Implementing Online Tools for Improving English Competencies of Elementary EFL Students

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The study aims to implement various online tools in an elementary English classroom and explore their impact on promoting students' curriculum competencies. To achieve these objectives, the researcher derived principles for selecting appropriate online tools from literature review, selected two classes from a public elementary school each as a control group and an experimental group; and visualized the network among students and online tools based on Actor-Network Theory (ANT). The control group studied English with textbooks and worksheets, while the experimental group used online learning tools including Vita, AI Pengtalk, Wordwall, Padlet, and Kahoot!. To identify the impact of using online learning tools on curriculum competencies, quantitative data from student survey results and qualitative data from a semi-structured interview were collected and analyzed. A map of the ANT network indicating how online tools affected students' curriculum competencies was developed through this study. Results indicated that students actively interacted with online tools and the English competencies of the experimental group improved significantly. This study suggests teaching and learning methods using various online tools in EFL situations, which also could be applied in remote classrooms.

Keywords: Actor-Network Theory, English competencies, Elementary English education, Online learning tools

Introduction

Due to the global pandemic, teachers accustomed to traditional face-to-face classrooms had no choice but to innovate their instructional methods. Elementary schools turned to fully remote learning systems, which previously existed as a mere option at other school levels (Hash, 2021). According to Lee et al. (2020), since the majority of elementary teachers lacked experience in conducting online classes, remote classes in the Spring semester of 2020 were considered to be more of an improvisation rather than carefully designed instruction. The Korean Institute of Education and Information (KERIS) reported that 45.14% of total remote classes in 2020 were conducted by uploading various materials usually consisting of lecture videos for student viewing. This put students in a position of the receiver, a rather passive status prone to absorbing the presented information. In English remote classes, students mostly had to listen and repeat the presented expressions, deprived of opportunities to communicate with their peers or teachers in English. This is in direct opposition with the current belief that English should be taught in various contexts for communication (No, 2015). Thus, after a year, many online tools that could be applied to remote classrooms had been developed and shared among teachers.

However, still, many teachers persist on using traditional materials and methods (Lee et al., 2020). This could be accounted for not only by the teachers' individual beliefs, but also for the fact that not much is known about the effectiveness of online tools for teaching English. Various studies have been conducted on the development of various online learning tools (Hampel, 2015; Raiyn, 2014; Sobaih, Hasanein, & Abu Elnasr, 2020), the perception and beliefs of teachers and students on the use of online tools (Inoune, Pengnate, 2018; Mozelius, Jaldemark, & Lindqvist, 2018; Oliver, Kellogg, Townsend, & Brady, 2010; Oyedotun, 2020; Zhang, 2020) and suggestions regarding their applications in classes (Biasutti, 2017; Porter, 2004; Singh, Mangalaraj, & Taneja, 2010). However, not much research has been conducted about integrating online tools in elementary classrooms, the types of tools and their specific usages during classes, and their effectiveness compared to traditional methods. During the pandemic, the use of online tools during classes is not an option but a necessity. However, lack of related research leads to a confusion in the field. Hence, this study aims to answer the following questions.

Research Question 1: What are the principles of using online tools in elementary English classes?
Research Question 2: How do students interact with the online tools during classes?
Research Question 3: How are online tools implemented in face-to-face and remote class situations?
Research Question 4: How does implementing online tools in elementary English classes affect the four domains of English competencies?

Research Background

English Competencies

The definition of English competency varies among scholars. In this study, the definition of the Ministry of Education (2015) was implemented. English competencies are an assembly of core contents and goals extracted from the previous national curriculum combined with current achievement standards for English learners. Korean English curriculum requires that students attain four competencies with several subordinate elements entailed. Koo (2020)'s instrument for measuring students' competencies, which was applied in this study, partially differs in terms of the subordinate elements as in Table 1. For example, 'communication strategies' is not mentioned in the national curriculum document, but is included in Koo's (2020) questionnaire after a series of literature reviews and interviews with education experts and K-12 students. The definitions and subordinate elements of each English competency are provided in Table 1.

Table 1

Details of English competencies (Lee, 2016; Koo, 2020)

Competence	meaning	Subordinate element
Communication competence	Being able to communicate in English in various contexts, such as daily routine	• Ability to understand English • Ability to express in English • Communication strategies
Self-management competence	Being able to continue learning English initiatively based on interest and attention about the language	• Interest and motivation • Confidence • Learning strategy related to learning English • Self-management and assessment about learning English
Information processing competence	Being able to properly utilize information in English in knowledge-based society	• Information ethics • Ability to collect, analyze, apply information
Community competence	Being able to participate in solving problems of community as a member of local, national, world-wide society	• Cultural identity and ability to embrace lingual & cultural variety • Interpersonal skills

Theoretical Framework

Actor-Network Theory (ANT) proposed by Callon (1991) and Latour (1991) provides an appropriate conceptual framework for identifying the nature of interaction between students and online tools. The theory advented in the era that interaction between technical agents and humans were enabled and the boundaries between the technical and the social are negotiable (Walsham, 1997). Many researchers (Bloomfield et al., 1992; Boland & Schultze, 1996; Monteiro & Hanseth, 1996) contended that the theory offers a new insight in understanding the socio-technical nature of human behavior, especially learning (Mlitwa, 2007). Mlitwa (2007) suggested Active theory (AT) and ANT to analyze technology use in teaching and learning. While AT implies that technical agents are neutral artifacts that mediate human actions, ANT focuses on the interconnectedness of all factors, including technology and human. Implementing ANT as a theoretical lens, this study explores the mutual and causal influence in network processes (Tuomi, 2001) to illuminate the process of online tools being utilized to facilitate learning and influencing students' curriculum competencies.

According to ANT, a network is the interaction of various actants to one another, and the actant is defined as "something that acts or to which activity is granted by another", allowing it to be either an online tool, a student, or anything that can interact in the context. An important factor about actants is made concerning intentionality. Kumar et al. (2013) explain that human and non-human actants' agentive capacity to influence the network may vary. Situating the class within an ANT framework, the researcher explored how non-human actants, the online tools, are implemented in an elementary English classroom, both remote and face-to-face situations, and the roles they play in students' learning process.

Implementing Online Tools in Korean Elementary English Classrooms

The National Curriculum of South Korea does not force a fixed approach for developing English competencies (Ministry of Education, 2015) but ensures that teachers must offer students plenty of opportunities to communicate in English. Under the pandemic situation, it is inevitable to adopt online tools to enable communication among students in remote classes. However, online tools have their characteristics, functionality, and challenges when used for teaching and learning (Biasutti, 2017). This suggests that, to implement online tools in remote classes, several appropriate tools need to be selected first. In response, elementary students' cognitive characteristics and instructional approaches suggested in the Korean national English curriculum document were considered to derive the principles (presented in Table 4).

Among the selected tools, AI Pengtalk is exclusively developed for elementary English, while other tools could be applied to general subjects. For example, Anindyajati and Choiri (2017) implemented Wordwall to increase the science-based vocabulary of students with hearing impairment. Yet considering the specific context of Korean elementary English education, some evidence to support their appropriateness are found from previous studies and documents.

Since the late 1980s, Korean elementary English education has been based on a consensus to take communicative-language teaching (CLT) and presentation-practice-production (PPP) model (No, 2015: 139). According to the national curriculum (2015), it is encouraged to take the formative assessment during the class and provide students with various options to express their learning outcomes.

Taking the contextual backgrounds into account, it can assign proper roles for each online tool and expect them to effectively fit in. Padlet is proved to be effective in sharing knowledge, feedback (Deni & Zanial, 2018; Fuchs, 2014), and improving vocabulary (Jabar & Ali, 2016). As students can communicate and negotiate on meaning in written English language on Padlet, it suits the basic premise of CLT that students are expected to interact with other people in their writings (No, 2015: 152). Wordwall was previously used for vocabulary instruction (Narkon, Wells, & Segal, 2011) and proved to be effective in improving vocabulary, thus expected to compensate for students' vocabulary knowledge. Some Wordwall templates including a quiz, random cards, and missing words provide drilling, which is commonly used for practice in the PPP model (Kim, 2016). Kahoot! is an internationally used tool mostly for formative assessment (Lunden, 2021) and reported to be effective when used in collaboration with other online tools (Sakar, Ford, & Manzo, 2017; Wang & Tahir, 2020). Vita, a video-editing mobile application, is designed intuitively and favorably used by teenagers according to its user review on Playstore. It enables students to easily express their learning outcomes in a form of video, which is encouraged by the Korean national curriculum. Lastly, AI Pengtalk is the least studied tool among those selected, yet best suits the purpose of this study. It is an English learning application for Korean elementary students developed by Educational Broadcasting System, equipped with artificial intelligence (AI) and augmented reality (AR) technology. It provides an AI chatbot on topics related to Korean textbooks, thus making it available for direct use in class. According to Hong et al. (2020), dialogue-based technology, such as the AI chatbot included in AI Pengtalk, needs to be used in elementary English education to help students overcome the relatively high affective filter and improve communicative competency. They highly evaluated the potential of AI Pengtalk as supplementary material to compensate for the imbalance of the achievement standards of the Korean elementary English curriculum.

There has been an emphasis and multiple attempts on improving English competency since the introduction of the revised curriculum in 2015 (Kim, 2016) yet specific strategies and activities compatible with remote situations have been barely sought. At this point, A deeper exploration on how online English classes are performed and what actants, including students and online tools, are involved is required to improve students' learning experience and their English competency.

Research Method

This study was conducted on 58 fifth-graders of two classes at a public elementary school in Gyeonggi Province, Republic of Korea. A single teacher with 3 years of teaching experience led both classes consisted of 29 students, which showed statistically equal achievement (p=.63) on a national standardized test. A total of 52 questionnaires were analyzed after excluding 2 absent students and 4 questionnaires that were considered to be unreliable. The experiment was conducted for 8 weeks, 3 hours per week for both classes. For 8 weeks, both classes were conducted face-to-face and remotely, respectively for 5 days in turns. All remote classes were conducted via Zoom, as a form of two-way synchronous class. Thus, 12 lessons for each class were done face-to-face, and in this case, class activities using online tools were done using mobile devices the school possesses.

For the control group, class activities remained traditional with textbooks and worksheets. Games were also played in the control group but were limited to simple games, such as bingo and matching cards, which don't involve electronic devices. During remote classes, the control group was provided with a video about target expressions, explanations, drills, and practices. Sometimes they played simple games made by PowerPoint but did not directly utilize online tools by themselves during class. For the experimental group, class activities involved online tools including Vita, Wordwall, Kahoot!, and Padlet. Students discussed and gathered materials they would like to use for their video on Padlet, made a video about their daily routine using Vita, played several games on Wordwall, and participated in quizzes using Kahoot!. The lesson plans for 8 weeks were built respectively for the control group and experimental group and went through a confirmation by a peer teacher with 10 years of career. After confirmation, the plans were modified and supplemented to provide a more coherent learning experience with the English curriculum. As typical English chapters are made up of 6 periods, consisting of listening, speaking, reading, writing, project, and wrap-up classes, lesson flow for both classes were identical.

Table 2

Lesson plan for the experimental group

period	Form	Chapter	AI Pengtalk	Kahoot!	Padlet	Vita	Word wall
1	Face-to-face		●				
2	Face-to-face		●	●			
3	Remote				●		●
4	Remote	3. Can I Take a Picture?	●	●	●		
5	Remote				●		●
6	Remote		●	●			●
7	Remote		●				●
8	Face-to-face		●				●
9	Face-to-face	4. Whose Shoes Are These?	●				●
10	Face-to-face			●			
11	Face-to-face						
12	Face-to-face		●	●			
13	Remote		●				
14	Remote		●				●
15	Remote	5. My Favorite Subject is Music.			●		●
16	Remote			●	●		●
17	Remote		●		●		●
18	Face-to-face		●	●			
19	Face-to-face		●		●		
20	Face-to-face				●		●
21	Face-to-face	6. I Get Up At Five			●		●
22	Face-to-face			●	●		
23	Remote		●		●	●	
24	Remote		●	●	●	●	

Koo (2020)'s instrument were implemented to measure students' English competencies. The original instrument consists of 11 subordinate elements with 3 items each, thus having a total of 33 items. The number of items were kept to maintain its satisfactory level of reliability (Cronbach's a=.905) but a few vocabulary changes were made to fit the context and make it more clear for target students. For example, the original term 'when writing an English assignment' was replaced by 'when participating in English activities' because students were not assigned homework during the experiment.

Table 3

Components of English competency assessment tool

Variables	Sample question	Number of items	Cronbach's a
Communication competence	I ask for help when it is hard to come up with an appropriate expression.	9	.904
Self-management competence	When studying English, I think about how what I learned before and what I learn anew are connected.	12	.921
Community competence	I try to understand other's position during group activities.	6	.884
Information processing competence	I can search for images and videos in English online.	6	.890
Total		33	.963

Pretest and posttest were both conducted using the same tool for both groups. Posttest included a question for a descriptive answer about student's thoughts on implementing online tools in English classes. The collected data were processed using SPSS 22.0 for Windows. To collect qualitative data about the impact of online tools on English competencies, answers for the last question in the posttest were first reviewed. Then a semi-structured interview with 5 students from the experimental group who left a significant opinion to figure out what exactly they felt during the class. The interview questions included "What do you think about each online tool?", "Was there any difficulty you experienced during the remote classes?" and more to deeply understand students' learning experience. Each interview lasted 10 minutes per participant and was conducted in Korean. Participants are labeled as student A through E for their anonymity. All Interviews were audio-recorded, blinded, transcribed, and then individually open-coded by the author and a fellow teacher who participated in organizing class activities, both experienced in open coding. Then the coders discussed until reaching an agreement on 3 categories: speaking opportunity, self-expression, and device issue. Quoted transcripts provided under each category were translated to the speaker's intention.

Research Result

RQ 1: What are the principles of using online tools in elementary English classes?

Table 4

Principles for implementing online tools in elementary English classrooms

Principles	Explanation
Principle of intuition	The tool must be simple enough for users to learn how to use it in a short time.
Principle of efficiency	The tool must be more efficient than existing tools in performing time-consuming tasks, such as gathering opinions or distributing worksheets.
Principle of sharing	The tool must enable communication with other subject in target language, such as the teacher, other students, or an AI chatbot.
Principle of accessibility	The tool must be available immediately, possibly in native language, without logging in, authenticating or downloading.
Principle of context	The tool must be selected to fit the classroom context, such as class content and student characteristics. Teachers' proficiency in the tool can also be considered contextual.
Principle of integration	The classes must be designed by converging multiple tools to achieve lesson goals, not relying on a single tool.

From a literature review focused on elementary students' cognitive characteristics and instructional approaches suggested in the Korean national English curriculum document, the principles listed above are derived. According to the principles, the tools selected in this study are AI Pengtalk, Vita, Word Wall, Padlet, and Kahoot!. All of them are available for free, designed intuitively that elementary students could understand how to use them in a short time. Besides Vita, a mobile application for video editing, all tools meet the conditions that allow in-class use at an elementary level; they are web-based, open-access with a link provided, equipped with simple UI, and offer multiple communication channels.

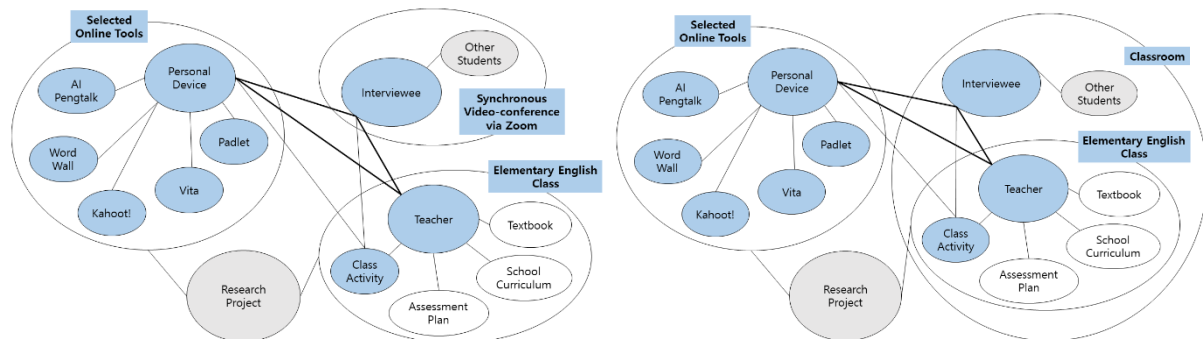**RQ 2: How did the students and online tools interact during the class?**

Figure 1. A map of actor-network comprised in the class

Figure 2 is a visualization of the actor-network formed both in remote classes (left) and face-to-face classes (right). Light blue circles are major actants, gray circles are minor actants that influenced major actants' outcomes, and white circles are the actor-networks that describe the ecology of the elementary English classes. The lines show the interactiveness between actants, and the thickness represents the strength of the connection. To examine how each actant influenced one another and students' learning experience, the researcher analyzed transcripts from semi-structured interviews.

Speaking opportunity. The use of an AI chatbot provided students with plenty of opportunities to practice speaking. Student A reported that "AI Pengtalk graded my pronunciation, gave scores and stars that I can collect. So repeating pronunciation drills was not as boring as when I did it in the classes". This supports Hong et al. (2020)'s opinion that online tools such as AI Pengtalk are appropriate for correcting the imbalance in achievement standards and expanding opportunities for speaking. Student C expressed her satisfaction with using AI Pengtalk in remote classes, saying, "It was nice to practice at home without paying attention to other people. In school, others tease me if I try too hard to sound like a native."

Self-expression. To some of the students in the experimental group, using various online tools meant extensive means to express themselves. Students B and D expressed their opinion on Vita and Padlet, which they selected to be extraordinarily satisfactory. Student B pointed out that "that heart button in Padlet is exactly like a heart button in Tiktok, Instagram and, you know, many SNSs. You don't know who liked your post, so that was the point where I decided to try harder and write longer." Student D put extra effort to complete his daily routine video using Vita. In the interview, he said that "I actually dream of being a YouTuber. Producing a vlog using Vita made me feel like I already am a YouTuber so I tried to make my video look like a real vlog posted by a real YouTuber."

Device issue. Along with the bright sides of online tools, some students experienced technical problems inhibiting their learning activity. Student E confessed that she was "frustrated because Pengsu (the AI agent in AI Pengtalk) didn't understand my pronunciation well, no matter how I tried." Student C was "a little annoyed when I had to type long words because it takes me a long time to find an alphabet on the keyboard." In a follow-up question for Student D, he admitted that he "wasted my time because some links to chants and Wordwall games did not open."

RQ 3: How are online tools implemented in face-to-face and remote class situations?

While there were some variations in each class's organization, 6 periods constitute a chapter, and class activities for each period are relatively fixed in Korean elementary English classes. Each period focuses on a certain function, such as listening, speaking, reading, and writing, but each function is not strictly limited to each period because many studies have proven that integrative instruction is more effective than practicing functions individually (Crowhurst, 1991; De Vries, 1970; Shanahan & Lomax, 1986). And the last two periods are mainly for replenishing, deepening, and finalizing what students have learned through a variety of activities, requiring students to use communicative functions in combination. Analyzing the class records, some findings based on the framework of a chaper could be distinguished.

The first period of a chapter is spent raising interest in a new topic and introducing new expressions (Ham et al., 2020). As AI Pengtalk provides game-based drills for listening and repeating, it is used in every first period of each chapter. While it provides drills at levels of word, sentence, and dialogues, only word and sentence drills were used here to control the amount of language input. After presenting and practicing the expressions, Word Wall was often used to review the expressions at the end of the period. Simple templates such as Maze chase, Group sort, and Matching pairs were applied here because other templates such as Unjumble, Match Up, and Missing word requires extensive reading skills.

The second period of a chapter focuses on speaking practice according to the PPP model. The PPP model consists of presentation, practice, and production of the target expressions. After a short review of expressions provided in the last class, more opportunities to utter were presented via Word Wall and AI Pengtalk. Mostly used templates from Word Wall were Random wheels and Random cards, both for presenting random images shortly one after another. Then students promptly spoke the expression matching the image, thus practicing speaking skills and pronunciation. Word Wall was used for the whole practice here, thus low-achieving students could get a sense of the target expressions while watching others participating in the practice. After enough practice, The students are allowed to produce speaking with their own meaning at dialogue level using AI Pengtalk. Drills from AI Pengtalk are for individual dialogue, so the teacher assisted them by walking around in the classroom in face-to-face classes. In remote classes, the teacher checked the EBSe site, which is linked to AI Pengtalk, to grasp each student's progress and encourage them through the synchronous video class platform.

The third period of a chapter introduces a short text about the topic, extending the use of expressions presented in previous classes. More vocabularies may be introduced, so Match up template in Word Wall is effective here. Students could experience top-down reading while matching each keyword to its definition. And Padlet is used here to practice controlled writing. For example, in 4th period, students were asked to write a sentence on Padlet using given words. Besides, students can also find authentic materials including target expressions on the internet. For example, in the 16th period, students introduced their favorite food on Padlet walls. To describe their favorite food, they had to explore new vocabulary such as 'oily' and 'meaty' beside the words presented in the textbook. Students utilized online dictionaries and asked questions vibrantly to express what they know about their favorite food. According to Sun and Ahn(2019), finding real language materials online and identifying different application aspects of vocabulary is one of the effective ways to guide elementary English vocabulary.

Figure 2. Writing activity using Padlet

The fourth period of a chapter is writing-oriented. Students have more opportunities to make sentences using expressions of the chapter. Typically formative assessment is done in this period to ensure that students understood the presented materials. Kahoot! can serve the role of formative assessment since it can skim through many materials in a short time in a form of a quiz. While a teacher can walk around and give individual feedback in the face-to-face classroom, it is hard to check individual writing in remote classes. Therefore, Padlet was used to have students write sentences on the wall. Then the teacher can check individual writing at a look. Moreover, feedback can be given through comments not only from teachers but from peer students. That peer feedback is more effective than teacher's feedback is already proven by many studies (Kamimura, 2006; Kurt & Atay, 2007; Rollinson, 2005).

The fifth period of a chapter is the most autonomous. It can be spent reviewing writing activity from last period or doing a small project, both to promote students' communicative skills. The fifth period was 1 face-to-face (5th period), 3 remote classes (11, 17, 23rd period) in the study. The face-to-face class was dedicated to a game, in which students draw an imaginary object and write a simple explanation about it in English on a note, hide notes in the classroom, and find notes and their owner by asking their classmates using the expression 'Is this yours?'. In remote situations, where it is relatively harder to promote student-to-student communication, AI Pengtalk can be useful. One of its functions, Schooltalk, allows multiple students to enter a chatroom and discuss the designated topic. In Schooltalk, Students' speech is transformed to text and teachers can give individual feedback based on the text. However, during the class, several students criticized that the application didn't recognize their pronunciation. Among them, some students were discouraged to feel that their pronunciation is not good enough to be understood even after several attempts. This should be improved before AI Pengtalk is further applied to more classrooms because this kind of problem can have a devastating impact on students' confidence, which is a key element for promoting motivation (Keller, 1987). Vita, an application for video editing, was exclusively implemented in the 23rd period due to the chapter's content properties. Students were asked to gather pictures about their daily routine from the beginning of the chapter (19th period), and the pictures were posted on Padlet to ensure accessibility during the chapter. As the pictures are posted online, the teacher instructed the students to be careful about their privacy when taking pictures and made a promise not to leak classmates' photos. In the fifth period of the chapter, students made a personal vlog using the photos they have been gathering by Vita. As such, the fifth period of each chapter can be dedicated to

diverse projects related to the topic.

The last period of a chapter is for wrapping up and extending the contents learned so far. In the last chapter, students shared their vlogs on Padlet and wrote comments on each other's videos. In other chapters, Kahoot! was mainly used for wrapping up the expressions introduced in the last five periods. To ensure all students achieved the lesson goal, the teacher focused on checking individual performance and giving feedback accordingly. After a short but tricky game, such as Anagram or Crossword generated by Word Wall, students are allowed to personally practice speaking using AI Pengtalk. For the rest of the time after a review, the teacher mainly provided scaffolding or encouraged students who are struggling with games or asking for help. It was also frequently observed that high-level students voluntarily helped low-level students.

RQ 4: How does implementing online tools in elementary English classes affect four domains of English competencies?

To explore how online tools affected students' English competency, Quantitative data about self-reported English competencies from both experimental and control groups were gathered. The results of paired t-test indicated that the experimental group's self-reported English competencies improved in most areas, while little improvement was observed in the control group.

Table 5

Result of paired t-test(experimental group)

		Mean	Sd	Mean difference (post-pre)	t	P
Communicative competence	Pre	3.26	.93	.07	2.58	.01*
	Post	3.34	.90			
Self-management competence	Pre	3.56	.83	.05	1.78	.08
	Post	3.62	.97			
Information processing competence	Pre	3.05	.46	.35	2.23	.03*
	Post	3.12	.97			
Community competence	Pre	3.82	.77	.11	2.46	.02*
	Post	3.94	.81			

*p<.05

Table 6

Result of paired t-test(control group)

		Mean	Sd	Mean difference (post-pre)	t	p
Communicative competence	Pre	3.44	.76	.10	.43	.66
	Post	3.54	.90			
Self-management competence	Pre	3.67	.73	.07	.30	.76
	Post	3.74	.49			
Information processing competence	Pre	3.25	.64	.15	.57	.57
	Post	3.40	.58			
Community competence	Pre	3.95	.67	-.03	-.17	.86
	Post	3.92	.81			

Discussion

The Ministry of Education in Korea (2020) requires a prompt shift between face-to-face and remote classes according to the infection situation of each school. The shift is often decided without forewarning that teachers should be skilled in both types of classes and be knowledgeable in online tools that could be directly used for their upcoming classes. Exploring 4 research questions about implementing online tools in elementary English classroom, this study offers an

insight for teachers who want to provide high-quality classes both in face-to-face and remote situations and suggests a few strategies applicable to elementary English education in Korea.

This study is significant in particular because it explored and proposed the role of AI Pengtalk in English class composition as an early attempt. According to Kim et al. (2020), teachers are aware of the need for AI utilization in school education and are reported to have a positive attitude towards AI, but there are concerns about it because it is less experienced and thus thought to be less possible in class utilization. AI Pengtalk is a nascent tool used in this study, which generated early implementation data. Based on the results of this study, changes in the composition of AI Pengtalk can be proposed in future studies. In addition, this study found that online tools were effective in collaborating with students, expanding communication opportunities, which aligns with the findings of Wang and Tahir (2020). The study also showed a shred of evidence that online tools provide students with additional learning opportunities even after school, which is a huge advantage for students who cannot keep up with others in the class. For example, according to the EBSe site, which provides students' access data to AI Pengtalk, during the experiment, 38% of total students voluntarily used AI Pengtalk during out-of-class hours. This can be attributed to the advantages of mobile-assisted language learning, such as spontaneity and accessibility, leading to students' autonomous learning (Kukulska-Hulme, 2012). Thus, it could be noted that online tools are capable of narrowing the education gap during the pandemic.

Yet there is a need for in-depth research on how to utilize online tools that are not selected in this study. In addition, the study did not specify exactly how each tool independently affects students' ability improvement. Still, to do this, it is necessary to apply other methodologies to analyze, as it can be a major obstacle to the class if it is restricted to use only a single tool during the experiment period.

In conclusion, the study provides a meaningful insight for teachers and instructors conducting remote classes, presenting a specific guideline to implement a combination of online tools to promote students' curriculum competencies. Further efforts could be made to identify the aspects and effects of online tools in other subjects than English. There are various types of English textbooks in Korea, while the framework of a six-period-long chapter is common. Thus, knowing how to construct a unit makes it relatively easy to map out the entire content. On the other hand, other subjects such as social studies and science have different compositions and require teachers to have the expertise to understand the characteristics of each online tool and use it in a content-specific context. It would be of great help to teachers preparing for classes if domestic studies were conducted to identify aspects and effects of online tools in other subjects.

References

Anindyajati, Y. R., & Choiri, A. S. (2017). The effectiveness of using word wall media to increase science-based vocabulary of students with hearing impairment. *European Journal of Special Education Research*, *2*(2), 14-24.

Biasutti, M. (2017). A comparative analysis of forums and wikis as tools for online collaborative learning. *Computers & Education*, *111*, 158-171.

Bloomfield, B. P., Coombs, R., Cooper, D. J., & Rea, D. (1992). Machines and Manoeuvres: Responsibility Accounting and the Construction of Hospital Information Systems. *Accounting, Management, and Information Technologies, 2*(4), 197-219.

Boland, R. J., & Schultze, U. (1996). From Work to Activity: Technology and the Narrative of Progress. In W. J. Orlikowski, G. Walsham, M. R. Jones, and J. DeGross (Eds.), *Information Technology and Changes in Organizational Work*. London: Chapman & Hall.

Callon, M. (1991). Techno-Economic Networks and Irreversibility. In J. Law (Eds.), *A Sociology of Monsters: Essays on Power, Technology and Domination*. London: Routledge.

Crowhurst, M. (1991). Interrelationships between reading and writing persuasive discourse. *Research in the Teaching of English, 25,* 314-338.

De Vries, T. (1970). Reading, writing, frequency, and expository writing. *Reading Improvement, 7*, 14-19.

Deni, A., & Zainal, Z., (2018). Padlet as an educational tool: Pedagogical considerations and lessons learnt. *Proceedings of the 10th International Conference on Education Technology and Computers,* 156-162.

Fuchs, B. (2014). The writing is on the wall: using Padlet for whole-class engagement. *Loex Quarterly*, *40*(4), 7.

Ham, S., Lee, Y., Kang, H., Park, S., Park, J., Ahn, S., Eun, J., Lee, J., Yang, N., Jung, J., & Reichmuth, H. (2020). *Elementary School English 3rd grade*. Seoul: Cheonjae Education.

Hampel, R. (2015). *Developing online language teaching: Research-based pedagogies and reflective practices*. Hampshire: Palgrave Macmillan.

Hash, P. M. (2021). Remote learning in school bands during the COVID-19 shutdown. *Journal of Research in Music Education*, *68*(4), 381-397.

Hong, S., No, G., Yoon, T., Lee, S., Oh, E., Choi, S., & Kwon, O. (2020). The Necessity of Using Dialogue-Based Technology in Elementary English Education. *Journal of Korean Elementary Education, 31*, 173-186.

Inoue, M., & Pengnate, W. (2018). Belief in foreign language learning and satisfaction with using Google classroom to submit online homework of undergraduate students. *5th International Conference on Business and Industrial Research,* 618-621.

Jabar, N., & Ali, A. (2016). Cultural video project assignment (VPA) through the eyes of young ESL learners: A multi-modal vocabulary learning approach. *Indonesian Journal of EFL and Linguistics, 1*(2), 157 - 173.

Kamimura, T. (2006). Effects of peer feedback on EFL student writers at different levels of English proficiency: A Japanese context. *TESL Canada Journal*, 12-39.

Keller, J. (1987). Development and use of the ARCS model of instructional design. *Journal of instructional development*, *10*(3), 2-10.

Kim, H., Park, J., Hong, S., Park, Y., Kim, E., Choi, J., & Ki, Y. (2020). Teachers' perceptions of AI in school education. *Journal of Educational Technology, 36*(3), 905-930.

Kim, N. (2016). Effects of voice chat on EFL learners' speaking ability according to proficiency levels. *Multimedia-Assisted Language Learning, 19*(4), 63-88.

Koo, K. (2020). Development and Validation of a Self-Assessment Tool for Upper Elementary and Middle School Students' Key Competencies in English Education. *The Journal of Mirae English Language and Literature, 25*(2), 135-161.

Korean Educational Researh Institute (2020). *Analysis of elementary and middle school's experience and perception of distance education in Covid-19* (GM2020-11). Korean Educational Research Institute.

Kukulska-Hulme, A. (2012). Language learning defined by time and place: A framework for next generation designs. In J. E. Diaz-Vera (Eds.) *Left to my own devices: Learner autonomy and Mobile-Assisted Language Learning. Innovation and leadership in English language teaching* (6th ed.) (pp. 1-13). Bingley, UK: Emerald Group Publishing Limited.

Kumar, T. R., John, S., Gopal, S., Mohan, G., Joseph, J., PAS Study Group, & Rangaswamy, T. (2013). Psychiatric advance statements: an Indian experience. *International Journal of Social Psychiatry*, *59*(6), 531-534.

Kurt, G., & Atay, D. (2007). The effects of peer feedback on the writing anxiety of prospective Turkish teachers of EFL. *Online Submission*, *3*(1), 12-23.

Latour, B. (1991). Technology is Society Made Durable. In J. Law (Editor), *A Sociology of Monsters: Essays on Power, Technology and Domination.* London: Routledge.

Lee, J., Seong, E., Lee, J., Lim, K., & Han, S. (2020). The challenges of online classes during the COVID-19 pandemic. *Journal of Educational Technology, 36*, 671-692.

Lunden, I. (2021). *Education quiz app Kahoot says it's now used by 50% of all US K-12 students, 70M users overall.* Retrieved from https://techcrunch.com/2021/05/06/kahoot-acquires-clever-the-us-based-edtech-portal-for-up-to-500m/ on 27th, October, 2021

Mlitwa, N. (2007). Technology for teaching and learning in higher education contexts: Activity theory and actor network theory analytical perspectives. *International Journal of Education and Development using ICT*, *3*(4), 54-70.

Ministry of Education (2015). *Elementary English curriculum. Ministry of Education Notice No. 2015-74* [Attachment 14]. Seoul: Ministry of Education.

Ministry of Education (2020). *Operational standards for systematic remote learning.* Retrieved from https://moe.go.kr/boardCnts/view.do?boardID=294&boardSeq=80131&lev=0&search on 11th, October, 2021.

Monteiro, E., and Hanseth, O. (1996). Social Shaping of Information Infrastructure: On Being Specific about the Technology. In W. J. Orlikowski, G. Walsharn, M. R Jones, and J. I. DeGross (Eds.), *Information Technology and Changes in Organizational Work.* London: Chapman & Hall.

Mozelius, P., Jaldemark, J., & Håkansson Lindqvist, M. (2018). Teachers' beliefs about professional development and the use of collaborative online tools in higher educational settings. *Networked Learning Conference, 11,* 361-364.

Narkon, D. E., Wells, J. C., & Segal, L. S. (2011). E-word wall: An interactive vocabulary instruction tool for students with learning disabilities and autism spectrum disorders. *Teaching Exceptional Children*, *43*(4), 38-45.

No, K. H. (2015). *Understanding Primary English Education.* Seoul: Korean Cultural Press.

Oliver, K., Kellogg, S., Townsend, L., & Brady, K. (2010). Needs of elementary and middle school teachers developing online courses for a virtual school. *Distance Education*, *31*(1), 55-75.

Oyedotun, T. D. (2020). Sudden change of pedagogy in education driven by COVID-19: Perspectives and evaluation from a developing country. *Research in Globalization*, *2*, 1-5.

Porter, L. R. (2004). *Developing an online curriculum: Technologies and techniques*. London: IGI Global.

Raiyn, J. (2014). Developing online course based on interactive technology tools. *Advances in Internet of Things, 4*(3), 1-7.

Rollinson, P. (2005). Using peer feedback in the ESL writing class. *ELT journal*, *59*(1), 23-30.

Sakar, N., Ford, W., & Manzo, C. (2017). Engaging Digital Natives through Social Learning. Journal of Systemics, *Cybernetics and Informatics, 15*(2), 1-4.

Shanahan, T., & Lomax, R. G. (1986). An analysis and comparison of theoretical models of the reading-writing

relationship. *Journal of Educational Psychology, 78*, 116-123.

Singh, A., Mangalaraj, G., & Taneja, A. (2010). Bolstering teaching through online tools. *Journal of Information Systems Education*, *21*(3), 299.

Sobaih, A., Hasanein, A. M., & Abu Elnasr, A. E. (2020). Responses to COVID-19 in higher education: Social media usage for sustaining formal academic communication in developing countries. *Sustainability*, *12*(16), 1-18.

Sun, M., & Ahn, K. (2019). Three elementary English teachers' practical knowledge and practices in teaching vocabulary. *Korean Journal of English Language and Linguistics, 19*(3), 560-586.

Toumi, I. (2001). *Internet, Innovation, and Open Source: Actors in the Network. 6*(1), retrieved from http://firstmonday.org/issues/issue6_1/tuomi/index.html on 6th, December 2021.

Walsham, G. (1997). Actor-network theory and IS research: current status and future prospects. *Information systems and qualitative research,* 466-480.

Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning–A literature review. *Computers & Education*, *149*, 1-22.

Zhang, C. (2020). From face-to-face to screen-to-screen: CFL teachers' beliefs about digital teaching competence during the pandemic. *International Journal of Chinese Language Teaching*, *1*(1), 35-52.