the classroom environment. Items number 25 to 27 in Section C was used to collect data that addresses this research question. In order to find out the significance of this research question, the mean and standard deviation was also calculated and used to analysed for significance between the variables. To establish whether the perspectives of teachers differ according to gender, level of academic qualification level and years of experience teaching in a secondary school, the data was then categorized and analysed according to the different strata.

3.6.4 Research Question 4

This research question intends to investigate the opinion of teachers in encouraging mobile phones integration in classrooms among students of secondary schools. Item number 33 and 34 in Section D were designed to answer this research question. Items number 35 and 36 in Section D was used to identify the reasons behind teachers' opinion. Then, items number 37 to 40 in Section E was used to investigate teachers' opinions on the aspects that should be taken into consideration when implementing mobile phones in classrooms. The data gathered were then analysed by calculating the mean and standard deviation of scores between the variables. For the purpose of further analysis, the opinions of teachers were also analysed and compared according to their gender, academic qualification level, as well as the number of years of experience being a secondary school teacher.

3.7 Conclusion

This chapter has discussed the sample and sampling procedures, as well as the instrument and data collection procedure. In addition, it discussed the implementation of instrument, identified the ethical issues, as well as the procedure for data analysis, which was used to address each research question. In Chapter 4, the section will discuss the data collected and analysed, in regards to the objectives and research questions.

Chapter 4: Findings

4.1 Introduction

In this chapter the results collected from the survey questionnaire were reported and analysed. The section begins with the socio-demographic information about the respondents to provide the background information of the participants. In the descriptive analysis, the data for each test item will be described, indicating the mean and standard deviation for all results collected using a 5-point Likert scale. In the inferential analysis section, the descriptive data was further analysed to determine whether the data is statistically significant, as well as the investigating the difference of results based on the gender, level of academic qualification and number of years of experience. The results were used to address each research question. Lastly, the summary section concludes this chapter.

4.2 Socio-demographic Information

The survey questionnaire was administered via online medium. Participants were approached through social and professional networking sites. They completed the survey questionnaire through the web application Google Forms. In order to limit physical contact during the period of pandemic, physical survey was not conducted.

Out of the 150 survey questionnaire distributed, 53 responses were collected. There were no missing data in the questionnaire. The sociodemographic information of the respondents is summarized and shown in Table 2 below.

Table 2

Socio-demographic characteristics of participants

Characteristic	Frequency, <i>n</i>	Percentage (%)
Age		
21 – 30 years old	15	28.3
31 – 40 years old	31	58.5
41 – 50 years old	5	9.4
51 – 60 years old	2	3.8
Gender		
Male	18	34.0
Female	34	64.2
Prefer not to say	1	1.9
Academic Qualification		
Bachelor's Degree	18	34.0
Post-graduate Diploma	5	9.4
Masters	27	50.9
Doctorate Degree (PhD)	3	5.7
Years of Experience		
0 – 5	15	28.3
5 – 10	20	37.7
10 – 20	16	30.2
More than 20	2	3.8

Note. *N* = 53

4.2.1 Age

The age of the respondents was categorized into 4 groups, shown in Table 2. It was observed that most of the respondents were between the age of 31 to 40 years old, where 31 (58.5%) teachers in this category took part in this survey. This was followed by teachers aged between 21 and 30 years old, where 15 (28.3%) teachers participated in this study. There were only 5 (9.4%) teachers between aged 41 to 50 that participated in this survey. Lastly, teachers aged between 51 to 60 years old were the age group with the lowest number of respondents, where only 2 (3.8%) teachers filled up the survey form.

4.2.2 Gender

In this study there were a total of 34 (64.2%) female respondents and 18 (34.0%) male respondents. 1 (1.9%) teacher preferred not to reveal the gender. The data showed that a majority of the participants were female teachers (Table 2).

4.2.3 Level of Academic Qualification

Teachers' were also stratified based on their highest level of academic qualification. The information is illustrated in Table 2. The four subpopulations were Bachelor's Degree, Post-graduate Diploma, Master's Degree and Doctorate's Degree (PhD). Among all participants, teachers who hold a Master's Degree made up most of the respondents, with 27 (50.9%) teachers out of the 53 respondents. This was followed by teachers who obtained a Bachelor's Degree, where 18 (34.0%) of participants were involved in this study. Teachers with a Post-graduate Diploma ranked the third, with 5 respondents

representing 9.5% of the sample. Teachers with the highest academic qualification formed the minority in this study, with 3 Doctorate Degree (PhD) holders representing 5.7% of the sample studied.

4.2.4 Number of Years of Experience Teaching in Secondary Schools

The majority of respondents were teachers with an experience of between 5 to 10 years of teaching in secondary school, with 20 respondents (37.7%). This was followed by teachers with more years of teaching. 16 teachers with 10 to 20 years of experience made up 30.2% of the participants. This was closely followed by newly qualified teachers with 5 or less years of teaching in a secondary schools, with 15 teachers (28.3%) out of the sample size of 53. Highly experienced teachers were the smallest group, where 2 (3.8%) teachers who participated in this study has more than 20 years of teaching experience. The summary of the information is presented in Table 2.

4.3 Descriptive Analysis

All information collected using a 5-point Likert scale was analysed and summarised in Table 3. The mean and standard deviation was calculated to understand the attitude of teachers towards each item. The following sections describe the data obtained in detail.

Table 3*Descriptive statistics of all items using a Likert scale*

Item	Min.	Max.	Mean	Standard Deviation
Does students in your classroom own personal devices?	1	5	4.49	0.89
Attitude of teachers in mobile phone integration prior to Covid-19	1	5	3.66	1.00
To what extent does mobile phones increase learning efficiency within the face to face classroom?	1	5	3.53	0.87
To what extent does mobile phones increase classroom management within the face to face classroom?	1	5	3.57	1.07
Proficiency of teacher in mobile phones incorporation within the classroom.	2	5	3.74	0.81
Teachers' perception on the resources provided to aid mobile phones integration within the classroom.	1	5	3.47	0.95
To what extent is time the major factor in the decision of incorporating mobile phones within classroom.	1	5	3.51	1.07
To what extent is internet stability the major factor in the decision of incorporating mobile phones within classroom.	1	5	4.06	1.23
Teachers' interest on professional developments regarding technology integration within the classroom	1	5	4.45	0.93
To what extent were the lessons conducted online efficient?	1	5	3.66	0.94
Students' level of motivation during ERT	2	5	3.11	0.78
Proficiency of teachers in integrating mobile phones in online lessons	1	5	3.81	0.94
To what extent did integrating mobile phones increased the learning efficiency during online lessons?	1	5	3.38	0.95
To what extent did integrating mobile phones increased the interactivity during online lessons?	1	5	3.58	0.84
Proficiency of learners in using mobile phones to participate in the lesson?	1	5	3.62	0.93
Students' level of online readiness	2	5	3.60	0.72
Teachers' level of online readiness	3	5	3.94	0.53
Attitude of teachers in mobile phone integration after ERT	1	5	3.30	0.93
To what extent would integrating mobile phones in face to face lessons help prepare students better for future events of ERT	1	5	3.57	0.91
Importance for schools to consider mobile phone integration	1	5	3.28	1.12
Importance for schools to reconsider banning policies on mobile phones	1	5	3.49	1.07
Efficiency of banning policies in overcoming cyberbullying	1	5	2.98	1.01
Importance of educating learners on usage of mobile phones is more important than banning mobile phones entirely	2	5	4.13	0.98

Note. N = 53

4.3.1 Perception of Teachers toward Mobile Phones Integration in Classrooms Prior to Emergency Remote Teaching (ERT)

In this section, teachers were encouraged to recall their attitude towards the incorporation of mobile phones pre-pandemic, when classes were conducted face-to-face. Overall, the study found that majority of students nowadays have a personal device (mean = 4.49, s.d. = 0.89). When asked about the attitude of teachers towards the incorporation of mobile phones in the classroom, teachers were mainly positive (mean = 3.66, s.d. = 1.00).

During the pre-Covid era of face-to-face teaching, most teachers expressed that when mobile phones were integrated in lessons, the device did increase the learning efficiency (mean = 3.53, s.d. = 0.87) as well as classroom management (mean = 3.57, s.d. = 1.07). In general, teachers also expressed that they are proficient (mean = 3.74, s.d. = 0.81) and confident in integrating technology within the classrooms.

Information were also collected to investigate the main factors behind teachers' decision to incorporate mobile phones in their respective classrooms (Table 3). Most teachers agreed that time (mean = 3.51, s.d. = 1.07) and internet stability (mean = 4.06, s.d. = 1.23) played a huge role in making this decision. It was also revealed that most teachers welcome professional developments and opportunities, and were eager to learn ways to properly integrate mobile phones within their classrooms (mean = 4.45, s.d. = 0.93).

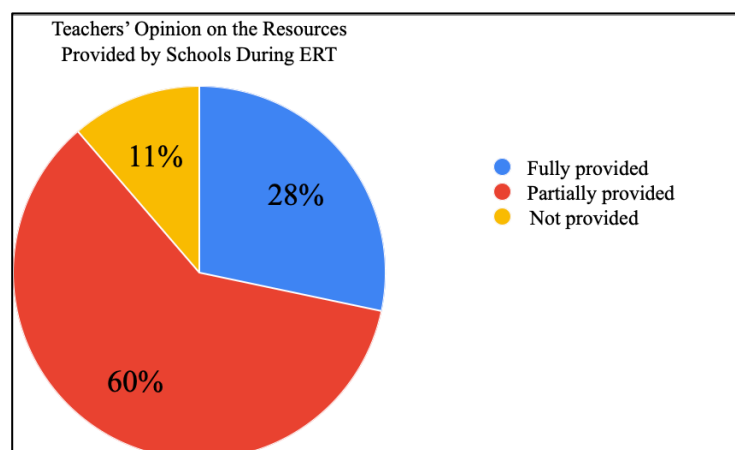
4.3.2 Perception of Teachers towards Mobile Phones Integration in Classrooms During Emergency Remote Teaching (ERT)

Teachers' experience of conducting classes during the period of Emergency Remote Teaching (ERT) was also investigated (Table 3). All in all, most teachers agreed that the virtual classes conducted were efficient (mean = 3.66, s.d. = 0.94). The motivation level of students during ERT was also ranked at an average level (mean = 3.11, s.d. = 0.78).

Most teachers had a high level of proficiency in integrating mobile phones while conducting virtual classes (mean = 3.81, s.d. = 0.94). During this period, 49 out of the 53 teachers (92.5%) discovered new digital tools that they had incorporated to facilitate learning. More than half of the teachers (60%) were provided with partial support by their attached educational institution as an effort to facilitate ERT (Figure 4). 28% of teachers were fully supported, with both hardware and software equipped for teachers. However, 6 teachers (11%) expressed that they were not given any form of resources, and had to rely on individual efforts to conduct lessons during ERT.

Figure 4

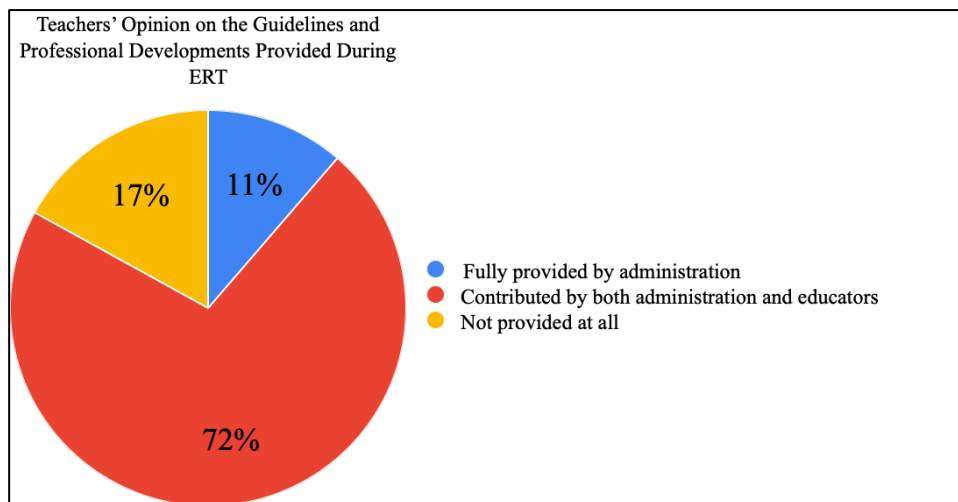
Teachers' opinion on the resources provided by schools during ERT



Among the support given, teachers were also asked specifically regarding the guidelines and professional developments of utilizing online tools during lessons (Figure 5). The study revealed that 38 teachers (72%) had collaborated with school administration in creating the guidelines. The results were followed by 9 teachers (17%) expressing that they were not given any support in this matter, and had to rely on individual effort to navigate the implementation of digital tools to conduct lessons virtually. A minority of teachers (11%) expressed that clear guidelines, instructions and standard operating procedures were provided and implemented by the school that they currently teach at.

Figure 5

Teachers' opinion on the guidelines and professional developments provided during ERT

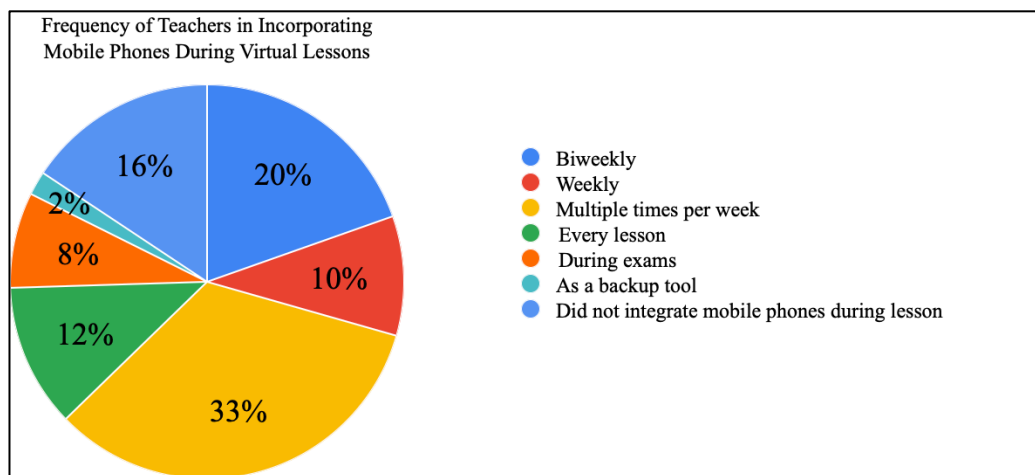


Among the various tools of technology, the study also found that 44 teachers (83%) did incorporate mobile phones in their lessons during ERT, whereas 9 teachers (19%) did not. As illustrated in Figure 6, a majority of teachers (33%) integrated mobile phones in their lessons more than once a week. This was followed by teachers who used phones fortnightly (20%). 8 teachers (12%) used phones more frequently, where phones were incorporated in every lesson. A small number of teachers (10%) only utilized mobile

phones as a tool to conduct virtual exam. Lastly, 1 teacher used mobile phones as a backup device to participate in classes when the preferred device of laptop was not functioning (2%).

Figure 6

Frequency of teachers in incorporating mobile phones during virtual lessons

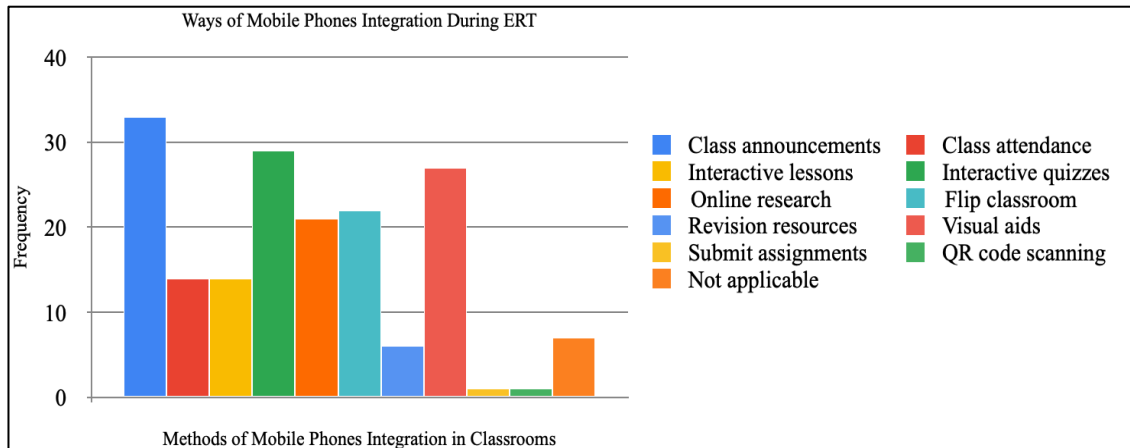


In terms of the most used function of phones during ERT (Figure 7), it was found that class announcement ranked the top, with 33 teachers (62.3%) expressed that mobile phone was the most preferred tool to make class announcements. This was followed with the conduct of interactive quizzes (54.7%), where learners used their phones as a device to select their answer during the quiz. Half of the participants also utilized mobile phones to display visual aids (50.9%). Flipped classroom (41.5%) and online research (39.6%) were also facilitated with the integration of mobile phones. Equal number of teachers (26.4%) used mobile phones to record attendance of students, and to conduct interactive lessons through web application like Nearpod. Lastly, a minority of teachers utilized phones as a revision tool for students (11.3%) where only one teacher used mobile phones

for students to submit their completed work online (1.9%) and utilized the phone's camera to access information via scanning QR codes (1.9%).

Figure 7

Methods of how mobile phones were incorporated in lessons during ERT



With the experience of mobile phones integration, teachers expressed that during ERT, mobile phones did increase the efficiency (mean = 3.38, s.d. = 0.95) and interactivity (mean = 3.58, s.d. = 0.84) among learners. It was also found that students were highly proficient (mean = 3.62, s.d. = 0.93) in using their phones to participate in virtual lessons. Teachers also rated their students with an above average level of online readiness (mean = 3.60, s.d. = 0.72), however the level of online readiness of students was rated lower when compared to teachers (mean = 3.94, s.d. = 0.53).

Teachers also reflected on the attitudes of their learners during ERT. 43.4% of the respondents experienced students who took initiative in utilizing their mobile phones for studies during ERT. Interestingly, same number of teachers (43.4%) also expressed that only some students took the self-initiative in utilizing mobile phones for academic purposes. 6 teachers (11.3%) expressed that no students under their care took the

initiative to learn using their mobile phones, and were mainly relying on teachers for subject knowledge and content delivery. Lastly, the least chosen option was only chosen by 1 teacher (1.9%), where this teacher expressed that all the students took initiative in utilizing mobile phones for their studies.

For teachers who did not integrate mobile phones during the period of ERT, these teachers mostly utilized laptop (98.1%) to connect with learners from home. This was followed by 41 teachers (77.4%) incorporating tablets to facilitate learning. Desktop was ranked the least, where only 23 teachers (43.4%) expressed that their learners participate in virtual classes through a home computer.

4.3.3 Perception of Teachers towards Mobile Phones Integration in Classrooms After Emergency Remote Teaching (ERT)

In order to be better prepared in case of future events of ERT, teachers' opinion was collected to investigate the changes teachers are keen to introduce in their classrooms post-Covid (Table 3). The study found that most teachers remained slightly positive (mean = 3.30, s.d. = 0.93) in terms of mobile phones incorporation in face-to-face classrooms after ERT. Teachers were also slightly positive (mean = 3.57, s.d. = 0.91) on the effectivity of mobile phones integration during face-to-face lessons to prepare learners with better adaptation skills in future events of ERT.

The top ranked aspect of mobile phones that were found useful during ERT were the ability to encourage an active learning classroom environment (73.6%). This was followed with the potential of mobile phones as a tool to conduct engaging and interactive

formative assessments (69.8%). More than half of the respondents (58.5%) were also keen to utilize mobile phones as it provided a high efficiency in documentation and classroom management. Only 37.7% of the teachers felt that mobile phones were useful in providing a personalized learning that accommodates learners of all abilities, where a minority of teachers (1.9%) expressed that mobile phones can facilitate experimental investigation, especially for science subject, where applications can be used as an alternative for laboratory apparatus and equipment. Phones are also used as a tool to conduct internet research (1.9%).

Lastly, teachers ranked the aspects of mobile phones that can potentially overcome and improve existing classroom practices. Most teachers (67.9%) expressed that by incorporating mobile phones regularly within the classroom, this practice will encourage learners to utilize their mobile phones as an educational tool. This was linked to the 62.3% of votes expressing that an active learning environment among learners can be encouraged and built up. 47.2% of teachers also expressed that mobile phones incorporation on a regular basis will equip learners with the skills necessary to adapt in future events of ERT, as well as being able to connect concepts learned in the classroom with real world examples (17.2%). The least chosen option was utilizing mobile phones to reduce the redundancy of administration records (39.6%).

4.3.4 Perception of Teachers regarding Policies to Prohibit Mobile Phones

Overall, most teachers were slightly supportive (mean = 3.28, s.d. = 1.17) in regards to the importance for schools to consider mobile phones integration in classroom activities, as well as the importance of integrating mobile phones to help prepare students for future

events of ERT (mean = 3.57, s.d. = 0.91). As most secondary schools in Malaysia still impose a banning policy for mobile phones, teachers expressed that it is important for schools to revise and reconsider these banning policies on mobile phones (mean = 3.49, s.d. = 1.07). There was also a strong disagreement towards the efficiency of banning policies in overcoming issues of cyberbullying (mean = 2.98, s.d. = 1.01). Lastly, teachers strongly agree (mean = 4.13, s.d. = 0.98) that educating learners on the healthy practices of mobile phones are more important than disallowing mobile phones entirely.

4.4 Inferential Analysis

In addition to the descriptive analysis based on the opinions of all teachers, further analysis of data was conducted to address each of the research question. Analysis were also conducted to see if there are any differences in the attitudes of teachers based on their gender, academic qualification level, and the number of years teaching in secondary schools.

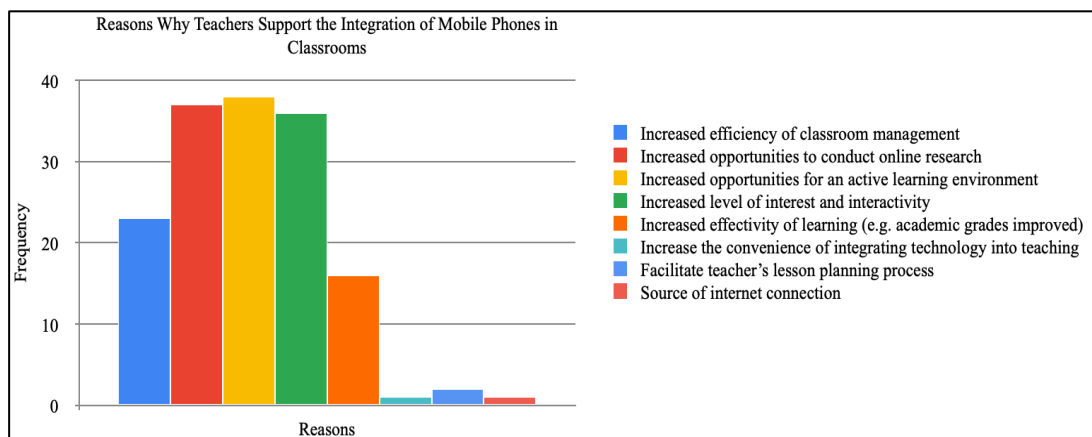
4.4.1 Teachers' Opinion and Proficiency in Relation to the Integration of Mobile Phones Prior to ERT

Data collected from the survey questionnaire was extracted and analysed to identify the opinion and proficiency of teachers towards mobile phone integration in classrooms before Emergency Remote Teaching (ERT). When teachers were conducting face-to-face lessons pre-pandemic, it was reported that most teachers somewhat agree that mobile phones should be allowed and encouraged as a tool to facilitate classroom activity in a physical classroom setting (mean = 3.66, s.d. = 1.00). This was mainly due to the benefits

that mobile phones offer. The bar chart in Figure 8 illustrates the advantages of mobile phones that motivated teachers to integrate this device as an educational tool within their classroom.

Figure 8

Advantages of mobile phones integration within the classrooms

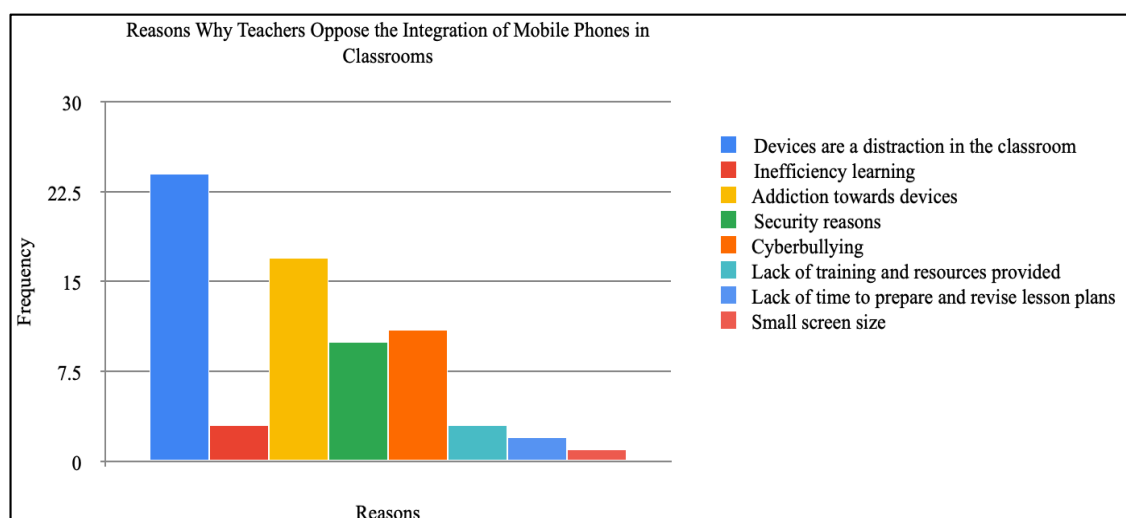


It can be seen that the main reasons behind teachers' support to incorporate mobile phones was the increased opportunities for an active learning environment (86.4%), followed by the increased opportunities to conduct online research (84.1%) and increased level of interest and interactivity (81.8%) during lessons. Half of the respondents (50.0%) also expressed that they would like to incorporate mobile phones in their classroom due to the increased efficiency of classroom management and evidences of improved academic grades (36.4%). Ranked at the bottom were teachers who utilized mobile phones as a source of network connection in the situations where the network connection at home is unsatisfactory (2.3%), as well as utilizing mobile phones to replace printed worksheets (2.3%), and conducting lessons using applications on phones (2.3%).

There were also concerns that has led to the hesitancy to incorporate mobile phones in classrooms, as presented in Figure 9. The main reason was that students can be distracted by their mobile phones during the lesson (80.0%). This was followed by the concerns where students may become addicted in using their phones (56.7%), missing out on the opportunities to engage with their peers face-to-face. The study also revealed the concerns of cyberbullying (36.7%) and security reasons (33.3%), where personal information can be breached. A small number of teachers found that mobile phones decreased the learning efficiency of learners (10.0%), and the lack of training and resources provided to the teacher (10.0%). 1 respondent also raised the issue of the small screen size of mobile phones, which is not be optimal for learning which requires long hours engagement (3.3%). Lastly, 3.3% teachers expressed that they are overwhelmed with their daily tasks, and did not have extra time to prepare and revise existing lesson plans to incorporate mobile phones.

Figure 9

Disadvantages of mobile phones integration within the classrooms



Teachers' opinions and level of proficiency on the integration of mobile phones prior to

ERT were then analysed to investigate the differences in gender, highest level of academic qualification, and the years of experiences being a secondary school teacher.

Teachers' Opinion and Proficiency in Relation to the Integration of Mobile Phones Prior to ERT by Gender

Table 4 revealed that female teachers (mean = 3.74, s.d. = 0.96) welcomed mobile phones integration more than male teachers (mean = 2.44, s.d. = 1.04), however the difference in means were not statistically significant, $t(50) = -1.01$, $p = 0.32$. Female teachers (mean = 3.91, s.d. = 0.75) were significantly more proficient and confident in integrating mobile phones in classrooms when compared to male teachers (mean = 3.44, s.d. = 0.86), $t(50) = -2.03$, $p = 0.05$.

Table 4

Results of Independent t-test examining teachers' opinion and proficiency in relation to the integration of mobile phones prior to ERT by gender

Item	Male		Female		$t(50)$	p
	M	SD	M	SD		
Teachers' Opinion on Mobile Phone Integration in Classrooms	3.44	1.04	3.74	0.96	-1.07	0.32
Teachers' Proficiency on Mobile Phone Integration in Classrooms	3.44	0.86	3.91	0.75	-2.03	0.05

Note Significant at the < 0.05 level. Mean parameter values for each of the analyses are shown for male ($n = 18$) and female ($n = 34$) teachers, as well as the results of t tests comparing the parameter between the two gender. The results of Levene's test assumed equal variance in teachers' opinion ($F(50) = 0.08$, $p = 0.79$) and proficiency ($F(50) = 1.26$, $p = 0.27$).

Teachers' Opinion and Proficiency in Relation to the Integration of Mobile Phones Prior to ERT by Academic Qualification Level

There was a significant difference between teachers' opinion depending on the highest level of academic qualification as determined by one-way ANOVA ($F(3,49) = 4.062, p = 0.012$) (Table 6). Compared to a teacher with a Post-graduate Diploma (mean = 2.40, s.d. = 1.34) (Table 5), teachers had significantly higher level of enthusiastic when they are a Masters' Degree (mean = 3.85, s.d. = 0.82, $p = 0.011$) and a Doctorate's Degree (PhD) (mean = 4.33, s.d. = 0.58, $p = 0.029$) graduate. The opinion of teachers who hold a Bachelor's Degree did not show statistically significance in the difference in opinion when compared with teachers that hold a Post-graduate Diploma ($p = 0.057$), Master's Degree ($p = 0.826$) and a Doctorate's Degree (PhD) ($p = 0.594$) (Table 7).

Table 8 indicates that teachers with a Masters' Degree had the highest proficiency of mobile phones integration (mean = 3.81, s.d. = 0.88), followed by teachers who are Bachelor's Degree holders (mean = 3.78, s.d. = 0.73) and Doctorate's Degree (mean = 3.67, s.d. = 0.58). Teachers who have a Post-graduate Diploma were least proficient (mean = 3.20, s.d. = 1.30). However, there was no statistically significant difference between teachers' proficiency in integrating mobile phones in classes when classified according to their level of academic qualification as determined by one-way ANOVA ($F(3,49) = 0.825, p = 0.486$) (Table 9).

Table 5

Descriptive statistics of teachers' opinion in relation to the integration of mobile phones prior to ERT by level of academic qualification

Teachers' Opinion on Mobile Phone Integration in Classrooms Before ERT	Frequency, N	Mean	Standard Deviation
Bachelor's Degree	18	3.61	0.98
Post-graduate Diploma	5	2.40	1.34
Master's Degree	27	3.85	0.82
Doctorate's Degree (PhD)	3	4.33	0.58
Total	53	3.66	1.00

Table 6

Results of one-way ANOVA examining teachers' opinion in relation to the integration of mobile phones prior to ERT by level of academic qualification

Teachers' Opinion on Mobile Phone Integration in Classrooms Before ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	10.335	3	3.445	4.062	0.012
Within Groups	41.552	49	0.848		
Total	51.887	52			

Note Significant at the < 0.05 level.

Table 7

Results of Tukey's Honest Difference test examining teachers' opinion in relation to the integration of mobile phones prior to ERT by level of academic qualification

(I) Academic Qualification Level	(J) Academic Qualification Level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Bachelor's Degree	Post-graduate Diploma	1.211	0.466	0.057	-0.03	2.45
	Master's Degree	-0.241	0.280	0.826	-0.99	0.50
	Doctorate's Degree (PhD)	-0.722	0.574	0.594	-2.25	0.80
Post-graduate Diploma	Bachelor's Degree	-1.211	0.466	0.057	-2.45	0.03
	Master's Degree	-1.452	0.448	0.011	-2.64	-0.26
	Doctorate's Degree (PhD)	-1.933	0.673	0.029	-3.72	-0.14
Master's Degree	Bachelor's Degree	0.241	0.280	0.826	-0.50	0.99
	Post-graduate Diploma	1.452	0.448	0.011	0.26	2.64
	Doctorate's Degree (PhD)	-0.481	0.560	0.826	-1.97	1.01
Doctorate's Degree (PhD)	Bachelor's Degree	0.722	0.574	0.594	-0.80	2.25
	Post-graduate Diploma	1.933	0.673	0.029	0.14	3.72
	Master's Degree	0.481	0.560	0.826	-1.01	1.97

Note Significant at the < 0.05 level.

Table 8

Descriptive statistics of teachers' proficiency in relation to the integration of mobile phones prior to ERT by level of academic qualification

Teachers' Opinion on Mobile Phone Integration in Classrooms Before ERT	Frequency, N	Mean	Standard Deviation
Bachelor's Degree	18	3.78	0.73
Post-graduate Diploma	5	3.20	1.30
Master's Degree	27	3.81	0.79
Doctorate's Degree	3	3.67	0.58
Total	53	3.74	0.81

Table 9

Results of one-way ANOVA examining teachers' proficiency in relation to the integration of mobile phones prior to ERT by level of academic qualification

Teachers' Opinion on Mobile Phone Integration in Classrooms Before ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	1.650	3	0.550	0.825	0.486
Within Groups	32.652	49	0.666		
Total	34.302	52			

Note Significant at the < 0.05 level.

Teachers' Opinion and Proficiency in Relation to the Integration of Mobile Phones Prior to ERT by Number of Years Teaching in Secondary School

Table 10 summarized teachers' opinion on mobile phones integration according to their level of experience. Teachers with 10 to 20 years of teaching experience supported the integration of mobile phones the most prior to ERT (mean = 4.13, s.d. = 0.82). The support was followed by teachers with less than 5 years of teaching experience (mean = 3.53, s.d. = 0.99) and teachers with 5 to 10 years of experience (mean = 3.45, s.d. = 1.19). Teachers with more than 20 years showed the lowest support (mean = 3.00, s.d. = 0.58), where they felt neutral regarding the integration of mobile phones in classrooms. It was revealed by the one-way ANOVA (Table 11) that the difference between teachers' opinion depending on the highest level of academic qualification was not statistically significant ($F(3,49) = 1.918, p = 0.139$).

With regards to the proficiency of teachers in the incorporation of technology within their classroom, a one-way ANOVA (Table 13) revealed that the difference between teachers'

proficiency on mobile phones integration before ERT depending on the highest level of academic qualification was statistically significant ($F(3,49) = 3.449, p = 0.024$).

The results by performing the Tukey's test (Table 14) suggested that teachers with more than 20 years of teaching experience (mean = 5.00, s.d. = 0.00) (Table 12) had significantly higher proficiency than teachers that had taught in similar environment for less than 5 years (mean = 3.33, s.d. = 0.62, $p = 0.027$). However, there was no statistical significance in the proficiency of teachers of less than 5 years of experience when compared with teachers between 5 to 10 years of experience (mean = 3.85, s.d. = 0.93, $p = 0.206$) and teachers between 10 to 20 years of experience (mean = 3.81, s.d. = 0.66, $p = 0.308$). The same phenomenon was also observed between teachers of 5 to 10 years of experience with teachers with 10 to 20 years of experience ($p = 0.999$) and more than 20 years of experience ($p = 0.188$). There was also no significance between the two groups of most experience teachers ($p = 0.173$).

Table 10

Descriptive statistics of teachers' opinion in relation to the integration of mobile phones prior to ERT by number of years of experience

Teachers' Opinion on Mobile Phone Integration in Classrooms Before ERT	Frequency, N	Mean	Standard Deviation
Less than Five(5) Years	15	3.53	0.99
Five(5) to Ten(10) Years	20	3.45	1.19
Ten(10) to Twenty(20) Years	16	4.13	0.82
More than Twenty(20) Years	2	3.00	0.58
Total	53	3.66	1.00

Table 11

Results of one-way ANOVA examining teachers' opinion in relation to the integration of mobile phones prior to ERT by number of years of experience

Teachers' Opinion on Mobile Phone Integration in Classrooms Before ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	5.453	3	1.818	1.918	0.139
Within Groups	46.433	49	0.948		
Total	51.887	52			

Note Significant at the < 0.05 level.

Table 12

Descriptive statistics of teachers' proficiency in relation to the integration of mobile phones prior to ERT by number of years of experience

Teachers' Proficiency on Mobile Phone Integration in Classrooms Before ERT	Frequency, N	Mean	Standard Deviation
Less than Five(5) Years	15	3.33	0.62
Five(5) to Ten(10) Years	20	3.85	0.93
Ten(10) to Twenty(20) Years	16	3.81	0.66
More than Twenty(20) Years	2	5.00	0.00
Total	53	3.74	0.81

Table 13

Results of one-way ANOVA examining teachers' proficiency in relation to the integration of mobile phones prior to ERT by number of years of experience

Teachers' Proficiency on Mobile Phone Integration in Classrooms Before ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	5.981	3	1.994	3.449	0.024
Within Groups	28.321	49	0.578		
Total	34.302	52			

Note Significant at the < 0.05 level.

Table 14

Results of Tukey's Honest Difference test examining teachers' proficiency in relation to the integration of mobile phones prior to ERT by number of years of experience

(I) Year(s) teaching in secondary schools	(J) Year(s) teaching in secondary schools	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Less than Five(5) Years	Five(5) to Ten(10) Years	-0.517	0.260	0.206	-1.21	0.17
	Ten(10) to Twenty(20) Years	-0.479	0.273	0.308	-1.21	0.25
	More than Twenty(20) Years	-1.667	0.572	0.027	-3.19	-0.14
Five(5) to Ten(10) Years	Less than Five(5) Years	0.517	0.260	0.206	-0.17	1.21
	Ten(10) to Twenty(20) Years	0.038	0.255	0.999	-0.64	0.72
	More than Twenty(20) Years	-1.150	0.564	0.188	-2.65	0.35
Ten(10) to Twenty(20) Years	Less than Five(5) Years	0.479	0.273	0.308	-0.25	1.21
	Five(5) to Ten(10) Years	-0.038	0.255	0.999	-0.72	0.64
	More than Twenty(20) Years	-1.188	0.570	0.173	-2.70	0.33
More than Twenty(20) Years	Less than Five(5) Years	1.667	0.572	0.027	0.14	3.19
	Five(5) to Ten(10) Years	1.150	0.564	0.188	-0.35	2.65
	Ten(10) to Twenty(20) Years	1.188	0.570	0.173	-0.33	2.70

Note Significant at the < 0.05 level.

4.4.2 Teachers' Opinion in Relation to the Efficiency of Teaching and Learning by Integrating Mobile Phones During ERT

To find out the opinion of teachers on the efficiency of mobile phones in facilitating the Emergency Remote Teaching (ERT) during the Movement Control Order (MCO) in Malaysia, teachers were required to rate their opinion based on a 5-point Likert scale. In general, teachers agreed that mobile phones integration increased the efficiency of learning during the period when classes were conducted online (mean = 3.38, s.d. = 0.95) (Table 3). The opinion of teachers were then further analysed to determine whether the opinion of teachers vary according to gender, highest level of academic qualification, as well as the number of years teaching in secondary schools.

Teachers' Opinion in Relation to the Efficiency of Teaching and Learning by Integrating Mobile Phones During ERT by Gender

Table 15 unfolded that female teachers (mean = 3.56, s.d. = 0.99) agreed more than male (mean = 3.00, s.d. = 0.77) teachers that mobile phones heightened the learning efficacy in their virtual classrooms. An independent *t*-test revealed that the difference was significantly higher, $t(50) = -2.25$, $p = 0.03$.

Table 15

Results of Independent t-test examining teachers' opinion in relation to the efficiency of teaching and learning by integrating mobile phones during ERT by gender

Item	Male		Female		<i>t</i> (50)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Teachers' Opinion on Efficiency of Mobile Phone on Lessons Conducted During ERT	3.00	0.77	3.56	0.99	-2.25	0.03

Note Significant at the < 0.05 level. Mean parameter values for each of the analyses are shown for male ($n = 18$) and female ($n = 34$) teachers. The results of Levene's test suggested that the variance in teachers' opinion is significantly different between the two gender ($F(50) = 5.20$, $p = 0.03$).

Teachers' Opinion in Relation to the Efficiency of Teaching and Learning by Integrating Mobile Phones During ERT by Academic Qualification Level

Teachers with a Doctorate's Degree (PhD) strongly agreed that the integration of mobile phones increased the efficiency of learners (mean = 4.00, s.d. = 0.00) (Table 16). This was followed by teachers with a Bachelor's Degree (mean = 3.44, s.d. = 1.20) and teachers with a Master's Degree (mean = 3.41, s.d. = 0.69). Teachers with a Post-graduate Diploma expressed that mobile phones integration was not useful in their classrooms (mean = 2.60, s.d. = 1.14). It was revealed by the one-way ANOVA that there was no significant difference between teachers' opinion depending on the highest level of academic qualification ($F(3,49) = 1.662, p = 0.187$) (Table 17).

Table 16

Descriptive statistics of teachers' opinion in relation to the efficiency of teaching and learning by integrating mobile phones during ERT by level of academic qualification

Teachers' Opinion on Whether Mobile Phone Integration Increased Efficiency in Virtual Classrooms	Frequency, N	Mean	Standard Deviation
Bachelor's Degree	18	3.44	1.20
Post-graduate Diploma	5	2.60	1.14
Master's Degree	27	3.41	0.69
Doctorate's Degree	3	4.00	0.00
Total	53	3.38	0.95

Table 17

Results of one-way ANOVA examining teachers' opinion in relation to the efficiency of teaching and learning by integrating mobile phones during ERT by level of academic qualification

Teachers' Opinion on Whether Mobile Phone Integration Increased Efficiency in Virtual Classrooms	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	4.290	3	1.430	1.662	0.187
Within Groups	42.163	49	0.860		
Total	46.453	52			

Note Significant at the < 0.05 level.

Teachers' Opinion in Relation to the Efficiency of Teaching and Learning by Integrating Mobile Phones During ERT by Number of Years Teaching in Secondary School

The study found that teachers with 10 to 20 years of teaching experience supported the idea that mobile phones increased the learning efficiency within their classrooms (mean = 3.56, s.d. = 0.89) (Table 18). This was followed by teachers with 5 to 10 years of teaching experience (mean = 3.45, s.d. = 1.10) and teachers with less than 5 years of experience (mean = 3.07, s.d. = 0.80). Teachers with more than twenty years showed the lowest support (mean = 3.00, s.d. = 0.71), where they felt neutral regarding the integration of mobile phones in classrooms. It was revealed by the one-way ANOVA (Table 19) that there was no significant difference between teachers' opinion depending on the highest level of academic qualification ($F(3,49) = 0.786, p = 0.508$).

Table 18

Descriptive statistics of teachers' opinion in relation to the efficiency of teaching and learning by integrating mobile phones during ERT by number of years of experience

Teachers' Opinion on Whether Mobile Phone Integration Increased Efficiency in Virtual Classrooms	Frequency, N	Mean	Standard Deviation
Less than Five(5) Years	15	3.07	0.80
Five(5) to Ten(10) Years	20	3.45	1.10
Ten(10) to Twenty(20) Years	16	3.56	0.89
More than Twenty(20) Years	2	3.00	0.71
Total	53	3.38	0.95

Table 19

Results of one-way ANOVA examining teachers' opinion in relation to the efficiency of teaching and learning by integrating mobile phones during ERT by number of years of experience

Teachers' Opinion on Whether Mobile Phone Integration Increased Efficiency in Virtual Classrooms	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	2.132	3	0.711	0.786	0.508
Within Groups	44.321	49	0.905		
Total	46.453	52			

Note Significant at the < 0.05 level.

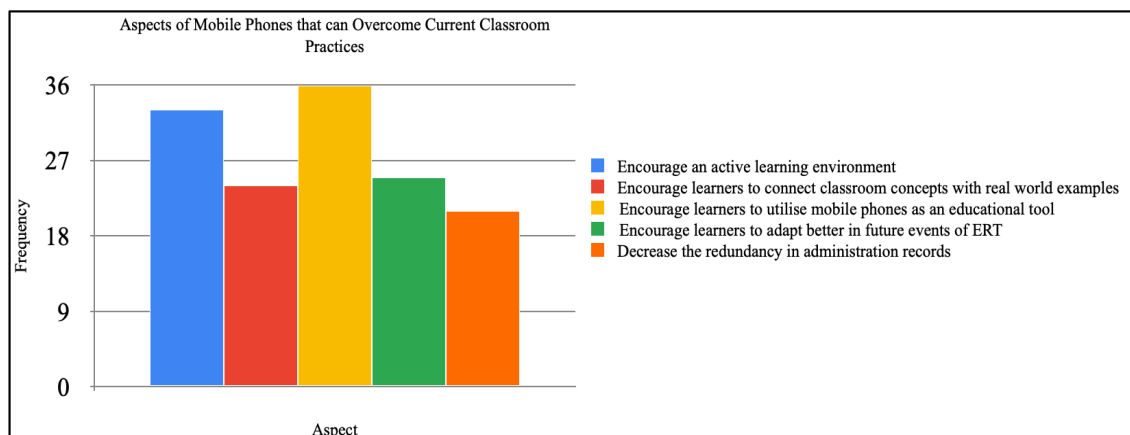
4.4.3 Teachers' Opinion in Relation to the Efficiency of Mobile Phones in Increasing the Interactivity During Teaching and Learning

This research question aimed to investigate the aspect of learning that has been enhanced and facilitated when mobile phones were integrated in the classroom environment. Figure 10 illustrated the aspects of mobile phones that can overcome current classroom practices when integrated as an educational tool. The top ranked reason of mobile phone integration is so that learners can be taught how to utilise their mobile phones for

academic purposes (68.0%), and to facilitate their learning process. 33 out of 53 teachers (62.3%) also found that mobile phones were useful in encouraging an active learning environment. This was followed by 25 teachers (47.2%) who expressed that if learners were familiar with utilizing their mobile phones during class regularly, they can build up the skills to adapt better in future events of ERT. Learners can also learn to relate concepts learn in the classroom with real world examples (45.3%), as mobile phones enable information to be easily accessible, enable learning to take place even outside school hours. However, most teachers did not find that mobile phones integration can help streamline the administration process, where only 21 out of 53 respondents (39.6%) agreed that administration records can be improved with the integration of mobile phones.

Figure 10

Aspects of mobile phones that can overcome the shortcomings in current practices in the classroom



Teachers' opinion on whether mobile phones has increased the interactivity of lessons was collected. Overall, it was found that students have an increased level of interactivity with teachers and peers when mobile phones were integrated during lessons (mean = 3.58, s.d. = 0.84) (Table 3). The opinion was further analysed to see whether there was a

difference according to the gender, level of academic qualification and number of years teaching as a secondary school teacher.

Teachers' Opinion in Relation to the Efficiency of Mobile Phones in Increasing the Interactivity During Teaching and Learning by Gender

The opinion of teachers were categorized to see whether there was a difference between gender. Male teachers (mean = 3.61, s.d. = 0.78) agreed more than female teachers (mean = 3.56, s.d. = 0.89) that mobile phones increased the interactivity of online class. However, an independent *t*-test (Table 20) was conducted and it was revealed that there was no significant difference between gender, $t(50) = 0.209, p = 0.835$.

Table 20

Results of Independent t-test examining teachers' opinion in relation to the efficiency of mobile phones in increasing the interactivity during teaching and learning by gender

Item	Male		Female		<i>t</i> (50)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Teachers' Opinion on Whether Mobile Phones Increased Interactivity in Lessons Conducted During ERT	3.61	0.78	3.56	0.89	0.21	0.84

Note Significant at the < 0.05 level. Mean parameter values for each of the analyses are shown for male ($n = 18$) and female ($n = 34$) teachers, as well as the results of *t* tests comparing the parameter estimates between the two gender. The results of Levene's test assumed equal variance in teachers' opinion by gender ($F(50) = 1.13, p = 0.29$).

Teachers' Opinion in Relation to the Efficiency of Mobile Phones in Increasing the Interactivity During Teaching and Learning by Academic Qualification Level

The opinion of teachers were categorized to investigate the difference according to the level of teachers' academic qualification. As summarized in Table 21, teachers with a Masters' Degree (mean = 3.78, s.d. = 0.75) agreed the most that mobile phones increased the interactivity of online class. This was followed by teachers with a Doctorate's Degree (PhD) (mean = 3.67, s.d. = 0.58) and teachers with a Bachelor's Degree (mean = 3.44, s.d. = 0.86). Teachers that hold a Post-graduate Diploma did not find that mobile phones increased nor decreased the interactivity in virtual classroom (mean = 3.00, s.d. = 1.23). It was also revealed by a one-way ANOVA (Table 22) that there was no significant difference between the level of teachers' academic qualification, ($F(3,49) = 1.494, p = 0.228$).

Table 21

Descriptive statistics of teachers' opinion in relation to the efficiency of mobile phones in increasing the interactivity during teaching and learning by level of academic qualification

Teachers' Opinion on Whether Mobile Phone Integration Increased Interactivity in Virtual Classrooms	Frequency, N	Mean	Standard Deviation
Bachelor's Degree	18	3.44	0.86
Post-graduate Diploma	5	3.00	1.23
Master's Degree	27	3.78	0.75
Doctorate's Degree	3	3.67	0.58
Total	53	3.58	0.84

Table 22

Results of one-way ANOVA examining teachers' opinion in relation to the efficiency of mobile phones in increasing the interactivity during teaching and learning by level of academic qualification

Teachers' Opinion on Whether Mobile Phone Integration Increased Interactivity in Virtual Classrooms	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	3.090	3	1.030	1.494	0.228
Within Groups	33.778	49	0.689		
Total	36.868	52			

Note Significant at the < 0.05 level.

Teachers' Opinion in Relation to the Efficiency of Mobile Phones in Increasing the Interactivity During Teaching and Learning by Number of Years of Experience

To investigate the difference in teachers' opinion according to the number of years of experience teaching in secondary schools, the data was categorized according to the subpopulations and analysed (Table 23). Teachers with more than 20 years (mean = 4.00, s.d. = 1.41) strongly agreed that mobile phones increased the interactivity of online class. This was followed by teachers with 10 to 20 years of experience (mean = 3.81, s.d. = 0.75) and teachers with less than 5 years of experience (mean = 3.60, s.d. = 0.83). Teachers that taught in secondary schools between 5 to 10 years ranked the bottom, where they slightly agreed that mobile phones increased the interactivity in virtual classroom (mean = 3.35, s.d. = 0.88). It was revealed by a one-way ANOVA (Table 24) that there was no significant difference between the number of years teaching in secondary schools, ($F(3,49) = 1.077, p = 0.368$).

Table 23

Descriptive statistics of teachers' opinion in relation to the efficiency of mobile phones in increasing the interactivity during teaching and learning by number of years of experience

Teachers' Opinion on Whether Mobile Phone Integration Increased Interactivity in Virtual Classrooms	Frequency, N	Mean	Standard Deviation
Less than Five(5) Years	15	3.60	0.83
Five(5) to Ten(10) Years	20	3.35	0.88
Ten(10) to Twenty(20) Years	16	3.81	0.75
More than Twenty(20) Years	2	4.00	1.41
Total	53	3.58	0.84

Table 24

Results of one-way ANOVA examining teachers' opinion in relation to the efficiency of mobile phones in increasing the interactivity during teaching and learning by number of years of experience

Teachers' Opinion on Whether Mobile Phone Integration Increased Interactivity in Virtual Classrooms	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	2.280	3	0.760	1.077	0.368
Within Groups	34.588	49	0.706		
Total	36.868	52			

Note Significant at the < 0.05 level.

4.4.4 Teachers' Opinion in Relation to the Integration of Mobile Phones After ERT

The intention of this research question was to investigate the opinion of teachers in encouraging the integration of mobile phones in classrooms among students of secondary schools. Overall, teachers were slightly positive in welcoming mobile phones to their classroom post-pandemic (mean = 3.30, s.d. = 0.93) (Table 3). Teachers' opinion was

then analysed to reveal the difference according to teachers' gender, level of academic qualification, as well as the number of years of teaching in secondary schools.

Teachers' Opinion in Relation to the Integration of Mobile Phones After ERT by Gender

Female teachers (mean = 3.29, s.d. = 0.91) welcomed the integration of mobile phones in classrooms more than male teachers (mean = 3.28, s.d. = 1.02). However, an independent t -test (Table 26) revealed that the means between male and female teachers was not statistically significant, $t(50) = -0.06$, $p = 0.95$.

Table 25

Results of Independent t -test examining teachers' opinion in relation to the integration of mobile phones after ERT by gender

Item	Male		Female		$t(50)$	p
	M	SD	M	SD		
Teachers' Opinion on Mobile Phones Integration After ERT	3.28	1.02	3.29	0.91	-0.06	0.95

Note Significant at the < 0.05 level. Mean parameter values for each of the analyses are shown for male ($n = 18$) and female ($n = 34$) teachers, as well as the results of t tests (assuming equal variance) comparing the parameter estimates between the two gender. The results of Levene's test assumed equal variance in teachers' opinion by gender ($F(50) = 0.10$, $p = 0.76$).

Teachers' Opinion in Relation to the Integration of Mobile Phones After ERT by Academic Qualification Level

A one-way ANOVA revealed that there was a statistically significant difference between teachers' opinion on mobile phones integration after ERT depending on the level of academic qualification ($F(3,49) = 3.198, p = 0.031$) (Table 27). To find out the groups which were statistically significant, a Tukey's post-hoc test was conducted and it was revealed that when face to face classes resume, teachers with a Doctorate's Degree (PhD) (mean = 4.33, s.d. = 0.58) significantly welcomed the integration of mobile phones more than teachers that graduated with a Post-graduate Diploma (mean = 2.40, s.d. = 1.34, $p = 0.020$) (Table 28). The opinion between teachers that hold a Bachelor's Degree (mean = 3.28, s.d. = 1.07) did not show any statistical significance between the opinion of teachers that hold a Post-graduate Diploma ($p = 0.210$), Bachelor's Degree ($p = 0.986$) and a Doctorate's Degree ($p = 0.230$). There was also no significant difference between the opinion of teachers that have a Post-graduate Diploma and a Master's Degree ($p = 0.119$), as well as between teachers that obtained a Master's and Doctorate's Degree ($p = 0.285$).

Table 26

Descriptive statistics of teachers' opinion in relation to the integration of mobile phones after ERT by level of academic qualification

Teachers' Opinion on Mobile Phone Integration in Classrooms After ERT	Frequency, N	Mean	Standard Deviation
Bachelor's Degree	18	3.28	1.07
Post-graduate Diploma	5	2.40	1.34
Master's Degree	27	3.37	0.63
Doctorate's Degree	3	4.33	0.58
Total	53	3.30	0.93

Table 27

Results of one-way ANOVA examining teachers' opinion in relation to the integration of mobile phones after ERT by level of academic qualification

Teachers' Opinion on Mobile Phone Integration in Classrooms After ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	7.396	3	2.465	3.198	0.031
Within Groups	37.774	49	0.771		
Total	45.170	52			

Note Significant at the < 0.05 level.

Table 28

Results of Tukey's Honest Difference test examining teachers' opinion in relation to the integration of mobile phones after ERT by level of academic qualification

(I) Academic Qualification Level	(J) Academic Qualification Level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Bachelor's Degree	Post-graduate Diploma	0.878	0.444	0.210	-0.30	2.06
	Master's Degree	-0.093	0.267	0.986	-0.80	0.62
	Doctorate's Degree (PhD)	-1.056	0.548	0.230	-2.51	0.40
Post-graduate Diploma	Bachelor's Degree	-0.878	0.444	0.210	-2.06	0.30
	Master's Degree	-0.970	0.427	0.119	-2.11	0.17
	Doctorate's Degree (PhD)	-1.933	0.641	0.020	-3.64	-0.23
Master's Degree	Bachelor's Degree	0.093	0.267	0.986	-0.62	0.80
	Post-graduate Diploma	0.970	0.427	0.119	-0.17	2.11
	Doctorate's Degree (PhD)	-0.963	0.534	0.285	-2.38	0.46
Doctorate's Degree (PhD)	Bachelor's Degree	1.056	0.548	0.230	-0.40	2.51
	Post-graduate Diploma	1.933	0.641	0.020	0.23	3.64
	Master's Degree	0.963	0.534	0.285	-0.46	2.38

Note Significant at the < 0.05 level.

Teachers' Opinion in Relation to the Integration of Mobile Phones After ERT by Number of Years of Experience

The attitude of teachers in mobile phones integration post-Covid were analysed according to the number of years of experience teaching in secondary schools (Table 29). Teachers with more than 20 years (mean = 4.00, s.d. = 0.00) were the most positive to integrate mobile phones in their classrooms after the period of ERT. This was followed by teachers with 10 to 20 years of experience (mean = 3.56, s.d. = 0.89) and teachers that taught in secondary schools between 5 to 10 years (mean = 3.30, s.d. = 0.87). Teachers with less than 5 years of experience ranked the bottom (mean = 2.93, s.d. = 1.03), where they slightly disagreed with the integration of mobile phones when face to face classes resume after ERT. It was revealed by a one-way ANOVA (Table 30) that there was no significant difference between the number of years of being a secondary school teacher, ($F(3,49) = 1.630, p = 0.194$).

Table 29

Descriptive statistics of teachers' opinion in relation to the integration of mobile phones after ERT by number of years of experience

Teachers' Opinion on Mobile Phone Integration in Classrooms After ERT	Frequency, N	Mean	Standard Deviation
Less than Five(5) Years	15	2.93	1.03
Five(5) to Ten(10) Years	20	3.30	0.87
Ten(10) to Twenty(20) Years	16	3.56	0.89
More than Twenty(20) Years	2	4.00	0.00
Total	53	3.30	0.93

Table 30

Results of one-way ANOVA examining teachers' opinion in relation to the integration of mobile phones after ERT by number of years of experience

Teachers' Opinion on Mobile Phone Integration in Classrooms After ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	4.099	3	1.366	1.630	0.194
Within Groups	41.071	49	0.838		
Total	45.170	52			

Note Significant at the < 0.05 level.

Teachers' Opinion on the Importance for Schools to Consider Mobile Phones Integration

Data was also collected to determine the attitude of teachers, on the importance for schools to consider mobile phones integration in preparation for future events of ERT. Overall, teachers agreed that mobile phones integration would be useful to enhance students' level of online readiness (mean = 3.28, s.d. = 1.17) (Table 3), and will aid students to adapt better in future events of ERT. The opinion of teachers was further analysed to investigate the statistical significance according to gender, level of academic qualification, and number of years of experience as a secondary school teacher.

Teachers' Opinion on the Importance for Schools to Consider Mobile Phones Integration by Gender

It was found that male teachers (mean = 3.28, s.d. = 0.90) were more open to the idea of mobile phones integration after ERT, when compared to female teachers (mean = 3.24, s.d. = 1.28). However, it was revealed by a dependent *t*-test that the difference in opinion was not statistically significant, $t(50) = 0.14$, $p = 0.90$ (Table 31).

Table 31

Results of Independent t-test examining teachers' opinion on the importance for schools to consider mobile phones integration by gender

Item	Male		Female		<i>t</i> (50)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Teachers' Opinion on the Importance of Schools to Consider Mobile Phones Integration	3.28	0.90	3.24	0.28	0.14	0.90

Note Significant at the < 0.05 level. Mean parameter values for each of the analyses are shown for male ($n = 18$) and female ($n = 34$) teachers, as well as the results of *t* tests comparing the parameter estimates between the two gender. The results of Levene's test suggested that the variance in teachers' opinion is significantly different between the two gender ($F(50) = 5.18, p = 0.03$).

Teachers' Opinion on the Importance for Schools to Consider Mobile Phones Integration by Academic Qualification Level

When categorized according to their level of academic qualification, it was found that teachers with a Doctorate's Degree (mean = 4.33, s.d. = 0.58) agreed the most to the importance in considering mobile phone to be properly integrated in classrooms (Table 32). This was followed by teachers with a Bachelor's Degree (mean = 3.44, s.d. = 1.10) and teachers with a Master's Degree (mean = 3.22, s.d. = 1.16). Teachers with a Post-graduate Diploma (mean = 2.40, s.d. = 1.34) disagreed with the integration of mobile phones as an aid for future emergency circumstances. However, despite the difference in opinion, there was no significant difference between groups, as revealed by a test of one-way ANOVA (Table 33), ($F(3,49) = 2.017, p = 0.124$).

Table 32

Descriptive statistics of teachers' opinion on the importance for schools to consider mobile phones integration by level of academic qualification

Teachers' Opinion on the Importance of Mobile Phone Integration in Classrooms After ERT	Frequency, N	Mean	Standard Deviation
Bachelor's Degree	18	3.44	1.10
Post-graduate Diploma	5	2.40	1.34
Master's Degree	27	3.22	1.16
Doctorate's Degree	3	4.33	0.58
Total	53	3.28	1.17

Table 33

Results of one-way ANOVA examining teachers' opinion on the importance for schools to consider mobile phones integration by level of academic qualification

Teachers' Opinion on the Importance of Mobile Phone Integration in Classrooms After ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	7.777	3	2.592	2.017	0.124
Within Groups	62.978	49	1.285		
Total	70.755	52			

Note Significant at the < 0.05 level.

Teachers' Opinion on the Importance for Schools to Consider Mobile Phones Integration by Number of Years of Experience

Teachers with different level of experience had a different opinion on this educational topic (Table 34). It was revealed that teachers with more than 20 years of experience strongly agreed that mobile phones should be integrated and incorporated in the syllabus as an aid during lesson delivery. Teachers with other level of experience slightly agreed on this matter, where teachers with less than 5 years of experience (mean = 3.27, s.d. =

1.03), teachers with 10 to 20 years of experience (mean = 3.25, s.d. = 1.24) and teachers between 5 to 10 years of experience (mean = 3.15, s.d. = 1.18) had similar opinion. It was also found that there was no significant difference between groups, as revealed by one-way ANOVA (Table 35), ($F(3,49) = 1.589, p = 0.204$).

Table 34

Descriptive statistics of teachers' opinion on the importance for schools to consider mobile phones integration by number of years of experience

Teachers' Opinion on the Importance of Mobile Phone Integration in Classrooms After ERT	Frequency, N	Mean	Standard Deviation
Less than Five(5) Years	15	3.27	1.03
Five(5) to Ten(10) Years	20	3.15	1.18
Ten(10) to Twenty(20) Years	16	3.25	1.24
More than Twenty(20) Years	2	5.00	0.00
Total	53	3.28	1.17

Table 35

Results of one-way ANOVA examining teachers' opinion on the importance for schools to consider mobile phones integration by number of years of experience

Teachers' Opinion on the Importance of Mobile Phone Integration in Classrooms After ERT	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Between Groups	6.271	3	2.090	1.589	0.204
Within Groups	64.483	49	1.316		
Total	70.755	52			

Note Significant at the < 0.05 level.

Differences in Teachers' Opinion to Integrate Mobile Phones Before vs After Emergency Remote Teaching (ERT)

A dependent t -test was conducted to compare the opinion of all teachers in the integration of mobile phones within their classroom before (mean = 3.66, s.d. = 1.00) and after ERT (mean = 3.30, s.d. = 0.93). The results of the t -test was $t(52) = 2.56, p = 0.01$. Since the p value is less than 0.05, the null hypothesis can be rejected. Therefore, the alternative hypothesis was accepted, indicating that the difference of opinions of teachers before and after ERT was statistically significant. The differences in teachers' opinion to integrate mobile phones before vs after Emergency Remote Teaching (ERT) by gender, level of academic qualification and number of years of experience were summarized in Table 36.

It was revealed that there was no statistical difference for male teachers on mobile phone integration before and after ERT, demonstrated through the dependent t -test, $t(17) = 0.68, p = 0.51$. Female teachers showed a significant decrease in the interest to integrate mobile phones in their classrooms when face to face classes resume, $t(33) = 2.52, p = 0.02$.

The data was also analysed according to teachers' level of academic qualification. For teachers who hold a Bachelor's Degree, there was no significant difference in their opinion towards this educational topic before and after ERT, $t(17) = 1.24, p = 0.23$. For teachers with a Post-graduate Diploma, the dependent t -test cannot be calculated due to the standard error being 0. Teachers' opinion remained the same, therefore the comparison between means cannot be conducted.

Teachers who hold a Master's Degree also showed a significant decrease in the idea to incorporate mobile phones after ERT, when compared to their opinion on this topic prior to ERT. This was revealed in the dependent *t*-test, where $t(26) = 2.38, p = 0.03$. However, teachers with a Doctorate's Degree (PhD) did not show significant difference in the change in opinion, $t(2) = 0.00, p = 1.00$.

Dependent *t*-test was also performed according to the number of years of experience of teachers. It was found that teachers who have less than 5 years of experience significantly disagreed to the idea of mobile phone incorporation after ERT, $t(14) = 2.81, p = 0.01$. Teachers with 5 to 10 years of experience did not show statistical significance in their opinion before and after ERT, as demonstrated by the dependent *t*-test, $t(19) = 0.65, p = 0.53$. Teachers with 10 to 20 years of experience also showed no significant difference in their opinion before vs after ERT, $t(15) = 2.51, p = 0.06$. The dependent *t*-test cannot be conducted to compare the means between the opinion of teachers with 20 years of experience because the standard error of the difference is 0.

Table 36

Results of Dependent t-test examining the difference between teachers' opinion before vs after ERT by gender, level of academic qualification and number of years of experience

Characteristic	Before ERT		After ERT		<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Gender							
Male	3.44	1.04	3.28	1.02	0.68	17	0.51
Female	3.74	0.97	3.29	0.91	2.52	33	0.02
Level of Academic Qualification							
Bachelor’s Degree	3.61	0.98	3.28	1.07	1.24	17	0.23
Post-graduate Diploma	2.40	1.34	2.40	1.34	-	-	-
Masters	3.85	0.82	3.37	0.63	2.38	26	0.03
Doctorate Degree (PhD)	4.33	0.58	4.33	0.58	0.00	2	1.00
Number of Years of Experience							
0 – 5	3.53	0.99	2.93	1.03	2.81	14	0.01
5 – 10	3.45	1.19	3.30	0.87	0.65	19	0.53
10 – 20	4.13	0.62	3.56	0.89	2.51	15	0.06
More than 20	3.00	0.00	4.00	0.00	-	-	-
Total	3.66	1.00	3.30	0.93	2.56	52	0.01

Note Significant at the < 0.05 level.

4.5 Conclusion

In this chapter, the data collected was presented and analysed. Descriptive and inferential analysis statistics were also conducted and reported. Each research question was also addressed based on the data collected and analysed. In Chapter 5, the chapter will discuss and evaluate the results obtained. The strengths and limitations of this study will also be discussed, as well as ideas for further research.

Chapter 5: Discussion and Conclusion

5.1 Introduction

In this chapter the conclusion was derived to address the issue of mobile phones integration in secondary schools of Kuala Lumpur, with reference to the data collected and analysed. The conclusions derived were also compared with existing literature. Evaluation of the data was also addressed based on the gender, level of academic qualification and number of years of teaching experience of the participants. This chapter also included the significance of the study, as well as the strengths and limitations of study. Suggestions for further research were also provided based on the conclusions and purpose of this study.

5.2 Discussion

In general, most teachers agreed that mobile phones integration during the period of ERT increased the learning efficiency among learners (mean = 3.81, s.d. = 0.94). Teachers also appreciated that with mobile phones, learners were more active in their learning (86.4%; Figure 8), as mobile phones acted as a research tool to explore their curiosity in learning (Ransom and Manning, 2013). Mobile phones also brought a revolution to the conduct of formative assessment, where traditional worksheets can be replaced with engaging quiz. With the integration of elements of gamification, learners' interest towards learning can also be heightened when they were able to customize their own avatar (Marczewski,

2013), monitor their own progress, collect points, as well as receive instant feedback for the quiz attempted (Fritz-Palao, 2014; Onodipe and Ayadi, 2020).

With the benefits that was recognized during ERT, it was predicted that teachers would be more interested to incorporate mobile phones in their classroom after ERT. However, surprisingly, the results suggested that after ERT (mean = 3.30, s.d. = 0.93), teachers were less interested to incorporate mobile phones compared to the pre-Covid era (mean = 3.66, s.d. = 1.00). Similar trend was observed regardless of the gender, academic qualification and number of years of teaching experience of the participants. Although teachers still agreed to the implementation of mobile phones before and after ERT, the results of the dependent *t*-test suggested that the decrease in teachers' interest were significant ($t(52) = 2.56, p = 0.01$). This is an interesting phenomenon, especially when teachers did realise the benefits of mobile phones in facilitating class activities during ERT.

There are several possible explanations to this situation. The main reason could be due to the stress that teachers experienced during ERT. A study conducted by Kruglova *et al.* (2021) found that teachers experienced a two-fold increase in fatigue and stress when ERT was introduced. The risk of being diagnosed with chronic fatigue syndrome was also significantly higher. Therefore, it can be deduced that while teachers recognized the benefits of mobile phone integration, the level of motivation to introduce this change remained low. Currently, countries are still transitioning between ERT and face to face classes depending on local situation of the pandemic. It has been more than one year since the pandemic was declared, and today various countries are still facing a second or third wave of Covid infection cases, with several new variants of the virus (Lovelace, 2021).

Teachers and school administrators are facing a greater level of uncertainty on a daily basis. With emphasis given to prepare existing students for major assessment, mobile phone incorporation is not prioritised at the moment. With the rolling out of vaccination programme, hopefully herd immunity can be achieved in near future. It is believed that once the situation of the pandemic is stable, the idea of incorporating mobile phones within the classroom can be revisited.

As suggested by the results obtained from this study, teachers do welcome professional developments (mean = 4.45, s.d. = 0.93) and the integration of mobile phones if time was given to implement this change (mean = 3.51, s.d. = 1.07). It was also ranked that time is the major factor when considering the implementation of mobile phones. As supported by Purcell *et al.* (2013), teachers might be more interested to venture into this idea if more time were given to them during working hours. Darling-Hammond, Hyler, and Gardner (2017) found out that an average teacher requires 40 hours spread across several months to learn, practice, experiment and master a new teaching technique, even with professional development. With the integration of mobile phones, which will include the use of applications to facilitate learning, teachers will also need to experiment these applications on their learners, and provide feedback to the developers to troubleshoot any problems faced during the lesson. Therefore, the integration of mobile phones has to be carefully planned, with sufficient time, planning and support given to teachers.

The results from the questionnaire also found that the majority of students own a personal device (mean = 4.49, s.d. = 0.89). The result aligned with the survey conducted by the Malaysian Communications and Multimedia Commission, MCMC (2020). This will definitely make the implementation of mobile phones easier since parents and students

will not need to purchase a new device, but rather to master the skills of utilizing their existing devices for education purposes.

Teachers strongly agreed that educating learners on healthy practices of using their mobile devices are more important than implementing banning policies (mean = 4.13, s.d. = 0.98). The opinion of teachers on this matter was consistent regardless of gender, level of academic qualification and number of years of experience. With mobile phones becoming increasingly common and accessible, schools and policy makers should aim to integrate programmes to increase the awareness of mobile phones usage among learners, since students are beginning to have an increasing level of awareness of how their phones can be used to aid their academic progress (Fakokunde, 2017). An interview-based research conducted with students in a Swedish secondary school also revealed that students recognized the benefits and shortcomings of having mobile phones in school, and agreed that banning policies were ineffective in shaping a conducive learning environment (Ott *et al.*, 2018).

5.2.1 Teachers' Opinion and Proficiency in Relation to the Integration of Mobile Phones Prior to ERT

This research question aimed to study the opinion and proficiency of teachers on mobile phone integration in classrooms before Emergency Remote Teaching (ERT). Prior to the pandemic, teachers agreed that mobile phones should be integrated within the classroom (mean = 3.66, s.d. = 1.00), and were aware about the benefits of mobile phones integration (Figure 8). In specific, teachers appreciated the ability of mobile phones in encouraging an active learning environment (86.4%), where learners can conduct

research and look for information regardless of time and location (Heathman, 2017). As discussed by Mellow (2005), students possessed a high level of technology literacy, and mobile phone integration could allow learner gain the appropriate tools to access knowledge limitless by time and location.

The study also revealed that the incorporation of mobile phones has heightened the interest of learners during class, with higher level of interactivity reported (mean = 3.38, s.d. = 0.95). Application like Flipgrid offers an equal opportunity for all students to share their opinion. These opportunities are often overlooked in the classroom, especially when the teacher to student ratio is high. Teachers could also offer personalized feedback to each learner, allowing the monitor of students' progress individually (Markett, 2006). Therefore, mobile phones can offer a chance for students to connect better with their teacher, peers and the subject knowledge (Bartlett, 2018).

The results also suggested that male teachers slightly disagreed (mean = 2.44, s.d. = 1.04) to the integration of mobile phones when compared to female teachers (mean = 3.74, s.d. = 0.96). The same opinion was also expressed by the Post-graduate Diploma teachers (mean = 2.40, s.d. = 1.34). On the other hand, teachers with a Doctorate's Degree (PhD) highly agreed (mean = 4.33, s.d. = 0.58) with the integration of mobile phone. One possible explanation could be that PhD holders have a higher awareness of the importance of conducting research, and are more likely to encourage learners to carry out active learning to gain knowledge of their interest (Utecht and Tullous, 2009).

According to the level of teaching experience, teachers with high level of experience (between 10 – 20 years) were most supportive in mobile phones integration (mean = 4.13,

s.d. = 0.82), compared to teachers of other years of experience. This could be related to their high level of proficiency in mobile phone integration (mean = 3.81, s.d. = 0.66). As suggested by the results, teachers with the more than 20 years of teaching experience had the highest proficiency of mobile phones integration compared to teachers of other experience (mean = 5.00, s.d. = 0.00). This came as a surprise as it was commonly thought that young teachers who grew up with technology would be more proficient in using technology within their classroom. One possible explanation could be that teachers with a more years of experience are highly familiar with their subject matter and are more proficient in guiding learners on building their knowledge and skills (Adeyemi, 2008), therefore they are able to utilize mobile phones to extend their existing classroom practices.

Teachers also expressed the disadvantages of mobile phones integration (Figure 9), mainly suggesting that mobile phones can act as a distraction tool (80.0%), and can cause students to use their phone for off-task activities during class. To overcome this issue, careful planning of the rules and regulations in using mobile phones in classrooms need to be carried out, setting clear boundaries on the usage of mobile phones. Students also agreed that a blanket banning policy on mobile phone was not efficient in overcoming the issues mentioned above (Ott *et al.*, 2018), but agreed that with the implementation of awareness programmes and practices, the usage of mobile phones in education could be balanced out.

Apart from acting as a distraction tool, teachers were also concerned about the increasing amount of cyberbullying cases in schools if mobile phones were allowed on campus (36.7%). However, it was found that cases of bullying in schools still exist regardless of

whether mobile phones were permitted on campus. This is because mobile phones are not the main cause of bullying, but rather is used as a tool for bullying to take place. Bullying still takes place in other forms in the absence of mobile phones (Przybylski and Bowes, 2017). Therefore, educators and schools need to look deeper into these issues and solve them at their root cause (Selwyn and Aagaard, 2021).

Some teachers were also afraid that data stored online can be leaked or exposed when the school faces a security breach. Similarly, students and teachers face the same amount of risk even in their daily life. It is recommended that schools should take measures to tighten the security of its networking and data storage system, and also educate staffs and students on healthy online practices to minimize the occurrence of such events (Keengwe, Schnellert, and Jonas, 2014).

5.2.2 Teachers' Opinion in Relation to the Efficiency of Teaching and Learning by Integrating Mobile Phones During ERT

The purpose of this research question was to find out the opinion of teachers on the efficiency of mobile phones in facilitating Emergency Remote Teaching (ERT) during the Movement Control Order (MCO) in Malaysia. Overall, teachers agreed that mobile phones have increased the efficiency of learning when classes were conducted virtually (mean = 3.38, s.d. = 0.95). When analysed based on gender, female teachers (mean = 3.56, s.d. = 0.99) agreed on a significantly higher level than male teachers (mean = 3.00, s.d. = 0.77).

In terms of academic qualification level, it was found that teachers with a Doctorate's Degree (PhD) rated the highest efficiency (mean = 4.00, s.d. = 0.00) on mobile phones integration in facilitating remote learning during the pandemic, followed by teachers with a Bachelor's Degree (mean = 3.44, s.d. = 1.20), Master's Degree (mean = 3.41, s.d. = 0.69) and a Post-graduate Diploma (mean = 2.60, s.d. = 1.14). When analysed according to the level of teaching experience, teachers with 10 to 20 years of experience (mean = 3.56, s.d. = 0.89) were the most interested in integrating mobile phones as a tool to facilitate classroom learning, similar to the opinion of teachers collected on this topic prior to ERT. It was interesting to note that teachers with more than twenty years showed the lowest support (mean = 3.00, s.d. = 0.71), despite having the highest proficiency of mobile phone integration (mean = 5.00, s.d. = 0.00). This could be due to the large amount of time and consideration required to revise the existing lesson plans to integrate mobile phones (Synder, 2017).

5.2.3 Teachers' Opinion in Relation to the Efficiency of Mobile Phones in Increasing the Interactivity During Teaching and Learning

This research question aimed to investigate the aspect of learning that had been enhanced and facilitated when mobile phones were integrated in the classroom environment (Figure 10). The study found that teachers appreciated that learners can be taught to utilize their phones for academic purposes (68.0%), especially as a research tool, which has proven to increase learners' academic performance (Lepp, Barkley and Karpinski, 2015). Majority of teachers also emphasised the cultivation of an active learning environment (62.3%), suggesting that teachers nowadays have an increased level of awareness and were keen on taking practical steps to push the classroom environment towards the

direction of active learning (Ott *et al.*, 2018). The same trend was observed regardless of gender, academic qualification level, and number of years of teaching experience.

5.2.4 Teachers' Opinion in Relation to the Integration of Mobile Phones After ERT

This research question intended to investigate the opinion of teachers in encouraging the integration of mobile phones in classrooms among students of secondary school post ERT. In general, teachers remained slightly interested in welcoming the integration of mobile phones (mean = 3.30, s.d. = 0.93). The difference between the opinion of male and female teachers was not statistically significant ($t(50) = -0.06, p = 0.95$).

However, there were split opinions based on teachers' academic qualification level, and the difference was significant as suggested by the one-way ANOVA test ($F(3,49) = 3.198, p = 0.031$). The results revealed by the Tukey's test suggested that teachers with a Doctorate's Degree (PhD) showed the highest level of interest towards this educational topic (mean = 4.33, s.d. = 0.58), similar to the trend observed pre-pandemic (mean = 4.33, s.d. = 0.58). The opinion of teachers holding a Doctorate's Degree (PhD) was statistically different with teachers holding a Post-graduate Diploma (mean = 2.40, s.d. = 1.34, $p = 0.020$), who disagreed with the integration of mobile phones in schools. It was also interesting to highlight that teachers with more than 20 years of teaching experience (mean = 4.00, s.d. = 0.00) were the most interested compared to teachers of other years of experience towards this educational topic post ERT, and is excited to embrace this reform when face to face classes resume.

5.3 Summary of Findings

While teachers have reportedly recognized the benefits of mobile phone integration during ERT, it came as a surprise that compared to teachers' opinion pre-pandemic (mean = 3.66, s.d. = 1.00), the interest of teachers to integrate mobile phones decreased significantly after ERT ($t(52) = 2.56, p = 0.01$). This significance in decrease was also observed in the opinion of female teachers ($t(33) = 2.52, p = 0.02$), teachers who hold a Master's Degree ($t(26) = 2.38, p = 0.03$), as well as teachers with less than 5 years of teaching experience ($t(14) = 2.81, p = 0.01$).

One possible explanation that has led to teachers' decrease in interest to incorporate mobile phones after the teaching experience during ERT is the lack of uniformity in education technology (Reich, 2021). While the transition from face to face classroom may be abrupt, the research on education technology has been conducted for the past few decades (Christensen, Johnson, and Horn, 2008). However, even with the extensive amount of research conducted and published, teachers found that education technology did not meet the expectations during the period of ERT. One major factor was the large amount of different applications and programmes that teachers have to learn and master. Teachers realized that the different functions of technology intended to integrate in their classroom are scattered across several applications, and often different applications have to be selected to accommodate for different subject groups and age of learners.

An interview conducted with teachers during ERT found out that the introduction of several applications and tutorials during ERT caused more confusion with the large amount of login details and use instructions (Reich *et al.*, 2020). While learning

management systems (LMS) (e.g. Moodle, Blackboard, Schoology, Google classroom) and video conferencing tools like Zoom and Skype facilitates instructional delivery and the accessibility of documents virtually, it functions as an extension of the teachers' current classroom practice, and does not support the level of interactivity that teachers can provide in face-to-face lessons, therefore is unable to replace existing classroom practices.

In this study, teachers with a Doctorate's Degree (PhD) generally showed great interest towards this educational topic. On the other hand, teachers with a Post-graduate Diploma were resistance towards this change. While little studies have been done to analyse the reason behind this observation, it was interesting to observe the difference in teachers' interest based on their level of academic qualification.

The results from the questionnaire also suggested that while teachers agreed with the integration of mobile phones, more effort need to be done to streamline the whole process, especially the unification of the various applications, as well as better planning for the integration of mobile phones to aid the transition period. Sufficient professional developments and time should also be given, where existing administrative duties and schedule needs to be adjusted to provide teachers with sufficient time to learn, practice, experiment those tools and communicate with the developers on ways to improve these digital tools for educational purposes. Therefore, adjustments need to be made so that teachers can integrate mobile phones when face to face classroom return, exposing learners to these tools during regular times, and not only during ERT.

In conclusion, banning policies are encouraged to be replaced with rules and regulations to educate students on the proper etiquette of online activity. As discussed above, banning policies on mobile phones will not eliminate the issues of cyberbullying, technology addiction and distraction entirely, as students are still using mobile phones, and are on social networking sites even outside of the campus. Mobile phones should not be disregarded merely as a harmful device in education, but rather proper evaluation should be conducted to analyse the benefits and disadvantages of mobile phones integration, and replace existing banning policies with guidelines of healthy mobile phones practices in schools and educational institutions. This will encourage a healthy learning environment that is interconnected with the vast development of technology that students grew up with, as well as establishing the moderation of mobile phones usage in facilitating their daily life and academic journey.

5.4 Significance of the Study

This study is significant, as similar studies has only been conducted globally, and mainly on the context of higher educational institutions. Focusing the study in Kuala Lumpur will provide insight on a local context and about the shift in teachers' perspectives towards mobile phones integration in the classroom. Focusing the study on secondary schools would also provide an insight of mobile phones integration in classrooms at a specific age group, where students are aged between 13-18.

The incorporation of mobile phones will cultivate learners to be more active in their learning. This will be useful especially in future events of ERT, where learners are already familiar with the tools required to conduct independent study, easing the

transition from face to face classroom into ERT. Students who were given the correct tool and have been utilizing them on a regular basis can master the skills to utilize their mobile phones for education purposes (Yates *et al.*, 2020), resulting in learners that are more confident and motivated to take charge of their own studies, exhibiting characteristic of an independent learner (Song *et al.*, 2013). Thus, making the transition from face to face to ERT easier in future events of emergency.

The findings of this research will also help teachers to understand better the problems faced by students in teaching and learning, especially under the constraints of ERT. Investigation on the obstacles faced by students could aid schools and policy makers to take targeted measures which will be able to improve the conditions of ERT more effectively. For example, professional developments can be designed to accommodate teachers with different level of proficiency in the integration of mobile phones.

ERT had also led to the delay and cancellation of examinations. Students' academic progress has been greatly affected as these external examinations are mostly used as an indicator of learners' ability, and dictate learners' admission to a higher level of education. Educators, teachers, and curriculum planners must also look into online assessment as a way moving forward, with the incorporation of mobile phones as an evaluation tool to assess students' performance.

Assessments conducted virtually also calls for issues related to accountability, for both teachers and students. Emphasis must be given to strengthen the practice of academic honesty among teachers and students, so that the standard and purpose of assessments

can be achieved, where students' true level of performance can be assessed, even under remote conditions.

The evidence collected from this study can form part of the evidence regarding the integration of mobile phones in education, and the need to review current rules and regulations regarding the use of mobile phones among secondary schools. It can also be used as a guide for other secondary schools in developing countries, which are facing similar obstacles and consideration in the implementation of mobile phones in schools.

5.5 Strengths and Limitations of Study

The study conducted was useful to identify the lessons derived from teachers' experience during the pandemic. The data collected was also analysed according to the gender, level of academic qualification and number of years of teaching experience. The results obtained by performing the analysis will be useful in the planning of future professional developments, where the incorporation of mobile phones in the classrooms can be personalized according to the background of teachers.

There were several limitations in this study. Firstly, teachers rated their own proficiency on the integration of mobile phones during ERT. In the absence of a criteria and rubric, the score obtained on the proficiency of teachers in mobile phones integration might not be an accurate representation of teachers' actual proficiency. The assessment of teachers' proficiency on mobile phones integrated could be conducted by an external party, and could be conducted through classroom observations, with a clear criteria and rubric to ensure that the rating given is fair and consistent.

The number of samples was also too small for this study to be generalized to the population. The data would be more valid if the sample size was larger. Moreover, when the opinion of teachers was analysed according to gender, level of academic qualification and number of years of teaching experience, the sample size for each stratum was unequal. The comparison would be more reliable and valid if the sample size was equal for each group.

The study was also conducted among secondary schools in Kuala Lumpur, the capital city of Malaysia and an urban area. The results of the study are therefore only applicable on the local context, and might not be valid to other region of the country, especially semi-urban and rural areas, with different level of accessibility of internet connection and mobile phones.

The participants of this study were a mixture of teachers in government schools, private schools and international schools. As private and international schools have more flexibility in the impose and regulations of mobile phones compared to government schools, the opinion of teachers were not analysed based on the types of educational institution attached. Understanding the types of education institution teachers belong to will help understand the difference in teachers' opinion, which will be useful for future measures to be planned and implemented.

As the study was conducted as a self-administered quantitative questionnaire, the data allows the report of teachers in Kuala Lumpur in general. However, the study lacks the ability to collect individual opinions and outlook from teachers. Interviews-based research would provide deeper insights on how teachers' background and experience

influenced their opinion towards the integration of mobile phones in the classroom, as well as practical suggestions on how the sector of education technology can further improved to accommodate students' need in learning.

5.6 Suggestions for Further Research

In the study, teachers strongly agreed that educating learners on healthy practices of using their mobile devices are more important than implementing banning policies. With mobile phones becoming increasingly common and accessible, schools and policy makers are encouraged to replace banning policies with clear rules and regulations on the mobile phones etiquette in schools. Awareness programmes should also be introduced so that students are made aware of the benefits of mobile phones in facilitating their studies, as well as the measures to avoid cases of cyberbullying, technology addiction, and issues of data breach.

Schools and policy makers should also discuss on the important elements that should be included in these awareness programmes. The opinion of subject expert, neuroscientists, schools, parents, teachers and students should be obtained and evaluated to design a programme that is evidence-based, and its effectiveness towards promoting a healthy relationship between learners and their usage of mobile phones.

Further studies should also be conducted to investigate the reasons behind teachers decrease in the interest to incorporate mobile phones after ERT. Understanding these reasons can help schools and policy makers to make decisions that are in the best interest

of teachers and learners, after careful consideration and feedback from teachers and students.

Similar studies should also be conducted to obtain the opinion from various stakeholders. The opinion of parents, students, administrators should be collected to provide a well-rounded perspective towards this educational topic. The study could also be conducted to investigate the differences between schools located in urban areas and in rural areas, as the accessibility to mobile phones and internet access will be different. It is also useful to collect the opinions of stakeholders from different types of schools, so that future steps can be taken towards the targeted group of students.

5.7 Conclusion

The chapter discussed the conclusion of this study. The summary of this study, and the findings from the questionnaire were interpreted and evaluated. The significance of this research was also provided and discussed. The strengths and limitations of this study was examined, and recommendations were made to overcome the limitations, as well as ideas for further research.

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Appendices

Appendix 1

Sample of survey questionnaire

The Change in Perspective and Approaches of Teachers toward Mobile Phones Integration in Classrooms Among Secondary Schools Before and After Emergency Remote Teaching (ERT)

Dear Sir/Madam,

Good day. My name is Felicia Chen Xin En, a postgraduate students currently completing my Master of Education from Veritas University College, Malaysia. I am currently doing a study entitled, "The Change in Perspective and Approaches of Teachers toward Mobile Phones Integration in Classrooms Among Secondary Schools Before and After Emergency Remote Teaching (ERT)".

Countries that are facing the COVID-19 outbreak implemented lockdowns to restrict human interaction as an effort to contain the spreading of the virus. The unpredicted circumstances have left no time for various sectors to be prepared. The education sector was not left out too, where schools were to immediately shift from face-to-face classroom teaching to Emergency Remote Teaching (ERT). Contrary to online teaching, ERT refers to the situation where pedagogies planned for face-to-face classroom environment had to be conducted online due to the unforeseen circumstances.

The purpose of this study is to understand the attitude of teachers toward integrating mobile phones in classrooms among secondary schools, in order to increase online readiness among students. The results of the study will be valuable for policy makers and researchers in understanding teachers' perspectives in order the increase the level of online readiness among teachers and students, in preparation of future events where ERT is required.

You are invited to participate in this study based on the study criteria. This is a short questionnaire which will take about 30 minutes to complete. It consists of four (4) sections and participants are required to answer ALL sections.

Appendix 1

Continued

Any information you provide will be entirely anonymous within the reporting and analysis, and will be held securely. By taking part in this questionnaire, you are granting the use of your anonymised data for research purposes. Your anonymised data will be used in completing this research paper. Completion of the question below indicates that you have read and understood the above information, and consent to participate in this questionnaire. Participants remain the right to withdraw at any time of the study.

Should you have any inquiries, please do not hesitate to contact:

Name: Felicia Chen Xin En

Email: 13553@vucstudent.edu.my

Thank you for your valuable time and opinion in making this research paper a success.

Consent

____ Yes, I consent to Veritas University College to collect and process my data

____ No, I do not consent to Veritas University College to collect and process my data

A: Socio-Demographic Factors

1. Age ____

2. Gender ____ a. Female ____ b. Male ____ c. Prefer not to say

3. Academic Qualification Level

____ Secondary education

____ Diploma

____ Bachelor's Degree

____ Post-graduate diploma

____ Master's Degree

____ Doctorate's Degree (PhD)

4. Year(s) of experience teaching in secondary schools

____ Less than five(5) years

____ Five(5) to ten(10) years

____ Ten(10) to twenty(20) years

____ More than twenty(20) years

Appendix 1

Continued

B: The Perception of Teachers towards Mobile Phones Prior to ERT

This section aimed to obtain the perceptions of teachers in mobile phones integration prior to ERT, as well as the reasons behind their stand. Participants are encouraged to recall their attitude towards this educational topic during face to face classes prior to the pandemic.

5. Does your current educational institution allow students to bring their mobile phones to school?
☐ Yes
☐ No
6. To what extent does students within your classroom own personal devices?
☐ 1 None of them own personal devices
☐ 2
☐ 3
☐ 4
☐ 5 All of them own personal devices
7. Prior to the Covid-19 pandemic, how do you feel about integrating mobile phones in classroom teaching and learning?
☐ 1 Strongly disagree
☐ 2
☐ 3
☐ 4
☐ 5 Strongly agree
8. If you agree, what are your reasons? Please select all applicable options.
☐ Increased efficiency of classroom management
☐ Increased opportunities to conduct online research
☐ Increased opportunities for an active learning environment
☐ Increased level of interest and interactivity
☐ Increased effectivity of learning (e.g. academic grades improved)
☐ Others

Appendix 1

Continued

9. If you disagree, what are your reasons? Please select all applicable options.

- ☐ Devices are a distraction in the classroom
- ☐ Inefficient learning
- ☐ Addiction towards devices
- ☐ Security reasons
- ☐ Cyberbullying
- ☐ Lack of training and resources provided
- ☐ Lack of time to prepare and revise lesson plans
- ☐ Others

10. To what extent does mobile phones increase learning efficiency within the classroom?

- ☐ 1 Very ineffective
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very effective

11. To what extent does mobile phones help in classroom management? (e.g. assignments, communication, attendance)

- ☐ 1 Not useful at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very useful

12. To what extent are you as a teacher proficient in incorporating mobile phones / technology within the classroom?

- ☐ 1 Not proficient at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very proficient

Appendix 1

Continued

13. How do you feel about the resources (e.g. hardwares and softwares) provided to aid mobile phones integration within the classroom?

- ☐ 1 Not sufficient
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very sufficient

14. To what extent is time the major factor when deciding to incorporate mobile phones in classroom?

- ☐ 1 Not important at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very important

15. To what extent is internet stability the major factor when deciding to incorporate mobile phones in classroom?

- ☐ 1 Not important at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very important

16. To what extent will you as a teacher welcome professional development on technology integration within the classroom?

- ☐ 1 Not interested at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very interested

Appendix 1

Continued

C: The Perception of Teachers towards Mobile Phones During ERT

This section aimed to obtain the perceptions of teachers in mobile phones integration during ERT, as well as the reasons behind their stand. Participants are encouraged to recall their attitude towards this educational topic throughout the period of conducting online lessons when schools are closed due to the Movement Control Order (MCO).

17. During the Movement Control Order (MCO), schools were closed and classes were conducted online. To what extent were the lessons conducted online efficient?

- ☐ 1 Not efficient at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very efficient

18. To what extent were students motivated during ERT?

- ☐ 1 Not motivated
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very motivated

19. Did you as a teacher discovered new tools online that have increased the efficiency and interactivity of lessons?

- ☐ Yes
- ☐ No
- ☐ Others

20. Were you provided with teaching resources by your attached educational institution? (Hardware and software)

- ☐ Yes, all of it
- ☐ Yes, but just partially (e.g. hardware provided but not software)
- ☐ Not provided

Appendix 1

Continued

21. Were you provided with guidelines and professional developments of utilising online tools in lessons?
- ____ Yes, clear guidelines, instructions and SOPs were provided
- ____ Yes, but it was a combination effort of teachers and management
- ____ No, teachers figured out how to use online tools as an individual effort
22. To what extent are you as a teacher proficient in integrating mobile phones in online lessons?
- ____ 1 Not proficient at all
- ____ 2
- ____ 3
- ____ 4
- ____ 5 Very proficient
23. Throughout the period of ERT, were mobile phones integrated in your lessons?
- ____ Yes
- ____ No
24. If yes, how frequent were mobile phones integrated in lessons?
- ____ Once every two weeks
- ____ Once a week
- ____ More than once a week
- ____ Every lesson
- ____ Not applicable
- ____ Other
25. What were the most used function of mobile phones in your lesson? Please select all applicable options.
- ____ Class announcements
- ____ Class attendance
- ____ Interactive lessons (e.g. Nearpod)
- ____ Interactive Quizzes (e.g. Quizziz, Quizlet)
- ____ Online Research (including looking for academic references, terms and concepts)
- ____ Flip classroom (e.g. Flipgrid)
- ____ Revision resources (e.g. Seneca Learning, Khan Academy)
- ____ Visual aids (e.g. videos, animations, virtual labs)
- ____ Not applicable

Appendix 1

Continued

26. To what extent did integrating mobile phones increased the learning efficiency during the lesson?
- ____ 1 Very inefficient
____ 2
____ 3
____ 4
____ 5 Very efficient
27. To what extent did integrating mobile phones increased the interactivity between teacher and learners?
- ____ 1 Very inefficient
____ 2
____ 3
____ 4
____ 5 Very efficient
28. To what extent were learners proficient in using mobile phones to participate in the lesson?
- ____ 1 Not proficient at all
____ 2
____ 3
____ 4
____ 5 Very proficient
29. Please rate students' level of online readiness. (Online readiness = readiness for stepping into the online learning environment)
- ____ 1 Not ready at all
____ 2
____ 3
____ 4
____ 5 Very ready
30. To what extent were learners taking self-initiative in utilising their mobile phones as an educational tool? (e.g. revision tool, research tool)
- ____ None. Students were relying on teachers for contents
____ Some students took initiative in utilizing mobile phones for studies
____ Most students took initiative in utilizing mobile phones for studies
____ All students took initiative in utilizing mobile phones for their studies

Appendix 1

Continued

31. If mobile phones were not integrated in lessons, what other technology was used by learners? Please select all applicable options.

- ☐ Desktop
- ☐ Laptop
- ☐ Tablet
- ☐ Other

32. Please rate teacher's level of online readiness. (Online readiness = readiness for stepping into the online learning environment)

- ☐ 1 Not ready at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very ready

D: The Perception of Teachers towards Mobile Phones After ERT

This section aimed to obtain the perceptions of teachers in mobile phones integration when face to face classes resume after ERT, as well as the reasons behind their stand. Participants are encouraged to recall their attitude towards this educational topic when schools are allowed to reopen for lessons.

33. In the future, when face to face classes resume, to what extent would you be interested in integrating mobile phones in your lesson?

- ☐ 1 Not interested at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very interested

34. In the future, when face to face classes resume, to what extent would integrating mobile phones in face to face lessons help prepare students better for future events of Emergency Remote Teaching (ERT)?

- ☐ 1 Not useful at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very useful

Appendix 1

Continued

35. What are the benefits of integrating mobile phones that you would like to incorporate in face to face classes too? Please select all applicable options.

- ☐ Active learning classroom environments
- ☐ Efficiency of documentation and classroom management
- ☐ Engaging and interactive methods of formative assessments
- ☐ Personalized learning that suits learners of all abilities
- ☐ Others

36. Which aspects can mobile phone integration help to overcome the current classroom environment? Please select all applicable options.

- ☐ Encourage active learning environment
- ☐ Encourage learners to connect classroom concepts with real world examples
- ☐ Encourage learners to utilising mobile phones as an educational tool
- ☐ Encourage learners to adapt better in future events of ERT
- ☐ Decrease redundancy of administration records
- ☐ Other

E: Overall Perception of Teachers in Integrating Mobile Phones in Classrooms

This section aimed to obtain the perceptions of teachers in mobile phones integration. Most secondary schools currently have a banning policy of mobile phones, and is commonly known as a distraction tool in the classroom. Participants are encouraged to recall their attitude towards this educational topic to help improve future classroom environment.

37. To what extent do you think that it is important for schools to consider integrating mobile phones in face to face lessons?

- ☐ 1 Not important at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very important

Appendix 1

Continued

38. To what extent do you think that it is important for schools to revise and reconsider banning policies on mobile phones?

- ☐ 1 Not important at all
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very important

39. Banning policies were introduced to overcome issues of cyberbullying. To what extent do you think banning policies on mobile phones in school is efficient in overcoming issues of cyberbullying?

- ☐ 1 Very inefficient
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 Very important

40. What are the areas that should be taken into consideration if schools were to incorporate mobile phones in classroom? Please select all applicable options.

- ☐ Provide sufficient time for transition
- ☐ Provide sufficient professional developments for teachers
- ☐ Provide support for troubleshooting and technical issues
- ☐ Restriction of social media
- ☐ Clear boundaries of what is allowed and not allowed when mobile phones are integrated in the classroom
- ☐ Sufficient plug points and electricity supply
- ☐ Provide teachers and learners with all resources required
- ☐ Balance between on screen and off screen time
- ☐ Strong and secure internet connection
- ☐ Other