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The Effects of Blended Learning Instruction on Vocabulary Knowledge of Thai Primary School Students

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Abstract

The present study aimed to investigate the effects of blended learning instruction on vocabulary knowledge of Thai primary school students and students' perceptions toward learning vocabulary through blended learning instruction. A mixed-methods approach was used. Quantitatively, a single group pretest-posttest design was used to measure students' vocabulary knowledge after ten weeks of vocabulary lessons via blended learning instruction. The qualitative method focused on students' perceptions toward blended learning instruction. There were a total of eight student participants at a small school in Kosumphisai, Maha Sarakham province. Three students were in fifth grade and five students in sixth grade. Two research instruments were used in this study: a pre-and-post-test and an in-depth interview. The quantitative results revealed that the post-test score was higher than the pretest score. The blended learning instruction can improve the students' vocabulary knowledge. The qualitative results showed that students had positive attitudes toward blended learning instruction on vocabulary teaching.

Keywords: vocabulary knowledge, blended learning, Thai primary school students

1. Introduction

Vocabulary serves as a crucial tool in communication. One cannot understand the meaning being conveyed without knowing the meaning of the words. Knowing vocabulary is the beginning stage of language learning, especially for young learners. Children need exposure to new words by hearing those words pronounced many times before speaking out and developing their language skills (Harmon et al., 2009; Linse, 2005; Meredith, 2012; Schmitt, 2000).

Vocabulary knowledge plays a vital role in second language learning because the students need sufficient knowledge of the words before comprehending what they have heard or read (Teng, 2014). It contributes to comprehension in language learning because understanding words enables readers and listeners to understand usages and develop verbal aptitude for both word and passage comprehension (Anderson & Freebody, 1981). In addition, vocabulary knowledge contributes to language production. Understanding the meaning of words can assist the student in conveying the message appropriately based upon the contexts in which it is used. Vocabulary knowledge promotes the comprehension and production of a language and also works as a good indicator of the performance and acquisition of any language skill. Therefore, language learners need to learn and accumulate vocabulary to be a master of a language.

Even though vocabulary is essential in language learning, a lack of vocabulary knowledge is already a serious and obvious problem for many students. Hunt and Beglar (2005) proposed that many EFL learners are likely to have less than sufficient vocabulary knowledge when using English. Chang and Read (2006) stated that many EFL learners struggle to comprehend the spoken language, mainly when there is no visual illustration. Besides, Cheng and Good (2009) found that a lack of vocabulary knowledge causes many EFL learners to find it difficult to understand passages or sentences that they read in English. These studies revealed the obstacles for EFL learners caused by the lack of adequate vocabulary knowledge.

In Thailand, studies have shown similar problems regarding students' inadequate vocabulary knowledge. A study by Songsiri (1999) explored the English reading comprehension of grade 12 students. The results revealed that the students' English reading abilities were unsatisfactory due to a lack of vocabulary knowledge. The students were not able to predict the vocabulary meaning in context. Adunyarittigun (2002) investigated Thai students who

learned English as a foreign language from the fifth grade until the end of secondary school. The study revealed that the students could not predict the meaning of unfamiliar vocabulary in context due to their lack of vocabulary knowledge and sentence structure. Likewise, Intarasombat (2002) investigated the effect of vocabulary development on English reading comprehension of tenth grade students and found that the students' mean score in vocabulary and reading comprehension tests was low due to limited vocabulary knowledge. Rattanaseeha (2007) also investigated the implementation of critical thinking to develop the reading comprehension of tenth grade students at a high school in Loei, Thailand. The results showed that the student's reading comprehension ability was low because due to a lack of vocabulary knowledge that interfered with their reading comprehension. A study by Patanasorn and Patanasorn (2011) examined the English vocabulary size of primary students. The results revealed that the sixth-grade students' vocabulary size was small compared with the expected vocabulary size of sixth-grade students set out by the Ministry of Education. Besides, Kotchana and Tongpoon-Patanasorn (2015) found that Thai Grade 6 students in the Northeastern region had a small vocabulary size, both receptive and productive. This previous research indicates that Thai EFL students commonly face difficulties in English learning caused by a lack of vocabulary knowledge (Saenpakdeejit, 2014). Moreover, inadequate lexical knowledge may obstruct students in enhancing their English proficiency. The Ordinary National Educational Test (O-NET) scores in the last few decades show that Thai primary school students' average English score is meager compared with scores in other core subjects (Mala, 2021). Therefore, it is important to increase students' vocabulary knowledge with effective instruction.

Attempts to enhance students' vocabulary knowledge has been done through various types of instruction, especially through the use of technology (Bozorova & Salixova, 2020). Currently, technology plays an important role in both Thai and international educational contexts. Students are constantly engaged with technology or social media, both inside and outside the classroom. Wantulok (2015) stated that learning through technology has become a part of students' lifestyles and the easiest way to learn since it is such an integral part of their lives.

Moreover, technology has been implemented in primary education instruction (Prescott et al., 2018; Schechter et al., 2015; Sharifi et al., 2015), especially for teachers and students in the digital era where technology is considered an essential tool in the learning environment. Technology can make the relationship between the students and teachers better because it makes the teaching and learning process more enjoyable (Cox, 2019). Therefore, technology-assisted instruction is one of the most popular ways to enhance vocabulary knowledge nowadays (Cristen, 2009).

Blended learning instruction is one of the most effective types of technology-assisted instruction. (Motteram & Sharma, 2009a). Blended learning aims to facilitate the language learning process in both online and face-to-face instruction (Reay, 2001; Rooney, 2003; Sands, 2002; Ward & LaBranche, 2003; Young, 2002). This type of instruction is the most suitable solution for many teachers working in physical classrooms who need to use technology as an aspect of their practice of educational technology development (Motteram & Sharma, 2009b). Online instruction is usually designed by teachers and implemented through E-learning software or smartphone applications.

Blended learning instruction is a technology-assisted approach that has rapidly grown, especially since the COVID-19 pandemic that started in 2020. Education has been affected particularly hard by the pandemic. Many countries worldwide have had to temporarily close educational institutions to prevent the spread of the COVID-19. Almost a billion students worldwide have not been able to go to school (UNESCO, 2020). Most governments are concerned about education, so they have sought possible ways to keep instruction going. Therefore, it has been necessary to support teachers, community experts or leaders, and everyone involved in the education system with other possible ways to teach, such as through smartphone applications, home-schooling, web-based online learning, and further innovative instructions.

In Thailand, the Ministry of Education (MoE) has also been concerned about education during the pandemic. They informed educational institutions to follow social distancing measures (UNESCO Bangkok, 2020a). The MoE has suggested different teaching methods, e.g., distance learning television (DLTV), online learning instruction, and blended learning instruction, enabling students to learn at their own pace and be empowered to take charge of their learning during the crisis. They have also encouraged teachers to be more active in providing support to learners via online platforms. By doing so, teachers can respond to the different needs of learners, provide them with feedback and generate an exchange of ideas. Among the suggested teaching methods, blended learning instruction offers an opportunity to give teachers and students interaction through face-to-face and online learning sessions (Singh, 2021).

A number of previous studies focusing on using blended learning for students' vocabulary knowledge enhancement were conducted with primary school students or higher level (e.g., Banditvilai, 2016; Banyen et al., 2016; Wichadee, 2017, 2018). However, studies focusing on primary schools, especially in the Thai context, has gained less interest (Schechter et al., 2015; Sharifi et al., 2015). To fill this gap, the present study aims to focus on implementing blended learning instruction to enhance the vocabulary knowledge of primary students in the Thai EFL context, particularly in a small local school. Therefore, this study aims to answer the following research questions to reflect the purpose of this study.

1) To what extent does blended learning instruction affect Thai primary school students' vocabulary knowledge?
2) What are the Thai primary school students' perceptions toward learning vocabulary through blended learning instruction?

2. Literature Review

2.1 Vocabulary Knowledge

2.1.1 Definition of Vocabulary Knowledge

Vocabulary knowledge refers to the knowledge of words (Laufer et al., 2004; Milton 2009; Nation, 1990, 2001). Haastrup and Henriksen (2000) identified word knowledge from the point of view of meaning, knowledge, and collocation, all of which make vocabulary knowledge. At the same time, Schmitt (2000) suggested that vocabulary knowledge is a knowledge of the different elements of vocabulary, which consists of word organization, productive and receptive fluency, and proficiency. Further, vocabulary knowledge implies the word's definition and tells how to use the word appropriately based on a given context.

2.1.2 Significance of Vocabulary Knowledge

Vocabulary knowledge is essential in learning languages. It contributes to the comprehension and production of language and works as a good indicator of performance and acquisition of any language skill (Nation, 2001). Besides, Fan (2003) stated that vocabulary knowledge is the most significant part of learning a language. Learners are more confident to understand and interpret the meaning of some unknown words from context. Indeed, learning vocabulary not only means learning new words but also knowing their functions and applicability to different contexts and situations.

Previous studies suggested that vocabulary knowledge is important for EFL students because they need sufficient knowledge of the words before comprehending what they have heard or read (e.g., Adunyarittigun, 2002; Chang & Read, 2006; Hunt & Beglar, 2005; Intarasombut, 2002; Songsiri, 1999). Therefore, language instructors should find an effective teaching methodology to help learners learn vocabulary and increase their lexical knowledge.

2.2 Blended Learning Approach

2.2.1 Definition of Blended Learning

Blended learning is one of the most effective approaches that has been used to facilitate language learning in the past two decades. Blended learning has been defined and characterized by many scholars. Allen et al. (2007) advocated that blended learning requires a rich blend of teaching and learning technology-based approaches and sometimes a mixture of technology-based and classroom learning. Graham (2006) described blended learning as a blended, combined learning system with computer-mediated teaching. In comparison, Garrison and Kanuka (2004) defined blended learning as the cautious incorporation of classroom experiences into online learning experiences. Bernath (2012) indicated that blended learning is a learning program that uses a combination of electronic learning (E-Learning) and traditional classroom teaching. To conclude, blended learning is a practice integrated with various learning modes, either in the classroom, outside learning, or different learning tools.

2.2.2 Blended Learning Models

When designing a blended learning classroom, an explicit model should be considered. According to Horn and Staker (2011), there are six blended learning models: the Face-to-Face Driver Model, the Rotation Model, the Flex Model, the Online Lab Model, the Self-Blend Model, and the Online Driver Model. The Face-to-Face Driver Model is the most similar to the framework of a conventional school. This model allows for the introduction of online education on a case-by-case basis, meaning that only a subset of students in a class will engage in any sort of blended learning. The Rotation Model employs a fixed schedule to speak to their instructors face-to-face and then switch to the online learning environment. The Flex Model is focused on heavy online training. The instructors work as facilitators rather than as instruction providers. The Online Lab Model includes learners who enter and attend a school for whole courses of fully online instruction. No licensed professors are available, but instead,

qualified professionals supervise them. The Self-Blend Model is used for more classes in a single school or district in a conventional environment. Learners take part in lectures but then take courses to accompany their usual study programs. The Online Driver Model is the opposite of a traditional face-to-face instructional paradigm. Learners operate from remote areas, for instance, from their homes, and receive their entire range of learning online. These models are crucial for conducting effective teaching activities. Nonetheless, teachers could choose a blended learning model suitable for their contexts to manage the classroom to provide a more effective learning environment.

In the present study, the rotation model was used as the primary model for many reasons. First, the study was conducted in an elementary school where students tended to be familiar with the online learning environment. This model also complies with traditional learning instruction in which face-to-face instruction is still used in class. In other words, teaching activities were not entirely online. It was also relevant and suitable for the participants' context in the study. The appearance of the rotation model is illustrated in Figure 1.

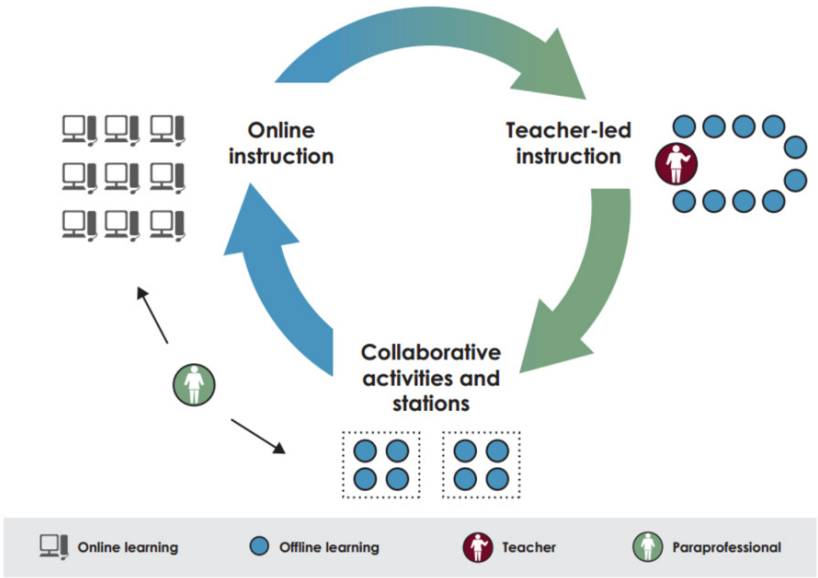

Figure 1. The rotation model (Horn & Staker, 2011)

Figure 1 shows the process of the rotation model. In the process, the teacher-led instruction is shifted from a physical classroom to an online learning mode. In other words, the teacher introduces a lesson to the students through face-to-face instruction. Later the students are assigned to work collaboratively while the teacher acts as a facilitator. The students then rotate to online learning using technology devices such as computers, tablets, or smartphones in order to work on a given task or activities through an online education platform that their teacher has set up for them. This model can be conducted in a physical classroom as well as a virtual classroom through online learning. In this model, the teacher can manage how much time is spent on face-to-face learning and how much time is spent on online learning.

2.2.3 Blended Learning Resources

Blended learning resources in class are also crucial in designing and conducting blended learning programs. Various blended learning resources are used for teaching blended learning classes to promote students' environment by considering safety and convenience. Allan et al. (2007) proposed blended learning resources, namely classroom technologies such as PowerPoint and interactive whiteboard, virtual communication tools such as podcasts and chat rooms, social networking software such as wikis and blogs, e-learning systems such as VLEs and smartphone applications, and smartphone learning. These resources are comprised of tools and technologies that teachers can choose from for designing and implementing blended learning in classes depending on the students' needs.

Regarding blended learning resources, many scholars have stated that using smartphone applications in teaching and learning provides positive ideas and benefits (Kizito, 2012; Prensky, 2004; Wang, 2017). These resources can motivate students to learn and understand better. It also helps new generations of students become interested in learning languages. In their blended learning classes, many teachers use various smartphone applications, e.g.,

Kahoot, Nearpod, Duolingo, Schoology, and Seesaw. For Kahoot, this application is a digital game-based student response system that allows teachers and learners in classroom settings to interact through competitive knowledge games (Educational App Store website, n.d.). Nearpod is a website and app-based digital tool that lets teachers create slide-based learning resources that are interactive for students to engage with and learn from. (Edwards, 2021). In addition, teachers can create lots of different interactive learning resources that allow students to engage and learn via their device or a single screen in the room. Duolingo is a free language learning application and website. This application is designed for users to progress through lessons. Users can learn a language for free by translating webpages (Jaskova, 2014). Schoology is considered an online learning management system, which has been developed to ensure collaborative online education and to maximize the cumulative impact on all learners in the learning phase (Schoology website, n.d.). Seesaw is an Instructional Content Platform that amplifies reading engagement and learning in every subject (Riadil, 2020). This application offers its platform to students from pre-kindergarten to grade 12 for all standard subjects such as English language arts, English language learning, health, history, math, music, etc. (Seesaw website, n.d.). For these applications mentioned earlier, teachers can choose blended learning resources for use in class depending on the students' needs.

In the present study, the Seesaw application was used as the leading blended learning resource for implementing a blended learning course in terms of online sessions to enhance students' vocabulary knowledge. Seesaw is a platform for student engagement. Seesaw is also an Instructional Content Platform that amplifies reading engagement and learning in every subject (Riadil, 2020). It offers a platform for students from pre-kindergarten to grade 12 for all standard topics such as art, computer science, drama, digital citizenship, English language arts, English language learning, health, higher education, history, math, music, physical education, reading, religion, science, social-emotional learning, social studies, special education, STEAM, world languages, and writing (Seesaw website, n.d.). This platform was constructed as a web application, to allow teachers to empower students to create, reflect, share, and collaborate.

The Seesaw application provides many features, such as photos, videos, drawings, PDF, links, QR codes, and text (Hamilton, 2017). It allows students to learn and engage in creative educational activities while giving teachers and parents insight into their progress and thinking. Students can annotate and draw, record, create captions with text or voice, create collages, add labels and text, and add shapes and backgrounds to their learning materials. This application can help teachers and learners create more creative activities in class.

There are many advantages of using this application in the language learning classroom. Students can show what they know using creative ways or techniques such as taking pictures, drawing, recording voices or videos, and more to capture learning in a portfolio. Teachers can create an effective way or creative activities to share the contents with their students in class. Moreover, parents can access the application to follow their child's portfolio.

In the present study, Seesaw was used as the main blended tool for implementing a blended learning course in terms of online sessions to enhance students' vocabulary knowledge. Because this application has various creative activities that provide students to show their work and its features seem to be suitable for young learners as primary level. Additionally, in this case, the researcher used Seesaw for online vocabulary teaching to support the teaching and learning process and make the students more interested in the class.

2.3 Related Studies

Several studies have been conducted using blended learning with learners in EFL/ESL settings. The review of the previous research can be divided into three aspects, which influenced the present study: EFL students' vocabulary knowledge through blended learning, the use of Seesaw application, and target groups of participants similar to the context in the present study.

Several studies revealed that learners' vocabulary knowledge increased after implementing blended learning. For instance, Djiwandono (2013) examined the effectiveness of blended learning approaches in Indonesian students' vocabulary learning and identified the learners' opinions about the blended learning experience. Similarly, a study by Krishnan and Yunus (2019) investigated the extent to which low-proficient learners acquire vocabulary based on the global CEFR scales. The research focused on using blended learning to extend vocabulary development among low-level learners. These studies suggested that blended learning positively affected EFL students' vocabulary knowledge. Blended learning can improve students' vocabulary knowledge after being implemented in vocabulary learning.

When considering tools used in blended learning, several research studies supported the use of the Seesaw application. To illustrate, a study by Javis and Martin (2018) found that Seesaw could motivate students and positively affect elementary school students' learning. In addition, Riadil (2020) from Tidar University, Indonesia, conducted research to investigate the effect of using Seesaw as the media of literacy to cultivate learners'

vocabulary. This study revealed that Seesaw could help learners increase their vocabulary knowledge and improve their reading ability. These studies suggested that the Seesaw application had positive impacts when implemented in the teaching and learning process.

Blended learning used with participants at the primary level has shown positive effects on vocabulary learning. For instance, Sharifi et al. (2015) focused on the effect of Rosetta Stone Computer Software on vocabulary learning of Iranian students. The study results indicated that the CAVI groups performed better on post-tests than the Teacher-led Instruction groups. Similarly, a study by Prescott et al. (2018) examined the implementation of a blended learning program for literacy instruction across kindergarten through Grade 5 in urban elementary school. They found that students in kindergarten through Grade 2 showed more substantial gains than students in later grades. These results suggest the benefits of a blended learning approach to literacy instruction for students, particularly when beginning early grades.

The studies reviewed above have shown that blended learning in English classrooms can enhance students' knowledge and skills in different contexts. However, while several studies on blended learning have been employed, the strategy of using the Seesaw application has rarely been conducted on vocabulary teaching. Therefore, the current study will use Seesaw to apply a blended learning instruction model in vocabulary learning. In addition, most of the previous studies concentrated on secondary school students or higher, whereas students in elementary school, especially in Thai contexts, have gained less interest. To fill this gap, the present study focuses on implementing a blended learning instruction to enhance the vocabulary knowledge of primary students in the Thai EFL context.

3. Methodology

3.1 Research Design

This study used a one-group pretest-posttest design, in which only a single group of participants was in the experimental group. This study employed a mixed-method approach of both quantitative and qualitative research methods. The quantitative method was used to measure students' vocabulary knowledge after implementing blended learning instruction. The qualitative practice focused on students' perceptions toward blended learning instruction on vocabulary teaching.

An independent variable of the study was blended learning used in the class. The blended learning model called the Rotation Model (Horn & Staker, 2011) was used to design the course. The blended learning course comprised 50 percent face-to-face sessions and 50 percent online sessions in the study.

A dependent variable was how much students' vocabulary knowledge improved in the study. After the posttest was completed, the students' perceptions of blended learning were examined using an in-depth interview. This research design was used because it is practical and appropriate in the school context. Due to the limited number of students in the school, the participants in the study were a single group. Figure 2 illustrates the research design of the study.

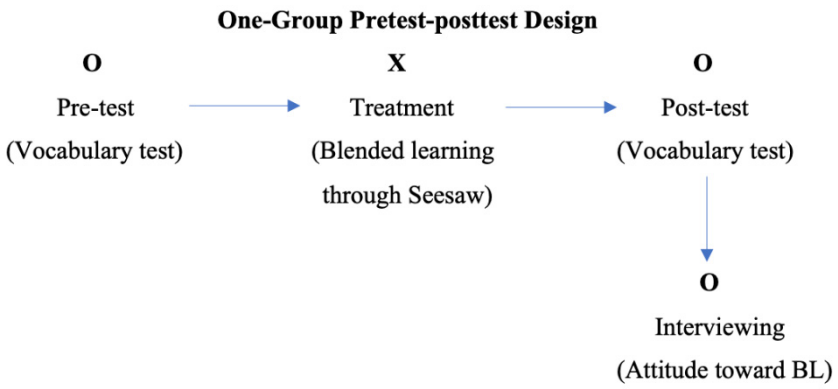

Figure 2. The research design of the present study

3.2 Population and Participants

The population in this study consisted of primary students in grades 4-6 who were studying at primary school in Maha Sarakham province. One primary school in the province was purposively selected because one of the

researchers is a teacher at the school. The school is a small school which has a total of 17 students and is classified as the Multi-grade Teaching school model, mixing students with different grades in the same class (Office of the National Education Commission, 2006). There are only two teachers in the school and they must teach all eight subjects including English. The researcher teaches grades 4-6 while the other teacher is responsible for grades 1-3 students.

In this study, the participants were 8 Thai students who were studying in grades 4-6 at the school. Due to the small number of students, the participants were multi-grade students. These included three students in fifth grade and five students in sixth grade, as no students were in fourth grade. Participants were selected purposively as a single group or experimental group. The age of the participants was between 10-12 during the time of the research. Basically, all of the participants were common characteristics of young learners. The students were enrolled in the fundamental English course, a 3-credit compulsory course, in the academic year 2021. In this course, vocabulary learning was focused on in every class period. These participants usually studied vocabulary from various activities taught by the teacher, such as using games for vocabulary learning, making a vocabulary notebook, etc. The selection of these students was done after research ethics approval was obtained.

3.3 Instruments

In this study, there were two instructional instruments and two research instruments. The instructional instruments consisted of lesson plans and a smartphone application, whereas the research instruments consisted of pre-posttests and in-depth interviews.

3.3.1 The Instructional Instruments

3.3.1.1 Lesson Plans

Lesson plans of the present study were designed to reflect a blended learning model (Horn & Staker, 2011). To investigate the effects of blended learning on vocabulary teaching, the lesson plans were designed based on the framework of the rotation model. The designed lesson plans are illustrated in Figure 3.

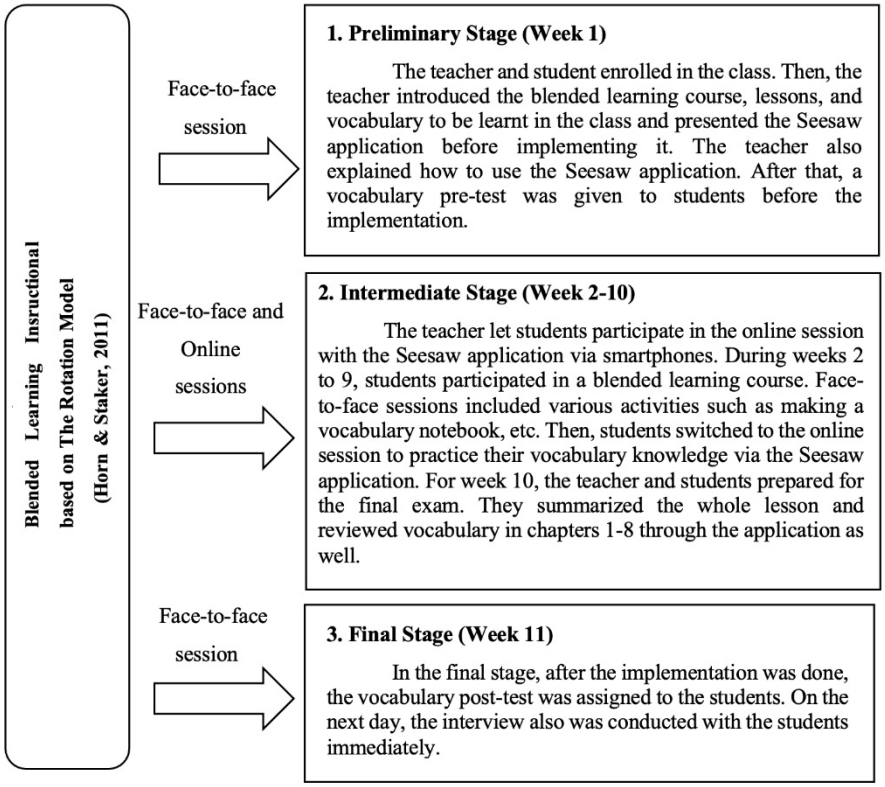

Figure 3. The designed lesson plans based on the Horn & Staker's Framework (2011)

Figure 3 shows that the framework was used to frame the study into three stages: preliminary, intermediate, and final. At the preliminary stage, the students participated in class. Before the implementation, the teacher presented the course syllabus, lessons, blended learning course, and Seesaw application, then let students sign up for the

Seesaw application and explained how to use it. After that, the vocabulary pre-test was given to the students before the treatment. The intermediate stage was designed to integrate 50 percent of face-to-face sessions and 50 percent of online sessions based on the rotation model of Horn and Staker (2011). In this stage, during weeks 2 to 10 of the process, the students enrolled in a blended learning course. For face-to-face sessions, the teacher let students do various activities, such as making vocabulary notebooks, playing vocabulary Bingo games, learning the meaning of words, etc. Then students switched to the online session to do the activities that the teacher had set for practicing vocabulary knowledge through the Seesaw application. In week 11, The teacher and students prepared for the final exam. They summarized the whole course and reviewed the vocabulary through the Seesaw application as well. The final stage was an entirely face-to-face session. After the implementation was done, the vocabulary posttest was assigned to the students. The next day, the in-depth interview was also conducted with the students immediately.

3.3.1.2 The Seesaw Application

Seesaw is a web-based application used to implement, plan, and access a specific learning process (Rouse, 2005). The Seesaw application provides students with an opportunity to learn and engage in creative educational activities such as drawing, voice recording, and creating collages. Moreover, it also allows teachers and parents to monitor individual students' progress and thinking. In addition, teachers can manage and design courses for students with an online learning platform via Seesaw.

For the online session in the present study, the teacher created a personal online class that was accessed through the Seesaw application via a smartphone account as an instructor. Next, the teacher set and gave a passcode to the students to access an online course in the Seesaw application made by the researcher.

After creating the class, the teacher created assignments for the students. The teacher then let the students do the activities through the application, such as writing vocabulary and taking quizzes. Additionally, the teacher had set a due date for submitting the assignment in the class. After the work was finished, the students gave feedback on using Seesaw to the teacher.

3.3.2 The Research Instruments

3.3.2.1 Pretest and Posttest

In this study, the researcher developed the vocabulary pretest and posttest to investigate the effects of blended learning to enhance students' vocabulary knowledge. The identical vocabulary pretest and posttest consisted of 30 multiple-choice items based on the CEFR A1 level. This was due to the Thai Ministry of Education setting a target for Thai primary students to reach A1 proficiency. The tests were given before and after the treatment. The test content covered eight parts of speech presented in the eight lessons in the textbook that the students had learned. The reliability and content validity of the test was checked by two experts in language teaching who have more than 20-years teaching experience. The reliability agreement between the two experts was 90%. Test item analysis was also conducted to find the discrimination power and the difficulty index of the test for ensuring that the test was appropriate for the level of the students.

3.3.2.2 The In-Depth Interview

The in-depth interview was conducted by one of the researchers to collect some qualitative information. It was used to investigate students' perceptions toward blended learning on vocabulary learning. The researcher prepared a list of five interview questions regarding the students' feelings overall about the English vocabulary learning class, the students' perceptions about vocabulary learning through the Seesaw application, the benefits of the Seesaw application, the students' perceptions toward vocabulary learning through blended learning instruction, and students' improvement in vocabulary knowledge through blended learning. Furthermore, participants' answers naturally and automatically were based on the formed that they learned in the blended learning course. Additionally, the interview questions were in Thai, and the interviewing process lasted about 15 minutes for each person.

3.4 Data Collection

The data collection was carried out in the first semester of the academic year 2021 at a primary school in Maha Sarakham province. The procedures of the data collection are described in Figure 4.

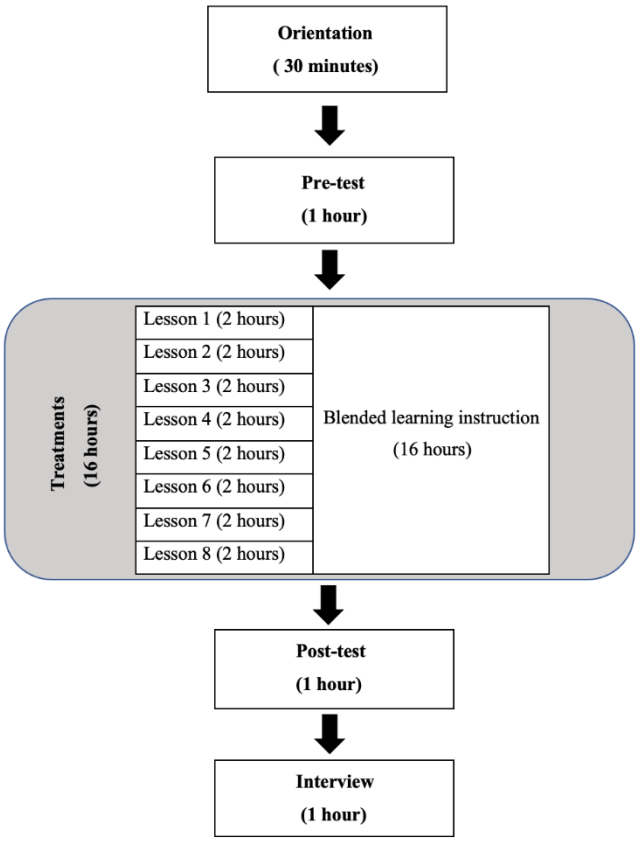

Figure 4. The procedures of the data collection

According to Figure 4, the data was collected following the steps in the figure. First, in the orientation, the teacher introduced blended learning and presented the smartphone application to the students. The time allocation was 30 minutes. In the next class, the students took the pretest to assess their vocabulary knowledge. The test was 60 minutes long. The researcher checked the test for the test marking due to ensure its objectivity. Then the treatments were assigned to the students. Each lesson was implemented. For lessons 1 to 8, the students took the blended learning classes combined with face-to-face and online instruction. The time allocation for the blended learning course was 16 hours. After the treatments were done, the posttest was given to the students to measure the effects of blended learning instruction on vocabulary learning. The test was 60 minutes long. The researcher scored the multiple-choice test items. Finally, after the posttest was done, the interview was conducted with the students to investigate their perceptions toward blended learning instruction. Eight students who were the participants in this study participated in an in-depth interview. Each student was interviewed in Thai for around 15 minutes. A voice recorder was used to record the interview session. Then, the participants' feedback about their attitudes toward blended learning instruction was transcribed.

3.5 Data Analyses

The data analysis was done both quantitatively and qualitatively. The pre-post test scores were analyzed using the standard deviation arithmetic means for the quantitative data. As the sample size was too small to use a paired-sample *t*-test, only mean scores were used to identify the difference between the pretest and posttest scores. The posttest score was expected to be higher than the pretest score. These analyses were done to inform the effects of blended learning on vocabulary learning. For the qualitative data, the interview data were analyzed using content analysis (Creswell, 1998; Kondracki & Wellman, 2002) to investigate students' perceptions of blended learning instruction. After the data was transcribed completely, the researcher read the transcriptions and identified the key points representing the students' perceptions of using blended learning during their class.

4. Results

The results are presented and discussed to address two research questions. The quantitative data was used to address the first research question. The qualitative data from the in-depth interview was used to address the second research question.

4.1 The Effects of Blended Learning Instruction on Vocabulary Knowledge of Thai Primary School Students

According to the scores gained by each student from the vocabulary pretest and post test, the scores can be presented as the percentages. The percentages of the scores gained of each student are shown in Table 1.

Table 1. The percentages of the scores gained by each student from the vocabulary pretest and post test

Participants	Percentages of pretest scores	Percentages of posttest scores
1	60	80
2	57	60
3	67	83
4	53	73
5	77	87
6	67	73
7	60	63
8	53	80

From Table 1, the first participant (P1) got a pretest percentage score of 60%, and after the posttest was conducted, the score in the posttest increased to 80%. For the second participant (P2), the pretest percentage score was 57%, and the score in the posttest increased to 60%. The third participant (P3) got a pretest percentage score of 67%, and the posttest score increased to 83%. Participant 4 (P4) got a pretest percentage score of 53% in the pretest, and the posttest score increased to 73%. Participant 5 (P5) got a pretest percentage score of 77%, and the posttest score increased to 87%. Participant 6 (P6) got a pretest percentage score of 67%, and the the posttest score increased to 73%. Participant 7 (P7) got a pretest score of 60%, and the posttest score increased to 63%. For participant 8 (P8), the pretest percentage score was 53%, and the posttest score increased to 80%. The results show that the percentages of each student in the posttest improved after they were taken with blended learning instruction.

The results show that pretest and posttest scores can be categorized into eight ranks of grades based on the academic grading system in Thailand education provided by the Ministry of Education (MoE). The grades are separated into the following percentage scores: greater than or equal to 80%, 76-79%, 70-75%, 66-69%, 60-65%, 56-59%, 50-55%, and less than or equal to 49%. The number of students achieving each rank in their posttest and pretest scores is shown in Table 2.

Table 2. The percentages of the scores students gained

Percentages of the scores		Number of the participants (N=8)
≥80	pretest	0
	posttest	4
76-79	pretest	1
	posttest	0
70-75	pretest	0
	posttest	2
66-69	pretest	2
	posttest	0
60-65	pretest	2
	posttest	2
56-59	pretest	1
	posttest	0
50-55	pretest	2
	posttest	0
≤49	pretest	0
	posttest	0

According to Table 2, in the pretest, no student got a score greater than or equal to 80% (N=0), while in the posttest, four of them (N=4) got a score greater than or equal to 80%. At the lower stage of the percentage, one of the students (N=1) got a score between 76-79% in the pretest, while no one (N=0) got a score between 76-79% in the posttest. No student (N=0) got a score between 70-75% in the pretest, whereas two students (N=2) got scores between 70-75% in the posttest. Two students (N=2) got a score between 66-69% in the pretest, and one (N=1) got this score in the posttest. Two students (N=2) got a score between 60-65% in the pretest and posttest. One student (N=1) got a score between 56-59% in the pretest, while no student (N=0) got a score between 56-59% in the posttest. In the pretest, two students (N=2) got a score between 50-55%, whereas no student (N=0) got a score between 50-55% in the posttest. At the lowest percentages, no student (N=0) got a score less than or equal to 49% in both the pretest and the posttest.

According to the results, it was found that the students' posttest score was higher than the pretest score. The results showed that blended learning positively affected students' vocabulary knowledge. The students' vocabulary knowledge improved after they had studied with blended learning instruction. Furthermore, the results also showed that blended learning instruction could be conducted with primary students.

4.2 Students' Perceptions toward Learning Vocabulary Through Blended Learning Instruction

To determine the students' perceptions toward blended learning instruction on vocabulary teaching, an in-depth interview was used to investigate the students' perceptions toward blended learning instruction after the posttest had been done. Five interview questions were discussed with all participants (N=8) of the experimental group for the interview data. The students' interview statements were transcribed from the recordings.

According to the interview data from five interview questions, it was found that the majority of the students' perceptions could be summarized into three main concepts: 1) Perceptions of their vocabulary knowledge through blended learning. 2) Perceptions toward a blended learning approach and the use of the Seesaw application, and 3) Perceptions toward the learning environment and students' satisfaction. These three main concepts are discussed in more detail below.

4.2.1 Perception of Their Vocabulary Knowledge through Blended Learning

According to the students' perceptions, most students mentioned that blended learning instruction could increase their vocabulary knowledge. In addition, most of them stated that they gained more vocabulary knowledge after learning vocabulary through blended learning. The examples of students' statements are shown below.

"*I feel that I gained more knowledge."* (Student 1)

"…I learned more English and learned new things." (Student 2)

"…I have learned a piece of new knowledge." (Student 4)

"…because I gained new knowledge." (Student 6)

"…It makes us gain more knowledge as well." (Student 2)

"This instruction can increase my knowledge." (Student 1)

"Yes, it can improve my vocabulary knowledge…. it makes me understand the content and gain more vocabulary." (Student 2)

"It can increase my knowledge because I have learned vocabulary through pictures and videos, which makes me gain more meaning from the English vocabulary." (Student 3)

"Yes, this method can improve my vocabulary knowledge." (Student 5)

4.2.2 Perception toward Blended Learning Approach and The Use of Seesaw Application

Regarding the students' perceptions toward the blended learning approach and the use of the Seesaw application, most of the students had a positive perception of the blended learning approach and the Seesaw application. This was because they used various online learning materials for vocabulary learning such as iPads, Zoom program, Google, Seesaw application, etc. For their perceptions of the blended learning approach, most of them mentioned that they used the iPad to do a lot of things for online learning, such as searching for information and pictures via Google, doing homework with a Stylus Pen for drawing and coloring, etc. In addition, they also stated that when they used the Zoom program for online learning, they could see the teacher and their friends through the program. Examples of students' statements are as follows.

"…and I can use the iPad via the Zoom program and search for information on the web." (Student 1)

"…I can use the Ipad to do everything such as searching the internet." (Student 2)

"...I also use an iPad. I have used the Zoom program and practice using it to find the information on the web." (Student 3)

"...I have used an iPad to find information via Google." (Student 4)

"...I have used an iPad for learning." (Student 5)

"...I also use an iPad to find information via Google." (Student 6)

"...using the iPad at the same time." (Student 8)

"...I can study online face-to-face with the teacher and friends via the Zoom application." (Student 1)

"This instruction is convenient. We can study via online instruction during the pandemic." (Student 2)

"...I feel excited to use an iPad to do exercises." (Student 3)

"I feel excited to use the iPad for online learning because I hadn't used this device before. I also used the Zoom program for learning." (Student 5)

"...I can see my friends and the teacher via the Zoom program during online learning." (Student 7)

"...I have done a lot of things like searching for a lot of pictures on Google" (Student 5)

"I enjoyed using the Ipad for doing homework because it was easy to use with the Stylus Pen for drawing and coloring." (Student 8)

Similarly, for the perceptions toward using the Seesaw application, most of the students were satisfied with using the Seesaw application for vocabulary learning. Most of them mentioned that the Seesaw application has various vocabulary learning features and exercises such as drawing, taking photos, voice recordings, coloring, submitting online work, etc. The following example statements are shown below.

"...I can learn and do the exercise through the Seesaw application." (Student 8)

"...I have also learned the vocabulary through various activities in the Seesaw application."

(Student 5)

"...The Seesaw application can help me do a lot of things such as drawing, taking a photo, and voice recording." (Student 1)

"...I can draw pictures through the app. This app can help me to do things" (Student 2)

"...I can draw pictures; it makes me enjoy it. I can record sound and do many exercises. It's a fun app that isn't boring. I can also submit my work through it online." (Student 3)

"...I have used a lot of features as well from the Seesaw application." (Student 5)

"...I can draw pictures on the iPad through the app. I can record my voice and send it to the teacher when I don't understand the assignment." (Student 7)

"This application has many benefits such as drawing pictures, coloring pictures, and show links to watching videos on Youtube." (Student 3)

"This app helps me to draw and colour pictures. I have used various features through this application."

(Student 4)

"...This application helps me to draw pictures, colour pictures, and record my voice." (Student 6)

4.2.3 Perceptions toward the Learning Environment and Students' Satisfaction

In regard to the students' perceptions toward the learning environment and students' satisfaction, the students were satisfied to participate in vocabulary learning through the blended learning environment. Most of them stated that they enjoyed learning and were not bored learning English vocabulary through blended learning instruction. Examples of students' statements are as follows.

"...and more enjoyed learning...." (Student 1)

"...It makes me not bored to learn." (Student 2)

*"...I have fun because it's not boring." (*Student *3)*

"I feel happy..... It's not boring." (Student 4)

"I feel that I enjoyed learning..... It makes me happy to learn English more." (Student 5)

"I feel happy, and I feel good to learn this course." (Student 6)

"I like vocabulary learning with this teaching method because it's fun, not boring. .....I enjoyed participating in the class with this instruction. I like studying this way more than studying in the classroom." (Student 1)

"I like it! I am so satisfied with this instruction…. It is not boring to learn English, and this instruction is a safe way to learn during COVID." (Student 3)

"In the past, I didn't like studying English because it was difficult, and I did not understand. It made me bored to study, but when I came to learn English through this method, I felt active to do the activity and homework because the Seesaw application has various features. I want to participate in the class every day." (Student 4)

"…This instruction makes me feel happy and enjoy learning English." (Student 7)

From the results, it can be concluded that most students have positive perceptions of learning vocabulary through blended learning instruction. The students are motivated to learn the English language using blended learning. This instruction assisted them in engaging in the English classroom and committed them to use technology devices through the Seesaw application for online learning. On the other hand, a few problems occurred during the online learning sessions. Some students reported that their home WiFi internet was unavailable, so they relied on their Hotspot Wifi through their mobile phones.

5. Discussion and Conclusion

This part discusses the results of the study into two main aspects. First, the effects of blended learning on students' vocabulary knowledge are discussed and compared to previous studies. Second, the students' perceptions regarding blended learning instruction on vocabulary learning are discussed in terms of positive and negative aspects. The section concludes by presenting the study's implications, limitations, and suggestions for further studies.

5.1 The Effects of Blended Learning Instruction on Vocabulary Knowledge

The results showed that the students' posttest scores were higher than the students' pretest scores. This reflected that blended learning had a positive effect on students' vocabulary knowledge. The students' vocabulary knowledge improved after they had studied with blended learning instruction. Furthermore, the results also indicated that blended learning instruction could be conducted with primary students. From the results mentioned earlier, it can be stated that blended learning contributed to the student's motivation to study the English language and increased their enthusiasm to do activities that involved the technology-based resources in blended class. In addition, blended learning can encourage them to engage more in the English classroom. Further, blended learning can encourage them to use technology devices through the Seesaw application for online learning. In brief, it is reasonable to suggest that the students got higher scores on the posttest because the blended learning instruction that involved technology could enhance their motivation and make the class more engaging for the students. The results of this study are similar to many previous studies, such as studies by Sharifi et al. (2015), Krishnan & Yunus (2019), Djiwandono (2013), and Tozun (2015). All these previous studies support the results that blended learning positively affected the students' vocabulary knowledge.

5.2 The Students' Perceptions Regarding Blended Learning Instruction on Vocabulary Learning

The results in this part were found from the in-depth interviews. It revealed that most students had positive perceptions of learning vocabulary through blended learning instruction. The results from the interviews show that blended learning makes them self-satisfied to learn English because this type of instruction allows them to use technology in class to do activities through the smartphone application. Besides, the students mentioned that they prefer to learn English using the blended learning instruction more than the traditional method. These results are consistent with many previous studies, such as studies by Al Bataineh et al. (2019), Javis and Martin (2018), and Djiwandono (2013), which ensured that the students had a positive perception of English language learning through blended learning. Furthermore, the findings of this study also supported blended learning reported in the literature by Shand and Farrelly (2018) and Gedik et al. (2012), all of which stated that blended learning instruction is advantageous.

However, some of the students' negative perceptions regarding blended learning instruction on vocabulary learning were due to a few problems that occurred during the online learning sessions. Some students reported that the internet WiFi in their homes was unavailable. Thus, they had a poor connection to the internet, which made

them unable to understand some of the content and could not catch up with the class. They, therefore, used their Hotspot Wifi on their mobile phones instead of their home internet WiFi to reconnect to the internet.

This study aimed to investigate the effects of blended learning instruction on the vocabulary knowledge of Thai primary school students and students' perceptions regarding blended learning instruction on vocabulary learning. The findings indicated that blended learning positively affected students' vocabulary knowledge. The students' vocabulary knowledge was improved after learning vocabulary through blended learning instruction. They gained more knowledge of vocabulary after learning through this instruction. Regarding the students' perceptions toward blended learning instruction on vocabulary learning, the findings revealed that most of the students had positive perceptions toward blended learning instruction in terms of their vocabulary knowledge, their perceptions toward the blended learning approach, and the use of the Seesaw application, and toward the learning environment and students' satisfaction. The students were satisfied and enjoyed vocabulary learning through blended learning. A blended learning class can increase their motivation to study English vocabulary more than in a traditional class. They became more enthusiastic about doing the activities that the teacher set for them. According to the findings, it can be concluded that blended learning instruction has its advantages in the primary EFL context. Furthermore, the findings reflected that blended learning instruction could be conducted not only with secondary school students but also with primary school students, particularly in the small school context.

On the other hand, there were limitations of this study. This study was conducted with a small group of participants due to the small school context in which the study took place. The data from the participants may therefore not reflect all of the objectives of the study. Future research should be conducted with a larger size of participants. Furthermore, data for this study was collected during the COVID-19 pandemic; therefore, it seems to be not convenient to collect the data due to the crisis. Further studies should be conducted under normal conditions in order to gain more explicit and complete data.

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