ผลงานวิจัยความร่วมมือทางวิชาการ ระหว่าง
มหาวิทยาลัยเทคโนโลยีสุรนารี มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี
และสำนักงานเขตพื้นที่การศึกษามัธยมศึกษาสุรินทร์
เพื่อพัฒนาคุณภาพการมัธยมศึกษาและบริการวิชาการแก่สังคม

ผลวิจัยเรื่อง

กรณีศึกษา การใช้เทคโนโลยีของครูไทยในชั้นเรียนภาษาอังกฤษ ระดับมัธยมศึกษา

(A Close Look at the Use of Technology by Thai Teachers in Secondary EFL Classrooms)

คณะผู้วิจัย

รองศาสตราจารย์ ดร.อธิปัตย์ บุญเหมาะ	มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี
อาจารย์ ดร.ธิดาพร จำปาเกตุ	มหาวิทยาลัยเทคโนโลยีสุรนารี
นายสดใส กาพย์กลอน	ศึกษานิเทศก์สำนักงานเขตพื้นที่การศึกษามัธยมศึกษาสุรินทร์

ได้รับการพิจารณาให้ตีพิมพ์เผยแพร่ในวาสาร CALL-EJ ระดับนานาชาติ

และนำเสนอผลงานในการประชุมวิชาการระดับชาติ ปี 2565

ในงาน 40th Thailand TEASOL Conference

2022

A Close Look at the Use of Technology by Thai Teachers in Secondary EFL Classrooms

Abstract

This study investigates how teachers in Thai secondary schools integrated networked education technology tools in their classrooms. It supplements/complements a research survey by Boonmoh et al. (2021) into how teachers used and perceived such technology. This study also explores some networked education technology tools, considering their teaching contexts and highlighting how teachers created content and used them in their teaching. In-depth interviews were conducted with 12 teachers in secondary schools of Secondary Educational Service Area Office 33 (Surin Province). These teachers were from small and medium-sized secondary schools in 8 districts of Surin. Their use of their networked education technology tools was analyzed based on types of tools/ applications used, types of activities, and topics of their use. The findings revealed that all 12 teachers knew technological tools and integrated technology to facilitate classroom learning resources. Kahoot was the most applications used in the classrooms. The use of technology is influenced by various aspects: students' motivation, real-world integration, students' familiarity, teachers' self-development, time-saving, and the current circumstance (Covid-19). Their main purposes of using were motivating students, engaging students, preparing for the test, and career advancement. Most activities created in the applications were used as a game or test rather than for lessons. Based on these findings, pedagogical implications are discussed.

Keywords: EFL classrooms, Teacher use of technology, Networked educational technologies

Introduction

In 2019, a training workshop on "Secondary Teachers and Technology Integration" was conducted to train Thai secondary teachers from all 17 districts in Surin province, in northeast Thailand. The workshop aimed at increasing teachers' knowledge of how to use technology in the classroom. During the workshop, two of the researchers investigated teachers' experiences and perceptions in using technology in their classrooms. The researchers then came produced a research study entitled "Teachers' Perceptions and Experience in Using Technology for the Classroom" (Boohmoh et al., 2021). The results showed that the teachers from that study seemed willing, ready, and eager to prepare themselves for integrating technology into their classes. The majority of participants had already used technology through computers or mobile devices. More importantly, the teachers could see the importance of technology integration, which refers to the use of technology in the classroom. The integration seems to be beneficial for both teachers and students since there is a positive influence on EFL classrooms (Hwang & Wu, 2012; Jones, 2001; Jumpakate & Rungruangthum, 2020; Toyoda, 2001). Although the previous study demonstrated positive perceptions towards technology integration in classrooms and some efforts for technology integration, there remains the need for insight into how technology is integrated into specific classroom settings. The previous study relied solely on questionnaire data, lacking more detailed information from interviews. This paper, therefore, provides a more in-depth study of teachers' specific uses of technology in their classrooms, with the resulting data gathered by screenshots or captured from the participants' mobile phones or computers.

Review of Literature

The Convergence of Technology and Education

Technology has become a significant tool in the classroom since the 1980s due to several extrinsic and intrinsic factors (Blackwell et al., 2014; Nim Park & Son, 2009). There are several factors regarding technology integration, namely the expansion of global economic competition (Leu & Kinzer, 2000; Mundy et al., 2012), facilities (Abbott, 2001; Leu & Kinzer, 2000), teachers' willingness (Alonso et al., 2019; Khamprem & Boonmoh, 2019; Taghizadeh & Hasani Yourdshahi, 2020), students (Kannan & Munday, 2018; Petersen & Sachs, 2015), and policies from both governmental and institutional contexts (Buasuwan, 2018; Goodman, 2017; Vungthong et al., 2017; Wiangsima & Boonmoh, 2018).

The first and most important factor that influenced the growth of technology's use by teachers in classrooms is the expansion of global economic competition. The global economic competition within a world economy is implemented due to the effective use of information and communication technology (ICT) then technology was introduced to the education world to improve educational effectiveness. Several studies have emphasized how technology can contribute toward genuine learner autonomy, improved communication skills, positive study attitudes and motivation, and learners' learning interests (Hwang & Wu, 2012; Jones, 2001; Jumpakate & Rungruangthum, 2020; Toyoda, 2001). With the potential positive impact on education, instructors then have been encouraged by the global economic competition to use technological tools in classes to teach students (Leu & Kinzer, 2000).

The second factor that influenced teachers to use technology is the increased availability of the necessary facilities, such as the internet, technological tools, and devices. The most important manifestation of the use of technology in an educational context is the internet, especially networked technologies. Johnson et al. (2016) clarified that networked technologies in education refer to social networking of in-class settings and out-of-class settings. More importantly, social networking can include online games, educational social networking platforms (e.g., Kahoot, Padlet, Quizizz, and Edmodo), and normal social network platforms (e.g., Facebook, Twitter, Tiktok, and Snapchat). So, the convergence of teaching with networked technologies is fundamentally reshaping and changing education as teachers are required to prepare students by letting students well-exposed to technological tools so the students will be ready for the future labor market in the globalization era (Abbott, 2001; Leu & Kinzer, 2000)

The global economic competition and facilities are not the only major factors that influenced teachers to use technology in their classes. Teachers' willingness is also considered a major factor as the teachers are the ones who taught in class by using technological tools. Their intrinsic motivation drives them to use or do not use technology in classes.

From previous studies (Alonso et al., 2019; Khamprem & Boonmoh, 2019; Taghizadeh & Hasani Yourdshahi, 2020), the scholars suggest that teachers' willingness was a crucial factor towards technology integration. Taghizadeh and Hasani Yourdshahi (2020) stated that most Iranian teachers of language institutes and schools were not provided with training courses regarding technology integration in young learners' classes; however, they were ready to participate in any technology-based professional development programs if provided. Similarly, Alonso et al. (2019) reported that pedagogical beliefs and evaluation are related to the adoption and assessment of the digital tool used in Chilean teachers. Moving to the Thai context, Khamprem and Boonmoh (2019) concluded that teachers' willingness to integrate technological applications in class depends on their stated needs i.e the teachers were willing to integrate technology in classrooms provided that they were given professional development programs that match their needs.

Another factor expanding the use of technology in education is the student. Nowadays, students in higher education contexts are considered "digital natives". The students aged 18 – 21 approximately so that they can use technology easily. Also, the students can access resources from the internet easily. Prensky (2001) first introduced the term "digital natives" to represent those people who have grown up with technology as an integral part of their everyday lives. To teach these students, using technology in the classroom has become an effective teaching approach (Kannan & Munday, 2018; Petersen & Sachs, 2015).

Apart from the three factors mentioned, policies in governmental and institutional contexts also have impacted the greater implementation of ICT use in educational contexts (Buasuwan, 2018; Wiangsima & Boonmoh, 2018). Similar to other countries worldwide, Thai teachers were encouraged to apply technological tools to their classes as well as attending training workshops related to technologies (Boonmoh et al., 2021). The Thai government has promoted the use of ICT in Thai education due to its benefits and has resulted in the implementation of computer-assisted language learning (CALL) and mobile-assisted language learning (MALL) in Thai education contexts (Boonmoh et al., 2021).

In a Thai context, the factor controlling the directions of ELT in the future will be educational policies (Wiangsima & Boonmoh, 2018). In Thailand, previous studies (Goodman, 2017; Vungthong et al., 2017) have shown educational policies play a significant part in influencing teaching practice. Also, institutional policies to promote the use of technology in the classroom have influenced administrators, including school principals. Administrators who have agreed to implement government policies are likely to support teachers' use of technology.

These factors have resulted in the widespread adoption of a range of new technological tools in the classroom (Johnson et al., 2016). Networked technologies are now an important teaching tool, promoting learner interactions with each other, with teachers, and with learning resources (Goodyear, 2001; Johnson et al., 2016; Yang, 2007). However, networked technologies are required to be integrated into classes with the support of networked technology devices, such as desktop computers, tablets, and laptops. (Johnson et al., 2016). Networked learning supports today's language learners' autonomous learning by connecting with global external resources (Kannan & Munday, 2018).

Both students and teachers need to have positive attitudes (e.g., willingness to use technological tools, eagerness to learn about technological tools) towards the use of technologies for networked technologies to be successfully incorporated into teaching. Many studies have focused on students' perceptions of technology use in classes (Hwang & Wu, 2012; Jones, 2001; Jumpakate & Rungruangthum, 2020; Toyoda, 2001). Conversely, there is a limited number of scholars investigating teachers' perceptions and their uses of technologies in classes. Furthermore, most teachers' studies are based on tertiary levels, where university lecturers are the main participants. Little is known about secondary school teachers' perceptions and their uses of technologies in classes.

Although several studies are capable of providing the necessary information about how teachers use technology in various contexts, a questionnaire-based study has its shortcomings for not being able to explain the reasons and choices of their technology use. For this reason, it is hoped that adopting another approach (in-depth interview method along with observation) will be useful to better explain the manner of technology use integration in Thai secondary school contexts.

Table 1

The related literature regarding Teacher's use of technology done using surveys

Authors	Research Methodology	Research Purpose(s)	Research Result(s)
Rashid et al. (2021)	A survey which is validated through the use of the Rasch model	To investigate Malaysian teachers' perceptions and tendency to use Virtual Learning Environment (VLE) as a tool for teaching.	Malaysian teachers had positive attitudes towards the use of VLE for teaching. were moderately ready to use VLE. They moderately accepted the VLE implementation. Also, the teachers felt that the VLE was useful and was easy to use.
Bhusal (2020)	A survey	To explore Nepalese teachers′ perceptions on integrating technology in English Language Teaching within a connectivism theoretical framework.	The results show teachers' positive attitudes towards technology integration in a way that integrating ICT tools in English language classrooms. However, they thought that English textbooks undervalue integrating ICT lessons and teachers are reluctant to use them and give main priority to the other grammatical and linguistic features.
Farah & Frayha (2021)	A survey	To examine Lebanese teachers' views of online teaching and their views of their abilities to teach via online teaching during the Covid-19 pandemic.	The results revealed that teachers seem to have a high sense of comfort with online teaching. Even though teachers seem to give more value to face-to-face instruction.
Nikolopoulou (2020)	A survey	To investigate Greek secondary school teachers' perceptions of mobile phone and tablet use in the classroom.	The teachers perceived the benefits of technology integration since the technological tools were associated with students' motivation, participation, enjoyable lesson, and easy access to information, and students' familiarity with technology. However, the teachers' perceived barriers were mainly related to the lack of equipment and the current policies regarding technology use in school settings.

Uzunboylu & Ozdamli (2011)	A survey & SPSS program	To investigate teachers' perceptions of mobile learning (m-learning) in Cyprus. Teacher perceptions were submitted to the SPSS program, then the distribution of the total scale score was checked.	The Cypriot teachers' perceptions of m-learning are related to teachers' feedback on three facets of m-learning, namely the aims of mobile technologies, mobile technologies appropriateness, and forms of m-learning application.
Liu, Lin, Zhang & Zheng (2018)	A survey	To examine the relationships between the Chinese language teachers' instructional use of technology and their perceptions of three internal factors and an external factor	The Chinese language teachers' use of technology could be predicted by two of three internal factors and one external factor.
Taghizadeh & Hasani Yourdshahi (2020)	A survey	To examine the attitude, knowledge, use, and challenges of Iranian English teachers of young learners to integrate technological tools into language classes.	Most Iranian teachers of language institutes and schools did not have sufficient pedagogical and technological knowledge to use technology to teach the English language to young learners. Also, a large number of teachers were not provided with training courses regarding technology integration in young learners' classes; however, they were willing to participate in technology-based professional development programs.
Alonso, Plaza, & Orfali, (2019)	A survey	To investigate Chilean teachers' perceptions of the integration of technology in evaluation processes, focusing on their beliefs about learning, evaluation, and technology.	The results show that pedagogical beliefs and evaluation are related to the adoption and assessment of the digital tool used. It is also revealed that beliefs are barriers that influenced teachers' use of technology

From the Table above, it can be seen that recent scholars mainly focused on teachers' perceptions of the use of technology in classes via survey research. There were some strengths and weaknesses of using surveys in collecting data related to teachers' use of technology. Surveys allow the researchers to see numerical and general data (e.g., numbers, percentages, and trends) while other factors (e.g., context, experience, infrastructure, policies) related to teacher's use of technology cannot be taken into account through surveys. Little has been done on exploring teacher's use of technology by using in-depth

interviews. Regarding technological tools, most studies point out how teachers perceive technology integration, and what technological tools were used in the class.

In this study, to more greatly emphasize teachers' use of technology, the researchers will explore further which tools are used, how the tools are used, and the topics that are being used. This study will explore how the teachers used technology in their classrooms.

Research question

How do Thai EFL teachers incorporate the use of technological tools in their secondary education classrooms?

Method

Participants

The participants were 12 from a cohort of 126 secondary school teachers from 56 schools in Surin Province who attended the "Secondary Teachers and Technology Integration" workshop in 2019. The workshop was organized by the Office of the Basic Education Commission (2011) and the Secondary Educational Service Area Office 33 (Surin Province).

The criteria for the selection of the participants were as follows. Since our current study focuses on technology integration in an actual classroom setting, the researchers needed to find participants who

1. according to the large-scale questionnaire (Boonmoh et al. 2021) know and already use some technology in their classrooms
2. work in either small-sized schools or middle-sized schools
3. were willing to participate in the study

The questionnaire responses revealed that from all 126 participants in 58 schools, 114 reported using at least one type of technological tool to support their teaching. Of these 114 participants, only 85 wrote their complete contact details on the questionnaire. Only 43 teachers met the first two criteria. With assistance from an educational supervisor, who is one of the researchers, the research team then could access 12 teachers who volunteered to participate in this study. Twelve participants were reached and asked to complete in-depth interviews to report their perceptions and their use of technology in classrooms. The participants were selected based on consecutive sampling because of accessibility and voluntary participation (Martínez-Mesa et al., 2016). Due to ethical considerations, all target participants were asked to complete a consent form, and they had the right to withdraw from the study at any time.

Types of secondary school in Thailand

The Office of the Basic Education Commission of Thailand divided primary and secondary schools in Thailand into four main types based on their size.

Table 2
The description of secondary school types in Thailand

School size	Numbers of students
Small	1-499
Medium	500-1,499
Large	1,500-2,499
Extra-large	more than 2,500

Differences in school size are not only different in terms of students, but also budget allocation, facilities, infrastructure, and teacher expertise. This may suggest that teachers who work in small or middle-sized schools may encounter some challenges concerning technology integration. The school sizes may influence teachers' use of technology because the funding regarding school facilities provided by the government for each school varied in school sizes. The larger schools tend to be supported and funded by the government more than medium and small schools. So, it is interesting to see how teachers in small and middle-sized schools integrate technology in class without adequate facilities.

Interviews

The main purpose of the interviews was to elicit the subjects' reasons for using technology in their classrooms on a case-by-case basis. The interviews were conducted individually with each subject by the researcher. Each interview lasted between 30 and 45 minutes. To provide a clear understanding of the data collection process, the questions used to guide the semi-structured interview were as follows:

- Can you describe for us the facilities that are provided in your school/classroom?
- Have you attended the "Secondary Teachers and Technology Integration" workshop?
- How many technological applications were introduced? Do you remember what they were?
- Which of these have you used in your teaching? Can you describe your experiences in using them?
- Why did you choose to use the applications you described?
- Were there specific reasons for using/ not using the other applications?
- What types of technology do you typically use at school?

These questions served only as a guideline for the interview. Open-ended questions allow the interviewer and participant to interact conversationally, while the interviewer ensures the main areas of interest are addressed.

Data analysis

The data in this study consist of interview transcripts. These were examined for two purposes: 1) to identify the technological tools used to enhance teaching and learning by the participants, and 2) to gain an understanding of how participants integrated technological tools in their teaching.

Regarding the first purpose, to identify technological tools used to enhance teaching and learning, the data reported by the teachers were listed and categorized in communication tools, applications, and teaching and learning platforms/ learning management systems (LMS)during the COVID-19 outbreak.

Regarding the second purpose, to identify an integration of technological tools in teaching and learning, the data were transcribed and reported based on the rationale of each teacher for choosing or not choosing technological tools to use in their classrooms. When the teachers indicated that they used technological tools, the rationale that influenced their use of technology was presented. The data from the interviews were divided into three groups based on the rationale.

Group 1: Turning challenges into opportunities

The participants in this group were from a small school where there were only limited facilities but the participants were able to integrate technology into their classes effectively.

Group 2: Making the best use out of everything

The participants in this group were from a medium school with adequate support from the school's administrators. So, they used various technological tools, applications, and websites.

Group 3: Meeting the standard

The participants in this group followed the policies defined by the government and administrators. They used technology only to reach the minimum standard built up by their schools. According to the keywords from the interviews, they did not use various websites, applications, and technological tools.

Results

The results of the study are divided into two parts: 1) technological tools used to enhance teaching and learning, 2) integration of technological tools in teaching and learning. The data in the first part will be presented in themes and subthemes containing numerical data and descriptions. The data in the second part will be presented based on the in-depth interviews, which will be a further explanation of the teachers' technology choices.

Technological tools used to enhance teaching and learning.

Table 3

Teachers' use of technology

		Group 1		**Group 2**							**Group 3**			
	Teachers (age)	**T1 (24)**	**T2 (33)**	**T3 (25)**	**T4 (26)**	**T5 (29)**	**T6 (32)**	**T7 (43)**	**T8 (51)**	**T9 (54)**	**T10 (26)**	**T11 (27)**	**T12 (30)**	**Total**
	Type of school	S	S	M	M	M	M	M	M	M	M	M	M	
Communication tools	*LINE* Group		□	□	□	□	□	□	□	□	□	□	□	11
	FACEBOOK Group	□		□		□	□	□	□	□				7
	MESSENGER	□		□		□	□	□		□				6
Application	*KAHOOT*		□	□	□	□	□	□	□	□	□	□		10

	QUIZIZZ			□	□		□	□	□					5
	GOOGLE FORM			□			□	□		□				4
	PADLET			□			□			□				3
	PLICKERS		□							□				2
Websites	*YouTube*	□	□	□	□	□	□	□	□	□	□	□	□	12
	Wheel of Names			□	□		□			□				4
	Jeopardylabs.com			□		□	□			□				4
	British Council						□							1
Teaching and Learning platforms/ LMS during COVID-19	Handouts	□	□	□	□						□	□	□	7
	Google Meet			□	□	□	□			□		□	□	7
	Google Classroom			□			□	□		□				4
	ZOOM							□						1
	Microsoft TEAM								□					1

As seen in Table 3, participants' ages ranged from 24 to 54. The participants were from two different school types: small and medium-sized schools. T1 and T2 work in small schools while T3 to T12 work in medium-sized schools. As previously mentioned, different school sizes would result in different amounts of budget allocation for the school and the facilities and infrastructure in schools. At a glance, it can be seen that teachers from small-size schools use relatively fewer technological tools than those in medium-sized schools.

The findings revealed that all 12 teachers knew technological tools and integrated technology to facilitate classroom learning resources. The majority of participants (11 out 12 participants) used the *LINE* group for communication with students. Interestingly, numerous participants reported that they used various technological tools simultaneously to communicate with students which are *LINE* group, *FACEBOOK* group, and *Messenger*.

Kahoot and *Quizizz* were the most used applications in the classroom. *Kahoot* was used the most, as reported by 10 out of 12 participants. *Quizziz* was also popular since five teachers used this application. *Plickers* was the least popular as can be seen that only two teachers reported using it. For websites used, *YouTube* was used the most as 12 participants stated. T3, T4, and T7 seemingly used various websites in classrooms. The underlying rationale may come from the fact that these teachers were from medium-sized schools. However, the data in the next part will be able to explain why they used more websites than other participants from the same school context.

Lastly, for the aspect of Teaching and Learning platforms/ LMS during COVID-19, seven teachers reported distributing handouts to students for teaching during the outbreak. Of these seven teachers, three used only handouts and the other four teachers used handouts along with other learning platforms. Other learning or LMS included *Google Meet*, *Google Classroom*, *Zoom*, and *Microsoft Teams*. The fact that some of the schools are not located in a city but a collection of communities meant the relevant teachers lived nearby their students and were able to deliver handouts to them.

Overall, it can be seen that the teachers used a variety of tools, websites, applications, and teaching platforms in their classrooms. The results revealed which tools were used and how often. The next section

of this paper explores how the teachers' different school settings influenced them in using some tools more than others and considers other factors affecting an individual's use of technology.

Integration of technological tools in teaching and learning

In this part, the results will be described based on the excerpts from the interviews of participants in a narrative style. The results will be narrated through stories to allow the readers to get insightful knowledge on the use of technology of each teacher. The datasets from all participants were divided into three main groups (Group 1, Group 2, and Group 3) based on the number of technological tools used within two main scenarios: small-sized schools and medium-sized schools.

Group 1: Turning challenges into opportunities

The data from this group are from participants in small-sized schools. The participants were those who had little access to technology but were willing to use it. This part illustrates how teachers integrated technology with very limited resources. The participants stated that externals factors affected their use of technology, namely poor infrastructure, inadequate technology, and lack of sufficient technological tools.

"*There is only one language teacher in my school, so I teach every level from Mattayom 1 to Mattayom 6 (Grade 7 to Grade 12). The number of students per class is from 2 to 15 students. In Mattayom 2, there are only two students…. There is no projector or computer in a classroom and the school's Internet Wifi is very weak.* "(*Teacher 1*)

"*It is difficult for me to teach in a small-sized school, and I know it is difficult for the students too. I have a job and I have to do my duties as a teacher. I want to motivate them to learn. I want them to enjoy what they are learning so I had to use technology with them.*"(*Teacher 2*)

With the limited facilities, T1 used her own devices plus Wi-Fi to teach. Also, some students had phones and others did not. To solve the problem, T1 decided to ask some students to use their phones to explore online websites that do not require immediate responses, such as *YouTube*. Also, T1 lends her smartphone to the students, when necessary.

"*I think I am quite lucky to teach in a small class. At least some students have smartphones, so when I show something like phonics, I ask students to use their smartphones to open YouTube. I also lend my smartphone to the students too.*" (*Teacher 1*)

Similar to T1, T2 used her own devices plus Wi-Fi in the classroom. T2 witnessed the gap between students who had phones and those who did. To deal with this issue, the teacher teamed up those students with phones with others who lacked them, encouraging them to work on activities together in 'team mode'. T2 found a way of using *Plickers* in the classroom that meant phones were not required to complete the activities

"*So if at least 2-3 students have smartphones, I will use Kahoot with the students. They can work collaboratively in a team mode. They look at questions from my laptop screen and they answer from their smartphone screen.*"(*Teacher 2*)

"Another application that I like is Plickers. It is free for students and they don't need to have smartphones. I just printed Plickers Cards and give them to students. I use these same cards with different groups of students. The students had fun and I am glad I can be a part to make them happy." (Teacher 2)

This information from T1 and T2 shows that internal factors supported teachers' use of technology. High teacher self-efficacy and positive teacher perceptions are some of the factors that affect technology integration in schools. The report from T1 confirms this statement.

"There is no projector or computer in a classroom and the school's Internet Wi-Fi is very weak. But I think I am quite lucky to teach in a small class. At least some students have smartphones, so when I show something like phonics, I ask students to use their smartphones to open YouTube. I also lend my smartphone to the students too." (Teacher 1)

The statement truly shows positive attitudes towards the use of technology in classrooms. In addition to that, internal factors (e.g., positive attitudes and teacher efficacy) positively influenced the teachers to set up a learning environment through instructional activities. The excerpt from T1 confirms the statement. T1 skilled at Facebook live and wanted students to have marketing skills. T1 intended to bring the real world to the classroom. Then T1 asked students to use a Facebook application to record a live video to practice marketing skills plus English skills. Consequently, the students might be motivated to learn through this activity. T2 also had high self-efficacy in technology adaptability as T2 asked students to learn online by using additional technological tools that do not require instant responses, such as Distance Learning Television (DLTV) along with *LINE*, which required instant responses. T2 also used offline materials, such as handouts to handle limited facilities problems. The excerpts below confirm the statements.

"When the facilities in the school are limited, I agree that it is extremely to teach English and to integrate technology in the classroom. But for me, I think it is a challenge. I have access to the Internet and I am comfortable with creating content on Facebook. So, I create a Facebook page called "XXX Easy English"... I want to inspire my students to get motivated in learning English."

During the COVID-19, I used Facebook Live to sell clothes online. I got this idea so I integrated my knowledge of English and video editing skills to teach my students. Students learned basic skills for video editing and they created videos and submit them to me. Sometimes I led some students to go live on Facebook to sell products (like woven cloth bags, dried fish) using Thai and some English words. When they could sell the products they were happy because they can help their family/ community and I think they know why English is important. (Teacher 1)

"Students did not come to school during Covid-19, so I created learning materials in handouts and send them to the students in LINE group. But not all students can smartphones so later I just created handouts, made photocopies, and distributed the handouts to students at their houses. Sometimes I just asked the students to watch the content from DLTV (Distance Learning Television)" (Teacher 2)

Group 2: Making the best use out of everything

Group 2 refers to the data from those lecturers who had some technological support (such as computers and monitors) and were willing to make full use of those technological tools. T3, T4, T5, T6, T7, T8, and T9 belong to this group. This part shows how these teachers integrated technology with some resources. It can be seen that the teachers in this group vary in age from 25 to 54. However, they shared some character traits in common in the way that they were from a medium-sized school. Also, they had high teacher self-efficacy, confidence, belief in technology integration, and positive attitudes towards technology integration. This may have resulted from the facilities provided by their school. Overall, it has been found that internal factors (e.g., positive teacher perceptions) affect technology integration in schools. There was only one external factor affecting the non-use of some technological tools, namely the lack of accessible resources.

Teachers from group 2 integrated more technological tools into their classrooms. Also, they could add more interactive activities into the classrooms. T7 shows that adequate technological facilities are correlated with teacher's self-efficacy, confidence, belief, and attitudes towards technology integration. The excerpts below show how teachers integrated technologies into their classrooms. It should be noted that T7 was the only teacher that invited the researchers to observe her classroom and her teaching demonstration.

"I integrated technology in all my English classes. I teach both compulsory English courses and elective English courses to Mattayom 2 (Grade 8) and Mattayom 5 (Grade 11) students. For this teaching demonstration, the Mattayom 5 students are taking an elective English course "English for Know All". The topic of the lessons is "Social Words". First I asked students to search from the Internet and choose one interesting social word for example the words 'permalink, retweet, vlog, viral, DM, unfriend, Hashtag'. Then they had to give a presentation of that word in front of the class. I used the "Wheel of "Names" tool to let the wheel pick a random name to give a presentation. After approval from me, they posted their words on the classroom wall. Everyone in the class needed to walk around the class, read their friends' work, and chose 9 words to create sentences to make a story. After creating, they tell the story and post it on Facebook. For me, I also needed to look at every word and I have to use some of these words to create a quiz game on Kahoot. If I want some sense of competing, I will use Kahoot or Jeopardy as a tool, but if I want students to be more serious, I will use the Quizizz application."(Teacher 7)

To support T7's statements, the figures below show how the teacher applied knowledge in technology and pedagogy to teach students in the classrooms.

Figure 1
Technology integration and in-class activities

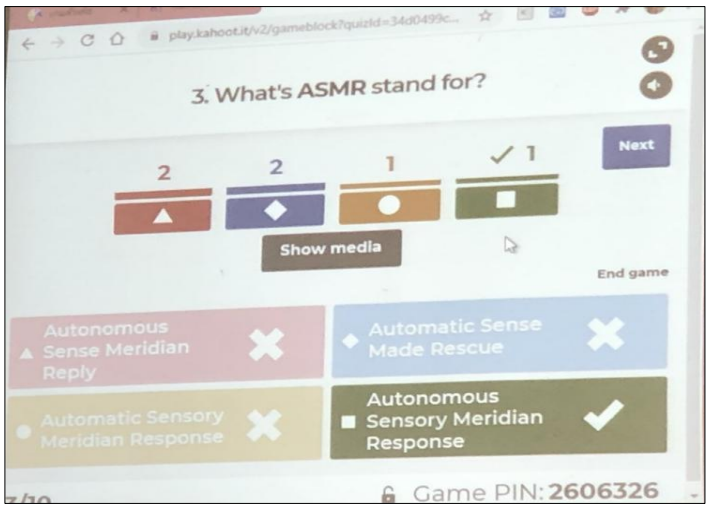
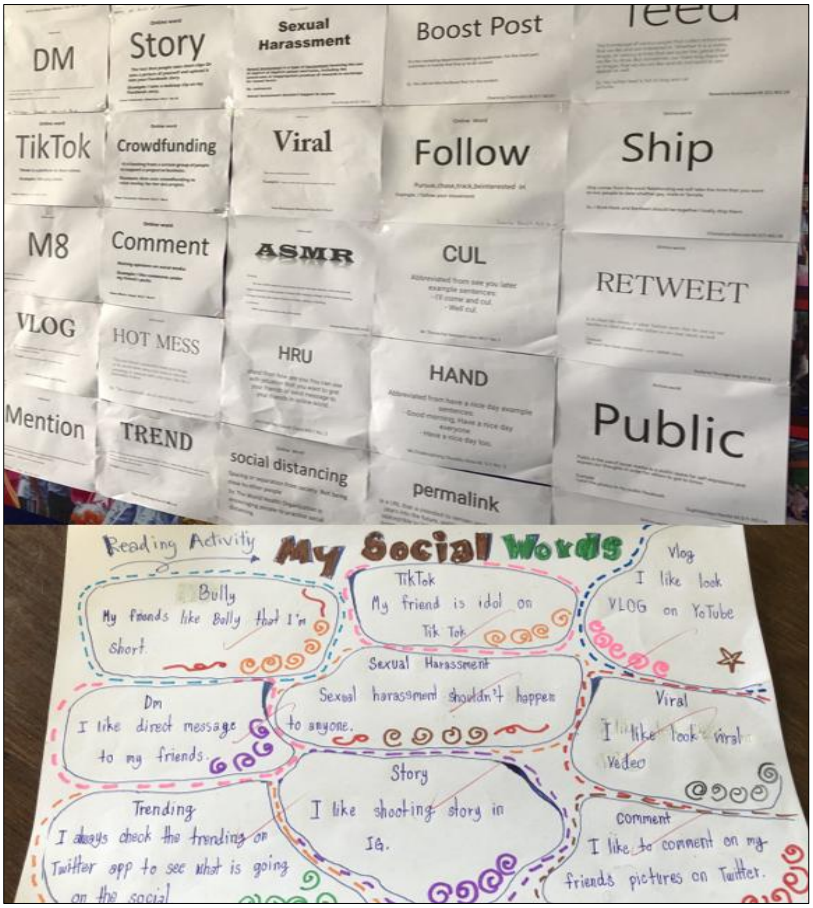


Figure 2

Technology integration and in-class activities (cont.)



T3 is also an outstanding participant who demonstrated how he used technological tools in class. It can be seen from the excerpts below that he used various types of tools since his school supported adequate facilities (e.g., whiteboards, speakers, WIFI, computers, and projectors).

"I always use technology in my classroom. Before Covid-19, I used Kahoot, Quizizz, Padlet, YouTube. This is a normal practice for me. But when COVID-19 started in March last year [2020], all teachers in the school need to teach online 100%. The school also asked that every teacher must set up Google Classroom. I also started to use more types of technology in class. I assign works in Google Classroom. I uploaded my teaching video there. Sometimes I went live on Facebook and share a link in Google Classroom. I use Google Forms to create a quiz. I created a Google site. It contains information about my name, the courses I am teaching, QR codes of the subject, or the group that students have to scan. So I put everything in Google Classroom. I also contact the students through LINE Group whenever I put something news in Google Classroom." (Teacher 3)

To support the participant's statements, the figures provided by the teacher below show how the teacher used *Kahoot* in the classroom.

Figure 3

How Kahoot was used in the classroom

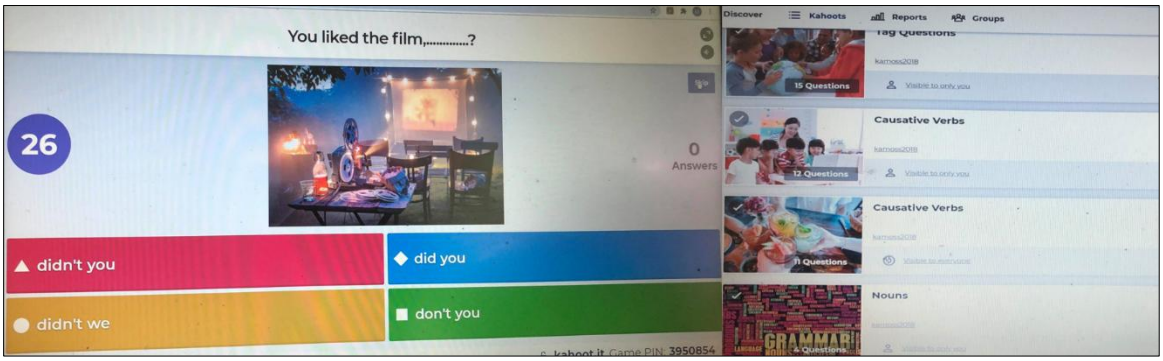
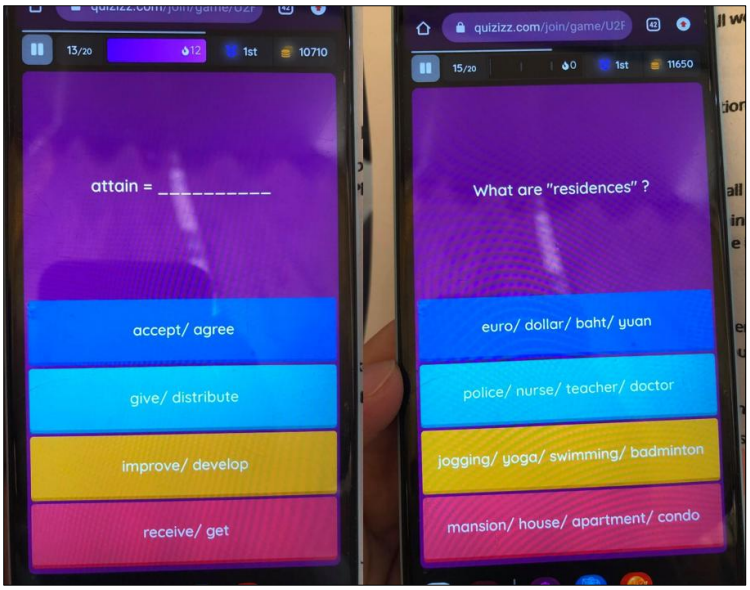


Figure 4

How Quizizz was used in the classroom



Although internet connection and students' lack of mobile devices seem to be the most reported problems when trying to integrate technology in the classroom, Teacher 5 shared his experience in using technology with such limitations.

I also remembered that when you came to give a workshop last time you used "Jeopardy game". You gave us the link and how to create it. I tried that to use with my students. They enjoyed it very much. The students didn't need mobile devices and this worked better in my school. I used my laptop and if the school Wifi is weak, I can use my 4G. The students played this game in groups. .... The questions I used in the game are related to English. For example, I asked students to change an affirmative sentence to a negative sentence, asking about irregular verbs, asking them to translate Thai sentences into English using the comparative form, superlative form, something like this. (Teacher 5)

Interestingly, T8 and T9, the only teachers aged above 50, demonstrated a preference for technology integration in their classrooms. Although age seems to be a factor affecting the use of technology use, it is clear that in this study the two teachers expressed an interest in applying technology in their classrooms.

I have been a teacher for 17 years. I saw a lot of changes in teaching English as well as in education policy. When the Ministry of Education launched the project ***One Tablet Per Child****, I needed to learn how to use a tablet and design activities relating to tablet devices. Another time when the ministry launched the project* ***One District One Lab School****, I needed to adapt myself to use web-based instructions and I needed to know about new technological devices such as an interactive whiteboard. So for this, I think I am comfortable with changes.*

Ok, let me share how I use technology in one class. In Mattayom 1 (Grade 7), the topic is occupation... First I created a quiz on Kahoot. The items will be like... "I work in a restaurant. I cook food. Who am I?" a pilot? police? a chef? or a nurse? Or "I work in a hospital. I wear a white coat and I help sick people. Who am I? This Kahoot quiz is played at the beginning of the lesson. It is like a pre-test. After that, I taught the students about the occupation. I showed videos from YouTube. Students will see a real example and they know how to pronounce the words correctly. At the end of the lesson, I created another quiz on Kahoot again. This is like a post-test. The questions will be like.... "A pilot is someone who..... a. can cook b. can fly c. can swim d. can teach" (Teacher 8)

After attending your technology workshop two years ago, I started using more technological tools in the classroom. I usually use YouTube because it is very easy, but I started to use Kahoot and Quizizz. I think students are very motivated when I use Kahoot it is convenient for me too. My American husband lives in Thailand for many years and used to teach English to local Thai people. He is very passionate about Thai students so when he knew I used Kahoot he upgraded Kahoot account from Kahoot Basic to Kahoot Premium. With Kahoot Premium, I can create a quiz with different question item types, I can access photos from the Kahoot image library to match the theme of my questions. For example, the questions are about Christmas I can easily look for photos about Christmas and add them to Kahoot. Another feature that I like is with Kahoot Premium I can create content by importing the content from my PowerPoint. (Teacher 9)

Lastly, it was interesting that the teachers from this group show their strong positive belief in technology integration. The teachers stated that "I can....", "I will...", and "I can learn..." to show their positive perceptions towards technology integration as seen from the excerpts below.

"I created a quiz, set the deadline for the students to complete. I can see the results easily" (Teacher 3)

"I can assign work to my students through Google Classroom." (Teacher 3)
"I would love to use technology in every class,... I can search in google image for London or I can search for a video of London city tour. I think seeing pictures is worth more than words." (Teacher 8)

"Well, I am old now, I am 54, and I am not very good at technology, but the students are very smart, they help me a lot with technology. So, I think I have to try to adapt myself I want the students to be motivated learners. I like to see them have fun when they are in my class." (Teacher 9)

One interesting common feature of group 2 teachers is self-development, related to their positive perceptions of technology integration and self-efficacy. T17 reported that using technology is a way to develop herself. Regarding bringing the real world to the classroom, T7 pointed out when she used technology, she could see the authentic examples from teachers around the world using technology. She felt that she is still a novice teacher who needs to learn more about using technology in class. It was surprising that three out of twelve participants did not only focus on students but were also concerned about themselves. They perceived technology integration as a part of their self-development. The excerpt below illustrates how teacher 10 perceived technology and teaching.

"I know that the students are very competent in using technology. I have two children who are in secondary school and we are very close, we talk about everything. So they often talk about what they enjoyed or did not enjoy when they study in English classes. They told me about the teacher opening YouTube about people in Australia and New Zealand or about a new application their teachers use. I am a teacher and I want to do the best I can to make the students happy. I tried using technology in class. I want to develop myself and value my work. When I have problems, I asked my children to help me. I have to admit that I don't know everything but I can learn." (Teacher 7)

Group 3: Meeting the standard

Group 3 refers to those teachers who have some technological support; however, they used only some of the technological tools. T10, T11, and T12 belong to this group and were all from the same school context, a medium-sized school. The majority of teachers in this group were relatively young, aged between 26 and 30.

From the interview data, it can be concluded that there were some reasons blocking teachers' use of technology in the classroom. The teachers knew about the features and benefits of the tools but did not have opportunities to explore them, due to a range of factors. These included: the teachers' lack of confidence during using technology, their beliefs and values, lack of time for the technology's use, lack of effective training, and facing technical problems in use, especially a lack of support (from administrators, or directors). In other words, some teachers stated that their workload and administrative duties prevented them from using technology in classes.

"It is difficult to use technology in the classroom. Many classrooms are not equipped with computers and projectors. There are two interactive classrooms where there are computers and projectors but if want to use technology, I have to reserve the classroom in advance. So, I only use it once or twice". (Teacher 10)

"I don't use technology in the class very often because the Internet connection is not stable. Also, I think using technology can disrupt my teaching time. If I see something interesting, I will tell students the link and they can watch later at home."(Teacher 11)

"I rarely use technology in the classrooms. There are no monitors to connect to the laptop in most of the classrooms. So it is very difficult. But for speaking class or when I teach about pronunciation, I bring my laptop to class. I open YouTube and connect to mini external speakers. In that way, the students can learn how to pronounce words or sentences correctly. If I find some useful resources for English language learning on YouTube, I sometimes share the URLs with the students by using LINE group chat." (Teacher 12)

The most interesting, thing is that all three of these teachers used handouts during the COVID-19. The teachers are from well-equipped schools with adequate facilities but they still used handouts. They either made photocopies and distributed them to their students or sent electronic files through LINE applications. T11 and T12 also reported using Google Meet as an online platform for teaching and learning during the COVID-19 as mandated by their schools' directors.

Discussion and Conclusion

All the teacher participants in this study were already using technological tools, websites, and applications in their classes. The findings are in line with several recent studies, which indicated that many teachers are commonly using technology for teaching purposes (Alonso et al., 2019; Liu, et al., 2018; Taghizadeh & Hasani Yourdshahi, 2020; Uzunboylu & Ozdamli, 2011)

The features/attributes of the online resources that are found useful by teachers from this study are consistent with the researchers' previous study (Boonmoh et al., 2021; Khamprem & Boonmoh, 2019) in a way that the participants from both studies mostly used free game-based learning tools, especially Kahoot because this tool is easy-to-use, free, support a classroom learning environment, and classroom engagement. From the previous study (Cárdenas-Moncada et al., 2020), Kahoot helps support students in playing together and incorporates game show features. Similarly, in this study, the teachers used Kahoot because of its main feature which allows students who lacked smartphones to play games together with the ones who have smartphones.

This study explored teachers' rationale for using technology in the classroom. Intrinsic factors, such as the lack of confidence among teachers during teaching, belief, and value, were found to be the main reasons blocking teachers' use of applications in their classrooms. Extrinsic factors (such as lack of time for the use of technology in teaching, lack of support (from administrators, or directors), not having enough facilities, and students not having their own smartphones) also played a part. Free-of-charge game-based learning tools were found to be particularly popular classroom tools, which all 12 teachers had integrated into their classrooms. The application that they used most often was Kahoot because these applications were easy to use and could save their time. However, some students did not have their own smartphones,

which limited the use of such applications. Two teachers from a small school did not have enough facilities (inadequate computers and poor internet connection). Then to conquer the limitations, the teachers made use of the features from game-based online applications, such as "team mode" that Kahoot provided. So, using game-based online applications could be counted as a guided solution for those teachers who are from the same settings: small-sized schools with inadequate supports.

The implications of this study refer to the influence of extrinsic and intrinsic factors on the teacher's use of technology. The results from this study are consistent with previous studies, which stated that extrinsic factors (such as workload, lack of time, sufficient facilities, and other administrative duties) and intrinsic factors (like teachers' beliefs, level of computer skills, and confidence in using technology) are the main factors positively or negatively influencing educators' use of digital technology (Blackwell et al., 2014; Nim Park & Son, 2009).

Interestingly, according to the findings from teachers in group 1 (Turning challenges into opportunities), it was noted that teachers from schools with very limited facilities were eager to integrate technology into the classroom. The lack of technological facilities could be the major challenge related to technology integration in educational settings (Nim Park & Son, 2009). However, it is contradictory that the school sizes do not affect teachers' motivation in this study. It is conclusive that intrinsic factors are essential and direct teachers' decisions. The factors that influenced teachers' decisions can be from intrinsic motivations, such as their attitudes, and confidence. The lack of facilities of the schools may influence the teachers for not using technology in classes; however, the teachers' decisions for using or not using the technology are more important. The results of this study are in line with several studies, which stated that intrinsic factors (such as teachers' attitudes, confidence, knowledge, and anxiety) about using technology correlated with their actual use, such that those more in favor of technology are more likely to adopt technology in their classroom (van Braak et al., 2004; Ertmer et al., 2012; Karaca et al., 2013; Lindahl & Folkesson, 2012).

Another important pedagogical implication relates to teachers' knowledge of technology whether to use technology in the classroom and what types of technology to use in the classroom. Teachers need to clearly understand the technological tools before integrating them into their classes. Besides, one of the teacher's duties in a technology-integrated class should be advising students on the strengths, weaknesses, functions, features, and uses of each technological tool. This allows students to understand the rationale behind each technology-integrated activity. It also makes it more likely that students will be motivated to learn effectively, using the technology, than if they were left to use the tools without any guidance.

This study found teachers' use of technology has been prescribed by governmental and institutional policies. This finding is consistent with the results of Wiangsima and Boonmoh's (2018) study, which reported that language policy using a top-down approach dictated the curriculum and teaching methods in language learning. The Thai Ministry of Education introduced projects utilizing a top-down approach, such as the Ordinary National Educational Test (ONET), One Tablet Per Child (OTPC), and STEM Education, over many years. However, due to technical and practical limitations, some projects such as One Tablet Per Child were canceled shortly after their introduction. Therefore, teachers have had to constantly adjust their pedagogical practices in response to abrupt policy changes (Wiangsima & Boonmoh, 2018). It is worth speculating on how more consistent long-term strategies would work. So, the government officers must come into contact with individual lecturers who are teaching in each school.

Consistent with the results from Wiangsima and Boonmoh's (2018) study, the participants from this study (group 3: Meeting the standard) did not use technological tools to some extent because they had

to follow the top-down policies, such as One Tablet Per Child, and One District One Lab School, which related to technology assigned by the school principal. To overcome the top-down policies, the teachers need to accept the changes and enhance their pedagogical and technological knowledge. From the findings of this study, one of the teachers from group 3 has witnessed changes for decades in a way that he/she accepted and was comfortable with changes. However, the acceptance of changes is uncontrollable. Some teachers from groups 1 and 2 could accept and adapt themselves easily to use technology in classes. Conversely, another group of teachers may not be able to accept and adjust themselves to serve the standard easily. Some teachers from group 3 stated that they were not comfortable using technology to overcome the policies. So, the teachers who were not fully ready and comfortable to change themselves used just only a few technological tools to just pass the minimum requirements to overcome the top-down policies. Therefore, intrinsic motivation is essential in a way that effective technology integration comes from teachers who change their mindset to be open to changes in the educational context. The training workshops and the sharing sessions organized by administrators from each school may help the administrators to explore the needs of those teachers whose intrinsic motivation does not expose them to accept innovation and using technology in the classrooms.

The findings from this study highlighted that adequate facilities can be one of the factors that support teachers' use of technology in the classrooms. Group 2 teachers (Making the best use out of everything) tend to use technological tools more than a teacher from group 1 (Turning challenges into opportunities). It can be concluded that facilities are a part of the factors that influenced the teacher's choices of using technology. So, the administrators should provide adequate facilities to teachers. More importantly, the facilities need to be in good condition and ready to use with continuous maintenance.

Apart from extrinsic factors, intrinsic factors, especially teachers' beliefs led the teachers to consistently and voluntarily integrate technology into classes. Thus, the professional learning community (PLC) should be implemented by the administrators of each school. By doing so, the teachers will have opportunities to exchange knowledge and experiences in technology integration. Moreover, Secondary Educational Service Area Office should provide meetings or workshops to organizing teachers into working groups of practice-based professional learning. Also, the supervisor should launch sharing sessions frequently for secondary teachers.

The researchers have witnessed how technology is used differently depends on the personal context and individual differences, such as lived experience, school facilities, beliefs, and workload. Some teachers are from a small school with inadequate facilities so they couldn't use various types of websites and tools. Based on research conducted for this paper, there appears to be an urgent need for training workshops targeting teachers at the secondary education level, namely, How and when to use technological tools in classrooms: case studies of teachers from different school contexts. According to the trend of having technological workshops (Dawson & Rakes, 2003; Georgina & Hosford, 2009; Kupetz & Ziegenmeyer, 2005), teacher training concerning technologies is encouraged by organizations and educators to enhance teachers' competence. So, the organizations and educators should divide the training into sections. Each section should be reserved for different groups of teachers from different school contexts. The concept of dividing teachers into groups is consistent with the concept of "precision language education". This concept is derived in part from "precision education" which, sequentially, is derived from "precision medicine". Precision language education is for dealing with individual differences by effecting as a diagnosis on each language learner, thus design the lessons to respond to each person's specific language-learning problems (Lian & Sangarun, 2017). In other words, future training workshops should

not be focused on only numbers of applications but also on how these applications can be applied to teachers from very diverse contexts.

Lastly, this study can broadly suggest the successful integration of technology in classrooms does not depend on the teacher's age. In this study, teachers from group 2 (Making the best use out of everything) whose ages ranged from 32-54 used technology in class more than teachers in group 3 (Meeting the standard) whose ages ranged from 26 to 30. It can be concluded that young generations of teachers who are nearly "digital natives" do not represent the full use of technology. The teachers who are younger and grew up with technology integrated into their daily lives may not have a strong passion for technology integration in their classes. Intrinsic factors regarding teachers' beliefs seem to impact the use of teacher individuals more than extrinsic factors (e.g., ages). The findings of this study are in line with Khamprem & Boonmoh's (2019) study, which reported that the effective integration of technology in classrooms does not depend on the teacher's age or years of teaching experience, but rather depended on their specified needs and willingness to learn. It would be worth exploring to find ways to enhance teachers' needs and willingness in using technology in classes. In Khamprem & Boonmoh's (2019) study, a 57-year-old participant who was unfamiliar with new applications was shown to be able to integrate applications in her classroom after being trained to achieve her stated needs. It can be concluded that teachers' ages do not affect their choices of technology integration as much as their years of exposure to technology. This is in line with Wright and Wilson's (2011) study. They examined teacher perceptions of technology integration and use in their classrooms. The results suggested that the participants who were more familiar with technology were more likely to facilitate students through technology.

In terms of the study's limitations, the current study used a small sample of schoolteachers in a sole province to understand how schoolteachers use technology in class in detail. In-depth interviews were conducted with only a few participants from a large-scale sample, 126 participants who participated in the workshop from the previous study in Surin. So, the results may not be suitable to generalize in detail how schoolteachers throughout the province use technology. Another limitation was that only three teachers demonstrated their technological tools/ applications used in the classes. So, the teachers' technology integration could be observed detailly and inclusively in further study. For further research, the researchers aim to continue investigating teachers' use and perceptions of technology integration in large schools and extra-large schools. Thus, the researchers can explore how the teachers with full equipment and facilities integrated technology into their classes. Besides, the researchers want to investigate the use of technology in English classrooms of teachers on a large scale of different schools from other provinces to get a better understanding and to evaluate the use of technology for teaching in classes throughout Thailand.

References

Abbott, C. (2001). *ICT: Changing education*. Psychology Press.

Alonso, R. R., Plaza, I. R., & Orfali, C. H. (2019). Barriers in teacher perception about the use of technology for evaluation in Higher Education. *Digital Education Review*, (35), 170-185. https://revistes.ub.edu/index.php/der/article/view/26813

Bhusal, D. R. (2020). Nepalese Teachers' Perceptions on Integrating Technology in English Language Teaching. *English Language Teaching and Research Journal (ELTAR-J)*, *2*(2). http://dx.doi.org/10.33474/eltar-j.v2i2.8552

Blackwell, C. K., Lauricella, A. R., & Wartella, E. (2014). Factors influencing digital

technology use in early childhood education. *Computers & Education*, *77*, 82- 90. https://doi.org/10.1016/j.compedu.2014.04.013

Boonmoh, A., Jumpakate, T., & Karpklon, S. (2021). Teachers' perceptions and experience in using technology for the classroom. *CALL-EJ*, *22*(1). 1-24. http://callej.org/journal/22-1/Boonmoh-Jumpakate-Karpklon2021.pdf

Buasuwan, P. (2018). Rethinking Thai higher education for Thailand 4.0. *Asian Education and Development Studies*, *7*(2), 157–173. https://doi.org/10.1108/ AEDS-07-2017-0072

Cárdenas-Moncada, C., Véliz-Campos, M., & Véliz, L. (2020). Game-Based Student Response Systems: The Impact of Kahoot in a Chilean Vocational Higher Education EFL Classroom. *CALL-EJ*, *21*(1), 64-78. http://callej.org/journal/21-1/Cardenas-Veliz-Veliz2020.pdf

Dawson, C., & Rakes, G. C. (2003). The influence of principals' technology training on the integration of technology into schools. *Journal of Research on Technology in Education*, *36*(1), 29–49. https://doi.org/10.1080/15391523.2003.10782401

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & education*, *59*(2), 423-435. https://doi.org/10.1016/j.compedu. 2012.02.001

Farah, M., & Frayha, N. (2021). Lebanese Teachers' Perceptions of Online Learning. International Journal of Advanced Research in Science, Engineering and Technology, 8(2), 16539 – 16547. http://www.ijarset.com/upload/2021/february/03-mireille-23.PDF

Georgina, D. A., & Hosford, C. C. (2009). Higher education faculty perceptions on technology integration and training. *Teaching and Teacher Education*, *25*(5), 690– 696. https://doi.org/10.1016/j.tate.2008.11.004

Goodman, J. (2017, July). Unpacking the narrative of educational failure: Thailand in the standardized testing era. In *13th International conference on Thai studies: Globalized Thailand? Connectivity, Conflict, and conundrums of Thai studies* (pp. 15-18).

Goodyear, P. (2001). *Effective networked learning in higher education: Notes and guidelines*: Centre for Studies in Advanced Learning Technology, Lancaster University. https://www.academia.edu/314168/Effective_networked_learning_ in_higher_education_notes_and_guidelines

Hwang, G. J., & Wu, P. H. (2012). Advancements and trends in digital game-based learning research: A review of publications in selected journals from 2001 to 2010. *British Journal of Educational Technology*, *43*(1), E6-E10. https://doi.org/10.1111/j.1467- 8535 .2011. 01242.x

Johnson, M., Riel, R., & Germain-Froese, B. (2016). Connected to Learn: Teachers' Experiences with Networked Technologies in the Classroom. *Canadian Teachers' Federation* https://mediasmarts.ca/sites/default/files/publication-report/full/ycwwiii_ connected_to_learn.pdf

Jones, J. (2001). CALL and the teacher's role in promoting learner autonomy. *CALL-EJ Online*, *3*(1), 3-1. http://callej.org/journal/3-1/jones.html

Jumpakate, T., & Rungruangthum, M. (2020). Word Clouds and English Language Teaching in Thai Classroom. *RMUTK Journal of Liberal Arts*, *2*(1), 15-26. https://larts-journal.rmutk.ac.th/index.php/lartojsdb/article/view/49

Kannan, J., & Munday, P. (2018). New Trends in second language learning and teaching through the lens of ICT, networked learning, and artificial intelligence. *Círculo de Lingüística Aplicada a la Comunicación*, *76*, 13–30. http://dx.doi.org/10.5209/CLAC.62495

Khamprem, K., & Boonmoh, A. (2019). Teachers' stated needs and their actual use of technology. *Human Behavior, Development and Society*, *20*(4), 41-51. https://so01.tci-thaijo.org/index.php/hbds/article/view/193626

Karaca, F., Can, G., & Yildirim, S. (2013). A path model for technology integration into elementary school settings in Turkey. *Computers & Education*, *68*, 353-365. https://doi.org/10.1016/j.compedu.2013.05.017

Kupetz, R., & Ziegenmeyer, B. (2005). Blended learning in a teacher training course: Integrated interactive e-learning and contact learning. *ReCALL: The Journal of EUROCALL*, *17*(2), 179. https://doi.org/10.1017/S0958344005000327

Leu Jr, D. J., & Kinzer, C. K. (2000). The convergence of literacy instruction with Networked technologies for information and communication. *Reading research quarterly*, *35*(1), 108-127. https://www.jstor.org/stable/748290

Lian, A. P., & Sangarun, P. (2017). Precision Language Education: A Glimpse into a Possible Future. *GEMA Online® Journal of Language Studies*, *17*(4). https://ejournal.ukm.my/gema/article/view/22096

Lindahl, M. G., & Folkesson, A. M. (2012). ICT in preschool: friend or foe? The significance of norms in a changing practice. *International Journal of Early Years Education*, *20*(4), 422-436. https://doi.org/10.1080/09669760.2012.743876

Liu, H., Lin, C. H., Zhang, D., & Zheng, B. (2018). Chinese language teachers' perceptions of technology and instructional use of technology: A path analysis. *Journal of Educational Computing Research*, *56*(3), 396-414. https://doi.org/10.1177/0735633117708313

Martínez-Mesa, J., González-Chica, D. A., Duquia, R. P., Bonamigo, R. R., & Bastos, J. L. (2016). Sampling: How to select participants in my research study? *Anais Brasileiros de Dermatologia*, *91*(3), 326–330. https://doi.org/10.1590/abd1806-4841.20165254

Mundy, M. A., Kupczynski, L., & Kee, R. (2012). Teacher's perceptions of technology use in the schools. *Sage Open*, *2*(1), https://doi.org/10.1177/2158244012440813

Nikolopoulou, K. (2020). Secondary education teachers' perceptions of mobile phone and tablet use in classrooms: benefits, constraints and concerns. *Journal of Computers in Education*, *7*(2), 257-275. https://link.springer.com/article/10.1007/s40692-020-00156-7

Nim Park, C., & Son, J. B. (2009). Implementing computer-assisted language learning in the EFL classroom: Teachers' perceptions and perspectives. *International Journal of Pedagogies and Learning*, *5*(2), 80-101. https://doi.org/10.5172/ijpl.5.2.80

Office of the Teacher Civil Service and Educational Personnel Commission (OTEPC). (2011) *Circular letter of OTEPC*. https://circular62.otepc.go.th/v1_t_ circualr_book _list.php

Petersen, K., & Sachs, R. (2015). The language classroom in the age of networked learning. In R. P. Leow, L. Cerezo, & M. Baralt (Eds.), T*echnology and L2 learning: A psycholinguistic approach*. De Gruyter Mouton.

Prensky, M. (2001). Digital natives, digital immigrants. On the Horizon, 9(5), 1-6. https://doi.org/10.1108/10748120110424816

Rashid, A. H. A., Shukor, N. A., Tasir, Z., & Na, K. S. (2021). Teachers' Perceptions and Readiness toward the Implementation of Virtual Learning Environment. *International journal of evaluation and research in education*, *10*(1), 209-214. https://eric.ed.gov/?id=EJ1285898

Taghizadeh, M., & Hasani Yourdshahi, Z. (2020). Integrating technology into young learners' classes: language teachers' perceptions. *Computer Assisted Language Learning*, *33*(8), 982-1006. https://doi.org/10.1080/09588221.2019.1618876

Toyoda, E. (2001). Exercise of learner autonomy in project-oriented CALL. *CALL-EJ*, *2*(2), 2-2. http://callej.org/journal/2-2/Toyoda2001.pdf

Uzunboylu, H., & Ozdamli, F. (2011). Teacher perception for m□learning: scale development and teachers' perceptions. *Journal of Computer assisted learning*, *27*(6), 544-556. https://doi.org/10.1111/j.1365-2729.2011.00415.x

Van Braak, J., Tondeur, J., & Valcke, M. (2004). Explaining different types of computer use among primary school teachers. *European Journal of Psychology of Education*, *19*(4), 407-422. https://link.springer.com/article/10.1007/BF03173218

Vungthong, S., Djonov, E., & Torr, J. (2017). Factors contributing to Thai teachers' uptake of tablet technology in EFL primary classrooms. *Asian EFL Journal*, *19*(2), 8-28. https://www.scopus.com/record/display.uri?eid=2-s2.0-85020104348&origin=inward&txGid=4cda4556cd67c94cf7cf2f884d0bae14

Wiangsima, A., & Boonmoh, A. (2018). Teachers' perceptions for teaching English in the near future. *Journal of Liberal Arts, Ubon Ratchathani University*, *14*(2), 270-310. https://so03.tci-thaijo.org/index.php/jla_ubu/article/view/242363

Wright, V. H., & Wilson, E. K. (2011). Teachers' Use of Technology: Lessons Learned from the Teacher Education Program to the Classroom. *SRATE Journal*, *20*(2), 48-60. https://eric.ed.gov/?id=EJ959529

Yang, D. F. (2007). *Improving networked learning in higher education: Language functions and design patterns* (Accession No. 2465) [Doctoral dissertation, University of Sydney] Sydney eScholarship Repository. http://hdl.handle.net/2123/2465