The Education University of Hong Kong

Honours Project

Project Title:

‘’How do General Studies teachers cope with the change of teaching mode under COVID-19?”

Submitted by

Yau Ka Yee

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Declaration

I, Yau Ka Yee, declare that this research report represents my work under the supervision of Dr. TOMMY Cheung and that has not been submitted previously for examination to any Tertiary Institution.

Yau Ka Yee

23rd April,2023

Abstract

The effectiveness of online teaching has been a heated topic in recent years. During the COVID-19 pandemic, most schools in Hong Kong adopted online teaching mode and teachers were forced to teach in online mode. There are also some studies that mentioned the negative effects of having online lessons during COVID-19 like limited class interactions, online resources, and an unfavorable learning environment at home. However, no research has been done locally to examine how teachers cope with the transformation of teaching mode in General Studies under the pandemic. This research study aims at investigating challenges that General Studies teachers faced and how they adapt to the sudden change of teaching mode under the pandemic, particularly in the field of General Studies curriculum. Hence, it is vital to find out the challenges that General Studies teachers face in delivering online classes which involve preparation for online teaching, teaching challenges during lessons and the assessment of student's performance in classes. Qualitative approach research has been implemented, in which 6 local in-service teachers with more than four years of teaching experience in General Studies or STEM Education were interviewed individually to find out the challenges faced with the transformation of the teaching mode. With more teaching experiences in pre-pandemic and post-pandemic, questions related to coping strategies were asked to gather valuable information on how to improve students' learning performance. Although there are different research presenting the disadvantages of having online courses, it is still crucial to investigate any changes of views from teachers after COVID-19. The interviewees also provide their insight on whether General Studies teachers see online learning as a useful tool in the post- COVID-19 era. Their viewpoints and experiences would be used as the authentic source of knowledge in this study. The findings provide valuable insights for educators in Hong Kong, particularly for those who teach General Studies and STEM on how to use different approaches in mixed modes of teaching to boost students' learning motivation.

Keywords: General Studies, STEM education, Online learning, mixed mode of teaching, COVID-19 pandemic

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1. introduction & Research backgrounds

1.1: Introduction

1.1.1 Transformation to Online- mode of learning

Throwing back to late 2019, the COVID-19 pandemic has spread around the world, influencing almost all places and countries. With the emergence of COVID-19 pandemic, schools are forced to be closed in many countries to control the transmissions. More than one billion students are affected worldwide, according to the United Nations Educational Scientific and Cultural Organization (2020). Information technology is utilized to continue education online as schools are forced to change from face-to-face lessons to online schooling. Lau et al. (2021) suggested that online education under COVID-19 aims to allow students to learn continuously at home during the periods of lockdown. It is hoped that children's formal learning would not be completely sacrificed by the pandemic.

In 2020, mixed-mode teaching was started to adopt and the teaching experience in my first block practice ignited me to think of the research topic. At first glance, I found that there are both advantages and disadvantages of the changing mode of teaching and it depends on various factors such as students' background, students' personalities, and teaching skills, to name but a few. There are also some research that mentioned the detrimental effects of online schooling under COVID-19 like limited social interactions, learning resources, and unfavorable learning conditions (Walters et al, 2020; Wahyono et al ,2020 ; Dong et al, 2020).

1.1.2 General Studies and STEM Education in Hong Kong

General Studies (GS) is one of the major subjects in Primary Schools. It involves three key learning areas, including Science Education, Technology Education and Personal, Social and Humanities Education (PSHE). Student-centered, self-directed learning and whole-person development are expected to promote among students under the General Studies curriculum (Curriculum Development Council, 2017). Science, Technology, Engineering, and Mathematics (STEM) education has been

promoted in Hong Kong education, according to the Education Bureau (2016). STEM extends to General Studies in Hong Kong and put great emphasis on the importance of interactions and hands-on activities, especially in civic education and science learning. Bybee (2010) provided STEM education aims at teaching students in handling daily issues. Meanwhile, the Curriculum Development Council (2017) updated the Curriculum for Primary General Studies with a similar objective of "arousing students' interest in topics related to science, technology and society".

It is concerned that students are not provided with classroom activities with the school closure, which could trigger dilemmas of losing significant elements in learning General Studies, including self-directed learning and whole-person development. Hence, teachers' views on their coping strategies on how to improve lessons are of utmost importance. Although there is different research presenting the drawbacks of adopting the online mode of teaching, it is still vital to investigate any changes of views from educators after the COVID-19 pandemic. Since teachers and students have adopted online teaching for over three years, it is hypothesized that they are adapting to the online mode of teaching. Therefore, I would like to investigate whether General Studies teachers see online schooling as an effective tool in the post-COVID-19 era.

1.2 Problem Statements and Hypothesis

This research focuses on what are GS teachers' coping strategies when teaching is switched online; and the challenges the stakeholders faced with their responsiveness. Most importantly, it is hoped to find out how GS online learning is limiting the pedagogical options and investigate the viewpoints towards online teaching in the post-COVID-19 era.

During the COVID-19 pandemic, the transformation to online courses brings some doubts and concerns about students' learning effectiveness. Under the school closure, teachers are forced to deliver online lessons, and digital devices have become important tools in learning. Hence, teachers act important roles to think of how to deliver online lessons in an effective way. However, there is no research has been done locally to

examine the challenges faced by in-service teachers in virtual classes with their coping strategies, particularly focusing on teachers who have taught General Studies. Thus, coping strategies are important to improve the effectiveness of online learning during the pandemic. Although schools in Hong Kong have started to change back to face-to-face lessons in recent months, it is expected to have an investigation into whether General Studies teachers see online learning as a useful tool in the post- COVID-19 era.

1.3 Research Questions

1. What are the challenges, concerns, and coping strategies for delivering online classes?
2. Do teachers find the digital divide an issue when they adopt online teaching?
3. What are the opportunities and challenges in delivering the General Studies curriculum online during the pandemic?
4. Do General Studies teachers see online learning will be a useful tool in the post-COVID-19 era?

2. Literature Review

2.1 Online learning under the COVID-19

In late 2019, the COVID-19 pandemic has spread worldwide, in almost all islands and countries. With the emergence of the COVID-19 pandemic, schools are completely closed globally due to COVID-19 lockdowns. More than one billion students are affected worldwide, according to the United Nations Educational Scientific and Cultural Organization (2020). Information technology is utilized to continue education online and minimize the negative effects on students' learning. Hong Kong is also not exempted from it. According to the Education Bureau (2020), schools are forced to change from face-to-face lessons to virtual lectures. Online education during the pandemic aims to let children learn at home during the periods of school closure, suggested by Lau et al. (2021). It is hoped that children's growth and development would not be negatively affected by the occurrence of COVID-19.

However, the transformation to online learning has encountered various knotty issues, including the availability of human resources, digital devices, and procedures which are

provided by Wahyono et al. (2020). Walters et al. (2020) suggested that students' learning experiences are negatively influenced due to sudden changes of learning mode. Their concentration, engagement, and abilities to learn were vitally lower in virtual lessons, compared with traditional learning. Worse still, students with specific learning difficulties even have a greater challenge in adapting to the online mode of teaching.

2.2 Educational Needs of primary students

Online schooling has been under a hot debate in recent decades. Many people have an assumption that online education is not as perfect as traditional schooling. Dong et al. (2020) provided that most Chinese parents are with negative thoughts toward online learning in the research. They suggest that students need a healthy learning atmosphere with social interactions and communication. However, the COVID-19 pandemic has caused a rapid shift to online learning. Primary students need more learning support to draw their attention during online schooling.

2.2.1 Importance of hands-on experience

The significance of hands-on experience has been positively appraised and promoted by several researchers. Furthermore, the research (Stohr-Hunt, 1996) revealed that there is a positive correlation between the frequency of hands- on experience and academic performance in standardized tests of science-related subjects which involve both cognitive domains and the master of science skills (Yunita, 2021). Reasoning and theoretical knowledge can also be consolidated with more hands-one experiences (Schwichow et al.,2016). Ornstein (2006) proposed that students could have greater motivation with an increasing chance of hands-on experience in lessons, which helps cultivate a positive attitude towards learning. This shows the importance of hands- on experience in learning to students, especially in science-related subjects.

2.2.2 Importance of learning interactions and Motivation

Zhou et al. (2019) state that parents', teachers', and peers' support have a great influence

on students' overall satisfaction. With more interactions among peers and teachers, students' motivation is enhanced with higher satisfaction which helps cultivate learning enthusiasm (Yunita, 2021). Palmer (2007) suggested that student motivation is an essential element of quality education. This suggests that students' motivation is an important educational element for students' learning. Nevertheless, classroom learning is hindered and the opportunity of having face-to-face interactions with teachers and peers is lost. As a result, they may have lower motivation in learning (Yeager et al, 2013) and have greater stress (Dumitrache et al, 2021) as they lack a sense of belonging.

Students' workload has also increased due to the transition of teaching mode (Pavin Ivanec, 2022) as students have difficulties concentrating in virtual classroom for learning (Giusti et al, 2021). A rather lonely learning experience that brings various challenges in students' learning processes threatens their learning as distance education limits class interactions (Elmer et al, 2020). This implies the importance of face-to-face interactions between teachers and students in education.

2.3 Challenges of online learning

2.3.1 Digital Divide

Digital Devices and online availability are important during school closure. Lack of access to high-speed Internet and technological devices would cause interruptions in students' online learning. According to the Organization for Economic Co-operation and Development (2001), the digital divide refers to the divide between people, families, enterprises, and geographical regions at different socioeconomic levels, in terms of their access to information and communication technology resources. There are three levels of the digital divide which include access to the internet and computer, the skills and usage of technologies and concerns with the impacts on access of technology respectively (Van de Werfhorst et al., 2020).

2.3.2 Digital Divide in Hong Kong during the COVID-19 Pandemic

According to Reichert et al. (2020), more than 60% of students in Hong Kong have

digital devices such as desktop computers and tablets at home which allow them to attend online lessons. Nonetheless, most of them have only one tool and need to share it with other family members at the same time. Only nearly 50 % of students can access it without sharing on at least one device. In addition, nearly one-tenth of students do not have large-display digital devices such as desktops and computers. This brings inconvenience and even challenges to attend online classes at home during school closure under the pandemic. Although some students can attend lessons online with smartphones, they have difficulties with some work such as reading a long passage. Although some students have good devices, they still lacked access to the learning materials necessary to facilitate STEM instruction (Santanu, 2020).

2.3.3 Problem Caused by Digital Divide in Education

In the research published by Van de Werfhorst et al. (2020), it mentioned that the digital divide in education has led to inequality in learning owing to the digital preparedness of students and schools. It also analyzed the relationship between students' socioeconomic background and their ICT skills, and concluded that students with better socioeconomic backgrounds would have better ICT skills in which support them to conduct online lessons. Digital preparedness of schools such as the availability of the internet and ICT competencies also influences students' learning. Van de Werfhorst et al.'s studies (2020) provided that between-school differences in school infrastructure and ICT competencies existed. Hence, students may be affected by uneven school infrastructure in different schools which leads to greater learning inequalities.

The above statement ''digital divide in education causes educational inequality'' is also supported by the Faculty of Education, University of Hong Kong (2020). As supported by their findings, the involvement in the e-learning experience could help students perform better in online learning. They provided evidence that students who attended in the Bring Your Device Program (BYOD) have more ICT skills and knowledge to attend the online classes smoothly during the suspension of face-to-face lessons. This suggests that the pre-existing digital divide among children and schools is enlarged by the COVID-19 pandemic. The pre-existing digital divide and the learning gaps among students would be

enlarged if there is no appropriate assistance. As a result, academic performance divides are provoked.

2.3.4 Poor Attention, Engagement and Motivation in virtual lessons

Virtual lessons profoundly have great impacts on students' learning effectiveness, as hands- on experience is greatly reduced. Yunita (2021) claims that students felt bored in virtual lessons, especially those science- related subjects, which results in lower motivation to learn. Hands-on experience is the most important elements in science-related subjects (Schwichow et al., 2016) as it helps students consolidate their scientific knowledge and theory. Nonetheless, they could not conduct experiments with their teachers and peers. They could only watch videos created by their teachers. As a result, lower students engagement was found in online lessons (Putri et al, 2020) due to the absence of hands-on experience and the opportunities in learning to apply in daily life. These research findings show lower students' learning motivation and engagement are greatly caused by reduced interactions between students and teachers, which further poses a negative effect on their learning performance.

In addition, students with special education needs (SEN) even have greater learning challenges during the school suspension. Putri et al. (2020) provided that a shorter attention span during the virtual lesson is found in most SEN students and lower their learning efficiency and effectiveness. Teachers need to use some teaching time to grasp students' attention in virtual lessons which result in a shortening of the exact teaching time. However, there are still some positive outcomes of delivering lessons online supported by some research. Hodges et al. (2020)'s research claims there are some advantages of using online learning tools in typical circumstances, which promotes student-centered and experiential learning.

Students' attention in learning is also affected by their learning environment. Students' attention is easily drawn by the activities of students' family members and noises at home (Aliyyah et al, 2020). Hence, their attention time span becomes shorter as they are less

likely to be focused on virtual lectures. Other students may also be disrupted and become less concentrated during virtual class.

2.3.5 Technical Assistance for Students

During school suspension, the digital divide has become one of the greatest challenges for low-income families. The inaccessible and unstable internet cause difficulties in learning as they may not be able to attend the lessons and finish their assignments online successfully. Worse still, some children may not have digital devices to attend classes.

In response to the situation, some subsidies and support offered by schools and charities helps minimize the digital divide in education. Ng et al (2020) suggested that the provision of learning devices and network accessibility enable students from lower classes to conduct online lessons. For instance, the 'e-Devices Support for eLearning at Home Scheme' launched by Hong Kong Jockey Club Charities Trust helps disadvantaged students to continue their studies at home. This project helps to alleviate the first level of the digital divide of low-income families.

However, the amplified effect of online learning brought about by school closure could not be fully solved by providing digital devices. With devices in hand, some students may not know how to use them. Thus, it is necessary to enhance students' digital competence performance by offering additional classes. Although IT support is provided by some schools, it still needs time to improve students' digital literacy skills, especially those with lower socio-economic status as they seldom use those devices. Ng et al. (2020) claim that students with special educational needs and disabilities have lots of limitations on e-learning owing to the serious digital divide. This indicates that the existing digital divide in learning could not be easily tackled with the provision of digital resources.

2.4 Support for teachers in delivering online lessons during the pandemic

2.4.1 Technological Pedagogical Training for Teachers

Due to the serious pandemic, face-to-face lessons are suspended, and online mode of teaching is applied to ensure the continuity of education. To ensure the quality of distance learning with updated and suitable pedagogical designs, teachers are forced to learn new learning devices and different platforms at speed. In Nambiar (2020)'s recent research about teachers' perspectives on online learning during COVID-19, more than 35% of teachers reported lower students involvement and engagement in virtual lessons. Connectivity issues, poor attendance, and difficulties assessing if the students understood the learning materials are great concerns among teachers.

With mentioned concerns, some online training about how to use digital technologies in education efficiently are provided to schoolteachers. In Moorhouse and Wong's research (2022), some teachers claim that it is worthwhile to attend workshops about the production of teaching videos with demonstrations provided by their school. Teachers without proficient technological knowledge may have different troubles in holding virtual lessons. With some workshops, teachers could learn differing online teaching strategies to provide synchronous online lessons, including how to create a ''breakout room'' for students to form in-class discussions. This shows the significance of professional development activities in assisting teachers in unfavorable conditions.

2.4.2 Supports in Delivering STEM education online

A STEM education center has been established by the Education Bureau (EDB), holding some seminars and workshops in professional development towards STEM such as the workshop on Human Pose Estimation using Machine Learning Technology and Introduction to CNC Milling Machine and Subtractive Rapid Prototyping. For students, there are some STEM-related activities and competitions to enhance their creativity and

consolidate their knowledge. Nevertheless, face-to-face activities are hindered due to the COVID-19 pandemics.

With school closure, STEM education also needed to shift to an online mode. Teachers had to think of how to conduct synchronous online lessons at the beginning of the school closure. The research (Trust and Whalen, 2020) revealed that greater than 60% of teachers felt overwhelmed as they lack knowledge in holding online lessons with online tools. In response to this, the EDB (2021) provides different courses to enhance teachers' understanding of conducting hands-on practical activities in online lessons towards STEM-related subjects such as 'Online Learning & Teaching Strategy Series: Experience Sharing on Designing Hands-on Practical Activities (New)" and" Online Learning & Teaching Strategies Series: (1) Micro-controller Basics and Hands-on Practical Activities (New) Organizing Division" . These activities also provide some strategies for teachers to cater to students with diverse learning needs. EDB promotes the need for developing professional collaborations between teachers and STEM professionals (Ali, 2021) which helps improve teaching quality towards STEM (Brand, 2020).

3. Research Questions:

3.1 What are the challenges, concerns, and coping strategies for delivering online classes?

During the COVID-19 pandemic, all schools were forced to close, and students were taught in an online mode of learning. As mentioned in 2.1, the transition of teaching mode is used to ensure students can learn under school closure. Nonetheless, both teachers and students take time to get used to the new learning mode. To be honest, there must be a big difference between the online mode of teaching and face-to-face lessons at first glance in terms of the teaching methods and learning environment. As a prospective General Studies teacher, I would like to investigate the challenges and concerns General Studies teachers faced during the pandemic. The coping strategies on what they had done to support learning are followed. Primary students do not have

a broad view to think of the effectiveness of virtual classes as they are small and immature. This research hopes to evaluate teachers' experiences and views toward online teaching during the pandemic.

Since face-to-face lessons are hindered, teachers can only observe students' performance through online platforms and their hand-in homework. Although students' academic performance also presents how they learn under the change of teaching mode, I would like to mainly focus on qualitative performance to compare how students perform in GS's face-to-face lessons and online lessons. This focuses on qualitative performance such as attention spans, interactions, and active participation to understand students' educational needs. Some research suggests there are several drawbacks of online learning such as poor students concentration and lower engagement. From the above literature review, in Dong et al.'s (2020) research, most Chinese parents held negative beliefs toward students' online education because of the lower concentration level. Therefore, interviews were conducted with schoolteachers who are more than 4 years of teaching experience in GS or STEM. It mainly focuses on the challenges of delivering online classes, such as arousing students' attention, and enhancing their understanding, interaction, and engagement. As a result, more information on how to provide suitable scaffolding to guide students can be collected.

Besides, the digital divide is also a knotty issue. Different ways are needed to explore to improve the situation and prevent further enlarging the learning gaps. As mentioned above, Van de Werfhorst et al. (2020) mentioned that a digital divide in education would cause educational inequality. Ng et al. (2020) claim that SEN students and disabilities have a serious digital divide. This shows various limitations in having online teaching. Werfhorst et al.'s studies (2020) stated that between-school differences in school infrastructure and competencies of using devices existed. The digital divide also poses a great influence on teachers' teaching qualities and thus it was covered in the research. Wahyono et al. (2020) suggested family members of students also play an important role to provide support in

students' online learning. This shows that teachers, caregivers, and students will also be easily interrupted in online teaching during the pandemic.

As mentioned above, students are easily distracted by the unfavorable learning environment. In Aliyyah et al. (2020)'s findings, the activities of family members may disrupt students' learning easily as students may be out of focus and resulting in limited knowledge gained. Students may not follow what teachers teach, leading to learning difficulties. Kyriacou (1997) said that learning difficulties are one of the causes of student misbehavior during lessons. This indicates that students may even behave badly in class easily and other students' learning may also be affected.

However, it is unreasonable to turn a blind eye to the challenges of virtual lessons i.e, students' engagement issues, the digital divide, to name but a few, as there may be some cases that needed online learning. Therefore, it is necessary to know how teachers cope with the challenges and get prepared for the changing mode. Teachers act as important roles to pinpoint the difficulties that students faced. For example, teachers may clearly realize the concentration problems or some disturbance during online classes. For instance, interviewees may suggest the problems of maintaining students' attention and concentration in virtual General Studies classes. It is important to know how teachers cope with the challenges i.e., what strategies are used during the class suspension. This can gather different coping strategies from various teachers and seek effective strategies to improve the current situation.

Although various research showed many drawbacks of online teaching, I would like to explore what are the learning differences among primary students in both teaching modes, i.e., face-to-face lessons and virtual lessons in General Studies. Teachers' own perspectives based on their observations and experience allow me to investigate the effectiveness of virtual lessons for primary students. More investigations can be made on teachers' online teaching to benefit students' learning.

3.2 Do teachers find the digital divide an issue when they adopt online teaching?

As mentioned in 2.3 of the literature review, the digital divide in education has led to inequality in education due to the digital unpreparedness of students or even the schools, suggested by Van de Werfhorst et al. (2020). It became obvious with the sudden change in the teaching mode. During school closure, digital devices become necessary to access to online learning. Without them, students are not able to get access to online lessons. Online accessibility and stability also affect students' learning. This suggests that digital preparedness is crucial in adopting online teaching in all parties, including both teachers and students.

Although the 'e-Devices Support for eLearning at Home Scheme' was launched to facilitate underprivileged students' e-learning at home, there are still some limitations in the application of digital devices. Therefore, I would like to investigate whether teachers find digital divide an issue while conducting online teaching. During the pandemic, they are forced to use digital devices to conduct online lessons. This means both teachers need to deal with all issues with students online. Therefore, teachers were interviewed to present whether the digital divide is an issue in the online mode of teaching, based on their observations in lessons and teaching experiences. With their viewpoints, coping strategies will be investigated on how to cope with the digital divide during the pandemic.

3.3 What are the opportunities and challenges in delivering General Studies curriculum online during the pandemic?

As mentioned in the introduction part, General Studies is a subject involving wider topics, including Science Education, Technology Education and Personal, Social and Humanities Education (PSHE). Some topics, particularly in science-related topics, place great value on hands-on activities to consolidate students' knowledge. In the literature review 2.2.1, Stohr-Hunt's research (1996) suggested that there is a

positive relationship between the frequency of hands-on experience and academic performance in standardized tests of science-related subjects. STEM education is usually included in General Studies in primary school, and many hands-on activities are involved. However, hands-on activities in lessons were reduced or even completely cancelled under the school closure. As what Elmer et al. (2020) provided, distance education limits academic interactions which threaten students' learning. Teachers can only introduce the activities online through their demonstration or videos of science experiments in virtual lessons.

Although there are several studies showed challenges in conducting online lessons in science-related topics, it is still important to examine what other challenges in delivering General Studies lessons online. On the other hand, the advantages of distance learning can also be investigated and how they take benefits of using online tools. As mentioned in literature review 2.3.4, the application of online tools in teaching helps promote student-centered and experiential learning. In literature review 2.4.2, it mentioned some support for teachers in holding STEM education online. It is important to investigate whether sufficient support is provided and how teachers think about the effectiveness. Therefore, several questions related to both opportunities and challenges in delivering online lessons would be asked during interviews with schoolteachers.

3.4 Do General Studies teachers see online learning will be a useful tool in the post-COVID-19 era?

After almost three years of online teaching, most teachers and students have started to get used to online learning. They may consider online learning as part of their daily learning. Since General Studies covered a lot of topics, including social and national education, science and technology, I found that there is a tight schedule for teaching General Studies in my previous block practices. Therefore, I would like to see whether online learning will be useful in supporting future GS lessons by incorporating mixed learning. It is assumed that mixed learning enables teachers to

teach in a more efficient way by providing pre-learning tasks or post-learning feedback via online platforms.

As a prospective teacher, I would like to explore whether GS teachers change their perceptions towards online teaching. At first glance, most teachers generally perceive negative attitudes toward online teaching. As mentioned above, most teachers in Moorhouse and Wong's research (2022) agreed that providing training courses and workshops about technological pedagogies is significant. This shows that most teachers found difficulties in teaching online during the pandemic. In literature 2.4.2, some assistance is given to teachers in delivering online lessons, particularly in STEM and science-related topics.

Besides, it is hypothesized that students' concentration and learning qualities of virtual lessons are questioned. There are three key learning areas in the curriculum of General Studies, including Science Education, Technology Education and Personal, Social and Humanities Education (PSHE). Student-centered, self-directed learning and whole-person development are suggested to promote among students under the General Studies curriculum. (Curriculum Development Council, 2017). This explains the importance of interaction and hands-on activities in teaching General Studies. As Dumitrache et al. (2021)'s and Elmer et al. (2020)'s mentioned above, face-to-face social interaction is hindered which causes stress to students easily. This shows that most people held negative beliefs towards online learning at the beginning of the change of learning mode as it limits students' interaction and thus their concentration, engagement and motivation are doubted.

However, online teaching or hybrid mode of teaching have been adopted for more than three years in Hong Kong. It is hypothesized that teachers and students have started to get used to the changing modes. Therefore, I would like to investigate whether teachers' perceptions has changed towards online teaching. This can also gather different viewpoints towards online teaching strategies to grasp students' attention and engagement, providing insights for pre-service teachers and primary

school teachers.

4. Methodology

4.1: Overview of Research Method in this Research Study

This study adopted qualitative approach research with a content analysis approach to explore how General Studies teachers adapt to changing modes of teaching during the COVID-19 pandemic and their perception toward online teaching as a contingency. According to what Marshall (1996) suggested, the choice between qualitative and quantitative research should not be based on the researcher's preference but should be determined by the research questions. Rosenthal (2016) suggested that a qualitative research approach provides a way to get in-depth information on the perspectives, attitudes, and motivations behind human behavior. Interview questions regarding the research questions will be designed to explore in-depth information related to General Studies teachers' viewpoints toward online teaching. Specifically, they were asked to share their views on the challenges of delivering virtual classes in COVID-19, with their coping strategies. Thus, the researcher used their viewpoints and experiences as the authentic source of knowledge in this study.

4.2: Qualitative Approach

A total of six in-service GS teachers who have more than four years of teaching experience in General Studies or STEM education were interviewed in the research. The major aim of carrying out interviews is to find out the challenges of delivering online lessons with coping strategies. The reason for finding teachers with more than four years of teaching experience in General Studies or STEM education is that they have more teaching experience pre-pandemic and post-pandemic. They can provide more sources of information based on their observation and teaching experience. Since this research focuses on how teachers cope with the change of teaching mode, it is important to know what opportunities and challenges that teachers face before

and after the pandemic. Therefore, teachers with more than four years of teaching experience are needed.

A set of interview questions (Appendix 1) was planned for six participants. Each participant was invited to participate in a nearly 30-mintues interview online or on phone individually. The interview questions consisted of 20 questions, with a series of sub-questions (i.e, Questions ‘’a’’ to ‘’d’’).

Patton (2002) provided in-depth interviews consisting of open-ended questions and follow-up probes to understand interviewees’ experiences, opinions, attitudes, and knowledge. Through interviewing schoolteachers with various open-ended questions and several interview questions based on the research questions, more information toward the comparison of students’ learning performance in traditional and virtual lessons is expected to be found. Applying semi-constructed interviews aims to help build closer relationships with interviewees to make it efficient. At the same time, open-ended questions give interviewees more autonomy in providing viewpoints based on their observations and real experience. The appropriate adjustments would be made to the questions according to the information provided by interviewees.

Semi-structured interviews were used in this research and primary sources of data were collected. Cantonese was used as the language medium for interviews. Questions, including the acquisition of knowledge, learning motivation, academic performance, perceptions and adaptation issues of students were asked in the interview. Through interviewing General Studies teachers, their responses and perspective help reach the mentioned research questions. Since there are some open-ended questions to present their observations and viewpoints, around a 30-minutes interview was held for each participant. This enables the interviewees to have sufficient time to think deeply and give their opinion based on their daily observations and educational experience. More valuable in-depth information is expected to be obtained.

Table 1: Brief background of the interviewees

	Gender	Teaching experience	Teaching subjects
Teacher A	M	7 years	Mathematics, General Studies and Computer Studies
Teacher B	F	5 years	Chinese, General Studies
Teacher C	F	18 years	Chinese, General Studies
Teacher D	M	6 years	Mathematics, General Studies and Computer Studies
Teacher E	F	8 years	English, General Studies
Teacher F	F	22 years	Chinese, General Studies

5. Research Findings and Discussion

Concerning the effectiveness of virtual General Studies on students' learning, teachers need to prepare and adapt to the new teaching mode quickly. During the Discussion, it is found that several challenges faced in implementing General Studies or STEM Education online are as follows: uncertain lesson preparation, limited guidance and resources, limited training and difficulties in managing students' undesirable behaviors. At the same time, most teachers mentioned the change of teaching role from facilitator to lecturer under the COVID-19 pandemic.

Overview of findings

Individual interviews were conducted with seven General Studies teachers who have taught for more than 4 years in primary school. The common viewpoints from the interviewees had been summarized based on the research questions.

5.1 Research Question 1

What are the challenges, concerns, and coping strategies upon the change of teaching mode?

In order to investigate the challenges General Studies teachers faced during the pandemic, I have asked teachers to think back to the preparation work and teaching

strategies before COVID-19. This helps compare the differences in the change of teaching mode. Most respondents in the interviews mentioned they would read the suggested teaching plans from school textbooks before designing the class activities.

However, most teachers find difficulties in the sudden change of the teaching mode during the COVID- 19. After summarization, three significant difficulties were found. All six respondents reported they have greater preparation work to make sure students can learn efficiently during virtual classes. This means they need to think of different teaching strategies to attract students' attention. However, some students have poor concentration with many distractions in the new learning environment. Besides, four respondents provided the difficulties in controlling the students' discipline online. This provokes another issue of the difficulty in providing a smooth lesson with more interactions and suitable assistance to students with learning difficulties.

5.1.1 Teachers' preparation work

Before the COVID-19 pandemic, teachers have different formats for their preparation work. Teacher D provided a detailed description of his preparation work before the pandemic. He said he would carefully read the lesson plans of the previous year individually, and then held a group meeting with other teachers to discuss whether they needed to add or subtract additional content. He also added that he put great emphasis on how to increase student interaction, such as through group discussions and scenario interaction, to increase student participation, hoping to inspire students to think about knowledge beyond textbooks[1].

Holding regular conferences is the habit of some teachers. Teacher E said she

[1] Teacher D: 「在疫情前，每班的常識科老師會先自己細閱上年的教案，再開小組會議，討論是否需加減內容。 備課重點集中放在如何增加學生互動環節，如小組討論、情景互動，提高學生的參與度，希望啟發學生思考課本以外的知識。」, see page X of appendix 5

would prepare lessons with other General Studies teachers to discuss the subject content, lesson plan design, and teaching activities in advance and evaluate whether students can achieve the suggested learning goals[2]. Teacher F has a similar practice, the lesson preparation is carried out with different teachers to determine the teaching sections required for each lesson, the learning goals and classroom activities of the lesson, the learning difficulties of the students, and finally decide how to arrange the homework[3].

On the other hand, teachers A, B and C have another format for their preparation work. They did the preparation by themselves. Teacher A said he would read reference books and suggested teaching plans provided by booksellers. Then, he would mark the key points of the content by summarizing the important messages of the coming lessons with considering students' learning abilities[4]. Teacher B said she would read all the teaching materials given by the booksellers before designing the lesson plans. If there are any difficulties, she will seek help from other teachers[5]. Teacher C has a similar practice, she would first summarize the key points of the content and the meeting would be held with colleagues if necessary[6].

As the above teachers mentioned, there are different ways in preparing for the lessons. Some teachers mainly did the preparation work individually while some would first attend group meetings with other teachers to discuss the teaching

[2] Teacher E: 「每單元都會同同級老師一起備課，事先討論將要授課的主題內容、教案設計、教學活動，評估學生是否能達到教師預設的學習目標。」, see page 80 of appendix 6

[3] Teacher F: 「通常先進行集體備課，全級的科任共同安排每課需用的教節、該課的學習重點、學生學習難點，以及安排甚麼課堂活動，最後決定如何佈置課業」, see page 84 of appendix 7

[4] Teacher A : 「在上課前，看參考書、教學計劃和書商所提供的建議方法，當中的備課重點是將應因學生的能力，歸納各方法，去設計課堂，將教學重點分折為各個小目標，並準備所需的教具。」, see page 65 of appendix 2

[5] Teacher B :「在上課前，看參考書、教學計劃和書商所提供的建議方法; 若遇到難題，便會向其 他同事請教。」, see page 69 of appendix 3

[6] Teacher C :「歸納課文的教學重點，有需要時會開小組會議。」, see page 72 of appendix 4

strategies and ideal progress. In the previous two block practices, there are different formats of preparation work. In the first practice, teachers did the preparation alone and they may hold a meeting if there are any special concerns toward the teaching strategies. For the second practice, I had to join the meetings with teachers of other classes to think of the best teaching strategies and some special arrangements for the lessons. This shows that preparation work is one of the important duties for teachers. Communication and cooperation among teachers are significant to improve teaching quality. Hurst and Reding (2000) claimed that developing good relationships is a part of the teachers' profession. Teachers can help each other through collaboration. Therefore, teachers need to work as a team at school to provide students with effective lessons.

However, most practices of teachers in their preparation work had changed due to the school closure under the COVID-19 pandemic. Teachers need to react promptly to help students cope with the challenges in virtual lessons. Since the teaching materials provided by the booksellers are for face-to-face lessons, they are not applicable to virtual lessons. This means that teachers need to design the teaching plan again without any references. Most teachers admitted that it adds a huge burden to them and have greater stress in teaching online.

Teacher B mentioned she needs to spend much more time on how to produce interactive teaching in virtual lessons. Since all the teaching materials made are for classroom activities, she needs to think of ways to apply them in ZOOM lessons. All the assignments are needed to adjust for students as online homework[7]. This is also explained by teacher D as he also thinks that previous learning materials and strategies became no longer suitable for online lessons[8].

[7] Teacher B :「備課時的重點放於如何利用電子軟件作互動教學，讓學生於利用 zoom 上課時，亦能進行課堂活動。另外，大家亦要思考把本來的實體功課化成甚麼網上功課更為合適。」, see page 69 of appendix 3

[8] Teacher D: 「疫情期間的網課備課工作比較多，原本的教學進程變得不再適用，預備時間較長。」,

Teacher A also indicated more time is needed to think of new ideas, search for information on the Internet, and design new teaching materials[9]. This is also mentioned in teacher C who agrees more time is spent making new PowerPoints and teaching videos as more new teaching techniques are needed to assist students learning[10]. Besides, teacher E said that all teachers in her school need to do the preparation work alone under the school closure. This results in longer preparation time with greater concerns towards students' learning abilities and adaptations[11].

In short, most teachers require more time in preparing for the online lessons due the school closure during the COVID-19. The previous teaching material became no longer applicable in online classes as some face-to-face activities are hindered. As the pandemic appeared suddenly, teachers needed to respond as fast as possible to help students adapt to the new teaching mode during the school closure. This means that teachers need to adjust or even redesign the teaching plans quickly to suit students' needs in online learning. However, teachers were not able to hold a meeting with their colleagues to discuss the teaching arrangements at school. They needed to discuss through online communication platforms or did the work individually. This adds a burden to them and requires more time in preparing for the lessons online. This shows that preparation work is one of the big challenges for teachers in creating a new learning environment with the consideration of students' learning needs.

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see page 76 of appendix 5

[9] Teacher A:「平日行政工作較為忙碌，需花多時間想新的點子，上網找尋資料，去設計新的教材。」, see page 66 of appendix 2

[10] Teacher C:「在疫情期間，需用更多時間準備教學簡報、影片及網上功課，想新的教學元素輔助學生建立知識。」, see page 72 of appendix 4

[11] Teacher E:「剛開始時，備課工作只能獨自進行，所有課堂活動和教學設計都是自己完成，備課工作亦因憂慮學生未及時適應而加重負擔，需從多方面思考如何增加學生在網課的投入程度。」, see page 80 of appendix 6

5.1.2 Teaching Strategies

Most teachers highlighted the focus on designing different class activities to arouse students' interest and increase their lesson participation before COVID-19. Aside from this, some teachers have developed reward systems to motivate students to answer questions. All respondents from the interviews think that they act as a facilitator to help students build and strengthen their knowledge.

Teacher A has a more comprehensive idea of how to act as a facilitator in the lessons. He mentioned that he would design different scenarios based on daily life to let students think of the solutions. The difficult tasks would be designed to carry out in groups with students of different learning abilities, which helps increase the chance of peer interactions. He said that students with greater abilities help lead the whole group to start discussions. A reward system is also involved in the activities[12].

Teachers B and C also put great emphasis on the reward system. Teacher B said it is used to draw students' attention in class and encourage them to participate in class activities such as scene interactions[13]. Teacher C said she usually draws students' attention by asking questions with rewards[14].

Teachers D, E and F tried to design different class activities to engage students. Teacher D said he always teaches students in the form of relaxing games. It not only helps to arouse their interest, but is also used to evaluate students' learning performance[15]. Teacher E emphasizes the importance of students' cooperation by

[12] Teacher A : 「設計情景，讓學生有選擇，並代入去角色去解決日常的問題，有些任務需以小組行式進行，以強帶弱、並設立獎勵基制。」, see page 65 of appendix 2

[13] Teacher B :「設計情景，並設立獎勵基制，鼓勵學生積極參與課堂活動；至於點樣評核學生表現，我會透過提問，課堂表現，學生家課等去評核。」, see page 69 of appendix 3

[14] Teacher C :「我是利用提問及獎賞增加學生的上課參與度。」, see page 72 of appendix 4

[15] Teacher D: 「我認為當佢哋多參與課堂活動，較容易掌握課堂內容，更有深刻的印象，學習表現

providing more group discussions with students of diverse learning performances[16]. Teacher F said she mainly focuses on thinking about different activities to let students understand the key points of teaching and try to arrange teacher-student and student-student interaction as much as possible when implementing face-to-face classes[17].

During the pandemic, most teachers said they needed to rethink and redesign their teaching plans to draw students' attention. Since it is difficult to let students work as a group, most teachers tried hard to think of individual tasks for students. At the same time, they needed to consider how to engage students in lessons with the individual tasks provided via online classes. For instance, Teacher F claimed that she needs to search different learning videos or learning platforms to attract students' attention by engaging them with games[18]. Besides, Teacher C said some knowledge was hardly explained during online classes as there was limited interactions between teachers and students[19]. This means that teachers needed to think of some new techniques to provide detailed and understandable explanations to students. Although online education allows students to learning continuously during the pandemic, it does not mean that all students can learn effectively in online classes. Some students may not be able to adapt to the new teaching mode at a fast pace. For instance, some students may feel bored during online lesson due to the lack of class interactions. To deal with it, teachers may need to think of ways to raise students' interaction in class. Since each student has different needs, teachers need to think of appropriate assistance to help each student adapt to the

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更佳。因此，我會以活動形式學習，嘗試以活動吸引他們。」, see page 75 of appendix 5

[16] Teacher E: 「教學活動會以學生為中心，希望學生能從活動中學習，與其他同學合作找出答案，協助他們建立知識。」, see page 80 of appendix 6

[17] Teacher F: 「在推行實體課時，主要透過活動讓學生明白教學重點，盡量安排師生及生生互動。」, see page 84 of appendix 7

[18] Teacher F: 「需要轉變教學方法，儘量蒐集合適短片輔以教學，讓課堂不致太沉悶，吸引學生學習。為提高學習興趣，需要利用不同電子學習平台，讓學生回答問題、參與課堂活動及以遊戲形式進行學習。」, see page 84-85 of appendix 7

[19] Teacher C : 「 複雜的概念較難解釋，而且學生上課容易分心。」, see page 73 of appendix 3

change of the teaching mode.

To summarize, most teachers faced the challenges of thinking the new teaching strategies in online classes to raise students' interest. The learning process will run effectively if teaching strategies are applied successfully to draw students' attention, as Cleveland et al. (2017) provided. Due to COVID-19, the learning process was changed to carry out at home by utilizing the online devices. Students were forced to adapt to the new learning habit which is learning at home. Siagian (2015) added that sudden changes of learning habits would cause a decline of students' interest and learning motivation. Although learning at home enables students to continue their learning process, it poses an impact on students' interest in learning. Setyorini (2020) added an example in which students may take the advantage of their learning time at home to do different stuff such as playing games and watching videos. Therefore, teachers are needed to think of different techniques to help students adapt to the new teaching mode and thus students can be more focused in online classes. This also helps prevent other discipline issues during lessons.

However, from the interviews, teachers could only seek solutions by themselves without much support as all the respondents mentioned they spent much time searching videos or thinking of new teaching strategies which are suitable for the virtual lessons. This shows that most schools were not prepared in reacting to the new teaching mode and teachers need to rely on themselves to get prepared for the online lessons. It shows that most teachers find difficulties in coping with the change of the teaching mode.

5.1.3 Classroom management

Apart from the concerns about teaching strategies, classroom management in virtual lessons is one of the great challenges in online lessons. Lo (2012) claims that effective learning only resulted from active interactions between teachers and

students toward the same learning goals.

Four respondents admitted the challenges in classroom management during virtual lessons. They have some common difficulties. Some respondents have mentioned the difficulties in asking students to open their cameras during online lessons. Teacher F puts great emphasis on spending much time on classroom management such as reminding students to open their cameras, mute their mic and draw students' attention by calling students' names[20]. Teacher E agrees that some students are refused to comply the rules of opening camera during lessons and muting the mic when it is not used[21]. Teacher A also faced the same issue that students do not listen to teachers' instructions and were reluctant to open the cameras during lessons[22].

In addition, Teacher D said that classroom management became more difficult in online lessons as students are easily distracted by home- learning environment or unstable online system[23]. This shows that some teachers felt helpless in how to persuade students to follow the instructions and be concentrated during lessons. Since primary students are not mature to have great self-control, students may be easily distracted by their surroundings. As a result, they may not be concentrated on lessons and leads to a vicious cycle of learning problems in the long run. It is also consistent with the research of Hau et al (2022) in which teachers and principals generally felt 'no person at home can help' in virtual learning. Since most of the students' parents are busy with work, they may not be able to attend lessons with their children. Therefore, teachers need to think of different ways to

[20] Teacher F: 「需要兼顧嘅嘢非常多，例如：點名、按掣讓學生進入課堂講課、管理課堂秩序，解決學生即時發生的不同問題（如學生沒有開鏡頭、開咪胡亂說話、學生家中背景聲音太嘈雜、部份學生不專注做自己的事、學生開了鏡頭，但不在鏡頭內等等情況。」, see page 86 of appendix 8

[21] Teacher E:「有些學生不願意開視像鏡頭，令我不知道他是否有認真上課。」, see page 82 of appendix 7

[22] Teacher A: 「有些學生有時不開視像鏡頭，不聽老師的指示。」, see page 67 of appendix 2

[23] Teacher D: 「網上課堂較難管理。學生可因外在環境影響 （家裡學習環境，網絡不穩定等），老師難以掌握每個學生的學習狀態。」, see page 77 of appendix 5

improve the situation.

To conclude, most teachers find difficulties in managing students' behaviors during online lessons. Since the practice of online learning is not their previous learning habit, students may not see the online lessons as an important matter. Sari and Nayir (2020) claim that some students perceive online lessons as a holiday at the beginning. Worse still, some parents are busy with work and students may behave even worse in class. At the same time, teachers do not have any training on how to manage students' behavior in online classes. This means that most teachers could only try to decide by themselves regarding classroom management in online classes. This is an indication that most teachers were trying to solve the problems by themselves without any support.

5.1.4 Students' concentration and motivation

In virtual lessons, all six respondents agreed the students' concentration declines apparently. Due to different disruptions, students could not attend the lessons smoothly.

Teacher B provided that some students could not focus during lessons when their guardians are not at home, or they attend the lessons in a noisy environment[24]. Teacher D agrees that students are easily out of focus in the noisy learning environment as some of them do not have an individual place for attending lessons[25]. Teacher F added that students' guardians or domestic helpers sometimes called them loudly to stay alert[26]. These show that primary students have poor

[24] Teacher B:「部分學校家中較嘈雜，上課難以集中；父母都外出上班，家中無人規管者容易分心。」, see page 71 of appendix 3

[25] Teacher D:「有些學生未必有獨立空間進行網課，易受家人活動影響。」, see page 77 of appendix 5

[26] Teacher F: 「有些因為兩兄弟姊妹在同一個客廳裏面上課，所以聲音會較嘈雜。若果是工人姐姐在家中看管，情況會比較差，又或是有一些老人家在鏡頭前走來走去，或者叫學生吃東西、罵學生等等。」, see page 86 of appendix 7

self-management, and they are easily distracted from their surroundings. The problem will be more serious if students do not have a quiet learning area. Other students in online lessons may also be disturbed if they forgot to mute the mic or they may be concentrating on looking at the camera of other students. Teacher A also provided that some students are not concentrated due to the unfavorable learning environment and some of them did not listen to the teachers[27].

In addition, some respondents (Teachers C[28] and E[29]) mentioned most parents are busy with work and they do not have time to assist their children in learning. This leads to slower learning progress and students could not meet the learning progress in class. As a result, they feel frustrated and do not stay focused during lessons. This shows that some students cannot follow in online learning which may pose negative impacts on their motivation in learning.

The findings discovered that teachers have great concerns about students' concentration and motivation. This is the reason why teachers spend much time on preparation work to create more attractive teaching activities to engage students. Although most teachers tried to search for different learning tools to draw students' attention, some students are also distracted by the unfavorable learning environments, and other students in the same classes are also be disturbed as teachers may stop talking until the students realized. Therefore, weaker concentrations and poor motivations of students are the challenges for teachers in virtual classes.

To sum up, most teachers have great concerns on students' concentration and

[27] Teacher A:「學生上課不專心，受他們家中環境影響(家人在旁看電視、或幾兄弟一起上網課，環境嘈雜)，有一些學生不一定配合完成老師的指定任務，不理會老師的指令。, see page 66-67 of appendix 2

[28] Teacher C:「很多家長忙於工作，缺乏時間輔導學生完成功課及温習，導致學生未能跟上原有的學習進度。」, see page 73-74 of appendix 4

[29] Interview E:「很多家長只顧工作，忽略學生；部分小朋友由老人家或工人姐姐照顧，較難管理或教導小朋友」, see page 82 of appendix 6

motivation with the change of teaching mode. Since the previous learning habits were changed suddenly, students could not adapt to it immediately. Students' learning interest and motivation would decrease with inadaptability. Interest in learning is of utmost importance as it helps raise students' attention to learning (Cheung, 2018). Nugroho (2020) also added interest in learning arises with experience, habits, and active participation in learning. This implies that teachers need to prepare brief and interesting learning materials for students so that they are easy to understand and follow. According to the cognitive development theory, primary students who are at a concrete operational development stage are easier to learn things in a simple and concrete way, accompanied by animations and pictures with real examples (Resnick, 2017). This implies that teachers have heavier workloads in thinking of ways to deal with students' poor concentration in classes.

5.2 Research Question 2

Do teachers find the digital divide an issue when they adopt online teaching?

According to the research of Van de Werfhorst et al. (2020), the digital divide involves three levels (the accessibility of digital devices, the skills and usage of technologies, and the concerns with the impacts on the access of devices). It would lead to learning inequality which further provokes academic performance divides. All six respondents have realized the issue of the digital divide. It would be divided into two parts, including the digital divide on teachers and students.

5.2.1 Digital Divide among students

Most respondents mentioned there is a digital divide among students. Teacher A provided that it is difficult to collect students' homework as some students could not receive their assignments without ICT skills or printers at home[30]. To deal with this, he said the school was opened to let students take their assignments and allow

[30] Interview A:「由於部分學生沒有影印機或不懂下載功課,疫情期間亦不能回校領取功課，導致功課無法完成。」, see page 67 of appendix 2

students without devices or internet accessibility to come to school to have lessons individually[31]. The above issues of difficulties in collecting homework and lack of ICT skills are also mentioned by Teachers C[32], D[33], and E[34]. Teacher F said she even found that some students from poor families may not have computers or stable internet necessary for online lessons at the beginning[35]. Teacher E added some students might not know how to use like entering into ZOOM meetings though they have online devices[36]. To deal with it, IT assistants in schools made teaching videos to provide guidelines and assistance for teachers and students. However, some junior primary students might not understand the steps provided and they need to rely on their parents or even seek help from teachers. As a result, it takes time to handle the issue and results in shorter learning time.

From the collected responses, it is clearly shown that both teachers and students may face difficulties in online lessons due to the digital divide. The most common challenge among respondents is to collect students' assignments during school closure. Some students may not have sufficient ICT skills to finish homework online or without printers to print the assignments. As a result, teachers have difficulties accessing their learning progress, which may then pose stress to them in designing new lessons.

Furthermore, students' parents also pose great impact on their learning. For instance, parents with greater digital skills can help students deal with technical

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[31] Teacher A:「校方定期派發學生的物資，分級讓家長來校取物資，並打陽光電話；若學生在家上課，沒有網絡，校方設立一些大房間給小部分學生分開上課。」, see page 67 of appendix 2

[32] Teacher C:「部分學生不懂得用 zoom，特別是低年級學生較難掌握；學生學習物資較難送到學生手上。」, see page 74 of appendix 4

[33] Teacher D:「有些家庭未必有能力購買列印機，有些功課未能完成，影響其學習進度。」, see page 77 of appendix 5

[34] Teacher E:「較難收集學生的功課，難以評核學生表現。」, see page 82 of appendix 6

[35] Teacher F:「部份學生屋企沒有合適的電腦裝置/網絡不穩定，會影響學習。」, see page 86 of appendix

[36] Teacher E:「初時學生未掌握如何使用 zoom。學校 IT 組制作 ZOOM 教學短片給師生，提供電話教學及解答 。」, see page 82 of appendix 6

issues. However, not all parents are with basic digital skills to support their children in solving technical challenges. They may rely on their teachers' assistance. As teacher E provided, teaching videos are given by School Information Technology for students and their parents. They could also call via telephone to get assistance[37]. Vigdor et al. (2014) reported that digital technology is found to be effective in learning only in households where parents can act as effective instructors in guiding their children. This implies that children still could not access valuable resources online with technologies in hands. It is important to provide students with guidance or assistance in the productive use of online resources.

The findings reveal that there was a digital divide in students' access to distance learning during the COVID-19 pandemic. Some students may not have the technologies which are necessary to online learning. For those who have devices, they may not have a quiet place to study or encounter many technical issues during online learning because of insufficient ICT skills. As a result, their learning is negatively affected. These results validate with the previous findings that the digital divide in education has led to inequality in learning (Van de Werfhorst et al., 2020). Respondents in the research also realized that disadvantaged populations have limited access to technological infrastructure and the techniques of using it. Those students need extra support for the application of digital devices, including from teachers and parents. These findings also align with the Bourdieu's theory of Social and Cultural Reproduction that digital and educational inequalities are correlated to the students' socioeconomic status. Therefore, teachers need to seek help from IT assistants in school to handle students' technical issues and minimize academic performance divides among students.

[37] Teacher E: 「初時學生未掌握如何使用 zoom。學校 IT 組制作 ZOOM 教學短片給師生，提供電話教學及解答。」, see page 82 of appendix 6

5.2.2 Digital Divide on teachers

On the other hand, teachers may not have well-trained ICT skills in supporting students in learning. This is also supported by Santanu (2020), who claimed that students still lack valuable instructions to facilitate STEM education though students are with digital devices.

For instance, teacher B realized that she also faced the issue of the digital divide during online teaching. She said that it is difficult to teach STEM online with limited knowledge of programming as it was seldom taught in university. However, the school suggests teaching students step by step in meeting the same result[38]. This results in a longer time to prepare for STEM lessons. She added that she needs to take more time in preparing how to teach programming online[39]. This means that she had a heavier workload in teaching during the periods of the pandemic.

Older teachers might have greater stress in teaching online during the pandemic. Ertl et al., (2020) claimed that a person's age poses the possible risk of experiencing detrimental effects of the digital divide. Older people are more likely to have greater challenges in using digital technology. Some research shows that greater digital competencies is found in teachers at a younger age (Kale and Goh, 2014; Cantú-Ballesteros et al., 2017). This means that more senior teachers might need to spend much more time and effort in familiarizing with digital techniques. To deal with it, Pongsakdi et al. (2021) added that professional development programs in the field of technology help teacher gain confidence in ICT usage. With greater confidence, they are more likely to use technologies during lessons

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[38] Teacher B:「學校推行的 STEM 與我在大學時學的 STEM 完全唔同。大學時學的 STEM 更多是強調創意，讓學生有自由發揮的空間，但現實中，發現學校重視的是學生要一步一步按指示做到一個統一的答案。」, see page 69-70 of appendix 3

[39] Teacher B:「在任教 STEM 時，學校把重點放於編程上，但我於大學時期很少接觸到編程，因而每次都要用很多時間自己備課。」, see page 69-70 of appendix 3

and their ICT skills could be enhanced gradually.

The above findings showed there was a digital divide in teachers. As Nurumov et al. (2023) mentioned, the effectiveness of remote learning for students is likely to be affected by the limitations in digital access and capabilities for teachers. Therefore, it is important to enhance teachers' digital preparedness with ICT competencies to support students' online learning. With digital preparedness and confidence, teachers can then provide clearer instructions in a more supportive way. As a result, students' learning can be improved with the contribution to reducing the digital divide in teaching and learning.

5.3 Research Question 3

What are the opportunities and challenges in delivering the General Studies curriculum online during the pandemic?

As mentioned before, General Studies is a subject that includes different aspects such as Science and PSHE. All teachers said they think they act as a lecturer in conducting online GS lessons most of the time. It is crucial to investigate the uniqueness of online GS through the literature and based on interviewees' perceptions. Some research (Stojr-Hunt, 1996; Elmer et al., 2020) claimed that science-related topics are difficult to conduct in virtual classes as there is limited interaction among students and teachers.

5.3.1 Dealing with the uniqueness of online General Studies through the literature

Lo (2010) said Primary GS curriculum in Hong Kong is more broad-based in structure. It integrates different key learning areas such as social education, science and technology, to name but a few. This means that teachers need to think of different teaching strategies that are applicable in online lessons. Lo (2010) also added process learning, communication, collaboration, and creative and critical thinking are the major skills that are expected to be developed in students. However, in virtual lessons,

students have a rather lonely learning lesson as face-to-face interactions are hindered. Students could not have direct communication with their peers and thus the mentioned skills above could not be successfully enhanced in online classes.

Diverse learning experience is expected to incorporate in General Studies lessons to equip students with the development of generic skills. Through the implementation of General Studies curriculum, generic skills such as communication skills, IT skills, collaboration skills, critical thinking skills, and creativity are hoped to be enhanced among students (Curriculum Development Council, 2017). This indicates that schools and teachers need to design different class activities to provide students with opportunities in the application of their generic skills. However, the COVID-19 pandemic hinders face-to-face activities in classrooms and teachers might encounter challenges in designing meaningful context to facilitate students to apply generic skills in daily life. In other words, teachers can only provide students with limited resources in online General Studies classes and limited skills can be obtained successfully.

According to the Curriculum Development Council (2017), General Studies curriculum also places a great emphasis on enhancing reasoning and theoretical knowledge on students. Nonetheless, Schwichow et al. (2016) said hands-one experience poses a great influence on reasoning and theoretical knowledge. This shows that online learning may not be able to enhance students' reasoning and theoretical knowledge. As a result, teachers need to seek different ways to help students build knowledge in online General Studies.

Several pieces of literature above showed that the General Studies curriculum involves broad topics and different key learning areas. When General Studies is conducted online, it provokes a lot of learning issues in

designing meaningful contexts to facilitate students to apply generic skills in daily life. General Studies is a subject that places a great emphasis on enhancing students' reasoning and theoretical knowledge. However, it is difficult to provide hands-on experience and thus teachers need to seek new teaching strategies in online lessons. It is hoped that students' generic skills can still be strengthened under the school closure.

5.3.2 Interviewees' Perceptions towards the Uniqueness of Online General Studies

During the interviews, most teachers found difficulties in enhancing students' interactions in science-related topics during lessons. Teacher B put great emphasis on the difficulties in teaching science-related topic online as there are many restrictions. For example, teachers could not know how students perform when they do programs individually. Teachers could not provide immediate support and guidance to students when they face any struggles in programming[40].

Besides, teacher E said that it is difficult to carry out experiments during online lessons[41]. Students may not have all the resources needed for doing experiments at home. Students are not allowed to do the experiments individually due to safety concerns. Therefore, both teachers B and E command to teach the topics related to society or the environment first and those science-related topics would be taught after the resumption of school. This shows that teachers do not have any assistance from the school, and they do not know how to teach science-related topics without doing experiments during online lessons. However, it is important to provide students with hands-on activities like experiments as Ornstein (2006)

[40] Teacher B:「網課時，難以教授學生編程，因為無法即時看到學生遇到的 bug 而作出指正。」, see page 70 of appendix 3

[41]Teacher E:「網課只能主要教授社會方面的知識內容，而需學生多互動的科學實驗實驗需等實體課時才能補教，這因安全問題和考慮到學生屋企未必有資源進行。」, see page 81 of appendix 6

proposed students would have greater motivation in learning if there are more hands-on experiences in class.

Apart from the challenges faced in delivering General Studies, there are some opportunities mentioned by Teacher F. She said there are different online learning platforms that allow students to learn in diversified ways[42]. This gives students freshness with more interactions online. Yunita (2021) also stated that students will be more motivated to learn with more interactions among peers and teachers and it helps cultivate learning enthusiasm.

Delivering a General Studies curriculum online has both opportunities and challenges. Some researchers like Herold (2016) also agree that digital education is beneficial to independent learners with different learning ways. Online learning platforms allow students to learn in their own pace with greater flexibility. However, there are still some topics which are unfavorable to teach online. Students may feel frustrated if they are taught online. Moreover, teachers' success of online learning platforms is affected by their preparedness and positive attitude. For example, teachers may not know how to teach some topics online like science or STEM-related topics. As a result, students may feel helpless and frustrated in a virtual environment. Therefore, some topics in General Studies may not be applicable to teach in online mode.

The results of the interview illustrated that there were both opportunities and shortcomings in delivering the General Studies curriculum online. Some respondents found opportunities in digital learning. Students could learn individually with greater flexibility. However, most respondents found difficulties in teaching particular topics, such as science-related or

[42] Teacher F:「唔同的學習平台各有優點，老師可按需要選用，令學生的學習更多樣化。」, see page 87 of appendix 7

STEM-related topics. This is because students cannot carry out hands-on activities in the classroom to strengthen their knowledge. Because of the developmental aspect, students in primary schools are more likely to learn by doing (Sutarto and Fathurrochman, 2020). With hands-on experience, learning enthusiasm can be easily cultivated. However, online education reduces students' interaction and hands-on experience. Their generic skills are thus hindered as some literature were presented in session 5.3.1 of the current research. This implies that teachers tried hard to teach science-related topics from the GS curriculum in online lessons, but most students learned passively.

5.4 Research Question

Do General Studies teachers see online learning will be a useful tool in the post-COVID-19 era?

All six respondents claimed that there are differences in preparation work before, during and after COVID-19. They still put great emphasis on the use of e-learning and digital learning platforms to facilitate students' learning after the resumption of face-to-face lessons although they all agreed that there is an increasing burden with the change of teaching mode.

Teachers D and E support mixed- mode of learning (both face-to-face and virtual learning). Teacher E said that flipped classroom is advantageous for students to learn by themselves and learning efficiency would be raised with the previous learning in the flipped classroom[43]. Teacher D has the same opinion towards teacher E as she could let students finish some pre-learning tasks before lessons via online platforms. She added that she still supports the mixed mode of learning

[43] Teacher E:「對我來說，我認為混合課堂更佳，雖然我對網上平台並不熟練，但這真係對學生有利。「翻轉教室」讓學生完成課堂前的網上自學活動，再課堂上講解，學生印象更深刻。」, see page 83 of appendix 6

although she is not good at making online teaching resources. It helps save time and increase learning efficiency[44]. These show that there is limited time in each lesson, and teachers would like to ask students to prepare for the lesson by doing the tasks online.

On the other hand, Four respondents (Teachers A,B, C, F) think that face-to-face learning is more effective in conducting General Studies or STEM lessons. Teacher A gives the most detailed reasons. He mentioned that face-to-face lessons allow teachers to know students' learning progress easily and provide feedback accordingly. He also added that primary students are easily distracted by external factors such as noisy environments and unstable online connections during online lessons. These issues can be easily solved, and students can be more concentrated in the classrooms[45].

Teacher B provided that face-to-face lessons have a better learning environment as students have greater interactions with their peers and teachers[46]. Although Teacher F has mentioned the advantages of having different learning ways in online lessons, she still thinks face-to-face lessons are still the best way to learn due to the greater elasticity[47].

Students' interaction in classes is a great concern among teachers. From the findings, there are only teachers who supported face-to-face lessons or mixed modes of teaching after the COVID-19. Since students can have face-to-face interaction with their peers, positive externalities may result. Di Pietro et al. (2020)

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[44] Teacher D:「我認為以混合課堂形式教授常識科或 STEM 會更有效，例如宜家會用「翻轉教室」先讓學生完成課堂前的網上自學活動，再於課堂中設置跟進活動，結合電子學習與自學活動模式。」, see page 79 of appendix 5

[45] Teacher A:「我認為面授形式教授常識科或 STEM，這樣能即時知道學生的學習進度，老師給予適當的回饋，即時跟進問題；以小學生的呈度，他們在面授時，更能專心上課，減少家中環境、網絡不穩定等額外因素對他們的影響，他們又能與其他學生合作學習，互相參考的想法，更能幫助他們學習。」, see page 68 of appendix 2

[46] Teacher B:「最好是面授課，能和學生面對面進行互動，而學生在課室亦較有學習氣氛。」, see page 71 of appendix 3

provided that students are easily motivated to work harder with classmates' high achievement. Their peers' hard work can be easily seen in the classroom. Although there is still socialization in online learning, it is significant to provide students with face-to-face contact in classrooms. Di Pietro et al. (2020) added classroom experience with teachers' and peers' communication is important for students, especially those in primary schools. Therefore, it is understandable why is there are more teachers who support face-to-face lessons.

After long periods of online learning, most students, parents, and schools have started to get used to having online education. Jamilah and Fahyuni (2022) claim that infrastructure supporting the implementation of online learning has developed better. Teachers' and students' digital literacy are gradually enhanced. Online education has become important nowadays. Lockee (2021) suggested that the primary purpose of online education before the pandemic is to provide students who were unable to attend placed-based lessons access to continuous learning.

However, its function has changed to assist students with face-to-face lessons. For instance, students can access learning videos or pre-learning tasks asynchronously. It is also mentioned by the interviewees in the current study. This means that some teachers see online learning as a useful tool in guiding students' learning and supporting face-to-face lessons. Their teaching is combined with traditional face-to-face teaching with technologies and online learning. Murphy (2020) stated that blended learning may help improve the quality of face-to-face teaching. Allan et al. (2019) added that blended learning helps students in different aspects. For example, asynchronous work allows students to learn independently while face-to-face classes allow students to reflect and interact with peers. Jamilah and Fahyuni (2022) claimed that the digital skills and infrastructure which have been developed during COVID-19 can still be honed and utilized in the post-COVID era in the form of blended learning. Therefore, it is shown that online teaching can be seen as a useful tool for most teachers to assist students' learning in face-to-face

[47] Teacher F:「始終都係面授的彈性及效果較佳。」, see page 87 of appendix 7

classes.

To summarize, most teachers found that online learning will be a useful tool in the post COVID-19 era, as they still put great emphasis on the use of e-learning after the resumption of schools. They tried to make good use of the developed infrastructure and students' digital skills in the form of blended learning. This aligns with the findings of Jamilah and Fahyuni (2022) in which students can learn effectively in the mixed mode of teaching. In order to make good use of digital skills, students should be provided with opportunities to use digital devices regularly in the classroom. This enables students to practice how to use them in a more effective way and thus their digital skills can be improved with time. At the same time, teachers can realize the technical difficulties faced by students and then provide certain assistance. With frequent practice, teachers and students can really get used to online education. As a result, students can then get the benefits from both face-to-face learning and online learning, corresponding to the findings of Jamilah and Fahyuni (2022) which presented the advantages of the mixed mode of learning. Moreover, the regular application of digital devices in schools helps teachers and students to be prepared and get ready for unexpected crisis in the future. In any situation, children's learning cannot be sacrificed as what the basic principles of lifelong education (Abuddin Nata, 2016). Therefore, online learning is seen as a meaningfully useful tool and thus it is worthwhile to incorporate mixed learning in General Studies in the post-COVID-19 era.

6. Additional Findings

6.1 Lack of technological support and Training

At the beginning of COVID-19, most schools needed to make prompt decisions on how to hold lessons continuously. From the interviews, it is found that most schools do not have enough technical support as they just relied on ICT teachers and IT assistants to deal with technical issues. For instance, Teacher A said that IT

assistants would produce teaching videos on how to use Zoom for teachers, parents and students[48]. Teacher E added teachers and students could ask IT assistants via phone calls for help if they encounter any difficulties on ZOOM[49]. This shows that most teachers have not receives related training on how to use online platforms. They mainly rely on themselves to seek ways to learn how to conduct online lessons effectively. If there are any questions, they first seek help from IT assistants or other colleagues with ICT knowledge. These results were consistent with the findings of Hau et .al (2022) which revealed the lack of computer skills was the most common challenge among teachers. Therefore, some teachers may even have heavier workloads as they need to spend time teaching other colleagues about the application of technology. As a result, those teachers may have limited time in preparing for lessons and even inadequate resting time.

As mentioned, teachers with ICT knowledge may have a greater workload as they need to help other teachers with limited technological knowledge. This means that most teachers in Hong Kong do not receive active training in the technological field. Other teachers, especially the class teachers have also faced the issue of heavier workloads as there are increasing amounts of administrative work. Even though there are teaching videos provided by IT assistants, some class teachers are required to call their students in the morning to remind them to have lessons or provide certain assistance.

Besides, most teachers in the interviews suggest that it is necessary to provide more training and resources to assist students in online learning. For example, teacher D believed that reducing the number of students in each ZOOM class helps increase teacher-student's interactions [50]. This means that more human

[48] Teacher A:「學校 it 組制作教學短片給師生。」, see page 67 of appendix 2

[49] Teacher E:「老師需要時熟習新的電子教學工具、初時學生未掌握如何使用 zoom。學校 IT 組制作 ZOOM 教學短片給師生，提供電話教學及解答。學校 it 組提供網上 ZOOM 教學，協助老師安排課堂。」,see page 82 of appendix 6

[50] Teacher D:「我認為需增加資源和人手，以協助學生，例如：改善師生比例，減少每班 ZOOM 人數，令教師有更大空間處理學生的個別需要，從而增加師生網課互動。」, see page 78 of appendix 5

resources are needed to provide favorable learning for students. At the same time, teachers should be provided with technical training in technological planning. This helps reduce teachers' workload and favors students learning.

Although full-day face-to-face classes were resumed in Hong Kong, technological support and training are also needed to support teachers and students in blended learning. As mentioned, most teachers in the current research still put great emphasis on the use of e-learning and digital learning platforms in schools. It is necessary to equip teachers in implementing active learning strategies and thus students could learn more efficiently. Cobo-Rendón et al. (2022) claimed that it is important to invest resources in acquiring the software and employing assistants to provide technical support for both students and teachers. Moreover, Ashrafi et al. (2022) added time and money are necessarily invested in training students and teachers in the use of digital platforms. Therefore, more technological training and support are needed to enhance the teachers' digital ICT competencies to support students' online learning.

6.2 Digital Divide in the age gap

Digital divide is one of the biggest challenges in online learning under COVID-19. In the beginning, digital device access was greatly concerned with the sudden change of the teaching mode. Both teachers and students were not reacting promptly to the digital devices required. In responses to this, the government and schools provided support to disadvantaged students to ensure each student could have access to online learning. However, the skills and usage of technologies were not greatly enhanced with active support as most interviewees particularly teachers at an older age or with lower ICT skills mentioned that more technical support is hoped to be provided. This implies that teachers' professional qualifications and age pose an influence on their digital capability. It was in line with the study of Ertl et al. (2020) that the digital capability divide is greatly affected by age.

It is surprisingly found that senior teachers are more engaged in synchronous online teaching than their younger counterparts from the research of Nurumov et al. (2023). The current study was also in line with the finding that one of the teachers who have only five years of teaching experience found difficulties in teaching online, particularly in the teaching of programming online, thus she was not engaged in teaching it. Nurumov et al. (2023) claim that confirmed that the professional rank of teachers might be associated with their digital capability. This means that senior teachers are more willing to conduct synchronous online teaching than colleagues who are recently employed.

On the other hand, there is research showing other findings that younger teachers are more willing to apply digital tools in their teaching (Inan and Lowther, 2010; Pegler et al., 2010). Moreover, studies have shown that teachers with proper training in ICT skills use ICT in lessons more frequently (Drossel and Eickelmann, 2017; Pongsakdi et al., 2021). Since teachers who received proper training can have more knowledge in applying in lessons, they are more likely to seek different teaching strategies with the use of digital tools to draw students' attention. However, Azhari and Fajri (2021) realized that teachers' existing skills and willingness to use ICTs before the pandemic cannot be applied directly to virtual lessons during school closure. In other words, although some teachers have participated in ICT training courses before, they are less likely to apply the learned digital knowledge and skills during online lessons under COVID-19. This was also consistent with my finding in the current research. Teachers with existing ICT knowledge sometimes need to seek help from IT assistants at the beginning of the pandemic. They needed to rethink their teaching strategies and seek different learning platforms as those teachers without any ICT knowledge. This shows the importance of ICT-related professional development for teachers to reduce the digital divide in skills. With regular training, teachers will be more able to provide students with a more smooth and more conducive learning environment.

It is necessary to say digital divide cannot be completely eradicated in a short period of time. Digital divide is caused by different factors including social, economic, geographical, cultural and the fear of technology factors (Várallyai et al., 2015). This shows that digital divide is a tactic issue in the world. However, online learning involves the use of digital devices and digital divide poses great influence on students' learning. Therefore, contribution to reducing the digital divide in teaching and learning is important, though it cannot be completely removed.

7. Recommendation

To gain a better understanding of how teachers experience and cope with the change in teaching mode, it would be beneficial for future research to examine this question in the framework of both qualitative and quantitative research design. This results in a larger sample size with teachers in different schools. The gathered responses can be more detailed, and it can follow up on the causes of teachers' challenges with coping strategies.

Teaching in the sudden change of the teaching mode is challenging during the pandemic. To improve the situation, there are some recommendations. The school acts as an important role in the investment in ICT school infrastructure development. It allows teachers to respond to the sudden change of teaching mode quickly with the use of technological devices. To reduce the digital divide in skills among teachers, more courses related to ICT- related professional development should be provided to school teachers. It helps enhance their knowledge and skills to hold online classes. In schools, some ICT- related professionals are needed to employ to provide the necessary support to both teachers and students. For universities, university teachers should better keep in touch with pre-service teachers to understand their difficulties or needs during internships. Since senior teachers and younger teachers might encounter different challenges, it is important to know the needs of pre-service teachers with assistance. This helps schools to be prepared by

making emergency action plans in the sudden change of teaching mode in the future.

Apart from schools and teachers, parents and students are needed to provide training in the application of digital devices. Although students are born in technological world, it does not mean that they have sufficient skills to use the devices in learning. It may be argued that they are almost get used to it during the periods of the pandemic. However, it is possible to see some junior students still need support from their parents as they may not have sufficient knowledge and skills. Their parents may also try to help them with limited digital skills. Therefore, training should be provided to both parents and students on how to use the digital device efficiently in learning. On the other hand, students should also be taught to develop a correct attitude in using digital devices. Although students have returned to schools, some teachers may apply mixed teaching with the application of digital devices. Therefore, it is important to let students know the importance of the proper use of digital devices in learning. This helps prevent the drawbacks of misusing digital devices and the opposite effect on students' learning.

8. Conclusion

In this study, the challenges faced by General Studies teachers during online education with their coping strategies and their viewpoints on incorporating mixed learning in future General Studies were examined. With the findings shown, it is clearly seen that most respondents encountered difficulties in preparation work, teaching strategies, classroom management, digital divide and motivating students in online lessons. As the COVID-19 pandemic appeared unexpectedly, schools and teachers were not ready for the online education process. Therefore, teachers and students had several difficulties in online learning.

From the interviews, it is observed that most teachers were not ready to the changing mode as they tried hard to improve the situation. In the beginning, teachers indicated the lack of infrastructure, stable internet access and sufficient digital devices. To respond to it, the schools and society provided support to disadvantaged students by

offering digital devices and making special arrangements. Sadly, technical problems still exist because of the limited digital skills, including both teachers and students. This indicates that students, teachers or even the schools were struggling in the distance education process at the beginning. Teachers bear a great responsibility to help students overcome the difficulties faced during online lessons. Most respondents felt overwhelmed and helpless to engage students in online classes, though they tried hard to redesign the teaching materials and consider new teaching strategies. However, they found that it is still challenging to conduct online lessons with their students because of limited interactions and some restrictions on hands-on experience. Some topics related to science and STEM may not be taught successfully during online learning. Therefore, in-service training related to online education is needed to let teachers know how to manage the process and teach in a more effective way.

After almost three years of online learning, teachers and students have started to get used to online learning. Teachers found online learning may be useful to assist face-to-face lessons as a form of blended learning or flipped classroom. Online learning has its benefits and opportunities to students with clear guidelines and support. Although it adds a burden on teachers' workloads, most respondents still support the incorporation of mixed learning in future General Studies. It can make good use of students' digital skills that were developed during the pandemic. Incorporating online learning as a usual habit in the classroom can also help teachers and students get prepared for having long periods of online learning in an unexpected crisis in the future.

After a detailed analysis of online teaching, it is clear that considerable challenges were encountered by teachers. Further support is needed to help teachers cope with the challenges faced. It is hoped that schools can incorporate mixed learning in a future General Studies classrooms by making good use of students' digital skills, thus improving the quality of students' learning.

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Appendix 1

深入訪談問題大綱

（一）基本資料

性別：　　教學經驗：　　任教的科目：

（二）訪談問題－老師對常識科或 STEM 網課的看法

2.1 疫情前常識科或 STEM 實體課的看法

1. 在疫情前，你是如何為常識科課堂備課，當中主要的備課重點是甚麼？
2. 你認為自己在推行常識科或 STEM 教育實體課時經常擔任什麼角色？（推行者/主導者/輔助者）
3. 你是如何增加學生的上課參與度及評核學生學習表現？

2.2a. 疫情期間對常識科或 STEM 網課備課工作的看法

1. 在疫情期間，網課成為新的教學模式，這對你備課工作有何改變？
2. 你在任教常識科或 STEM 備課工作時有沒有遇到甚麼挑戰或困難？

2.2b. 疫情期間對常識科或 STEM 網課授課的看法

1. 你認為常識科或 STEM 網課與實體課授課有何不同之處？
2. 你在任教常識科或 STEM 教育網課授課時有沒有遇到甚麼挑戰或困難？
3. 你是如何增加不同年級學生的課堂參與度？（例如：是否須開啟視像／利用聊天室功能）
4. 你認為自己在推行常識科或 STEM 教育網課時經常擔任什麼角色？（推行者/主導者/輔助者）

2.2c. 疫情期間常識科或 STEM 老師如何評核學生表現

1. 在面授和網上課堂教學中，學生的課堂表現有何分別？
2. 疫情期間，你有沒有曾調整常識科或 STEM 教育的評核準則？

2.2d. 常識科或 STEM 網課的額外困難（個人層面：網上課堂管理／課堂設計；學生層面：學習環境／電子科技）

1. 你在常識科或 STEM 網課時有沒有其他額外困難？
2. 學生的家庭背景會否影響他們參與網課的投入程度？

2.2e 疫情期間學校對常識科或 STEM 的協助

1. 在剛疫情爆發時，學校有什麼短期教學問題？當時如何提供支援？
2. 疫情期間需進行長期網上教學，學校如何協助老師安排課堂?
3. 你認為網課教學的支援（政策／資源／培訓／人手)是否足夠？

3. 疫情完結後，老師對未來常識科或 STEM 網課的看法

1. 恢復全面實體課後，備課的重點是否跟疫情時一樣？
2. 恢復全面實體課後，你還有使用網上學習平台嗎？為甚麼？（例如：反轉教室／google classroom）
3. 疫情完結後的教學轉變是否增加了你的工作負擔？
4. 你認為應以面授／網課／混合課堂形式教授常識科或 STEM？

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Appendix 2

Interview Transcript of Teacher A

（一）基本資料

性別： 男　　教學經驗： 7 年　　任教的科目：數學、常識、電腦

（二）訪談問題－老師對常識科或 STEM 網課的看法

2.1 疫情前常識科或 STEM 實體課的看法

1. 在疫情前，你是如何為常識科課堂備課，當中主要的備課重點是甚麼？
2. 你認為自己在推行常識科或 STEM 教育實體課時大多時候擔任什麼角色？（推行者/主導者/輔助者）
3. 你是如何增加學生的上課參與度及評核學生學習表現？

1.常識科課堂備課：在上課前，看參考書、教學計劃和書商所提供的建議方法，當中的備課重點是將應因學生的能力，歸納各方法，去設計課堂，將教學重點分折為各個小目標，並準備所需的教具。 2. 輔助者 3.設計情景，讓學生有選擇，並代入去角色去解決日常的問題，有些任務需以小組行式進行，以強帶弱、並設立獎勵基制。在評核方面，可以透過提問，追問，學生的工作紙，實作、自評表去評核學生的學習表現。

2.2a. 疫情期間對常識科或 STEM 網課備課工作的看法

1. 在疫情期間，網課成為新的教學模式，這對你備課工作有何改變？
2. 你在任教常識科或 STEM 備課工作時有沒有遇到甚麼挑戰或困難？

1.備課工作大致不變，有些教具需找電子工具來代替。

2.平日行政工作較為忙碌，需花多時間想新的點子，上網找尋資料，去設計新的教材。

2.2b. 疫情期間對常識科或 STEM 網課授課的看法

1. 你認為常識科或 STEM 網課與實體課授課有何不同之處？
2. 你在任教常識科或 STEM 教育網課授課時有沒有遇到甚麼挑戰或困難？
3. 你是如何增加不同年級學生的課堂參與度？（例如：是否須開啟視像／利用聊天室功能）
4. 你認為自己在推行常識科或 STEM 教育網課時大多時候擔任什麼角色？(推行者/主導者/輔助者）

1. 學生有一些實作任務需要小組完成，網課很難實行、互動性較差、班級管理較難實行，有一些學生不理會老師指示。

2. 學生上課不專心，受他們家中環境影響；學生不配合完成老師的指定任務；老師需額外找方法錄制教學影片，並需花額外大量時間熟習運用新的網上電子工具。由於上課時間限制，老師不能解答學生很多問題，師生之間的互動少了很多，教學成效下降了。

3.設文獎勵計劃、也會用聊天室功能和分組討論功課(老師會進入不同小組監督)

4. 主導者

2.2c. 疫情期間常識科或 STEM 老師如何評核學生表現

1. 在面授和網上課堂教學中，學生的課堂表現有何分別？
2. 疫情期間，你有沒有曾調整常識科或 STEM 教育的評核準則？

1.網上課堂：學生上課不專心，受他們家中環境影響(家人在旁看電視、或幾兄弟一起上網課，環境嘈雜)，有一些學生不一定配合完成老師的指定任務，不理會老師的指

令。

2.有

2.2d. 常識科或 STEM 網課的額外困難（個人層面：網上課堂管理／課堂設計；學生層面：學習環境／電子科技）

1. 你在常識科或 STEM 網課時有沒有其他額外困難？
2. 學生的家庭背景會否影響他們參與網課的投入程度？

1.網上課堂管理：有些學生有時不開視像鏡頭，不聽老師的指示、不交功課，較難收集學生的功課，難以即時給學生回饋。

課堂設計：互動性較小

2.會，很多家長忙於上班，缺乏輔導學生；家長的老人家較難管理小朋友；學生家中環境太多引誘，家中較小，幾兄弟姐妹在同一房間一起上網課，學生較難專心、wifi 不穩定、作息沒有規律

2.2e 疫情期間學校對常識科或 STEM 的協助

1. 在剛疫情爆發時，學校有什麼短期教學問題？當時如何提供支援？
2. 疫情期間需進行長期網上教學，學校如何協助老師安排課堂?
3. 你認為網課教學的支援（政策／資源／培訓／人手)是否足夠？

1.短期問題: 老師需要時間熟習新的電子工具、學生不懂得用 zoom、由於部分學生沒有影印機或不懂下載功課,疫情期間亦不能回校領取功課，導致功課無法完成。學校 it 組制作教學短片給師生，校方定期派發學生的物資，分級讓家長來校取物資，並打陽光電話；若學生在家上課，沒有網絡，校方設立一些大房間給小部分學生分開上課，校方亦支援家長解決學生有關的 it 或情緒問題。

2.學校 it 組制作教學短片給老師。

3.足夠

3. 疫情完結後，老師對未來常識科或 STEM 網課的看法

1. 恢復全面實體課後，備課的重點是否跟疫情時一樣？
2. 恢復全面實體課後，你還有使用網上學習平台嗎？為甚麼？（例如：反轉教室／google classroom）
3. 疫情完結後的教學轉變是否增加了你的工作負擔？
4. 你認為應以面授／網課／混合課堂形式教授常識科或 STEM？

1.有小小分別，會多運用了電子學習，促進學生學習

2.會，反轉教室／google classroom，這樣會促進學生學習，提升學生的學習動機

3.有

4.我認為面授形式教授常識科或 STEM，這樣能即時知道學生的學習進度，老師給予適當的回饋，即時跟進問題；以小學生的呈度，他們在面授時，更能專心上課，減少家中環境、網絡不穩定等額外因素對他們的影響，他們又能與其他學生合作學習，互相參考的想法，更能幫助他們學習。

Appendix 3

Interview Transcript of Teacher B

（一）基本資料

性別： 女 教學經驗： 5 年 任教的科目：中文及常識

（二）訪談問題－老師對常識科或 STEM 網課的看法

2.1 疫情前常識科或 STEM 實體課的看法

1. 在疫情前，你是如何為常識科課堂備課，當中主要的備課重點是甚麼？
2. 你認為自己在推行常識科或 STEM 教育實體課時大多時候擔任什麼角色？（推行者/主導者/輔助者）
3. 你是如何增加學生的上課參與度及評核學生學習表現？

1 在上課前，看參考書、教學計劃和書商所提供的建議方法; 若遇到難題，便會向其他同事請教 2 輔助者 3 .設計情景，並設立獎勵基制，鼓勵學生積極參與課堂活動；至於點樣評核學生表現，我會透過提問，課堂表現，學生家課等去評核

2.2a. 疫情期間對常識科或 STEM 網課備課工作的看法

1. 在疫情期間，網課成為新的教學模式，這對你備課工作有何改變？
2. 你在任教常識科或 STEM 教育備課工作時有沒有遇到甚麼挑戰或困難？

1. 備課時的重點放於如何利用電子軟件作互動教學，讓學生於利用 zoom 上課時，亦能進行課堂活動。另外，大家亦要思考把本來的實體功課化成甚麼網上功課更為合適。

2. 在任教 STEM 時，學校把重點放於編程上，但我於大學時期很少接觸到編程，因而每次都要用很多時間自己備課。學校推行的 STEM 與我在大學時學的 STEM 完全唔同。大學時學的 STEM 更多是強調創意，讓學生有自由發揮的空間，但現實中，發現學校重視的是學生要一步一步按指示做到一個統一的答案。

2.2b. 疫情期間對常識科或 STEM 網課授課的看法

3. 你認為常識科或 STEM 網課與實體課授課有何不同之處？

4. 你在任教常識科或 STEM 教育網課授課時有沒有遇到甚麼挑戰或困難？

5. 你是如何增加不同年級學生的課堂參與度？（例如：是否須開啟視像／利用聊天室功能）

6. 你認為自己在推行常識科或 STEM 教育網課時大多時候擔任什麼角色？（推行者/主導者/輔助者）

3. 網課時，難以教授學生編程，因為無法即時看到學生遇到的 bug 而作出指正。因為咁，網課主要教授社會方面的知識內容，實體課才補教科學實驗/編程的內容。

4. 有，無法即時指正學生。

5. 上課需要開啟鏡頭，抽學生答問題，使用分組討論功能進行小組討論。

6. 主導者

2.2c. 疫情期間常識科或 STEM 老師如何評核學生表現

4. 在面授和網上課堂教學中，學生的課堂表現有何分別？

5. 疫情期間，你有沒有曾調整常識科或 STEM 教育的評核準則？

4. 學生網課較消極，實體課較積極

5. 沒有（提示：這題要問科主任，普通科任沒有權力調整）

2.2d. 常識科或 STEM 網課的額外困難（個人層面：網上課堂管理／課堂設計；學

生層面：學習環境／電子科技）

6. 你在常識科或 STEM 網課時有沒有其他額外困難？

7. 學生的家庭背景會否影響他們參與網課的投入程度？

6. 學生於網課的專注力比實體課弱

7. 會，部分學校家中較嘈雜，上課難以集中；父母都外出上班，家中無人規管者容易分心。

2.2e 疫情期間學校對常識科或 STEM 的協助

8. 在剛疫情爆發時，學校有什麼短期教學問題？當時如何提供支援？

9. 疫情期間需進行長期網上教學，學校如何協助老師安排課堂?

10. 你認為網課教學的支援（政策／資源／培訓／人手)是否足夠？

8. 課時不足，因網課時間一節只有 30 分鐘，比實體課少了 15 分鐘。當時只能另外再拍攝教學影片放於網上，請學生觀看。

9. 提供電腦器材

10. 沒有特別培訓

3. 疫情完結後，老師對未來常識科或 STEM 網課的看法

1. 恢復全面實體課後，備課的重點是否跟疫情時一樣？
2. 恢復全面實體課後，你還有使用網上學習平台嗎？為甚麼？（例如：反轉教室／google classroom）
3. 疫情完結後的教學轉變是否增加了你的工作負擔？
4. 你認為應以面授／網課／混合課堂形式教授常識科或 STEM？

1. 恢復實體課後，重點放於課堂間的互動活動，放輕電子教學。
2. 有，google classroom, 用以提供額外教學資料，讓學生於家中自習。
3. 是

4. 最好是面授課，能和學生面對面進行互動，而學生在課室亦較有學習氣氛。

Appendix 4

Interview Transcript of Teacher C

（一）基本資料

性別： 女　　教學經驗： 18 年　　任教的科目：中文、常識

（二）訪談問題－老師對常識科或 STEM 網課的看法

2.1 疫情前常識科或 STEM 實體課的看法

1. 在疫情前，你是如何為常識科課堂備課，當中主要的備課重點是甚麼？
2. 你認為自己在推行常識科或 STEM 教育實體課時大多時候擔任什麼角色？（推行者/主導者/輔助者）
3. 你是如何增加學生的上課參與度及評核學生學習表現？

1. 歸納課文的教學重點，有需要時會開小組會議
2. 輔助者，透過提問，追問輔助學生建立知識
3. 我是利用提問及獎賞增加學生的上課參與度；學生的功課、自評表、測考等都有用來評核學生的學習表現

2.2a. 疫情期間對常識科或 STEM 網課備課工作的看法

1. 在疫情期間，網課成為新的教學模式，這對你備課工作有何改變？
2. 你在任教常識科或 STEM 備課工作時有沒有遇到甚麼挑戰或困難？

1. 在疫情期間，需用更多時間準備教學簡報、影片及網上功課
2. 要花更多時間備課，想新的教學元素輔助學生建立知識

2.2b. 疫情期間對常識科或 STEM 網課授課的看法

3. 你認為常識科或 STEM 網課與實體課授課有何不同之處？

4. 你在任教常識科或 STEM 教育網課授課時有沒有遇到甚麼挑戰或困難？

5. 你是如何增加不同年級學生的課堂參與度？（例如：是否須開啟視像／利用聊天室功能）

6. 你認為自己在推行常識科或 STEM 教育網課時大多時候擔任什麼角色？(推行者/主導者/輔助者）

3. 要更多的準備，需花額外大量時間熟習運用新的網上電子工具；網上較難管理及指導學生，有部份學生不聽從老師的指示 4. 複雜的概念較難解釋，而且學生上課容易分心，受他們家中環境及家人影響 5. 請學生用網上手仔舉手及開啟視像 6. 主導者

2.2c. 疫情期間常識科或 STEM 老師如何評核學生表現

4. 在面授和網上課堂教學中，學生的課堂表現有何分別？

5. 疫情期間，你有沒有曾調整常識科或 STEM 教育的評核準則？

4. 在網課，學生較平靜。在面授時，學生較熱情及投入 5. 沒有

2.2d. 常識科或 STEM 網課的額外困難（個人層面：網上課堂管理／課堂設計；學生層面：學習環境／電子科技）

6. 你在常識科或 STEM 網課時有沒有其他額外困難？

7. 學生的家庭背景會否影響他們參與網課的投入程度？

6. 未能直接幫助能力弱的學生

7. 有。很多家長忙於工作，缺乏時間輔導學生完成功課及温習，導致學生未能跟上原有的學習進度

2.2e 疫情期間學校對常識科或 STEM 的協助

8. 在剛疫情爆發時，學校有什麼短期教學問題？當時如何提供支援？

9. 疫情期間需進行長期網上教學，學校如何協助老師安排課堂?

10. 你認為網課教學的支援（政策／資源／培訓／人手)是否足夠？

8. 部分學生不懂得用 zoom，特別是低年級學生較難掌握；學生學習物資較難送到學生手上，需利用電子形式傳送給學生

9. 安排老師回校上網課

10. 不足，因為老師很多時候在家工作，要自己負責

3. 疫情完結後，老師對未來常識科或 STEM 網課的看法

1. 恢復全面實體課後，備課的重點是否跟疫情時一樣？
2. 恢復全面實體課後，你還有使用網上學習平台嗎？為甚麼？（例如：反轉教室／google classroom）
3. 疫情完結後的教學轉變是否增加了你的工作負擔？
4. 你認為應以面授／網課／混合課堂形式教授常識科或 STEM？

1. 當然有些少分別，會多運用電子學習，輔助學生鞏固知識
2. 有，除了面授外，還可以使用網上平台補充教學資料
3. 是
4. 面授

Appendix 5

Interview Transcript of Teacher D

（一）基本資料

性別： 男 教學經驗： 6 年 任教的科目： **常識，數學，電腦**

（二）訪談問題－老師對常識科或 STEM 網課的看法

2.1 疫情前常識科或 STEM 實體課的看法

1. 在疫情前，你是如何為常識科課堂備課，當中主要的備課重點是甚麼？
2. 你認為自己在推行常識科或 STEM 教育實體課時大多時候擔任什麼角色？（推行者/主導者/輔助者）
3. 你是如何增加學生的上課參與度及評核學生學習表現？

1 在疫情前，每班的常識科老師會先自己細閱上年的教案，再開小組會議，討論是否需加減內容。 備課重點集中放在如何增加學生互動環節，如小組討論、情景互動，提高學生的參與度，希望啟發學生思考課本以外的知識。

2 我認為自己在推行常識科或 STEM 教育實體課時係擔任輔助者角色，協助學生思考相關內容。上課時會多以提問形式問學生意見，啟發佢哋思考，從而鞏固佢哋現有的知識。

3 我認為當佢哋多參與課堂活動，較容易掌握課堂內容，更有深刻的印象，學習表現更佳。因此，我會以活動形式學習，嘗試以活動吸引他們。至於如何評核學生學習表現，每堂課後都會有問答比賽，希望利用 5 至 10 分鐘時間考核學生，問答形式會以輕鬆的遊戲形式進行。至於每單元課後學校都會要求有評估來評核學生學習表現。

2.2a. 疫情期間對常識科或 STEM 網課備課工作的看法

1. 在疫情期間，網課成為新的教學模式，這對你備課工作有何改變？

2. 你在任教常識科或 STEM 備課工作時有沒有遇到甚麼挑戰或困難？

1 在剛爆發疫情時，由於網課與實體上課形式不同，而且需在網上進行，備課工作因此而增加了，我和同事們需重新調整教案和教材，望將教學內容整理得簡潔而清晰，讓學生能從網課中易於掌握。

2 老實說，疫情期間的網課備課工作比較多，原本的教學進程變得不再適用，預備時間較長。由於教科書只提供了實體課時的教材，有些活動未能在網課中進行，固需預留較多時間進行網課備課工作。

2.2b. 疫情期間對常識科或 STEM 網課授課的看法

1. 你認為常識科或 STEM 網課與實體課授課有何不同之處？
2. 你在任教常識科或 STEM 教育網課授課時有沒有遇到甚麼挑戰或困難？
3. 你是如何增加不同年級學生的課堂參與度？（例如：是否須開啟視像／利用聊天室功能）
4. 你認為自己在推行常識科或 STEM 教育網課時大多時候擔任什麼角色？(推行者/主導者/輔助者）

1 網課與實體課授課最大的分別當然是電子資源的限制及網絡問題，

2 任教常識科或 STEM 教育網課授課時會經常出現網絡問題，我曾經因網絡不穩定而自行退出 ZOOM，令學生課堂未能順利進行；又時學生亦因網絡問題未能清晰地看、聽、說。

3 為了增加學生的課堂參與度，所有學生須開啟視像，讓我觀察學生是否在專心聆聽。當他們有問題時，先開啟麥克風。至於聊天室功能，只能邀請高年級學生使用，低年級未能有效地在課堂進行。

4 你認為自己在推行常識科或 STEM 教育網課時擔任主導者角色，大部分都是我講

述學習內容，由於網課時學生間的互動難以進行，教學設計會較靜態；加上，考慮到學生學習環境未必適合長期開麥克風，擔心活動時影響其他同學，固多由我講述。

2.2c. 疫情期間常識科或 STEM 老師如何評核學生表現

1. 在面授和網上課堂教學中，學生的課堂表現有何分別？
2. 疫情期間，你有沒有曾調整常識科或 STEM 教育的評核準則？

1 學生在面授課堂中表現較網上課堂積極，網上教學的學習效果比面授課堂差。我認為這關網絡不穩定或家裡環境影響，學生未必能全堂專注聆聽。

2 老實說，常識科或 STEM 教育的評核準則必定有調整，當中的小測及考試的內容會較疫情前容易。由於剛爆發疫情時，老師和學生須時間適應突然的教學模式轉變，故降低考試的難度。

2.2d. 常識科或 STEM 網課的額外困難（個人層面：網上課堂管理／課堂設計；學生層面：學習環境／電子科技）

1. 你在常識科或 STEM 網課時有沒有其他額外困難？
2. 學生的家庭背景會否影響他們參與網課的投入程度？

1 網上課堂較難管理。學生可因外在環境影響 （家裡學習環境，網絡不穩定等），老師難以掌握每個學生的學習狀態。由於小學生既缺少自我約束力，網課課堂又缺乏學習的氛圍，令學生難以投入，需多方面思考課堂設計，增加學生課堂參與度。

2 我認為學生的家庭背景會影響他們參與網課的投入程度，有些學生未必有獨立空間進行網課，易受家人活動影響；有些家庭未必有能力購買列印機，有些功課未能完成，影響其學習進度。

2.2e 疫情期間學校對常識科或 STEM 的協助

1. 在剛疫情爆發時，學校有什麼短期教學問題？當時如何提供支援？
2. 疫情期間需進行長期網上教學，學校如何協助老師安排課堂?
3. 你認為網課教學的支援（政策／資源／培訓／人手)是否足夠？

1 在剛疫情爆發時，未知往後是否繼續網課，停課初期，學校未有完善的教學安排。當時學校為教職員提供 Ipad，拍攝教學影片複習已教授的內容。

2 隨着復課日子不斷延期，學校為老師及學生建立 ZOOM 系統，利用短片講述 ZOOM 及 GOGGLE CLASSROOM 如何授課及發放資訊和功課。

3 我認為需增加資源和人手，以協助學生，例如：改善師生比例，減少每班 ZOOM 人數，令教師有更大空間處理學生的個別需要，從而增加師生網課互動。

3. 疫情完結後，老師對未來常識科或 STEM 網課的看法

1. 恢復全面實體課後，備課的重點是否跟疫情時一樣？
2. 恢復全面實體課後，你還有使用網上學習平台嗎？為甚麼？（例如：反轉教室／google classroom）
3. 據上題，疫情完結後的教學轉變是否增加了你的工作負擔？
4. 你認為應以面授／網課／混合課堂形式教授常識科或 STEM？

1 恢復全面實體課後，備課時增加左學生互動環節，如小組討論、情景互動，提高學生的參與度；由於初期未完全熟練網課學習，令學習進度減慢；為了加快進度，現利用網上學習平台輔助實體課，故備課的工作亦因此增加了。

2 恢復全面實體課後，我都有使用網上學習平台來輔助面授課堂，利用「翻轉教室」先讓學生完成課堂前的網上自學活動，再於課堂中設置跟進活動，讓學生更有效學習。

3 疫情完結後的教學轉變當然增加左工作負擔，備課時需思考點樣結合網上學習平台，讓學生更有效學習；另外，由於我對電子教學平台較為熟識，故須指導不太熟悉電子科技的同事，配合教學。

4 你認為以混合課堂形式教授常識科或 STEM 會更有效，例如宜家會用「翻轉教室」先讓學生完成課堂前的網上自學活動，再於課堂中設置跟進活動，結合電子學習與自學活動模式。

Appendix 6

Interview Transcript of Teacher E

（一）基本資料

性別： 女 教學經驗： 8 年 任教的科目：英文、常識

（二）訪談問題－老師對常識科或 STEM 網課的看法

2.1 疫情前常識科或 STEM 實體課的看法

1. 在疫情前，你是如何為常識科課堂備課，當中主要的備課重點是甚麼？
2. 你認為自己在推行常識科或 STEM 教育實體課時大多時候擔任什麼角色？（推行者/主導者/輔助者）
3. 你是如何增加學生的上課參與度及評核學生學習表現？

1 每單元都會同同級老師一起備課，事先討論將要授課的主題內容、教案設計、教學活動，評估學生是否能達到教師預設的學習目標 2 自己在推行常識科或 STEM 教育實體課時擔任輔助者，教學活動會以學生為中心，希望學生能從活動中學習，與其他同學合作找出答案，協助他們建立知識。 3 有些學習任務需以小組形式進行，以強帶弱，鼓勵小組合作；至於評核方面：上課時會多提問及追問，並以家課和測考評核學生學習表現

2.2a. 疫情期間對常識科或 STEM 網課備課工作的看法

1. 在疫情期間，網課成為新的教學模式，這對你備課工作有何改變？
2. 你在任教常識科或 STEM 教育備課工作時有沒有遇到甚麼挑戰或困難？

1&2 當然有轉變啦！剛開始時，備課工作只能獨自進行，所有課堂活動和教學設計都是自己完成，備課工作亦因憂慮學生未及時適應而加重負擔，需從多方面思考如何增加學生在網課的投入程度

2.2b. 疫情期間對常識科或 STEM 網課授課的看法

3. 你認為常識科或 STEM 網課與實體課授課有何不同之處？

4. 你在任教常識科或 STEM 教育網課授課時有沒有遇到甚麼挑戰或困難？

5. 你是如何增加不同年級學生的課堂參與度？（例如：是否須開啟視像／利用聊天室功能）

6. 你認為自己在推行常識科或 STEM 教育網課時大多時候擔任什麼角色？(推行者/主導者/輔助者）

3 網課互動性較差，無法即時看到學生的學習問題，例如：教授學生編程時無非即時看到學生遇到的困難

4 學生在家上課易分心，更難留意所有學生表現；無法即時指正學生

5 設獎勵計劃（ClassDojo）及聊天室功能增加不同年級學生的課堂參與度

6 主導者，網課只能主要教授社會方面的知識內容，而需學生多互動的科學實驗實驗需等實體課時才能補教，這因安全問題和考慮到學生屋企未必有資源進行

2.2c. 疫情期間常識科或 STEM 老師如何評核學生表現

4. 在面授和網上課堂教學中，學生的課堂表現有何分別？

5. 疫情期間，你有沒有曾調整常識科或 STEM 教育的評核準則？

4 .網上課堂：學生上課不專心，容易受家人家中活動影響（環境嘈雜）

5 有，其評核準則變得較容易，多以短答或選擇題

2.2d. 常識科或 STEM 網課的額外困難（個人層面：網上課堂管理／課堂設計；學

生層面：學習環境／電子科技）

6. 你在常識科或 STEM 網課時有沒有其他額外困難？

7. 學生的家庭背景會否影響他們參與網課的投入程度？

6 有些學生不願意開視像鏡頭，令我不知道他是否有認真上課；較難收集學生的功課，難以評核學生表現 7 會，很多家長只顧工作，忽略學生；部分小朋友由老人家或工人姐姐照顧，較難管理或教導小朋友

2.2e 疫情期間學校對常識科或 STEM 的協助

8. 在剛疫情爆發時，學校有什麼短期教學問題？當時如何提供支援？

9. 疫情期間需進行長期網上教學，學校如何協助老師安排課堂?

10. 你認為網課教學的支援（政策／資源／培訓／人手)是否足夠？

8 老師需要時熟習新的電子教學工具、初時學生未掌握如何使用 zoom。學校 IT 組制作 ZOOM 教學短片給師生，提供電話教學及解答 9 學校 it 組提供網上 ZOOM 教學，協助老師安排課堂。 10 缺乏培訓，老師很多時候需自行摸索

3. 疫情完結後，老師對未來常識科或 STEM 網課的看法

1. 恢復全面實體課後，備課的重點是否跟疫情時一樣？
2. 恢復全面實體課後，你還有使用網上學習平台嗎？為甚麼？（例如：反轉教室／google classroom）
3. 疫情完結後的教學轉變是否增加了你的工作負擔？
4. 你認為應以面授／網課／混合課堂形式教授常識科或 STEM？

1. 備課工作當然不同啦，會多思考更多電子學習元素

2. 有的，依家亦有用 google classroom，向學生發放教學短片。由於疫情令教學速度減慢，需追趕課節，故部分教學內容會讓學生自行完成，加快教學速度。我亦有運用反轉教室讓學生先完成預習，再課堂上講解，不但能加快教學速度，同時能讓學生印象更深刻。

3. 有的，由於我在資訊科技的技能稍遜，需投放更多時間在建立 google classroom 等網上教學，令工作時間加長。

4. 對我來說，我認為混合課堂更佳，雖然我對網上平台並不熟練，但這真係對學生有利。「翻轉教室」讓學生完成課堂前的網上自學活動，再課堂上講解，學生印象更深刻。

Appendix 7

Interview Transcript of interview F

（一）基本資料

性別：　女　　教學經驗：　22　　任教的科目：中文、常識

（二）訪談問題－老師對常識科或 STEM 網課的看法

2.1 疫情前常識科或 STEM 實體課的看法

1. 在疫情前，你是如何為常識科課堂備課，當中主要的備課重點是甚麼？
2. 你認為自己在推行常識科或 STEM 教育實體課時大多時候擔任什麼角色？（推行者/主導者/輔助者）
3. 你是如何增加學生的上課參與度及評核學生學習表現？

1.通常先進行集體備課，全級的科任共同安排每課需用的教節、該課的學習重點、學生學習難點，以及安排甚麼課堂活動，最後決定如何佈置課業。

2.在推行實體課時，主要透過活動讓學生明白教學重點，盡量安排師生及生生互動。在不同的情況下，會以主導者或引導者的身份進行教學，大多時候擔任輔助者。

3.留意儘量安排每位學生回答老師的提問。如部分學生過於被動，可主動請他回應，或以加分的形式，鼓勵學生主動參與、舉手回應老師及參與課堂活動。

2.2a. 疫情期間對常識科或 STEM 網課備課工作的看法

1. 在疫情期間，網課成為新的教學模式，這對你備課工作有何改變？
2. 你在任教常識科或 STEM 備課工作時有沒有遇到甚麼挑戰或困難？

1. 需要轉變教學方法，儘量蒐集合適短片輔以教學，讓課堂不致太沉悶，吸引學生學習。為提高學習興趣，需要利用不同電子學習平台，讓學生回答問題、參與課堂活動及以遊戲形式進行學習。
2. 網課時間短，學生專注力比實體課堂低，在「山高皇帝遠」的情況下，要讓他們專注學習，是一項十分高難度的工作。因此需要比平常花更多時間去搜集教學材料及構思具吸引力的學習活動。

2.2b. 疫情期間對常識科或 STEM 網課授課的看法

1. 你認為常識科或 STEM 網課與實體課授課有何不同之處？
2. 你在任教常識科或 STEM 教育網課授課時有沒有遇到甚麼挑戰或困難？
3. 你是如何增加不同年級學生的課堂參與度？（例如：是否須開啟視像／利用聊天室功能）
4. 你認為自己在推行常識科或 STEM 教育網課時大多時候擔任什麼角色？(推行者/主導者/輔助者）

1.在實體課時較方便進行實驗活動及課堂活動，以至有具質素的師生及生生互動。
2.較難觀察及評估學生的學習成效，以及學生在課堂時是否專注。
3. 開啟視像是必須的，另會因應學生能力使用不同的電子學習平台，輔以教學，例：nearpod,peardeck,wordwall,kahoot,padlet,mentimeter.
4.主導者

2.2c. 疫情期間常識科或 STEM 老師如何評核學生表現

1. 在面授和網上課堂教學中，學生的課堂表現有何分別？

2. 疫情期間，你有沒有曾調整常識科或 STEM 教育的評核準則？

1.學生的專注度在面授課堂一定比網課高

2. 有，因進行網課，未能進行實體的生活實務評核計考試分

2.2d. 常識科或 STEM 網課的額外困難（個人層面：網上課堂管理／課堂設計；學生層面：學習環境／電子科技）

1. 你在常識科或 STEM 網課時有沒有其他額外困難？
2. 學生的家庭背景會否影響他們參與網課的投入程度？

1. 需要兼顧嘅嘢非常多，例如：點名、按掣讓學生進入課堂講課、管理課堂秩序，解決學生即時發生的不同問題（如學生沒有開鏡頭、開咪胡亂說話、學生家中背景聲音太嘈雜、部份學生不專注做自己的事、學生開了鏡頭，但不在鏡頭內等等情況，影響教學進度。有時還有因為老師未熟習一些學習平台的運作，而多花了時間。
2. 絕對有，如部份學生屋企沒有合適的電腦裝置/網絡不穩定，會影響學習，後期先由學校提供。有些因為兩兄弟姊妹在同一個客廳裏面上課，所以聲音會較嘈雜。若果是工人姐姐在家中看管，情況會比較差，又或是有一些老人家在鏡頭前走來走去，或者叫學生吃東西、罵學生等等。

2.2e 疫情期間學校對常識科或 STEM 的協助

1. 在剛疫情爆發時，學校有什麼短期教學問題？當時如何提供支援？
2. 疫情期間需進行長期網上教學，學校如何協助老師安排課堂?
3. 你認為網課教學的支援（政策／資源／培訓／人手)是否足夠？

1.疫情剛爆發時，我哋學校下學期是沒有網課的，只有老師製作教學影片在 Google Classroom 讓學生自行收看及完成 Google form、工作紙及作業等功課

2. 學校為老師在每個課室安排一部電腦及一部手提電腦，供老師在課堂時能進行教學及控制課室秩序。

3. 突然轉變為網課，老師和學生都需要時間適應，因為上課的形式不同，老師需要多花時間自學不同的學習平台，相對是較為吃力。有時需要同事之間互相分享及學習。

3. 疫情完結後，老師對未來常識科或 STEM 網課的看法

1. 恢復全面實體課後，備課的重點是否跟疫情時一樣？
2. 恢復全面實體課後，你還有使用網上學習平台嗎？為甚麼？（例如：反轉教室／google classroom）
3. 疫情完結後的教學轉變是否增加了你的工作負擔？
4. 你認為應以面授／網課／混合課堂形式教授常識科或 STEM？

1.當然不同，現在可聚焦集中設計課堂活動，讓學生參與更多。

2. 有，因為唔同的學習平台各有優點，老師可按需要選用，令學生的學習更多樣化。

3. 無疑是增加了工作量，依家使用電子教學已日趨純熟，故可以接受。

4. 始終都係面授的彈性及效果較佳