The Barriers of Technology Integration in Hong Kong Primary School English Education: Preliminary Findings and Recommendations for Future Practices

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Abstract—**The use of technology has become increasingly popular in various education contexts. However, integrating technology into teaching and learning is not without problems. This study aims to understand the barriers of technology integration in Hong Kong primary school English education. Thirty-six in-service teachers of an e-learning training course participated in this study. Through a free-response survey, they reported the barriers of using technology in their day-to-day English teaching. The findings indicated that a lack of resources (e.g., technology resources and preparation time) and inadequate knowledge and skills of e-learning practices were the two most frequently reported barriers of technology integration in local schools. Based on the responses of the teacher participants, five recommendations were made to inform future practices of e-learning. These recommendations included using some low-cost technology tools, having a technology integration plan in school, ensuring students' access to technology, improving students' skills and attitudes of e-learning, and providing opportunities of professional development.**

Index Terms—**Barrier, e-learning, English education, primary school, technology integration.**

I. Introduction

Thanks to the advancement of information technology, there is a growing interest in using technology in various education contexts, including English education. Some mobile devices such as tablets [1] and smartphones [2] have been used to facilitate student learning inside the English classroom. Besides, some contemporary instructional approaches such as flipped learning [3], [4] and distance learning [5], [6] also rely heavily on information technology. Students are now able to prepare for their class meetings or even learn independently outside the classroom using e-resources such as online video lectures. Information technology has played an important role to enhance teaching and learning inside and outside the classroom.

However, integrating technology into education is not without challenges. Even in Hong Kong – a well-developed city, barriers are encountered when using technology in day-to-day teaching. For example, Fox and Henri [7] found that the teachers in Hong Kong have little time to attempt new technology-enhanced pedagogies due to the exam-oriented culture. Time constraints and the way of assessment become

the barriers of technology integration.

The Hong Kong government is now implementing the Fourth Strategy on Information Technology in Education (ITE4), aiming to promote student learning through the use of technology in teaching and learning [8]. In fact, the government has launched a series of strategies to improve the technology infrastructure [9], e-resources [10], and e-leadership [11] of Hong Kong schools. Still, what are the barriers of technology integration in Hong Kong education?

This survey study aims to understand the barriers that Hong Kong primary school English teachers encounter when integrating technology into their day-to-day teaching. The overarching goal of this study is to offer recommendations for future practices of e-learning. The following research questions were thus posed:

1) What are the barriers of using technology in Hong Kong primary school English education?

2) What are some recommendations for future practices of e-learning in English education?

II. Literature Review

This session first highlights a few representative examples of using technology in English education contexts. The barriers of technology integration are then discussed.

A. Technology Integration in English Education

Information technology has been applied to support various aspects of English teaching and learning. For example, some mobile devices can be used as teaching tools. In their freshman English course, Wang, Teng, and Chen [1] taught English vocabulary using an iPad app, called "Learn British English WordPower" (Fig. 1). This app assisted their students in mastering words and phrases in the English language. At the end of their 14-week course, they examined the effect of teaching with the iPad app in comparison to the traditional semantic-map teaching approach. Their post-test results indicated that the students who received the iPad vocabulary teaching significantly outperformed the traditional classroom students. More importantly, most of the students agreed that the use of technology could assist their language learning.

Zarzycka-Piskorz [2] used digital game elements such as points and a leaderboard to motivate students in learning grammar. She gamified her general English language course using "Kahoot" – a game-based learning platform that can be used in mobile devices. She prepared questions related to the course materials and made the questions available on Kahoot. During the class activities, her students gave their answers

using their mobile device through their student account. Being gamified with Kahoot, her class activities involved level-up, task accomplishment, and teamwork. In this gamified environment, more than 70% of her students stated that they felt motivated to learn grammar. Furthermore, her students generally agreed that learning with Kahoot was better than traditional teaching.
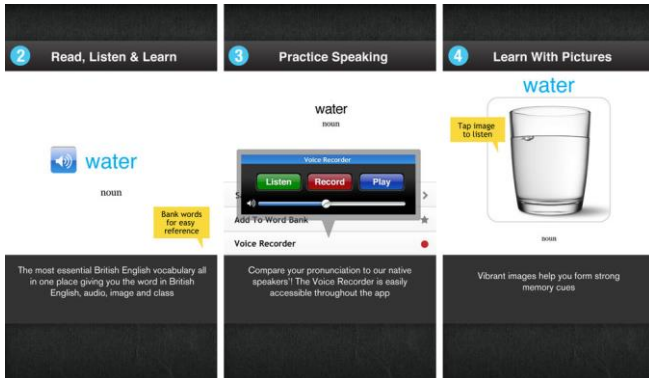

Fig. 1. Screenshots of "Learn British English WordPower" app.

Apart from the use of educational hardware and software, information technology also enables pedagogical changes. Take the flipped classroom approach as an example. Teachers in a flipped classroom would produce some instructional videos to offload the direct lecturing part online (e.g., [3], [4]). As students have visited the video lectures and acquired some basic knowledge before class meetings, more in-class time can be spent on interactive learning activities such as group discussion [12], [13].

Engin [3] used the flipped classroom approach to deliver her academic writing course. She created several instructional videos to introduce how to write a research question, organize an argumentative essay, to name a few. Before the face-to-face lessons, her students studied the course materials by watching these videos. Engin [3] further required her students to produce digital videos to present some course topics for their classmates. In other words, her students not only learned English through e-learning resources, but they also created digital videos using information technology.

Huang and Hong [4] taught Grade 10 English reading comprehension using the flipped classroom approach. They found that flipped learning could significantly improve student achievement. Despite the success of their intervention, they highlighted that institutional support is vitally important for the implementation of flipped classrooms. Specifically, "it relies on the extent of the investment by schools in computer resources for English education purposes" (p. 190).

B. The Barriers of Technology Integration

When integrating technology into teaching, teachers may encounter multiple barriers. Lo and Hew [13] focused on the challenges of flipped learning in K-12 education contexts. They identified various challenges in the existing studies, ranging from the student aspect (e.g., being unable to stay focused when watching instructional videos), faculty aspect (e.g., workload on resources preparation), to operational aspect (e.g., teachers' limited IT skills). While their analysis

is somewhat specific to flipped learning, some of their guidelines proposed are useful for the future practices of e-learning (e.g., preparing e-resources progressively and providing institutional support).

Through a synthesis of research, Hew and Brush [14] classified the barriers of technology integration into six main categories, including (1) resources, (2) knowledge and skills, (3) attitudes and beliefs, (4) institution, (5) assessment, and (6) subject culture. Table I provides an overview of these barriers.

TABLE I: BARRIERS OF TECHNOLOGY INTEGRATION

Barrier	Description
Resources	The lack of resources such as technology, access to available technology, time, and technical support.
Knowledge and skills	The lack of knowledge and skills of specific technology, technology-enhanced pedagogies, and technology-related classroom management.
Attitudes and beliefs	Teacher attitudes and beliefs toward the use of technology in teaching and learning.
Institution	The institutional barriers such as leadership, school time-tabling structure, and school planning.
Assessment	The pressures of assessment due to its consequences such as promotion or graduation for students.
Subject culture	The incompatibility of the norms of a subject culture such as institutionalized practices and expectations.

According to Hew and Brush [14], the lack of resources is the most frequently reported barrier of using technology in education. There are several types of resources which include technology, access to available technology, time, and technical support. For example, creating e-learning resources (e.g., instructional videos) would result in time burdens when teachers start using technology-enhanced pedagogies such as flipped learning [13]. Even though these resources are available online, some students in remote areas may not have the Internet access at home [6], [13]. The lack of access to available technology resources becomes the barrier of e-learning.

The lack of knowledge and skills is another highly reported barrier of technology integration [14]. Lo and Hew [13] revealed that some teachers have inadequate knowledge of technology-enhanced pedagogies or lack the skills of creating e-resources and its management. For example, some teachers are not familiar with flipped learning [13] or some other computer-assisted language learning approaches [5]; a few teachers have difficulty creating their first instructional video [15] and upload their videos online [16].

Besides, teacher attitudes and beliefs toward the use of technology determines their day-to-day teaching practices [17], which in turn can become a barrier of technology integration [14]. In the context of second language instruction, Lam [17] found that teachers were unlikely to use technology in their classroom if they could not see the benefits of e-learning. There is therefore a need to provide in-service training of computer-assisted language learning [5], [17].

Other barriers are relatively less frequently reported, including institution, assessment, and subject culture [14]. However, these barriers have indeed hindered the use of technology in the classroom. For example, not all teachers in Hong Kong are willing to attempt new technology-enhanced

pedagogies because information technology is not directly relevant to the assessment of learning (e.g., public examinations) [7]. Therefore, identifying teachers' barriers of technology integration is the first step to overcome these barriers.

III. METHODS

To give a clear picture of the research background, we first introduce the major policies of information technology in Hong Kong education. We then provide the background information of our research participants. After that, the details of data collection and analysis are discussed.

A. Research Background

This survey study was conducted in Hong Kong. Table II shows that the Hong Kong government has launched a series of strategies on information technology in education (ITE). From 1998 to 2014, the first three strategies (i.e., ITE1, ITE2, and ITE3) were enacted and completed, emphasizing on the infrastructure [9], e-resources [10], and e-leadership [11], respectively. The achievements of ITE1 to ITE3 have enabled Hong Kong to shoot the target of enhancing student learning using technology. In fact, this is the goal of the current strategy on information technology in education (i.e., ITE4) [8] launched in 2015.

TABLE II: STRATEGIES ON INFORMATION TECHNOLOGY IN HONG KONG

Strategy (Year)	Main focus	Official document
ITE1 (1998-2003)	Infrastructure	[9]
ITE2 (2004-2007)	e-resources	[10]
ITE3 (2008-2014)	e-leadership	[11]
ITE4 (2015-current)	Student learning	[8]

Under the "Support Scheme on e-learning in Schools," 100 public schools in Hong Kong received an average of HK$100,000 (about US$13,000) to enhance the technology infrastructure in 2014 [8]. Now, the scheme has been extended to the remaining 900 public schools in Hong Kong. This grant has been used to enhance the Wi-Fi network as well as acquire mobile devices in school [8]. The teachers and students are thus able to access and use these e-learning resources in class.

B. Research Participants

A total of 73 primary school English teachers participated in a 2-hour e-learning training course in The Chinese University of Hong Kong. They were invited to complete a written survey on the barriers of technology integration in late September 2017. Thirty-six (49.3%) of the teacher participants provided responses to the survey, sharing their problems and barriers of using technology in English teaching.

Fig. 2 shows that their background was diverse in terms of their teaching experience ($Mdn = 12$, $M = 12.17$, $SD = 7.64$), ranging from 1 to 28 years. Such distribution enabled us to understand the barriers of technology integration from the full spectrum of in-service teachers, ranging from the junior to the senior teachers.

Regarding their position level, 13 (36.1%) out of the 36 teacher participants stated that they were the panel chairperson or assistant chairperson of the English department in their school. The responses of this particular group of teachers allowed us to understand the barriers of technology integration from the administrative level.
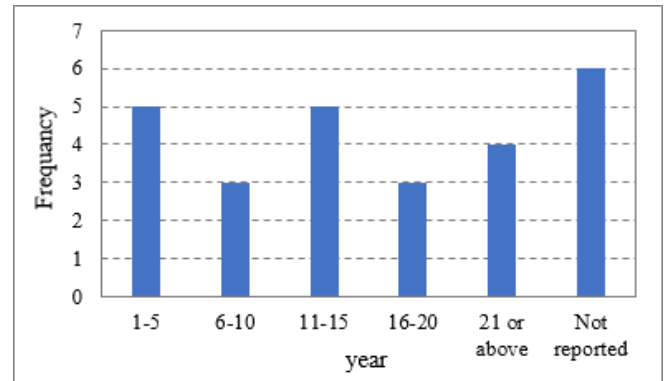

Fig. 2. Teaching experience of the teachers.

For the grade level of teaching, Fig. 3 shows that most ($n = 30$) of the teacher participants taught the senior primary (Grade 4 to 6). Only half of them ($n = 15$) also taught the junior primary (Grade 1 to 3). None of the teacher participants taught the junior primary only. Therefore, one should exercise caution that the data collected from these research participants may be biased toward their experience of senior primary English teaching.
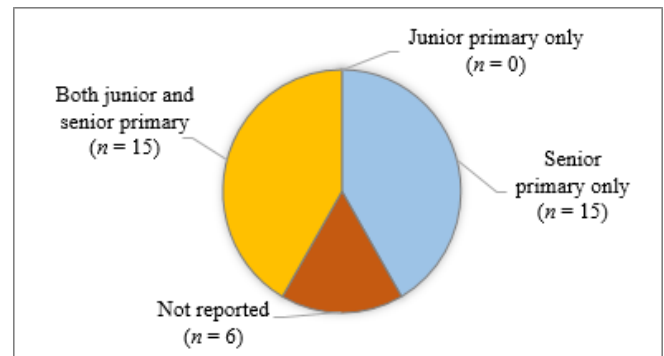

Fig. 3. Grade level of teaching of the teacher participants.

C. Data Collection and Analysis

To answer the research questions, a 15-minute survey (see Appendix) was used to investigate teachers' barriers of technology integration. First, the teacher participants were anonymously asked to provide some background information about their teaching experience, position, and grade level of teaching. They then gave free-responses about their barriers of technology integration. A unique identifier was assigned to each teacher participant ("CP" stands for chairpersons or assistant chairpersons and "NC" stands for non-chairpersons).

Their free-responses were collected and analyzed through a thematic content analysis. Codes were assigned to the data and grouped into categories. Initially, the general framework for coding followed the six barriers of technology integration (Table I) defined by Hew and Brush [14]. Similar codes were organized into sub-categories under their framework. All the emergent categories and sub-categories were constantly compared, contrasted, and revised to identify the key themes.

IV. RESEARCH FINDINGS

When the 36 teacher participants were asked for the barriers of technology integration, each of them stated at least one barrier of using technology in their English teaching. Table III shows that all the reported barriers could be categorized using the framework defined by Hew and Brush [14].

The findings indicated that the lack of resources was the most often reported barrier of using technology in English education. After that, the problems related to knowledge and skills were also frequently stated. Finally, a notable few teacher participants mentioned the barriers about attitudes and beliefs, institution, assessment, and subject culture.

There was approximately a 1:2 ratio in the number of panel chairpersons or assistant chairpersons ($n = 13$) to the number of non-chairpersons ($n = 23$). Remarkably, we found that the counts in each category roughly followed this ratio except the barriers about knowledge and skills. While less than half of the non-chairpersons expressed their concerns about the knowledge and skills of using technology in English education, almost all the panel chairpersons or assistant chairpersons were worried about this aspect.

TABLE III: SIX CATEGORIES OF BARRIERS BY POSITION LEVEL

Category of barriers	Chairperson# ($n = 13$)	Non-chairperson ($n = 23$)	Total*
Resources	16	29	45
Knowledge and skills	12	11	23
Attitudes and beliefs	1	3	4
Institution	0	2	2
Assessment	0	1	1
Subject culture	0	1	1

Including both panel chairpersons and assistant chairpersons.
* The numbers do not add up because one teacher participant might report more than one barrier.

A. The Barriers Related to Resources

The 45 reported barriers about resources were further organized into six sub-categories (Table IV). The lack of technology in school was the most frequently mentioned sub-category of resources. For example, a teacher worried about the "Availability of iPad copies in school for all students" (NC-20). A teacher specifically stated that there were only 60 iPads in school (CP-08). Such a small number of mobile devices could not cater to the demand of the whole school. Meanwhile, some "Students don't have their own iPads" (CP-06) and "Some even don't have a computer at home" (CP-07). Inadequate technology resources thus hindered the use of e-learning in English education.

There were two sub-categories related to time constraints. For the time on preparation, teachers mentioned that "We may not have enough time to explore the latest e-learning tools" (CP-10) and "get to know different apps for the students' learning" (NC-09). Besides, teachers could spend little time on e-learning in their English teaching because "The curriculum is tight" (CP-07).

Several teachers reported the barriers about technical support and access to technology. Some technical issues such as "Wi-Fi stability" (NC-12) and "Hardware support"

(NC-18) were their concerns of using technology in their day-to-day teaching. Finally, a few teachers brought out the issue about "Regional barrier of the access of certain websites" (CP-12).

TABLE IV: THE REPORTED BARRIERS ABOUT RESOURCES

Sub-category	Count	Representative participant quotes
Technology – School	21	"Lack of iPads (60 whole school)" (CP-08); "Availability of iPad copies in school for all students" (NC-20).
Technology – Students	3	"Students don't have their own iPads" (CP-06); "Some even don't have a computer at home" (CP-07).
Time – Preparation	7	"Teachers have to prepare the teaching materials and tools" (CP-04); "We may not have enough time to explore the latest e-learning tools" (CP-10); "Teachers don't have enough time to get to know different apps for the students' learning" (NC-09).
Time – Teaching	5	"The curriculum is tight" (CP-07); "Time regarding rules/codes of conduct for using digital resources" (NC-05); "I think it is quite time-consuming to teach students using iPad/tablets especially in English" (NC-08).
Technical support	5	"Wi-Fi stability" (NC-12); "Hardware support" (NC-18).
Access to technology	4	"Regional barrier of the access of certain websites" (CP-12).

B. The Barriers Related to Knowledge and Skills

The 23 reported barriers about knowledge and skills were further organized into two sub-categories (Table V). First, there were concerns about teachers' knowledge and skills of using technology. In the words of the teacher participants, "Teachers are not familiar in using e-learning tools" (CP-01) and "Not aware of the available educational apps that can be used in our English lessons" (CP-09).

TABLE V: THE REPORTED BARRIERS ABOUT KNOWLEDGE AND SKILLS

Sub-category	Count	Representative participant quotes
Knowledge and skills – Teachers	14	"Teachers are not familiar in using e-learning tools" (CP-01); "Adaptation of the suitable tools e.g., apps of learning platforms" (NC-17); "Not aware of the available educational apps that can be used in our English lessons" (CP-09).
Knowledge and skills – Students	9	"Some students do not have the ability in using e-tool" (CP-07); "The students have to use the tool before the learning activities" (CP-04) "Students must learn the very apps first as they have little knowledge to iPads" (NC-20).

Second, several teachers reported that some students were not capable of using technology to learn English. As one of the teachers observed, "Some students do not have the ability in using e-tool" (CP-07). Another teacher even suggested that

"Students must learn the very apps first as they have little knowledge to iPads" (NC-20).

C. Other Less Frequently Reported Barriers

There was a scattering of reported barriers covering attitudes and beliefs, instruction, assessment, and subject culture.

The four reported barriers about attitudes and beliefs were further organized into two sub-categories (Table VI). For the attitudes and beliefs of teachers, one of the panel chairpersons expressed that "Teachers are not confident in using e-learning in lesson" (CP-07). At the same time, some teachers had a "Conservative mind of belief" (NC-12) regarding e-learning. As for the students, a teacher reported that some students did not have an appropriate learning attitude when mobile devices were used in their English lessons. In the words of the teacher, "Students are excited and play other games in iPad secretly" (NC-02).

TABLE VI: The Reported Barriers about Attitudes and Beliefs

Sub-category	Count	Representative participant quotes
Attitudes and beliefs of teachers	3	"Teachers are not confident in using e-learning in lesson" (CP-07); "Conservative mind of belief" (NC-12).
Attitudes and beliefs of students	1	"Students are excited and play other games in iPad secretly" (NC-02).

For the institutional barriers, two reported barriers related to school planning. A teacher wrote: "Book the iPad (competitions from other subjects)" (NC-23). When there was a lack of technology resources, such problem could shift to the institution level. As a teacher mentioned, the "Logistics of iPads" (NC-10) was a concern of using technology in the English classroom.

One reported barrier related to assessment. A teacher wrote: "Assessment through typing – speed of students' typing skills" (NC-05). This response highlighted the problem of using e-assessment in which students' typing skills determined the time required for completion in addition to their English ability.

Finally, one reported barrier related to subject culture. A teacher worried about students' familiarity with e-learning because "The introduction of e-learning especially with iPads in class will be a new culture/practice that students need to get used to" (NC-01).

V. DISCUSSION

This survey study uncovered the recent barriers of technology integration in Hong Kong primary school English education. Remarkably, our findings still resonate the study by Hew and Brush [14] published ten years ago (i.e., 2007). The barriers related to resources still dominantly hindered the use of technology in local primary school English classrooms. Specifically, the lack of technology in school was the most frequently stated problem to be addressed. In addition, the barriers related to knowledge and skills were also reported very often. The findings indicated that there is a need for both teachers and students to improve their knowledge and skills about e-learning.

In this stage of research, our study involved only 36 teacher participants. Although the small sample size affects the generalizability of our preliminary findings, five recommendations are derived from the voices of the teacher participants to overcome the barriers of technology integration. Table VII first provides an overview of these five recommendations for future practices of e-learning.

TABLE VII: Recommendations for Future Practices of E-Learning

Recommendation	Empirical rationale
1. Using some low-cost technology tools • Purchasing cheaper alternatives • Using the e-tools which require minimal technology	Lack of technology in school.
2. Having a technology integration plan in school • Establishing a system to manage technology resources and provide technical support • Introducing technology into a few subjects at a time • Reducing class loads for a few e-learning teachers • Creating e-learning materials collaboratively	Lack of technology in school; Lack of technical support; Lack of preparation time.
3. Ensuring students' access to technology • Reserving computer facilities in school for students' e-learning after school	Students' lack of technology; Lack of access to technology.
4. Improving students' skills and attitudes of e-learning • Teaching the knowledge and skills of e-learning during computer lessons • Establishing rules for e-learning activities	Lack of teaching time; Students' inadequate knowledge and skills; Students' inappropriate attitudes.
5. Providing opportunities of professional development • Offering more in-service training courses in higher education institutions • Participating in the training of technology knowledge and skills	Teachers' inadequate knowledge and skills; Teachers' attitudes and beliefs.

A. Using Some Low-Cost Technology Tools

Although the Hong Kong government has provided every school with a grant to acquire mobile devices [8], this one-off subsidy can no longer cater to the demand of the local schools. The limited number of mobile devices cannot adequately serve the needs of every concurrent lesson. A teacher (NC-23) even reported that teachers from different subjects had to compete for the technology resources (i.e., mobile devices). In view of this situation, school leaders can use some relatively low-cost technology tools at the start of introducing technology in school [14], [18].

Take the cost of acquiring mobile devices as an example. On a fixed and limited budget of technology resources, schools can stretch their purchasing capacity if the cost of each mobile device is lower. Samsung is one of the cheaper alternatives [19]. Fabian and MacLean [20] purchased Samsung tablets for their students. In their language course, many learning activities such as creating e-portfolio and word processing were carried out with the tablets. Most importantly, the students could use various e-learning apps (e.g., "LearnEnglish Grammar" and "Socrative") to facilitate

their English learning.

Apart from the low-cost technology, teachers can also consider using some e-tools which require minimal technology. For example, "Plickers" is an education app that can collect students' real-time responses without the use of their mobile device [21]. Teachers first prepare some multiple-choice questions before class. Then each student uses a printed Plickers card to show their response inside the classroom. Using the Plickers app installed in teachers' smartphone, teachers can scan students' responses through the phone camera (Fig. 4). Their responses become the learning data which will be displayed and recorded instantly in the app. As Krause, O'Neil, and Dauenhauer [21] comment, it is a cost-effective tool for formative assessment inside the classroom. By contrast, Zarzycka-Piskorz [2] used Kahoot in her English classroom to collect students' real-time responses to her questions. Although this app is free of charge and enables the use of game elements, each student must have a mobile device for class participation. When there is a limited number of mobile devices in school, Plickers is one of the low-cost alternatives that can be used to engage students in class activities.
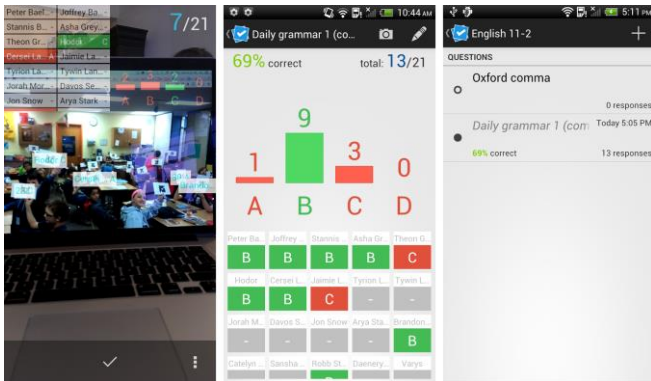

Fig. 4. Screenshots of "Plickers" app.

B. Having a Technology Integration Plan in School

Our findings suggested that there is a need to have a technology integration plan in school, especially when the technology resources cannot serve the whole school and the use of e-learning approaches still requires a considerable start-up effort.

School leaders should establish a system to manage the technology resources in school and to provide sufficient technical support. For example, a teacher participant brought out the issue of "Logistics of iPads" (NC-10) in school. School leaders should establish procedures for booking e-tools such as mobile devices. Google Forms is a free and user-friendly tool to create an online booking system for technology resources. Besides, IT technicians should check the information technology systems and hardware regularly. Specifically, maintaining Wi-Fi stability is vitally important because many e-learning approaches require Internet access. Technicians may also consider preparing several portable Wi-Fi routers which rely on mobile data service. Using these routers can be a backup plan for Internet access when the school Wi-Fi system is unstable during class.

When the technology resources are inadequate to serve the concurrent demand from different subjects, school leaders

should implement e-learning practices in a reasonable pace. Hew and Brush [14] suggest introducing technology into a few subjects at a time. Not only can the resources competition among different subjects be minimized, but schools can also buy time for resources accumulation.

Regarding the lack of preparation time on e-learning, school leaders can consider reducing class loads for a few teachers [22]. In this way, these teachers can coordinate the use of technology and take up the responsibility for creating e-learning materials and lesson plans. Lim and Khine [23] further suggest the teachers to produce the resources collaboratively to avoid duplicating efforts.

C. Ensuring Students' Access to Technology

Remarkably, some teachers reported that there were still a few students who did not have a computer or could not access the Internet at home. Therefore, it is not possible for them to complete any e-learning tasks at home. As Lo and Hew [13] suggest, school leaders should reserve some computer facilities in school to support the implementation of technology-enhanced pedagogies. In this way, students can have an option to complete their take-home e-learning tasks in school after school hours.

It is worth noting that some primary school students do not have their own tablet device. Therefore, school leaders should exercise caution when launching "Bring Your Own Device" (BYOD) policy. The socioeconomically disadvantaged students may need financial support from school or other funding sources to acquire a mobile device for e-learning.

D. Improving Students' Skills and Attitudes of E-learning

Some teachers expressed that their students did not have the knowledge and skills of e-learning. For example, some students might encounter difficulties in operating mobile devices or did not have the ability to use some education apps. However, teaching these knowledge and skills in English lessons may not be feasible because the English curriculum in Hong Kong is tight. School leaders can consider refining the focus of technology education to support students' e-learning. During their computer lessons, teachers can introduce the necessary knowledge and skills of e-learning. The English lessons can thus focus on the subject knowledge rather than the knowledge and skills of information technology.

In addition, students should be trained to have the right attitude toward e-learning. Undesirable behavior such as playing other games on iPad during lessons should be decreased. Lim *et al.* [23] therefore suggest rules and procedures to be established in technology-integrated classrooms, covering the discipline aspect (e.g., the use of resources) and educational aspect (e.g., group work and note-taking). These rules and procedures become students' guidelines for appropriate behavior in an e-learning environment.

E. Providing Opportunities of Professional Development

Some teachers lack the knowledge and skills of using technology in English education. In particular, most of the panel chairpersons or assistant chairpersons expressed such concern. This finding indicated that based on their

observation, not all members of their English department were confident and capable of using technology in their day-to-day teaching.

Professional development can improve teachers' knowledge and skills of e-learning practices as well as their attitudes and beliefs toward technology integration [14]. We suggest that higher education institutions can offer more in-service training courses of e-learning [5], [17]. Based on our teachers' responses, several topics can be covered to address their concerns and needs: (1) Basic technology knowledge and skills [22], (2) classroom management skills in the technology-integrated classroom [23], and (3) examples related to the use of technology in English education [24]. These training courses not only improve teachers' knowledge and skills of e-learning practices, but also save teachers' time on exploring and learning the latest e-learning tools. Once the courses are available, school leaders should encourage and free up their teaching staff to participate in the training.

VI. CONCLUSION AND LIMITATIONS

This survey study enriched our understandings of the use of technology in Hong Kong primary school English education. Two major barriers of technology integration were identified, including a lack of resources and inadequate knowledge and skills of both teachers and students. The responses of the teacher participants provided insights into future practices of e-learning. In particular, five recommendations were made to overcome the reported barriers. For example, school leaders should have a technology integration plan to manage technology resources and to introduce technology into school at a reasonable pace. In addition, we recommend higher education institutions provide more training courses for in-service teachers to improve their knowledge and skills of e-learning practices.

Nevertheless, two major limitations of this survey study must be acknowledged. First, our analysis could only focus on the survey responses provided by a limited number of teacher participants who attended our e-learning training course. The absence of a category or sub-category did not necessarily imply the absence of a certain barrier. Instead, it only indicated that the teacher participants did not mention that aspect in the survey. In future research, this survey study can be scaled up by involving more in-service teachers. Furthermore, teacher interviews can be conducted to probe for more detailed responses. Second, this study relied on teachers' self-reported data of technology integration. These data may be biased toward their own perception and experience of using technology. Some barriers encountered may not be noticed and reported in the survey. Therefore, school visits and class observations can be administered in future research. Together with the teacher interviews, these research methods can provide a more in-depth and objective understanding of the current situation of technology integration in English education in Hong Kong.

APPENDIX (SURVEY QUESTIONNAIRE)

Please kindly supply the following information in order for us to better understand your needs and issues:
1) You have _____ year(s) of teaching experience.
2) Your (administrative) responsibilities in school are: *(multiple answers are allowed)*
   ☐ English teacher of P._____
   ☐ Form coordinator of P._____
   ☐ Assistant English panel chairperson
   ☐ English panel chairperson
   ☐ Others (please specify): _____
3) What do you think are the possible barriers of using e-learning in teaching English in the classroom?

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