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Teachers' Rationale and Use of Technology: A Comparative Study Involving a Public Technical College and a Private High School

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Abstract

The aims of the study were twofold. First, it explored the technological applications that teachers at a wealthy private school incorporated in their classrooms and the rationale adopted. Second, it compared the findings with a previous study that investigated the stated needs and use of technology of teachers at a public technical college. The participants in the current study included the head of the foreign language department and 10 English teachers at a private high school. The head was interviewed to determine the need for technological incorporation. A training workshop was then organized to match the expressed needs. After one semester, semi-structured interviews were conducted. The findings revealed that all 11 teachers used technology applications to facilitate classroom learning resources. *Kahoot* and *Quizizz* were the most popular applications used, as the teachers reported that they felt these applications could motivate and encourage their students' learning. When comparing the results with our previous study, the main differences were in terms of the number of participants who actually used technology, the types of applications used, and the rationales for use and non-use of technology. On the basis of these findings, the pedagogical implications and suggestions are discussed.

Keywords: *Teachers' technology use, training, adoption hindrances*

Introduction

Technology has become an integral part of every aspect of today's dynamic society. The impact of technology, especially on teaching and learning, is growing rapidly. According to Zehra and Bilwani (2016), over the last two decades, the rapid evolution of technology has made traditional teaching methods outdated, and technology integration has become an important facet of successful teaching. The trend has escalated quickly as students have become increasingly tech-savvy.

The Thailand National Education Act of B.E. 2542 (Office of the National Education Commission, 1999) provides a top-down approach to language policy that dictates the curriculum and instruction in language learning. Although the Act may create a mindset for teachers, there are gaps in practice (Darasawang et al., 2012). Wiangsima and Boonmoh (2018) reported that the use of technology in classrooms stemming from top-down policy has proven unsuccessful. Such a policy has a controlling influence on the methods of instruction and affects students' engagement. For example, the One Tablet per Child Project, required all public school teachers to learn to use a computer tablet and integrate it into their teaching. The teachers set objectives and designed classroom activities related to the tablet devices. However, when the project was cancelled, the tablets were no longer used. Abrupt policy changes like this result in teachers continually adjusting their pedagogical practices in response (Wiangsima & Boonmoh, 2018).

In the context of some public schools and colleges, teachers are not motivated to facilitate technology in the classroom because of five main factors: (a) lack of access to technology resources and having no facilities provided, (b) difficulty for teachers in monitoring students, (c) large classroom sizes, (d) lack of Wi-Fi and Internet connectivity, and (e) teachers' lack of knowledge and confidence. A lack of access to technology resources and having no facilities provided has been corroborated by the studies of Riasati et al. (2012) and Saenkhot and Boonmoh (2019). The second factor is difficulty for teachers in monitoring students. According to Riasati et al. (2012), it may be difficult for a teacher to closely monitor their students to determine if they are utilizing an educational application on their

devices. Large student numbers demotivates teachers to facilitate technology in the classroom, as students' devices take up a great deal of Internet bandwidth (Riasati et al., 2012). The fourth factor is lack of Wi-Fi and Internet connectivity in some areas (Khamprem & Boonmoh, 2019). The last factor is that teachers lack knowledge of technology and are not confident in using the knowledge they have (Saenkhot & Boonmoh, 2019).

In the context of private schools, teachers may keep up with rapidly changing technology for other reasons. These teachers are under the jurisdiction of the Office of the Private Education Commission (OPEC). Different policies can be applied, and private teachers from each school may employ different approaches to enhance students learning. Investigating teachers' use of technology and their rationales for its use provides a broader picture of how and why technology is used. To continue with this goal, the objectives of the current study were to investigate teachers from a wealthy private school regarding their use of technology and the kinds of technology that they incorporated in their classrooms; this allowed a comparison with our previous study (Khamprem & Boonmoh, 2019) in a public technical college.

Literature Review

Integration of Technology in the Classroom

Technology use is becoming an increasingly important part of higher and professional education on account of providing an accessible and comprehensive teaching and learning environment. Integrating technology into classroom instruction involves more than just teaching computer skills (Solano et al., 2017). It demands that educators look for effective means of innovation in order to encourage students' engagement and increase their learning.

The integration of technology in classrooms has many benefits to both students and teachers. Gorra and Bhati (2016) indicated that technology enhanced learning-related activities in the classroom, promoted the communicative capacity of students, improved teaching effectiveness and student-teacher interaction, created a context for language teaching, and provided flexibility in course content, among other benefits.

Looking at various aspects of technology integration as a very broad concept, the present researchers sorted previous studies into two categories: (a) teachers' use of technology and (b) factors hindering teachers' technology integration in the classroom.

Teachers' Use of Technology

Wright and Wilson's (2011) study in the US, investigating teachers' perceptions of technology integration and use in their classrooms, showed that the participants who were more familiar with technology were more likely to facilitate learning through technology. Most teachers were willing to experiment with new technologies to facilitate students' learning and improve their critical thinking, and they agreed that technology could help to motivate and support the students' learning. Some teachers adopted technologies that allowed students to take control of their own learning.

Kurt and Eristi (2012) investigated 21 teachers at a Turkish elementary school regarding effective technology integration and problems they experienced in the process. Their data showed that the teachers were willing to use technology in their courses. However, it was apparent that they needed constant support regarding the use of technology. However, the limited number of technological support staff hindered the teachers' efficacy. This study reached a similar conclusion to that of Wright and Wilson (2011); both found that teachers were willing to use technology in their courses.

A study by Cote and Milliner (2018) used questionnaires to investigate 42 English teachers employed at a private university in Japan. It showed that all the teachers in the English program were confident in using digital technology, and they also had very positive perceptions of the use of technology. Moreover, they were willing to learn and facilitate the use of more technological applications because they saw the potential.

In a Thai context, Saenkhot and Boonmoh (2019) conducted semi-structured interviews with 12 EFL teachers (with varied years of teaching experience) in a public high school in Bangkok to examine

what types of technology tools the teachers used in their classrooms. Their findings revealed that all the teachers integrated technologies in their classes. Certain types of tools were already used by all the teachers, while some cutting-edge tools were more limited in their adoption. Three prominent factors that facilitated the teachers' use of technology were convenience, enhancing the students' understanding, and stimulating the students' interest.

Also in Thailand, a study by Kunna and Sukavatee (2017) used questionnaires and semi-structured interviews with 20 EFL teachers to study the use of and types of technology used. In their English classrooms, the teachers used various types of technology, for example, using songs and movies with video and audio technologies; applying Google, YouTube, Facebook, BBC, and Line; and using notebooks and cell phones to facilitate their teaching. They also used technology in warm-ups to provoke students' interest, present new content, and show examples of language being used.

Factors Hindering Teachers' Technology Integration in the Classroom

The previous studies have highlighted that teachers were willing to experiment with new technology to facilitate students' learning. However, there are also factors that hinder teachers' technology integration in the classroom. These are mainly a lack of facilities, teachers' anxiety about technology, excessive time consumption, and a lack of Wi-Fi and Internet connectivity.

In terms of a lack of facilities, a study by Kotrlik and Redmann (2009) reported examples of perceived barriers that included an insufficient availability of technology compared to the number of students in class, a lack of technical support for the teaching and learning process, and a lack of time for developing lessons to use the available technology. With regard to the last point, it should be noted that insufficient technology and support place an additional time burden on teachers and students, especially when the technology has to be shared with a larger group of individuals. The studies from Merc (2015) and Solano et al. (2017) also addressed facilities. Their results indicated that student teachers were not benefiting in their teaching practice from technology available at the desired level, and student teachers were not utilizing technological aids for a number of reasons. For example, failure to use technology was due to lack of basic facilities in the practicum school, insufficient training, and the cooperating teacher's and university supervisor's choice of technology.

With regard to teachers' anxiety about technology, Kotrlik and Redmann (2009) used mailed questionnaires to investigate factors that prevented 67 secondary technology education teachers in Louisiana from using technology. The results indicated that teachers were experiencing minor barriers to technology integration and some technology anxiety.

The next aspect is excessive time investment, and the findings of Zehra and Bilwani (2016) included it in the barriers that teachers faced in the integration of technology. They investigated the perceptions of teachers in both elite and ordinary schools. The results from self-administered surveys indicated that the teachers' use of technology for teaching and learning could be frustrating and time consuming. Teachers from both the elite and ordinary schools mentioned that major barriers were lack of Internet access and insufficient availability of computers, laptops, and other equipment, all of which conformed to the studies of Merc (2015) and Solano et al. (2017).

The last aspect is a lack of Wi-Fi and Internet connectivity. A study by Khamprem and Boonmoh (2019) used a survey questionnaire to reveal teachers' positive attitudes toward technology. The teachers were expected to learn new kinds of technology, to be updated regarding twenty-first century technological skills, and to apply technology in their classrooms. The findings of the semi-structured interviews, however, revealed that some teachers did not use technology to facilitate classroom learning because of a lack of facilities, a lack of Internet connectivity and Wi-Fi, as well as students not having their own smartphones.

The selected studies highlight key elements regarding teachers' use of technology in classrooms. It can be concluded that most teachers have a positive view towards professional development, and they are willing to be trained to improve their ability in the integration of technology in the classroom. However, some of them also needed constant support and were held back by factors, such as a limited

number of staff providing technological support to teachers, an inability to receive immediate support in moments of need, lack of sub-structure, and lack of time.

In our recent research study (Khamprem & Boonmoh, 2019), we explored perceptions of the use of technology by 10 teachers at a public technical college in Thailand and what technology applications they used in their classrooms. The results revealed that despite their positive attitudes towards technology and a willingness to use technology, some of these teachers did not incorporate technology into their lessons. When examining the factors that hindered their technology integration in the classroom, lack of Internet access and available equipment or facilities were major hurdles. Poor internet connectivity or even a lack of Internet access and a lack of facilities are common problems in public schools and colleges. It is for these reasons that we wished to conduct a study to find out teachers' needs regarding their use of technology and the kinds of technology that these teachers incorporated in their classrooms in a wealthy private school, as well as comparing this with teachers' stated needs and their use of technology in a public technical college.

As mentioned previously, most studies related to the use of technology in classrooms are contextually focused on either high schools or universities, and the results are not related to the researcher's present current teaching context, Assumption College Thonburi. In this context, all the classrooms are well equipped with technology support, and there are no practical limitations in utilizing various technologies. Moreover, the head of the school was completely supportive of teachers' use of technology in the classroom, and both teachers and students had their own smartphones. This study aimed to examine teachers' use or non-use of technologies in the classroom, as well as the types of technology tools utilized by the teachers and factors hindering their use of technologies in classrooms in comparison with the previous results obtained by Khamprem and Boonmoh (2019) regarding teachers' use of technology in a public technical college.

Research Questions

1. What kinds of technological applications do teachers from a private high school report using to facilitate learning in their classrooms compared with teachers from a public technical college?
2. What are the rationales and hindrance factors reported by teachers from a private high school in using technological applications in their classrooms compared with teachers from a public technical college?

Methodology

Contexts

This study was conducted in the context of a wealthy private school in Thailand. This school is not part of the government system and has its own enrolment process and costs. This school has both a primary school level (Grades 1 to 6) and a secondary school level (Grades 7 to 12). Students can opt to study in either an intensive English program (IEP) or an English program (EP). The tuition fees per semester range from US$ 700–840 for the IEP and from US$ 3,350–5,000 for the EP.

The college in our previous study was a public (government-run) technical college. It offers both a certificate in vocational education (*Bor Wor Chor*), which is taken during the upper secondary period (equivalent to Grades 9 to 12), and a technical diploma (*Bor Wor Sor*). The first level is free, and the tuition fees per semester for the technical diploma are around US$ 240.

Participants

The participants of this study were 11 out of 14 Thai teachers of English from Assumption College Thonburi, Bangkok, Thailand during the 2019 academic year. All the participants were English teachers in the Intensive English Program, with a range of three to more than 10 years of teaching experience. The participants were four men and seven women and ranged in age from 28 to 57 years old. Six of them were teachers at the junior high school (Grades 7 to 9) and five were teachers at the senior high school (Grades 10 to 12). All of them had attended a workshop called "Applications in the 21st Century"

run by one of the researchers. The objectives of the workshop were to (a) introduce technological applications teachers can use in their classroom and (b) provide teachers with hands-on experience in using and designing learning content through specific technological applications. The six technological applications introduced during the workshop were *Kahoot, Quizizz, Plickers, Padlet, Crossword*, and *Jeopardy.*

The participants in our previous study attended the same workshop. They went through the same process with only one exception; only four technological applications were introduced (Kahoot, Quizizz, Plickers, and Padlet*)*.

Instrument

A mixed design method was used to address the research outcomes, as quantitative and qualitative data can help each other in explaining the phenomena being studied (Creswell & Plano, 2011). The instrument employed was a semi-structured interview. The questions were designed based on the research questions, and they were open ended so that we could ask follow-up questions in order to further explore the details of the answers provided. Consent forms were given to the participants before the interviews were conducted. They were informed that they were free to participate in this study or to withdraw at any time.

The questions for the interviews addressed three areas: (a) types of technological applications used by English teachers, (b) reasons for teachers' using technological applications in the classroom and (c) factors that hinder the use of technology. As a semi-structured interview, the questions served only as a guideline for the interview. The use of open-ended questions allowed the interviewer and participant to interact in a conversational manner, while the interviewer ensured the main areas were addressed.

Procedures

First, the "Applications in the 21st Century" workshop was conducted at the beginning of the first semester. After one semester (four months), semi-structured interviews were conducted on an individual basis to collect data in order to answer the research questions. Each participant was interviewed in an individual session and was asked to sign the corresponding informed consent form in order to participate. The interview took place in the school's meeting room and lasted 15–20 minutes. All the interviews were recorded. The collected interviews were then transcribed, and the textual data were analysed by categorization into themes. The findings of our previous study (Khamprem & Boonmoh, 2019) were also used to compare with the findings of this current study. Finally, the comparative results were noted.

Data Analysis

Keywords from the responses were identified and categorized into three main groups: types of technological applications used by the English teachers, reasons for teachers' use of technological applications in the classroom, and factors that hindered the use of technology. One set of interview transcripts was sent to an external coder to verify the reliability of the analysis.

Findings

In Table 1 a comparison is given of the provided facilities and technological applications used in the classroom by teachers from the two different contexts. The results show that in the private high school, all the listed facilities (computer, loudspeaker, smart board, whiteboard, landline-based Internet, and Wi-Fi Internet) were provided in the classroom, and the teachers reported using all these facilities in their classroom. In comparison with the study by Khamprem and Boonmoh (2019), the earlier results showed that not all of those facilities were provided in the classrooms. Loudspeakers were provided in some classrooms, but no smart boards were available. Computers and whiteboards were the only kinds of facilities provided in all the classrooms. Although the Internet (landline and Wi-

Fi) was provided, they were not available in all areas, and sometimes the Internet connectivity was unstable.

Table 1 *A Comparison of Teachers' Use of Technology*

		Current Study (*N* = 11)	Khamprem & Boonmoh (2019) (*N* = 10)
Facilities Provided in the Classroom	Computer	√	√
	Loudspeaker	√	X
	Smart board	√	X
	Whiteboard	√	√
	Internet (landline)	√	?
	Internet (Wi-Fi)	√	?
Applications Teacher Used on Computer / Smartphone	PowerPoint	11 (100%)	6 (60%)
	YouTube	10 (90.9%)	5 (50%)
	Word	8 (72.7%)	8 (80%)
	Google	8 (72.7%)	-
	Excel	6 (54.5%)	3 (30%)
	Dictionary	5 (45.5%)	2 (20%)
	Line	3 (27.3%)	8 (80%)
	Facebook	2 (18.2%)	8 (80%)
Did the teacher attend the "Applications in the 21st Century" workshop?		Yes, 11 (100%)	Yes, 10 (100%)
Did the teacher actually use these applications in their classes?		11 (100%)	Yes, 6 (60%) No, 4 (40%)
Applications Teachers Used in the Classroom	Kahoot	11 (100%)	5 (50%)
	Quizizz	6 (54.5%)	-
	Padlet	2 (18.2%)	-
	Plickers	1 (9.1%)	4 (40%)
	Crossword	3 (27.3%)	-
	Jeopardy	4 (36.4%)	-

Note. The symbol "?" means these kinds of facilities were provided, but due to some technical problems, teachers could not use them completely.

When asked about teachers' preferences of technologies on smartphones or computers, the results from the current study showed that all the participants used PowerPoint as an instructional media, followed by YouTube (90.9%). The rationale was the since the facilities were provided in the classrooms, it was easy for teachers to use the mentioned programs. For MS-Word and Google, the same number of teachers reported using these programs in the classroom (72.7%), followed by MS-Excel, a dictionary, Facebook and Line (54.5%, 45.5%, 27.3% and 18.2%, respectively). However, the results from Khamprem and Boonmoh (2019) were quite different. An interesting point was that none of the participants from the public technical college used *Google* in the classroom due to limitations of the Internet and Wi-Fi connection. These problems can waste a teacher's time during the class, as can be seen from this previously unpublished comment of a participant from the previous study:

> I have used Google in the classroom in order to show some evidence and give some examples to my students, but sometimes I cannot connect to the Internet and also the program cannot work. I have to wait for its connection, and it's really a waste of my time. So, after that, I will not use the programs which need the Internet in class anymore. (Participant 6)

Another interesting point is that Line and Facebook were popular applications among teachers from the previous study (80%). This might have been because the teachers used these applications for personal purposes and not for educational ones in the classroom.

It can be seen that teachers from both the current and the previous study had attended the "Applications in 21st Century" workshop run by one of the researchers. With regard to the applications teachers used in the classroom, the results showed that all 11 participants used Kahoot to facilitate teaching in their classroom, followed by Quizizz (54.5%), Jeopardy (36.4%), Crossword (27.3%), and Padlet (18.2%). Plickers was used by only one participant. For the teachers from the public technical college, the results showed that six of the 10 participants used technological applications in the classroom. Of these six, five teachers used Kahoot, while four used Plickers in their classroom. However, it was found that none of the participants from the previous study used Quizizz, Padlet, Crossword, or Jeopardy.

It can be concluded from Table 2 that differences occurred between the teachers from the private high school and the public technical college in terms of the applications they used in the classroom. Some applications that were used by the private school teachers as the facilities were provided in the classroom. Moreover, some participants in the current study reported that most students were active learners. They loved a variety of learning tools, so the teachers felt they had to facilitate new technology and interesting applications in the classroom. An interview with one participant directly supported this:

> I have to learn new technology and new applications in order to catch up with my students. If I use only the same application as Kahoot, students will be out of focus and they also will not concentrate in the classroom. It can make the classroom environment boring. (Participant 2)

However, the results from Khamprem and Boonmoh (2019) found that Kahoot and Plickers were applications that teachers used the most because students were already familiar with these and only required an Internet connection from the teachers. One teacher from the previous study reported that she was aware of the unstable Internet connection and that she decided to use Plickers for this reason (in a previously unpublished remark):

> The Internet connection at the college is unstable. Sometimes, it did not work properly, so I think using Plickers can help. With Plickers, my students did not need to have an Internet connection. I just needed a connection in the classroom computer, and I can use 4G or 3G from my smartphone. (Participant 7)

Table 2 *Comparison of Rationales for Teachers' Use of Technological Applications in the Classroom*

Rationales for Teachers' Use of Applications in the Classroom	Current Study (*N* = 11)	Khamprem & Boonmoh (2019) (*N* = 6)
Encouraging and motivating students	7 (33.3%)	2 (15.4%)
Ease of use	6 (28.6%)	2 (15.4%)
Changing teaching techniques	3 (14.3%)	-
Reducing paper usage	2 (9.5%)	2 (15.4%)
Familiar to students	2 (9.5%)	1 (7.7%)
Recording scores	1 (4.8%)	2 (15.4%)
Time-saving	-	3 (23.0%)
Analysing tests	-	1 (7.7%)
Total	**21 (100%)**	**13 (100%)**

In Table 2 details are given of the rationales for teachers' use of technological applications in the classroom compared with those of the teachers from the public technical college. In the current study, participants reported their rationales for using technological applications as follows: encouraging and motivating students (33.3%), ease of use (28.6%), changing teaching techniques (14.3%), reducing paper usage (9.5%), and familiar to students (9.5%). Only one participant (4.8%)

reported using these applications for recording scores. A number of comments from participants during the interviews supported these reasons as follows:

> I used Kahoot and Quizizz during my class and let students do the activities by using these applications. The purpose for using is I want to encourage and motivate students in my class. Moreover, I want to change my teaching techniques by using technology to facilitate in my classroom instead of lecture the class. (Participant 1)

> I used only the Quizizz application in my classroom because I think it helps me to motivate and encourage my students. I used the Quizizz application once a week after I finished the class. The purpose for using is to practice students' knowledge and their understanding from the lesson. (Participant 3)

> I used Quizizz in my class for pre-test and post-test. I think this application helped me to encourage and motivate students, and I can also record students' scores from this application. I used it once a week and my students enjoyed using it. (Participant 4)

Similarly, teachers in Khamprem and Boonmoh's (2019) study reported the similar reasons for using technological applications except for changing teaching techniques. None of the participants from the earlier study agreed that these applications helped them in changing teaching techniques. This could be due to the fact that teachers in the current study described their students as being very active and that they should bring a variety of teaching tools to the students. Moreover, the teachers also used technological applications in order to save time and to catch up with their students. One teacher from the previous study mentioned that she had used applications for analysing tests to check the limitations and knowledge of her students**:**

> I use Kahoot and Plickers in my class for recording students' scores because students can know their scores in real time; it helps me to save my time for doing other things. Moreover, it is easy to use, especially the Kahoot application. I can also analyse my test from the percentage of students' answers. (Participant 1)

Table 3 shows the factors that hindered the use of technology in the classroom as reported by the teachers. For the current study, the most mentioned factor was time limitation, which was reported by four teachers (23.5%). The following interview excerpts supported this:

Table 3 *A Comparison of Factors Hindering the Use of Technology*

Factors that Hinder the Use of Technology	Current Study (*N* = 11)	Khamprem & Boonmoh (2019) (*N* = 6)
Time limitation	4 (23.5%)	-
School rule limitations	3 (17.6%)	-
Unfamiliarity with the applications	2 (11.8%)	-
Job rotation	2 (11.8%)	-
Cannot be used in a real lesson	2 (11.8%)	-
Heavy teaching load	1(5.9%)	-
Problem with classroom management	1 (5.9%)	-
Students lack focus	1 (5.9%)	-
Prefer paper-based work	1 (5.9%)	-
Problem with Internet and Wi-Fi connection	-	5 (62.5%)
Students not owning smartphones	-	2 (25%)
Students guessing the answers	-	1 (12.5%)
Total	**17 (100%)**	**8 (100%)**

> I love to use technological applications in my classroom but because of time limitations and lots of teaching work, I cannot prepare a lesson by using the mentioned technological applications, and I also have many responsibilities in my department. (Participant 1)

> I don't have time to use technological applications because school has lots of activities, I have to teach students within the specified period and finish all the lessons before their examination. Moreover, school rule limitations and job rotation are also factors for why I don't want to use the applications. (Participant 5)

> Because of time limitations, I cannot prepare my lessons for students. Moreover, I think these applications are only the activities and cannot be used in real lessons, as well as my class is mostly reading and speaking which these applications do not cover. (Participant 9)

The second most reported aspect was school rule limitations, which was mentioned by three teachers (17.6%). Two teachers (11.8%) each mentioned that they were not familiar with the applications, job rotation prevented the necessary time investment, and these applications could not be used in real lessons. These can be considered minor factors that hindered the use of technology in the classroom. One teacher each (5.9%) mentioned that because of a great deal of teaching work, problems with classroom management, and students lacking focus, they preferred more paper-based work. Relevant interview excerpts regarding some of these points were as follows:

> When I used applications, I could not control students' use of the smartphone. Some of them were unfocused by playing games and surfing on the Internet like Instagram, Line, Facebook, etc. (Participant 6)

> I preferred to use paper-based work more than use these applications. I think these applications can be used as an activity in the classroom, but they cannot be used in real lessons. Finally, students have to do and submit paperwork to teachers. (Participant 7)

When compared with the study by Khamprem and Boonmoh (2019), the results were very different. The results from the previous study showed major factors that hindered the use of technology were problems with the Internet and Wi-Fi connectivity, students not owning their own smartphones, and students guessing the answers, while these problems were not mentioned in the current study. Some unpublished comments from the first study were as follows:

> Internet connection is a big problem, the Wi-Fi is quite low speed and does not cover all areas. (Participant 1)

> The problem that I found is about the Internet. The Wi-Fi is very slow, and it does not cover all parts of the college, including some classrooms. (Participant 3)

Discussion

In assessing the results, we need to bear in mind extraneous variables in the two educational contexts. Nonetheless, because the teachers from both settings underwent very similar training in using technology in their classrooms, it provided a research opportunity with high external validity to examine whether they applied skills and knowledge from the workshop conducted in their own classrooms (even if the research does not have strong internal control over the numerous factors that are occurring in the two "real-life" contexts).

The study's findings showed that all the teachers had integrated technologies in their classrooms. The most used programs were PowerPoint followed by YouTube, MS-Word, MS-Excel, Line, and Facebook, in descending order of use. For technological applications, the most used applications were Kahoot, followed by Quizizz, Jeopardy, Crossword, and Padlet. The Plickers application was used by one teacher. The rationale that the teachers' reported for using the mentioned technological applications was because they helped to encourage and motivate students. Moreover, these technological applications were easy to use, helped the teachers in changing their teaching technique, reduced paper usage, could be used to record students' scores, and could be applied in other teaching

processes. The findings of this current study correspond with those of the study done by Wright and Wilson (2011) in that technologies in the classroom were seen as helping to motivate and support students' learning. Some teachers adopted technologies that allowed students to take control of their own learning. In addition, the results of Cote and Milliner's study (2018) were also supported in that most teachers were willing to learn and facilitate more classroom technology because they saw the potential for improving their teaching and enhancing students' learning. These findings are consistent with those of Saenkhot and Boonmoh (2019), who reported on teachers integrating technologies in their classes. Certain types of tools were already used by all the teachers, while some cutting-edge tools are only now being integrated in the classrooms.

However, the study also identified some factors that hindered the teachers' use of technology. For example, a time limitation was one of the most often mentioned factors. Other aspects were school rule limitations, teachers not being familiar with applications, job rotation, and the perception that the applications could not be used in real lessons. In addition, there were factors less often mentioned that hindered the use of technology in the classroom, such as teaching loads, problems with classroom management, students lacking focus, and some teachers preferred more paper-based work. Some of these factors are consistent with Kotrlik and Redmann's (2009) study. They found that the perceived barriers for teachers were a lack of technical support in the teaching and learning process, as well as a lack of time to develop lessons that use technology. However, the recent findings are contrary to the studies by Merc (2015), Solano et al. (2017), and Zehra and Bilwani (2016) that mainly focused on technology courses. They indicated poor use of technology was on account of lack of basic facilities in schools, not enough facilities to incorporate in the classroom, a lack of Internet access, and insufficient availability of computers, laptops, and other equipment. Moreover, Khamprem and Boonmoh (2019) pointed out that some teachers did not use technology to facilitate classroom learning because of a lack of Internet connectivity and Wi-Fi, as well as students not having their own smartphones.

Looking at the similarities and the differences between the kinds of technological applications used by teachers from the private school and the public technical college (see the previous study by Khamprem & Boonmoh, 2019), only some teachers from the public technical college used at least one of the mentioned applications in their classroom. They cited poor Internet connectivity as the rationale for not using the applications, while all the teachers from the private high school used technological applications in the classroom. This is a very interesting result; although access to the Internet and availability of facilities seemed to be the main issues at the public technical college, more than half of the teachers were able to incorporate applications (Kahoot and Plickers) in the classroom. This may suggest that teachers at the technical college struggled more than teachers at the private school when it came to teaching with technology. However, teachers at the private school may enjoy the luxury of access to the Internet and technology with fewer issues. It was not a surprise that all the teachers in that context used applications in their classrooms.

It can be concluded that the number of teachers from the private school who used applications was more than the number of teachers from the public technical college who used applications. Also, when a variety of technological applications were facilitated in the classroom, teachers from the private school used more varied applications than teachers from the public technical college. The reasons that all the teachers from this wealthy private school used all the applications may reflect the fact that the classrooms were better equipped with facilities to aid the teachers in incorporating them in classes. Students and teachers may have also had more or easier access to them as educational aids.

Another interesting point is that the Kahoot application seemed to be the most popular for teachers in both the private school and public technical college. Moreover, Quizizz and Padlet were secondary applications used by teachers from the private school, and none of the teachers from the public technical college used these applications. When using Kahoot, teachers have an option to choose between a "classic mode" or "team mode." The team is different from the classic mode in that it allows five seconds for the team to discuss issues with each other after a question is asked, and only one device is needed for each team. Not all students need to have a smart device to play. This may

explain why Kahoot was popular for teachers in the public technical college. Quizziz and Padlet, by contrast, do not have a function similar to team mode. Each student needs her/his own device to play. This could explain why teachers at the public technical college did not use them.

When comparing teachers from the private high school and the public technical college regarding the hindrance factors for using the technological applications in the classroom, the current study found that time limitation was the most mentioned hindering factor for using technological applications, while the most mentioned hindering factor of teachers from the public college was problems with Internet and Wi-Fi connectivity. In addition to the time limitation, some additional hindering factors of teachers from the private school were school rule limitations, lack of familiarity with applications, job rotation, unusable applications in a real classroom, lots of teaching work, problems with classroom management, students lacking in focus, and some teachers' preference for paper-based work. In contrast, the teachers from the public college reported students not having their own smartphones and students guessing answers from applications, which were less often mentioned as hindering factors for them.

Implications and Recommendations

The goal of the research was not to identify all the similarities and differences between the teachers but rather to focus on how their practices changed after completing the same technology workshop and the rationales behind those changes.

Kahoot was the application used the most by teachers from both the public and private schools because it was easy to use and the teachers were familiar with it. However, Plickers was an application that was used the most by teachers from the public technical college, whereas there was only one teacher in the private school who used this application in the classroom. The reason for this difference was related to problems with Wi-Fi and Internet connectivity. Therefore, they could more easily use the Plickers application, which facilitated students in the classroom, instead of using applications that needed Internet and Wi-Fi connectivity.

Technology is always changing. What is considered cutting edge today will be commonplace in the near future. A major implication of this research is that there are various contexts in which technology is implemented in education. This study (and the data from Khamprem and Boonmoh, 2019) focused on the impact of a technology in two specific contexts. Even with that narrow focus, the practise of teachers diverged quickly due to technology availability and the perceptions of the teachers as to what they thought would be beneficial, what application involved the expenditure of too much effort, or those that would encounter too many obstacles. In this particular instance, the teachers at the wealthy school had more options from which to choose due to a better infrastructure. However, other hindrances, such as school rules, may still interfere. In contrast, the teachers at the public school were very aware of the lack of resources but were adept at identifying tools that would work (for example, technology integration does not necessarily require a device or Internet connection for every student). With regards to technology, this might be the most important lesson that "one size does not fit all." Future success in technology integration will likely involve a balance between the extremes of too little and too much investment in technology.

There are a few gaps in our knowledge about public involvement in research that follow from our findings, and this research topic would benefit from further study. A future study could also explore the students' role in addition to the teachers' role; for example, studying students' stated needs regarding the use of technology would help to improve and facilitate the use of appropriate and useful student applications. How other online applications can be integrated into teaching and learning during the ongoing COVID-19 pandemic in addition to Kahoot, Padlet, Plicker, and Quizizz applications would also be valuable. Finally, it would also be helpful to explore the use of online applications in other specific fields, such as mathematics, science, social pedagogy, and so on.

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