Effects of Digital Game-Based Learning on Vocabulary Gain, Retention, Motivation and Perceptions of Thai Upper Primary School Students

Tanaporn Kongprab

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Arts in Teaching English as an International Language
Prince of Songkla University
2019

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Major Program   Teaching English as an International Language

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This is to certify that the work here submitted is the result of the candidate's own investigations. Due acknowledgement has been made of any assistance received.

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I hereby certify that this work has not already been accepted in substance for any degree, and is not being concurrently submitted in candidature for any degree.

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(Miss Tanaporn Kongprab)

Candidate

ชื่อวิทยานิพนธ์	ผลการเรียนรู้ผ่านเกมดิจิทัลที่มีต่อการจดจำคำศัพท์ ความคงทน แรงจูงใจและการรับรู้ของนักเรียนไทยระดับประถมศึกษาตอนปลาย
ผู้เขียน	นางสาวธนาภรณ์ คงปราบ
สาขาวิชา	การสอนภาษาอังกฤษเป็นภาษานานาชาติ
ปีการศึกษา	2561

บทคัดย่อ

การวิจัยกึ่งทดลองนี้มีวัตถุประสงค์เพื่อศึกษาการเรียนรู้ผ่านเกมดิจิทัลที่มีผลต่อการจดจำคำศัพท์และความคงทนของคำศัพท์และเพื่อสำรวจผลของการเรียนรู้ผ่านเกมดิจิทัลและเกมแบบธรรมดาที่มีต่อแรงจูงใจในการเรียนการรับรู้ของนักเรียนระดับชั้นประถมศึกษาตอนปลายในการเรียนภาษาอังกฤษที่ผ่านเกมทั้ง 2 แบบ โดยการเรียนผ่านเกมดิจิทัลที่มีชื่อว่า *Kahoot!* กลุ่มตัวอย่างคือนักเรียนประถมศึกษาปีที่ 6 จำนวน 60 คน จากโรงเรียนอนุบาลป่าบอน จังหวัดพัทลุง และแบ่งเป็น กลุ่มทดลองและกลุ่มควบคุมโดยใช้เวลา 15 สัปดาห์ การเก็บข้อมูลเชิงปริมาณใช้แบบทดสอบก่อนเรียน-หลังเรียน แบบทดสอบความคงทน และแบบสอบถามแรงจูงใจ โดยใช้การวิเคราะห์ทางสถิติค่าเฉลี่ย และค่าเบี่ยงเบนมาตรฐาน และการทดสอบความแตกต่างระหว่างค่าเฉลี่ยสองค่าที่ได้จากกลุ่มตัวอย่างที่เป็นอิสระจากกัน และคำถามปลายเปิดเพื่อเก็บข้อมูลเชิงคุณภาพ และใช้วิธีการวิเคราะห์เนื้อหาเพื่อวิเคราะห์ข้อมูล

ผลการวิจัยพบว่าก่อนการเรียนผ่านเกมดิจิทัลไม่พบนัยสำคัญทางสถิติระหว่างนักเรียนกลุ่มตัวอย่างทั้ง 2 กลุ่ม ($p > 0.05$) หลังจากการเรียนผ่านเกม จากการทดสอบค่า t พบว่านักเรียนกลุ่มทดลอง ($\bar{x}$ = 25.07) สามารถจดจำคำศัพท์ได้มากกว่านักเรียนกลุ่มควบคุม ($\bar{x}$ = 17.47) และมีนัยสำคัญทางสถิติ ($p < 0.05$) โดยมีค่าระดับนัยสำคัญที่ .05 อย่างไรก็ตามในการทดสอบความคงทนของคำศัพท์ 3 สัปดาห์หลังจากการทดสอบหลังเรียนพบว่าไม่มีนัยสำคัญทางสถิติระหว่างกลุ่มตัวอย่างทั้ง 2 กลุ่ม ($p > 0.05$) จากการวิเคราะห์ค่าเฉลี่ยของแบบสอบถามแรงจูงใจพบว่านักเรียนกลุ่มทดลองมีแรงจูงใจในการเรียนมากกว่านักเรียนกลุ่มควบคุมโดยมีนัยสำคัญทางสถิติที่ p <0.01 และผลจากการวิเคราะห์ข้อมูลคำถามปลายเปิดพบว่านักเรียนทั้งสองกลุ่มมีการรับรู้ต่อการเรียนผ่านเกม 5 ประการดังนี้ 1) บรรยากาศการเรียนรู้ที่สนุกสนาน 2) วิธีการที่มีประสิทธิภาพของการเรียนรู้คำศัพท์และทักษะทางภาษา 3) การเข้าสังคม 3) แรงจูงใจในการเรียน 5) ทักษะการใช้เทคโนโลยีซึ่งพบแค่ในกลุ่มทดลอง อย่างไรก็ตามพบว่านักเรียนกลุ่มทดลองมีความประทับใจต่อการเรียนมากกว่าเพราะนักเรียนสามารถนำทักษะการใช้เทคโนโลยีไปใช้ในชีวิตประจำวันในยุคดิจิทัลได้

คำสำคัญ: *คาฮูท!* **การเรียนรู้ผ่านเกมดิจิทัล การจดจำคำศัพท์ ความคงทนของคำศัพท์ แรงจูงใจ การรับรู้ นักเรียนไทยระดับประถมศึกษาตอนปลาย**

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Major Program   Teaching English as an International Language

Academic Year   2018

ABSTRACT

The purposes of this quasi-experimental research were to investigate the effects of Digital Game-Based Learning (DGBL) on the upper primary school students' vocabulary gain and retention and to explore how the digital and non-digital games affect learning motivation of Thai upper primary school students and their perceptions toward the use of both games with the application of a digital game called *Kahoot!*. Sixty Thai upper primary school students were participants from two classes at Anuban Pabon school in Phatthalung province and divided into 2 groups: the experimental group and the control group. The experiment period was 15 weeks. The pre-and post-tests, delayed post-test, and learning motivation questionnaires were used to collect the quantitative data. Means, standard deviation and the independent sample t-test were employed for data analysis. An open-ended question was used for qualitative data, and analyzed with content analysis.

The research results showed that prior to the use of digital game-based learning technique, there was no significant difference ($p > 0.05$) between the two groups. After the treatment, there was a significant difference between the two groups with the significant difference ($p > 0.05$). The results with learning through DGBL 10 weeks showed that there was significant difference ($p < 0.05$) between the two groups at the significant level of .05. Then, the vocabulary retention, three weeks after the post-test, the result showed that there was no significant difference between the two groups in vocabulary retention. Moreover, the average mean score of students' learning motivation in the experimental group was higher than that of the control group. There was a statistical difference in the motivation between the two groups ($p < .01$).

According to the results of the open-ended question, both groups of the students revealed five positive perceptions toward the treatments including: 1) enjoyment learning atmosphere, 2) effective method for vocabulary learning and language skills, 3) socialization, 4) learning motivation and 5) technology skills which found only in the experimental group. However, the experimental students had more impression since they could learn the technology skills which they can use in their daily life.

Key words: *Kahoot!*, Digital Game-Based Learning, vocabulary gain, vocabulary retention, motivation, perceptions, Thai upper primary school students

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CONTENTS

LIST OF TABLES

LIST OF PAPERS

This thesis is based on the following papers:

Kongprab, T., & Sukseemuang, P. (2019). Effects of Digital Game-Based Learning on Vocabulary Gain and Motivation of Thai Upper Primary School Students. *Proceedings of the 11ᵗʰ International Conference on Humanities and Social Sciences: Global Digital Society: Impacts on Humanities and Social Sciences, Prince of Songkla University, Songkhla, Thailand, 107-125.*

Kongprab, T., & Sukseemuang, P. (2019). English Instruction Using Digital Game-Based Learning on Vocabulary Retention and Perceptions of Young Thai Learners. Manuscript submitted for publication.

LETTERS OF ACCEPTANCE 1

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Dear   Miss Tanaporn Kongprab

This is with reference to your submission of the abstract/paper entitled **"Effects of Digital Game-Based Learning on Vocabulary Gain and Motivation of Thai Upper Primary School Studentss"** for presentation at the 11th International Conference on Humanities and Social Sciences "Global Digital Society: Impacts on Humanities and Social Sciences" on May 2-3, 2019 at the 60th Anniversary of His Majesty the King's Accession to the Throne International Convention Center, Hat Yai, Thailand. The Editorial Board has reviewed your abstract/paper and is pleased to inform you as follows:

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Sincerely yours,

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LETTER OF SUBMISSION

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Tanaporn Kongprab:

Thank you for submitting the manuscript, "English Instruction Using Digital Game-Based Learning on Vocabulary Retention and Perceptions of Young Thai Learners" to Veridian E-Journal,Silpakorn University (Humanities, Social Sciences and arts). With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

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1. Introduction

1.1 Background

Language serves as the ability to communicate among people, and each language vocabulary plays a crucial role in almost every area of communication. Learning a new language relies on learning its vocabulary which comprises thousands of words. According to Nation (2001), "vocabulary learning is not a goal in itself; it is done to help learners listen, speak, read or write more effectively" (p. 362). The ability in comprehension and future reading performance can be predicted from oral vocabulary growth (Neuman & Wright, 2014). Moreover, the National Reading Panel (2000) indicated that vocabulary is considered as a vital link between oral and written language. Although Oxford (1990) affirmed that it is challenging for learners to memorize a huge number of vocabulary, limited vocabulary may negatively affect learners in achieving the four basic skills as it is the smallest component that learners need to know in order to use the target language meaningfully and appropriately (Ngan-ha, 2007; Kurniawan, 2009).

In Thailand, English is considered as a foreign language and it is taught as a compulsory subject since primary school level (Kitjaroonchai & Kitjaroonchai, 2012). However, the present English instructional methods are unsuccessful in helping learners to have competence in learning English (Kongkerd, 2013) since most classrooms are teacher-centered (Noytim, 2006). Students are not provided with sufficient opportunities to be exposed to authentic English and thus failed to accomplish the standards required (Khamkhien, 2011). As Wiriyachitra (2002) mentioned that the difficulties of Thai English language learners particularly in the primary and secondary schools were because they were being passive. Moreover, they were poorly-motivated because of unchallenging English lessons and there were not adequate classrooms equipment and educational technology.

Vocabulary learning is one of the most common problems in L2 learning. Inadequate knowledge of vocabulary and sentence structure is reflected as the main problem in learning language (Gunning, 2002; cited in Sripramong 2004). Sawangwaroros (1984) indicated that Thai learners, even those at the university level, did not have enough vocabulary in applying with other skills. Likewise, most Thai

teachers seem to emphasize on teaching grammar, reading and writing rather than vocabulary (Sripetpun, 2000). It is probably due to the fact that vocabulary learning is considered as boring (Nguyen & Khuat, 2003) because most of Thai learners are taught to remember a large number of unfamiliar vocabulary by rote memorization which can demotivate them in learning English. Although it is helpful to use the correct form of words, students cannot apply vocabulary in the real context. As Nation (2001) emphasized that incidental vocabulary learning activities are useful means of vocabulary learning. However, some studies indicated that reading practice or incidental learning was not sufficient to acquire vocabulary (Laufer, 1997; Laufer & Hulstijn, 2001) since only few words through reading and guessing were presented several times (Day, Omura & Hiramatsu, 1991). At the beginning level, intentional vocabulary learning is necessary for second language learners in order to build up their vocabulary store (Chedo, 2002) and due to its focused repetition or memorization strategies, it can haste learners' process of lexical growth which can be accomplished by themselves in a short time (Hung, 2015). Furthermore, comparing to incidental learning, the retention rates of intentional vocabulary learning are commonly higher (Hustijn, 2003). Therefore, if learners learn vocabulary knowledge intentionally through various exciting activities or different types of exercises with their highly motivation, they will be able to gain and retain more vocabulary.

In teaching vocabulary to young learners, teachers have to prepare the lessons to meet their needs. Game-based learning, defined as an environment where game content and game play enhance knowledge and skill acquisition (Prensky, 2001), is one of the effective teaching approaches. As play is a crucial part of a child's growth, it benefits to children's cognitive and psychological development (Farber, 2015; Gee, 2007). Children enjoy playing since it is fun and motivating. Once their curiosity is stimulated by the activity or game, they are capable to pay long period of attention. Piaget (1965), one of the initial developmental psychologists, claimed that the role of games in "learning by doing" can shape intrinsic motivation. Through game instruction, he also suggested that children could master cognitive skills and enlarge their imagination (Piaget as cited in Anonymous, 1952). With these advantages in a variety of settings, instructors have appreciated and applied games as a teaching method for both children and adults (Hill et al, 2003; Kim, 2011) in order to

encourage learners to actively participate in learning activities (Baid & Lambert, 2010)

In the 21st century, technology is increasingly developed all over the world. Prensky (2001), therefore, defined two new terms according to this transformation: "digital immigrants" are those who were not born into the digital era but have become captivated by and adopted many or most aspects of new technology later of their lives, while "digital natives" are those who have exposed to information technology from their birth. Teaching young learners or the "digital natives" with the ordinary learning environments or with the traditional method might be inefficient and can bring boredom into classroom because it cannot enhance their enthusiasm to get involved in learning. Rushkoff (1996) pointed out that young learners seemed to be more future oriented, more appropriate and aware of the use of technology than adults. Schools, therefore, have to prepare their learners to gain new skills corresponding to the innovative curriculum and to keep them up to date with continually changing world (Carroll, 2007; Fisher & Frey, 2008). The application of Information Technology (IT) in education has been more and more focused. According to Boyle and Nicol (2003), the use of interactive technologies in classroom has gained popularity in the last decade in response to an increasingly digital generation.

Digital games can arouse learning. According to Kapp (2012) students can take in the element of conflict, attain sense of achievement or loss, and get immediate feedback. They can also obtain a sense of competition-driven system (Burke, 2014) which will motivate them to learn and to pay more attention to the lesson so that they can be the winner of the game. By learning through this activity, students are more likely to become active learners and pursuit knowledge by themselves. In addition, many researchers indicated that digital games might be advantage, especially for vocabulary acquisition (Cheung & Harrison, 1992; Miller & Hegelheimer, 2006; Ranalli, 2008).

Recently in Thailand, many digital games, such as Plickers, Quizlet live, Fabulous finds and Quizizz, are used in higher educational field since there are a lot of classroom tools that teachers can use to create or share the lesson during the class. Not only can it create interesting games which suit with learners' lifestyle (Wichadee

& Pattanapichet, 2018), but also it plays such a crucial role in facilitating the students' learning, in rising students' motivation and in helping teachers to make the lessons more appealing and to increase students' comprehension. Digital game-based learning offers students with interactive and enjoyable learning opportunities (Prensky, 2001; Reinders, 2012).

In relation to digital game-based learning, *Kahoot!* is one of those well-known educational digital games which can be accessed with no cost via smartphones and computers. It was first launched in Norway in 2013. This game-based learning platform can be applied with any subject and many languages. In English learning, it is largely used because it can make the learning more pleasant through competition, also it can ease and enhance students' learning. Wang (2015) applied *Kahoot!* in the classroom teaching and the results revealed that the students who did *Kahoot!* learned more than those who did paper quizzes. Thomas (2014) also claimed that *Kahoot!* helps motivate and involve learners because it can turn tiring, colorless class into lively and highly exciting class.

As discussed above, in this digital era, traditional teaching approach is far-reaching shifted to incorporate with digital game-based learning. *Kahoot!* is the digital game in the 21st century. The technology in education has been proved to be an effective tool to motivate learners, enhance their enthusiasm, increase and check their comprehension (Kim, 2015; Simões et al., 2013). However, little research has focused on Thai context, especially with Thai upper primary school students. In this current study, it was aimed to determine how the application of digital game affects upper primary school students' motivation on their vocabulary gain and retention and to investigate students' perceptions toward digital games.

1.2 Purposes of the Study

The present study identified the following four objectives

1. To investigate Thai upper primary school students' vocabulary gain
2. To compare the students' vocabulary retention
3. To explore how the digital and non-digital games affect both types of motivations of Thai upper primary school students
4. To investigate Thai students' perceptions toward the use of the game

1.3 Research Questions

1. To what extent does digital game-based learning affect Thai students' vocabulary gain?

2. Is digital game-based learning more effective than non-digital game in vocabulary retention? How?

3. What are the differences between learning motivation of Thai students in the experimental group and students in the control group?

4. What are Thai students' perceptions towards application of digital game and non-digital game in vocabulary learning?

1.4 Significance of the Study

The study about digital game-based learning was not extensively researched area by scholars, especially in Thailand. This study added the findings of the benefits of digital game-based learning, especially with Thai upper primary school students. The results revealed the effectiveness of using digital game-based learning in enhancing Thai upper primary school students' vocabulary gain and retention. Moreover, the findings provided new insights to English language teachers about digital games in English language classroom in order to help motivate students to learn and remember vocabulary and to raise students' positive perceptions toward learning vocabulary.

1.5 Definition of Key Terms

Digital game-based learning: A way of learning using the entertaining power of digital game as an instructional instrument to stimulate learners and provide interactive and enjoyable learning atmosphere (Prensky, 2001; Reinders 2012).

Vocabulary gain: The vocabulary knowledge and the ability to spell, tell the meaning and make sentences (Sukkrong, 2010) using the vocabulary learnt which were acquired by an individual after the treatment.

Vocabulary retention: The ability to recall the vocabulary learnt from the treatment, spell, tell the meaning and make sentences (Sukkrong, 2010) after the treatment for 3 weeks.

Motivation: In educational field, motivation is an initial desire of a person to do something and a satisfaction achieved from the activities (Gardner, 1985). Motivation has such an optimistic influence that leads learners to become success in second language learning. According to Ames and Ames (1989), a student's drive to create and keep the intention and goal-seeking act also can be referred to motivation.

Perception: The insight information of students' awareness, attitude, sense, experience and knowledge toward the treatments used in this study.

Digital game: A game that players have to use their PCs or mobile phones connected to the internet in order to answer the multiple-choice questions which are made by the instructor via its application before the class starts. The faster players can answer correctly, the higher the scores they will get. In this study, it is called "*Kahoot! online* " since the participants use PCs to play the game and get real time scoring.

Non-digital game: A game that players do not have to use their PCs or mobile phones connected to the internet. However, it has the identical nature and purpose as the digital game since four different colors and shapes sticks will be provided to the players in order to show his/ her answer from the multiple- choice questions without giving scores to the winner or unreal time scoring. In this study, it is called "*Kahoot! offline*" game.

2. Literature Review

2.1 Vocabulary teaching and learning for young learners

To master a language, it is important for learners to acquire the vocabulary because it is a crucial component. Hunt and Belglar (2005) believed that "the heart of language comprehension and use is the lexicon" (p.24) since speakers cannot express themselves and understand others with inadequate vocabulary. This will lead to failures to communicate meaningfully. Vocabulary is considered as a challenging task in second language learning as Nation (2006) set a minimum learning target of 6,000-7,000 word families for communication and of 8,000 - 9,000 word families for comprehension of written texts.

As Schmitt (2008) mentioned that there are two types of vocabulary learning including intentional and incidental vocabulary learning. Hulstijn (2006) made a

distinction between these two as "intentional learning is referred to as a learning mode in which participants are informed, prior to their engagement in a learning task. Then they will be tested on their retention of what they have studied. Incidental learning can be defined as a mode in which participants are not forewarned of an upcoming retention test for a particular type of information". In short, the former is to learn vocabulary explicitly while the latter is learning vocabulary as the by-product of other activities namely reading or listening.

Many researchers indicated that incidental learning from the context can provide fruitful outcome of vocabulary learning (Day et al., 1991; Jenkins et al., 1984). However, some studies showed that reading practice or incidental learning was not sufficient to acquire vocabulary (Laufer, 1997; Laufer & Hulstijn, 2001) because most of the vocabulary items are low frequency words which are suggestive for advanced learners (O'Dell, 1997: 270). That is the reason why they have a certain level of proficiency in learning a second language so that they can guess the meaning of new words in reading passages more than those who have insufficient vocabulary. It can be assumed that incidental vocabulary learning may be an effective way of acquiring vocabulary for advanced learners, while intentional or explicit instruction in essential for beginners since their reading ability is limited (Hunt and Beglar, 1998).

While each approach has its advantages and disadvantages, intentional vocabulary learning is a particular interest to this study. As Nation (2001) suggested that teaching vocabulary for beginners should be aiming at enlarging their size of the vocabulary through direct vocabulary teaching. Moreover, explicit vocabulary teaching that links new vocabulary to prior knowledge is thought to have an immense effect on vocabulary expansions (Baumann & Kame'enui, 2004). Beck et al. (1982) also believed that direct vocabulary instruction is related to a high vocabulary growth. Therefore, Beck et al. (2002) drew principles to combine instruction to enhance student learning including directly explaining words in a child-friendly design, boosting active engagement in learning, giving the words in rich language contexts with various examples, and restructuring the words or tasks when required. The most important of these principles is to make sure that children are provided with sufficient opportunities to respond (Greenwood et al., 2002).

Seal (1991) proposed three stages for teaching intentional vocabulary. They consist of conveying the meaning, checking comprehension and consolidation respectively. First, at the presentation stage, instructors present and convey the meaning of vocabulary. In order to help the beginners to comprehend the meanings, a diversity of modes are required. Instructors may employ the visual aids, pictures, authentic objects or show the word relations which are synonyms or antonyms. Second, at the checking comprehension stage, there are various ways to check students' comprehension. There are, for example, filling in the blank, pair matching and sorting exercise. The last one is consolidation stage where instructors ensure that their students are able to apply the learnt words correctly and appropriately. Instructors can conduct some activities that involve the use of the learnt words as many as possible, for example, a *real–life* situation where the learners can use the target language, a game of 'Simon Says', revision exercise.

Exercise is one means of intentional vocabulary learning and it has a beneficial effect on vocabulary learning. To connect new knowledge or new words to existing knowledge, Thornburg (2002, as cited in Cevik, 2007) declares that exercises should be embraced. It is because multiple exposures to various contexts can facilitate deeper word knowledge of learners than a single exposure (Bolger et al., 2008). Therefore, to enlarge vocabulary store of Thai primary students who are at the beginning level of second language learning, it is necessary to adapt intentional vocabulary teaching approach together with vocabulary exercise that students can explore the real use and can get them engage to learn.

2.2. Educational Technology in the 21st Century

Technological innovation is continually increased in the 21st century. The world is considered to be "a digital world" where people even in the remote area, can have access to computers and internet (Aghlara and Tamjid, 2011). Educational field has no exception. The internet has optimistic effects both on the educational institutions and the students (Vijitsriphiboon, 2006). According to Alsharafat et al. (2017), the effects of modern technology has led educational establishments to race since it offers new technological means in facilitating learning and in supporting educators.

With the influence of technology and globalization that has hastened English into a commanding language to communicate from field to field, Wu et al. (2014) affirmed that many learners have discovered that their traditional English learning, where they are not involved in their learning and are often seen to be the passive receivers of information with the lack of motivation, did not get them ready them to the real world use of language. The ordinary classroom, hence, could be changed to become more practical room to offer more flexibility, reflective the modern world and assist communication (Sucaromana, 2013).

To raise engagement and to simplify the learning of students with diverse proficiency levels in language learning, numerous technologies have been adopted to overcome this challenge (Huang et al., 2017). There are, for example, e-learning and online learning which supplementary lessons were established on the web with the purpose of supporting conventional types of learning. Students are provided with more chances to access to the lessons which are typically relevant and paralleled topics to the learnt lessons in the classroom at anytime and anywhere.

Another example of well-known technology used in language class is blended learning. Although the idea of blended learning has been proposed for a long time, its terminology was not decisively proven until the beginning of 21st century. Sharma and Barrett (2007) defined the term blended learning as "a language course which combines a face-to-face (F2F) classroom component with an appropriate use of technology" (p.7). However, the use internet and digital media which are now involved in classroom together with the interaction of teacher and students can also be explained as blended learning (Friesen, 2012).

With the increasing of e-learning in Thai universities, Banditvilai (2016) conducted a case study of using blended learning to enhance learner's language skills including listening, speaking, reading and writing and autonomy with Thai university students. She mentioned that Thai government pay attention to the benefit of e-learning and the education framework which are under National Information and Communication Technology Plan (ICT) and Education Policy. The study showed the relationship of blended learning and the development of language skill in Thai context. Comparing the outcome of the experimental group in which e-learning was used in parallel with traditional classroom and that of the control group in which only

traditional classroom was treated. The result revealed that the online practice promoted four language learning skills, autonomous and learner motivation.

Therefore, it is widely accepted among educators and learners because e-learning can bring new alternative ways from distance learning that hardly has chance to join in face-to-face instruction.

2.3 Game-based learning, Gamification and learning theories

Playing games help promote the degree of enjoyment. Game is a nature part of children's life because they tend to play more than adults because they are not involved in work and survival activities, and so they have greater amounts of energy to expend (Aghlara & Tamjid, 2011). Many psychologists assured that it benefits children's psychological development. Alsharafat et al. (2017), therefore, designated that children need to learn by playing as it ensures continuing education and lifelong learning, especially in this era of rapid technology progress. Researchers indicated that games can increase learners' problem solving skills and rise players' self-esteem and self-confidence (Gee, 2003; Griffiths, 2002; Haugland, 2000; Liu, Cheng, & Huang, 2011). Therefore, educators and researchers have tried to give the definition of game-based learning (GBL) as applying game contents and game play in order to increase knowledge and skills acquisition, providing with a sense of achievement that players or learners gain from problem solving of the challenges and tasks (Kirriemuir& McFarlane, 2004; McFarlane et al., 2002; Prensky, 2001; Qian & Clark, 2016).

Additionally, games are the activity that can arouse intrinsic motivation (Malone, 1981). It is hence regularly applied in education to facilitate the lessons and alter students' performance which can be defined as "gamification". This term was determined by Deterding (2011). It is referred to as integrating games in other activities apart from non-game background to increase engagement and motivation of participants or learners. In educational context, Kapp (2012) stated that gamification is "*using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems*" (p.10). The rewards and competition from gamification in language learning can provoke the motivation of learners because it helps increase the engagement of learners. According to Lean

(2015), the benefits of gamification are very helpful in learning because it is fun and can help promote the degree of enjoyment with stress-free classroom atmosphere where learners can possess the learning knowledge by themselves.

In Qian and Clark (2016) study, they have discussed the effective of game design and learning outcomes which can be supported by the sociocultural theory of learning (Vygotsky, 1978) and flow theory (Csikzentmihayi, 1990). According to Vygotsky (1978, as cited in Qian & Clark, 2016) declared that learning happens when it is social, active and situated. Also, he added that play is conductive to learning. Through the exploration of games, players can experience the social roles and also social learning which provide the term that Gee (2003) called dispersed knowledge. It means it is not necessary for players or learners to own all knowledge and skills by themselves. In contrast, when they work with game system and while competing with others in game activity, the skills and knowledge will be contributed to the central place.

Besides, Csikszentmihalyi (1990, as cited in Qian & Clark, 2016), flow theory is a basis for motivation in games and learning because players or leaners are forced by their natural pleasure to kill their time and have goal to achieve rather than external rewards. It was described as the state where learners or players are extreamly engaged in an activity that they forget everything else, as well as a sense of time and self- awareness (Csikszentmihalyi, 2004). In education game, the state of flow in learning of learners is interrupted by content and assessment while in the entertainment game balance the flow with ability level of players (Shute, 2011).

2.4 Digital game-based learning and digital native EFL learners

The rapid development of technology changes the habit of new generation. Digital games have gained more interests from people of all ages than the traditional game because they can easily access the games through their computers, tablets and mobile phones which is more suitable for their daily lives. Juul (2003) designated digital games as *"…a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable"* (p.5). Digital game is

often seen to offer only entertainment; however, according to Cornillie et al. (2012), digital game is considered as an element within Computer Assisted Language Learning (CALL) which is regarded as a part of Second Language Acquisition (SLA). It is because it provides adaptable devices to teach any subject or any skill in order to have an effective learning outcome. Prensky (2001) defined the term "digital game-based learning (DGBL)" as a tool to serve an educational purpose with the application of the entertaining impact of digital games. He also indicated that all digital game-based learning is based on two keys assumptions. The first one is that learners nowadays have changed radically as a result of the digital technology. Another assumption is that computer games enhance motivation of today's young people to learn.

With the great merits are unavailable in the traditional classroom, in language learning, many researchers have pointed out that teaching content which is presented by educational computer games are exciting, brilliant as it can draw students' attention and can increase learning's motivation and particularly, their learning performance (Burguillo, 2010; Garris et al., 2002; and Liu &Chu, 2010).

Accordingly, if young EFL learners who have limited vocabulary and perceive it as boring and challenging task are provided with digital game-based learning classroom, they will be able to increase and retain their vocabulary store as well as to maintain their learning motivation. It is because digital games help rising enjoyable, relax atmosphere, observable learning improvement and superior possession of learning (Leaning, 2015).

2.5 Motivational impacts of digital game-based learning on vocabulary gain and retention

In educational field, Gardner (1985) stated that motivation is the primary desire of an individual's work to do something and a fulfillment achieved from the activities. It is often distinguished between two varieties: extrinsic and intrinsic motivation. For the extrinsic motivation, it is the "motivation to engage in an activity as a means to an end" while the intrinsic motivation is the "motivation to engage in an activity for its own sake" (Pintrich & Schunk, 2002, as cited in Carreira, 2005, pp. 39-40). The former is determined by the external rewards such as prizes, candy, grades

or scores while the latter is done by their owns without the external rewards (Broussard, 2012). Through the application of digital game-based learning, not only it extrinsically motivates students to compete and earn the higher points with feedback on their achievement, but also it can intrinsically motivate them because playing inherently provoke their interest and enjoyable and they can feel that it is worth doing so.

Many studies illustrated that digital games enhanced students' learning motivation and their enthusiasm to get involved in learning (Lee& Hammer, 2011; Liu & Chu, 2010; Muntean, 2011; Poondej & Lerdpornkulrat, 2016). Since classroom experience is vital for the progress of young learners in learning new language, the task used in class should be able to gain their attention which is quite short and their participation. Therefore, teachers should create the activity to bridge them to the state of that they wish to fulfill their need or motivation. The effectiveness of gamification applied in educational context is considered as a motivation tool that grasps the interest of educators (Domínguez et al., 2013; Lee & Hammer, 2011) because it can stimulate learning and enhance learners' engagement (Paisley, 2013; Simões et al., 2013) or the degree to which an individual shows his/her active participation, attentiveness and enthusiasm (Reeve, 2012).

In acquiring and retaining a new language, motivation is considered as an important factor for the reason that it can ascertain how learners are individually and actively engaged to the lesson (Oxford & Shearin, 1994). Learners are able to retain the information and transfer it to other contexts if they are engaged and interested in meaningful tasks (Kearsley & Shneiderman, 1998). Scholars have characterized engagement with various scopes, including challenge, sensory appeal, attention, feedback, curiosity and interest (O'Brien & Toms, 2008; Trevino & Webster, 1992). Also, motivation in the context of language retention was described as the learner's perception toward the goal of language learning (Crookes & Schmidt, 1991).

With better motivation digital game has brought into EFL classroom, students can get involved in the procedure of learning and initiate their goals to achieve during the class; they are more likely to put their effort so that their learning performance becomes more satisfying. It is worth to further this study in Thai context where learners are poorly-motivated in learning English (Wiriyachitra, 2002).

2.6 *Kahoot*!

Relating to digital game-based learning, *Kahoot!* is known as a popular digital game-based which was first launched in 2013 as a result of the Lecture Quiz research project at the Norwegian University of Science and Technology. It has embraced gamification as a way to motivate and involve learners because it can turn tired, colorless class into lively and highly exciting group of students who are willing to absorb knowledge (Thomas, 2014). It is also considered as a Student Response System that can engage students through its game-like quizzes, discussion and surveys (Dellos, 2015). *Kahoot!* is an online educational website accepted globally with more than 30 million users as it makes fun learning environment for learners of all ages, in any subjects or topics and freely available (Byrne, 2013; Cross, 2014; Plump & LaRosa, 2017; Thomas, 2014).

Instructors can create digital game-based learning with multiple-choice quizzes, discussions and surveys before the class. With the simple layout, colorful platform, music, pictures added by instructor and moving answers, it can gain students' attention and get involved in learning. This can be supported by Schmidt (2005) who pointed out that sensual stimuli is valuable to learning for all learners, or even learners with learning difficulties. Furthermore, students try hard to get the right answers so that their names can be seen on the scoreboard at the end of each question and game. With this leveling and ranking system, students can gain a sense of trial, error, failure and success throughout the game. Nevertheless, failure scores of the respondents are not displayed on the centered screen so that it does not demotivate learners. In contrast, it keeps them to develop and maintain a positive relationship with their failures. According to Zichermann and Cunningham (2011), leveling system can be compared as progress stairs that assure players to work together with challenges and other players at a level equivalent with their own capability. Similarly, Domínguez et al. (2013) claimed that the raking system can motivate learners since their efforts can be seen in public and immediately recognized. Therefore, *Kahoot!* has been accepted as an effective tool in promoting learners' motivation and learning performance of all level since it first launched.

To construct games with *Kahoot!*, teachers need to register at *Kahoot!* website (https://getkahoot.com) before the class. There are several features and options which

are available to create questions. To start the game, students do not have to create their own account or download the application, which can be time- consuming and confusing (Plump, 2017). They only have to login by using their computer, laptop, tablet or smartphone with wireless connection to get access by its application or by browsing the website (https://kahoot.it). *Kahoot!* can be played individually or if there are not enough devices, a team mode is offered to use one device per group. That means everyone has the right to join this game even though the school is not able to provide sufficient devices. Then, players have to type the code appeared on the overhead screen and type their names which will display on the player list. Within this real-time game, the students can see the points they earn which the total scores for each item are 1,000 points based on the correct answers and the speed of response. At the end of the game, the total of gained scores of each player or team will be displayed on the overhead screen and this result can be exported and saved for the teachers to see the overall scores of all players.

2.7 Related Studies on Digital Game-Based Learning

Digital games are employed, particularly in vocabulary and grammar teaching in order to vary the materials and activities used in class because it has been accepted as a hidden approach that offers students with interactive and enjoyable learning opportunities (Prensky, 2001). In the 21st century, therefore, researchers have been activated with the new teaching approach- DGBL and started to conduct the studies to explore the effects of DGBL, especially on the vocabulary acquisition and motivation.

Yip and Kwan (2006) have investigated the uses of online vocabulary games as a tool for teaching and learning English vocabulary through a quasi-experimental study with 100 undergraduate students in Hong Kong for 9 weeks. They revealed the results that online game could increase vocabulary assessment scores of students in experimental group since they could learn better and could recall and retrieve more vocabulary learned than those of the control group where only face-to-face lessons were taught. In addition, they favored more digital educational games than traditional lessons as they can gain a sense of autonomy and conduct their own learning.

In Turkey, Turgut and Irgin (2009) conducted a study through observations and semi-structured interviews with 10 young language learners via the computer

games at the internet cafés with a purpose to contribute to the social context where knowledge can be acquired outside of the schools. Turkish children spend most of their time, like children from other parts of the world in the 21st century, playing computer games in English language. In examining the effects of vocabulary instruction via online games, the results revealed that playing online games help promote learners not only engagement and entertainment, but also their language learning performance and particularly vocabulary skills because they can develop some strategies such as guessing words from context, looking up for the meaning by online dictionary and asking people sitting near them.

In 2011, DeHaan had studied digital game projects that used in teaching and learning English to investigate more information about games that educators have to realize in order to provide the practical media at a rural Japanese University. Based on constructionist learning and media literacy theories and practices, two completed extracurricular projects were described in his paper: game design and game magazine creation. The aims of this research were to lead students towards a superior perception of games' formal features and technologies and to progress their spoken and written English language skills. The result revealed that projects enhanced participants' motivation, provided challenging environment and numerous opportunities for realistic discussions in the foreign language.

Aghlara and Tamjid (2011) conducted a study to examine Iranian children's vocabulary retention through the digital computer game called SHAIEx. The experimental group was treated with this game during a 45 day teaching period whereas the control group was taught through traditional methods without using digital game. At the end, the result indicated that participants in experimental group outperformed those of the control group because they have learned English vocabulary by playing digital game and watching animation on a computer screen and they were unconsciously aware that they were involved in learning language while children in the control group learned vocabulary intentionally with their serious awareness. The researchers, therefore, concluded that digital game can get children engagement to learn vocabulary and facilitate the learning process of children and their cognitive achievement.

In Malaysia, Ismail and Mohammad (2017) conducted a study to improve students' learning and their learning process and to investigate the students' perception towards digital game called *Kahoot!* as a formative assessment tool and its association with the gender of undergraduate medical education students. They carried out a cross-sectional study and employed the survey consisted of 12 items through *Kahoot!* survey platform and the result revealed that the students had optimistic perceptions toward *Kahoot!* as it is fun, effective and better than e-learning platform. The motivation and perceived knowledge retention showed higher mean scores with male student.

In the study by Llerena Medina and Rodríguez Hurtado (2017), they applied *Kahoot!* as a tool to teach English vocabulary to undergraduate students from different faculties in Ecuador. A quasi-experimental study was performed with two groups of students for 10 weeks. At the end of each unit, *Kahoot!* with a ten-question game was conducted in order to review learned vocabulary in each class. The result revealed that it improved learners' engagement and interaction. Also, the application of *Kahoot!* in language classroom increased motivation and improved students' acquisition of vocabulary. The survey of students' satisfaction indicated that students delight in playing *Kahoot!* since it is easy to use. With the benefits of digital games, the researchers, consequently, suggest to use classroom technology in language classrooms to improve learning.

In Thai context, Chaiyo and Nokham(2017) conducted a study with 121 undergraduate students who were attending gerontological nursing course four hours a week for one full semester. They investigated how the use of *Kahoot!*, Quizizz, and Google forms affected the students' concentration, engagement, enjoyment, perception, motivation and satisfaction. The results revealed that students learned better from doing the quiz via these learning technologies but there were statistical difference in the concentration, engagement, enjoyment, motivation and satisfaction. *Kahoot!* and Quizizz has shown a lot of positives over Google forms when applied in the classroom.

Wichadee and Pattanapichet (2018) also investigated the impact of *Kahoot!* on Thai private university students to find out the students' learning performance, namely grammar and vocabulary and motivation during 14 weeks and used *Kahoot!*

as revision exercises after the lesson. After the study, they found out that the students in the experimental group obtained higher scores than those in the control group. This is because they had more fun playing *Kahoot!* while learning grammar and vocabulary. Moreover, they had positive perceptions toward the application of digital games in English class. The researchers supported that *Kahoot!* can be used to stimulate learning, especially language improvement which can occur in a pleasurable learning environment.

To sum up, as we have seen that although DGBL was proved to be valuable way of teaching English in today's world, it has been under- researched area by scholars, especially in Thailand. Research in DGBL is thus significant as it has great impact to make students enjoy attending the class. Several research gaps have been identified with regard to the effects of DGBL. First, most previous studies had focused on the effects of DGBL only on vocabulary acquisition and motivation, little research has been conducted on its effects on vocabulary retention. Second, most of scholars seemed to look at its effects on adult learners, while upper primary school students, who are at the beginning stage of EFL learning and whose characteristics should be involved in this way of learning, need to enlarge their vocabulary size with enjoyment. Third, despite the benefits of DGBL that has been brought into EFL class, few research projects have been explored learners' motivation and perceptions toward the application of digital game. Consequently, it is recommendable that more studies should be done in Thai context as well.

3. Research Methodology

3.1 Participants

Altogether 60 Thai students from two classes of Primary 6 (Grade 6), aged between 11 and 12, at Anuban Pabon School in Phatthalung province participated in the study. They were sampled based on a purposive sampling from the intact groups. In order to avoid disruption of the school policy because the study spanned across almost one full semester, they were assigned to be in the control group and the experimental group within their own classes. One class comprising 30 students (male 17, female 13) was selected to be the experimental group while another class (30

students: male 22, female 8) was chosen to be the control group. They were accustomed to playing computer games, but none of them had previously learned English through DGBL medium.

Prior to data collection, the researcher asked for their verbal consent and ensured that their answers were used only for research purposes and that their names would remain anonymous.

3.2 Data Collection method

This study employed a quasi-experimental research design, consisting of quantitative and qualitative method. It was aimed to investigate how the application of digital game called *Kahoot!* affected the upper primary school students' vocabulary gain, retention, motivation and also their perceptions toward the application of digital game.

Both groups of participants were involved in the same research procedure which lasted 15 weeks. One week before the treatment of digital game-based learning *Kahoot!* started, the pre-test was administered to all participants. According to the main objectives of this study, both groups of participants got the 2-hour treatment a week for 10 weeks. Three teaching stages, presentation, practice and production, were adopted. In the first hour, ten vocabulary were taught in the presentation and practice stage through intentional vocabulary teaching method by the researcher. In the 2nd hour of lesson, 10 vocabulary quiz game was given to the students in the production stage.

The experimental group had the opportunity to review the learned vocabulary with the quizzes of digital games called *"Kahoot! online"* at the computer room with their partners since there were not enough computers for every single students. The faster they could complete the quiz, the higher the scores they would get. They were able to see the scores they earned after each quiz which were shown on the projector screen and at the end of the game; the winner's name was announced.

On the other hand, the control group reviewed the learned lessons by the non-digital game which had the same nature and purpose as *"Kahoot! online!"* game called *"Kahoot! offline"* game with the handmade materials (4 multiple choice colored sticks) to answer the quiz provided by the researcher in their classroom. They

only knew the scores they gained but the winner's name was not announced due to the time constraint. After the course, in the twelfth week, both groups did the post-test, the learners' motivation questionnaire and an open-ended question. Three weeks later, the delayed post-test were administered to both group of the students.

3.3 Research Instruments

3.3.1 Vocabulary knowledge checklist (see Appendix A)

The words were chosen based on English. O-NET (Ordinary National Educational Test) from the past few years, which was supervised by the National Institute of Educational Testing Service (Public Organization) or NIETS in 2017. In order to determine the exact unknown number of vocabulary of the sampled students, the checklist consisted of 200 words which were alphabetically randomized by the researcher. The students from both experimental and control groups were asked whether they knew, were not sure or did not know these words. Furthermore, to ensure that the participants did not know the selected words, they had to write the meaning of the words they knew. The familiar words were excluded. A total number of words taught in this study were 100 words (10 words for each lesson) and they were grouped under the theme in each lesson. However before distributing the checklist to the sampled students, three experts from the faculty of Liberal Arts, Prince of Songkla University were asked to approve, review and modify for its validity. Besides, in order to measure the readability, the vocabulary knowledge checklist was piloted with 30 students who were not the participants of this study but they were in the same level (Primary 6) from the same school.

3.3.2 Teaching stages and lesson plans (see Appendix B and C)

The students in both groups have learned 10 words from the checklist for each lesson for 10 weeks. The same contents, objectives and teaching stages were used in both groups. In the production stage, however, digital game- *Kahoot! online* was used by the students in the experimental group while non-digital game called *Kahoot! offline* was applied in the control group. As shown in the following table:

Teaching stages	Purposes	Method	
		Experimental Group	Control group
Presentation stage (20 minutes)	**Knowledge** - spelling - word meaning	normal	normal
Practice stage (40 minutes)	**Comprehension** - spelling - word meaning - applying vocabulary learnt in new sentence	normal	normal
Production stage (60 minutes)	**Application** - applying DGBL used quiz game in order to test the vocabulary meaning, form and use.	Digital game (at computer room)	Non-digital game

Before launching the lesson plan in the real treatment, the same three experts were asked to approve, review and modify the lesson plans for its validity. Moreover, 30 students who had joined the vocabulary knowledge pilot session were invited to join the class to validate the lesson plans.

3.3.3 Vocabulary achievement tests (pre-test, post-test and delayed post-test) (see Appendix D, E and F)

Students of both groups were required to do the tests which were randomly selected from the learned vocabulary during the treatment. To examine the students' vocabulary gain and retention, the tests measured their knowledge, comprehension and application.

Procedures of constructing vocabulary tests:

1.1) Analyzing (Word selection)

Vocabulary used in this study were analyzed and selected from the vocabulary knowledge checklist. However, for the pre-test, post-test, and retention test, only 60 words were randomly selected from the learned vocabulary during the treatment.

1.2) Designing

180 items of vocabulary tests were conducted to have the different but identical version; 60 items for each test. In other words, these tests were probed to have the same construct from the test specification by using the parallel forms in order to have the reliability tests.

As the purpose to examine the students' vocabulary gain and retention, the tests were used to measure their knowledge, comprehension and application. According to Nation (2005), for the deliberate teaching and learning of vocabulary, it is important to consider the learning burden which are meaning, form and use. The tests therefore were constructed as follow:

20 items   Meaning   (word and meaning/picture matching)

20 items   Form   (spelling, filling missing alphabet in the gap)

20 items   Use   (sentence completion)

1.3) Developing

The validity of 180 items from both tests were approved, reviewed and modified by the same three experts from Prince of Songkla University. By doing so, the researcher created an evaluation form for the experts in order to ascertain that each item was keeping with the objectives. Three types of answers were given in order to calculate the Item- Objective Congruence (IOC). They were as follow:

1   Congruent

0   Questionable

-1   Incongruent

1.4) Piloting

After analyzing, the IOC scores were higher than 0.5, which means they were congruent and ready for piloting the test to 30 students (same group with those who had joined in the lesson plan pilot session). 180 items were proved to have validity, they were selected for pre-test, post-test and delayed post-test (60 items each).

3.3.4 Learning motivation questionnaires and the open-ended questions asking students' perceptions toward the application of digital game (see Appendix G)

The learning motivation questionnaires were distributed to both experimental and control groups in the twelfth week after the post-test. The questionnaire consisting of 10 items which were modified from Keller's Course Interest Survey (Keller, 1987) and translated into Thai were used to examine learners' motivation. The first part was included with personal information of respondents, which were gender, class and age.

The second part was the questionnaire statements which were measured by using five-point Likert scales as follow:

5	Strongly agree
4	Agree
3	Neutral
2	disagree
1	Strongly disagree

The third part was an open-ended question asking students' perception toward the application of digital game.

The validity of the questionnaire was approved by three experts and it was piloted with the same group of the students in the vocabulary pilot test in order to measure the readability. The coefficient alpha technique was used to measure its reliability. Being at .87, hence, the questionnaire was found to be reliable.

3.4 Data analysis

For the quantitative data, the data collected from pre-test, post-test, delayed post-test and learning motivation questionnaires in both groups were analyzed by using the statistical program. The internal consistency of the participants' pre-test

scores was first assured for the homogeneity and normality. Since the participants were not randomly selected to receive the treatment, their prior knowledge could be different among the classes. By means of descriptive statistics, the pre-tests of both groups were analyzed through means, standard deviation and the independent samples t-test, which revealed no significant difference between the two groups. Therefore, it can be assumed that before starting the treatment, two groups of participants were comparable in their learning performance. The result of post-test carried a significant difference.

For the vocabulary retention aspect, although the results indicated that the learning performances of the two groups of participants were equivalent in the pre-test and there were statistical differences between the two groups in the post-test score, in retention test, there was no significant difference.

For the motivational aspect, the questionnaires were distributed to both groups at the end of the treatment. The mean scores of learning motivation were compared and the independent sample t-test was used to analyze if there was any significant difference of motivation between the two groups. The results yielded statistical significance.

For the qualitative data of perceptions aspect, at the end of the treatment, an open-ended question was administered to both groups of participants asking their perceptions toward both types of game. The content analysis was employed to analyze the prominent perceptions and categorized based on the themes.

4. Findings

4.1 Effects of Digital Game-Based Learning on students' vocabulary gain

Table 1: Descriptive statistics of pre-test and post-test

items	Control		Experimental		t		df	sig
	Mean	S.D.	Mean	S.D.				
Pre-test	7.60	3.47	9.93	5.74	-1.907		58	.06
Post-test	17.47	13.65	25.07	14.53	-2.088	*	58	.04

*Significance level 0.05

Prior to the use of DGBL technique, the mean score of the control group was 7.60 with the standard deviation of 3.47 and that of the experimental group was 9.93 with higher standard deviation of 5.74. The independent sample t-test was employed to examine if there was any statistical significance. The finding suggested that there was no significant difference ($p > 0.05$) between the two groups. Consequently, it is evident that both groups of students had equivalent prior knowledge before learning, indicating that the two groups were comparable in their learning performance.

Nevertheless, after the treatment, the results showed that the experimental group ($\bar{x}$ = 25.07 with S.D. of = 14.53) significantly outperformed the control group ($\bar{x}$ = 17.47 with S.D. of =13.65). According to the results ($p < 0.05$), there was a significant difference between the two groups; the students who used DGBL, *Kahoot!* online, had higher learning achievement than those who used non-DGBL, *Kahoot!* offline.

4.2 Effects of Digital Game-Based Learning on students' vocabulary retention

Table 2: Descriptive statistics of delayed post- test

items	Control		Experimental		t		df	sig
	Mean	SD	Mean	SD				
Post-test	17.47	13.65	25.07	14.53	-2.088	*	58	.04
Delayed-test	17.70	13.23	21.67	16.50	-1.027		58	.31

*Significance level 0.05

After having learned through DGBL for 10 weeks, the results showed that there was significantly different ($p < 0.05$) between the two groups. The experimental group ($\bar{x}$ = 25.07 with S.D. of 14.53) significantly outperformed the control group ($\bar{x}$ = 17.47with S.D. of 13.65) indicating that DGBL used as the experimental medium in this study was proved to be a productive instrument in increasing upper primary school students' vocabulary knowledge.

However, in order to discover the effectiveness of DGBL in vocabulary retention, three weeks after the post-test, the retention test was provided to the participants of both groups. Table 2 shows that the mean score of delayed post-test of control group was $\bar{x}$ =17.70 which is 0.23 higher than their posttest while the score of

retention test of experiment group was $\bar{x}$ = 21.67 which is 3.4 less than their post-test score. The independent sample t-test was used to analyze the findings. It is suggested that there was no significant difference between the two groups in vocabulary retention. Therefore, DGBL is more effective than non-digital game in their post-test but not in vocabulary retention.

4.3 Effects of Digital Game-Based Learning on students' motivation

Table 3: Descriptive statistics of motivation questionnaire

Motivation	Control		Experimental		t	df	sig
	Mean	S.D.	Mean	S.D.			
1. This course can develop my language proficiency.	4.20	.76	4.70	.53	-2.944**	52	.00
2. The content of this course is useful to me.	4.67	.48	4.93	.25	-2.693**	44	.01
3. The activities in this course capture my attention.	4.47	.57	4.83	.38	-2.929**	50	.01
4. I think the given tasks are not too difficult.	4.10	.71	4.57	.73	-2.510**	58	.01
5. I feel confident that I will do well in this course.	3.80	.71	4.30	.84	-2.489*	58	.02
6. I enjoy studying English.	4.50	.57	4.83	.46	-2.484*	55	.02
7. The content in this course motivates me to learn.	4.30	.88	4.70	.47	-2.206*	44	.03
8. I actively participate in the activities of this course.	4.20	.81	4.50	.63	-1.608	58	.11
9. The amount of work in the course is suitable.	4.63	.56	4.57	.63	.436	58	.66
10. I am very satisfied with the course.	4.70	.47	4.77	.77	-.404	58	.69
Average	4.36	.37	4.67	.30	-3.587**	58	.00

** significance level 0.01

To investigate students' learning motivation, the questionnaire was administered to both groups at the end of the course. Based on the findings, the greater motivation was found in the experimental group for almost every item on the questionnaire. The highest mean score of the experimental group was item number 2 ('The content of this course is useful to me', $\bar{x} = 4.93$) while their counterparts selected item number 10 ('I am very satisfied with the course', $\bar{x}= 4.70$).

The independent sample t-test was used to analyze each questionnaire item; the result indicated that there were statistical differences between the two groups in almost every item. Still, there were no significant differences between the two groups in few items (item number 8: I actively participate in the activities of this course, item number 9: The amount of work in the course is suitable, and item number 10: I am very satisfied with the course)

However, the average mean score of students' motivation in the experimental group ($\bar{x}= 4.67$) was higher than that of the control group ($\bar{x} = 4.36$). The analysis of average mean score of the questionnaire by comparing an independent sample t-test revealed a statistical difference in the motivation between the two groups ($p < .01$) as shown in Table 2. Therefore, digital game-based learning in this study was proved to be an effective way in promoting learning motivation for young Thai learners in this study.

4.4 Effects of Digital Game-Based Learning on students' perceptions

After applying the DGBL and non-digital game in the English language classroom for ten weeks, the open-ended question was provided to both groups of participants in order to obtain the qualitative data asking their perceptions toward DGBL in learning English vocabulary. The analysis from the open-ended question revealed five dominant themes, specifically, enjoyment learning atmosphere, effective method for vocabulary learning and language skills, socialization, technology skills, and learning motivation. The experimental group students had positive perceptions toward DGBL and they perceived it as a tool to get them involved in the lesson more than the traditional method. Furthermore, the control group student also perceived the use of non-digital game in the same ways as the experimental group students; however, the levels of their perception were different.

In the following part, the letters in each code referred to the group of the participants (EXP for experimental group and CTL for control group) and their genders (B for boy and G for girl), while the number identified participant's number in this study.

First, for enjoyment learning atmosphere, most of the participants from both groups have seen the GBL as a tool to increase their enthusiasm in learning since playing games is fun and can motivate them to learn. EXP-B14 student was so happy that he could learn English through computer games together with his friends and the teacher. EXP-G28 student also was pleased to play computer games because she could gain both knowledge and gain fun at the same time. The students had the following to say:

> *I was so glad and enjoyed playing the digital game with my friends and teacher. It helped me to gain more knowledge. Although we had learned it in a short time, it was meaningful to me.* (EXP-B14)

> *I was so happy and enjoyed learning English. I gained more knowledge from the computer game and I found it amusing.* (EXP-G28)

Likewise, CTL-B18 student was satisfied with the game because it was fun and he has learned something new which made him like the English subject more.

> *The activity in the class was fun. I really like it. I could gain more knowledge and it made me love to learn English more.* (CTL-B18)

Second, GBL was found to be an effective method for vocabulary development and language skills because both groups of the students love to play games. Moreover, some students in the experimental group found that *Kahoot!* helped them to remember more of the vocabulary and also to improve other language skills. EXP-B19 student was impressed with *Kahoot!* since he could see his improvement in English. Additionally, his friend, EXP-G2, could read English more and could remember more vocabulary after learning. EXP-G20 indicated that *Kahoot!* could not

only rise her ability in remembering vocabulary, but also helped her to make quicker decisions. The students had made the comments as follows:

> *I really enjoyed learning English with Teacher through computer games because it was so amusing and I could see my progress in English.* (EXP-B19)

> *I love to study English, however, in the past I used to guess the meaning of the words and did not know how to read. Now I can read English more because the teacher has taught me by using Kahoot! game. I was happy and had so much fun at the same time. Moreover, there were a lot of vocabulary that I remembered from this in the school exam. Kahoot! game turned difficulty words become easier.* (EXP-G2)

> *It was really fun and Kahoot! helped me to increase the ability to remember the vocabulary. Also it helped me to rise the speed in thinking and make the decision in a short time.* (EXP-G20)

On the other hand, one student (CTL-B4) in the control group revealed that he could only recall some vocabulary after playing games. While, his friend (CTL-G9) found the games were fun and she could remember more words which she could use when she had to do the English examination for entering a well-known secondary school.

> *Through the games we played in the class, I can remember some vocabulary.* (CTL-B4)

> *I was happy playing the game that you (researcher) has brought into the class. I have learned lots of words which will be beneficial for the exam that I will take for entering to secondary 1 in at Phatthalung school after I finished Primary 6.* (CTL-G9)

Third, playing games is valuable for socialization. The students of both groups had a pleasurable time playing games with their friends. They engaged more to the lessons. However, their engagement was at different level. The students in the experimental group were eager to play the games with their friends since they could compete with themselves and their friends and could help each other to find the answer. As EXP-G1 said that she wanted to compete with herself and her friends with their friends. Also one of the students (EXP-G17) explained that by playing games in pair she could help her friend to find the answer which could help her to acquire more knowledge. Moreover, another student (EXP-G8) was contented playing the games with her friend.

Kahoot game made me enjoy learning because I can compete with myself and friends. I can do something new which can improve my English. The game was really fun. (EXP-G1)

When we played game in pair, we could help each other to find out the answer. We have gained more knowledge. I really enjoyed the game. (EXP-G17)

The digital game was enjoyable because I could learn new vocabulary with my friends. (EXP-G8)

Likewise, the students in the control group had amusing time playing the games with their classmate but some of them felt embarrassed when their answers were incorrect and some indicated that there were few limitations that they could not compete with their friends.

The pro of this game is that we could gain more vocabulary and enjoyed learning in the same time; however, the con is that when our answers were wrong, all of our friends could notice. We felt quite ashamed. (CTL-G21)

The game was good but there were some limitations that I could not win my

friends. (CTL-G20)

Fourth, technology skills were one of the themes frequently found only in the experimental group. Since nowadays the trend of Thailand 4.0 is being promoted by the current government in order to bring awareness for Thai people to get ready for the rapid change of the world. This skill is important in the 21st century and the students themselves saw such importance that they wanted to prepare themselves to the digital era. They were enthusiastic to play the computer. The followings are their words:

I like the game so much because it is useful to me. Learning through computer is good because I can learn skills for "Thailand 4.0". (EXP-B3)

I know more vocabulary that I didn't know before and I can play the game with computer, it was so amusing. (EXP-G7)

I enjoyed learning this subject because I could play the computer game and answer the vocabulary quiz online. (EXP-B10)

The last theme was learning motivation. Although this study employed intentional vocabulary learning teaching method, the students of both groups were motivated to learn and remember the vocabulary without being forced by their teacher. For the experimental group, the students were both intrinsically and extrinsically motivated because they thought that it was worth for them to remember the vocabulary in the class so that they could get more scores when they played the digital game. Comments provided by the participants are as follow:

I really enjoyed learning English vocabulary in the classroom because if I focus on what I learn in the class, I will gain more points in the computer room when we play the game. (EXP-G12)

I love playing the computer game and answering the quiz in Kahoot! because if I win, not only I can learn new vocabulary but also I can get the prize. (EXP-B27)

Correspondingly, some of the students in the control group were both intrinsically and extrinsically motivated. For student CTL-B24, the games were very attractive to make him really like to learn English, however, due to the time constraint during the games play that the teacher (the researcher) could not provide the score depending on the rapidity of answer the quiz. Therefore, only the first student who got the correct answer could get the prize as student CTL-B23 stated that:

The game could draw our attention to learn English. It was really good and entertaining. I really like this game. (CTL-B24)

The game was fun, however, only the student who answered the first one could get the prize from teacher. The game could improve us to be good at answering the questions in English. (CTL-B23)

5. Conclusion and Discussion

Vocabulary teaching using the DGBL was magnificently implemented in a natural teaching environment in Thai context. The major objectives of this current study were to investigate the effects of DGBL on vocabulary gain and retention of Thai upper primary school students and also to explore their motivation and perceptions towards the application of digital game. This study proved that the DGBL was an effective teaching instruction for the upper primary school students in EFL context. Based on the findings, two aspects of the results should be brought to discuss here:

The first is the vocabulary learning aspect. According to the quantitative results from the vocabulary gain and retention, it was discovered from this study that after applying DGBL in English class, there was a significant difference in vocabulary gain between the experimental group and the control group at a significant level p

<0.05, and the experimental group students outperformed the students in the control group one. Although it is quite overloaded for young learners in order to remember a large amount of vocabulary through intentional vocabulary learning approach, the experimental participants could gain more words than their counterparts.

However, this study also revealed some unexpected results since the rates of retention of both groups of participants were comparable. The mean scores of vocabulary retention in the control group were a bit increased after 21 days while those of the experimental group were decreased. This might well be true with the engagement theory of Kearsley and Shneiderman (1998) who claimed that if learners are engaged in the meaningful tasks, the information will be retained and transferred to other contexts. By playing through non-digital games, the analysis from the qualitative data also supported that the control group students were involved in the class activities because they perceived the enjoyment of the learning activities –the same as the experimental group students. This might be due to the fact that the nature of children, they love to play the games. Whatever the games are employed in learning, the children will happily and excitedly enjoy them. Moreover, they will pay longer attention if the games are fun and motivating. Therefore, the learning engagement that also occurred in control group and their intrinsic motivation might help them to maintain their vocabulary retention.

On the other hand, the possibility in forgetting some vocabulary of the experimental students is higher because they already had gained large size of vocabulary in the post-test. From the analysis of their perceptions, another possible reason that affects their vocabulary retention might be because students focused too much on competition games that their intrinsic motivation and engagement were dropped after three weeks. As some of them mentioned that they were engaged in the digital games because they wanted to compete with their classmates and wanted their names to be shown on the scoreboard.

Additionally, for the reason that the digital game used in the treatment was quite speedy and due to its function that required players to think and answer fast so that they could gain more scores, some students in the experimental group might not be able to pay attention to the questions of the quiz. Typically, in order to transfer the learned vocabulary to short-term memory where the information is placed to use,

learners have to pay attention to a stimulus and see it as relevant within 20-30 seconds and constantly use it. Consequently, their abilities to retain the learned vocabulary were decreased while their counterpart had more time to focus on and analyze the questions of non-digital game.

The results of this study were consistent with the study of Aghlara and Tamjid (2011). In their study, digital games could lead learners to better learning motivation and could ease children's learning process. Moreover, they also indicated that digital games could increase Iranian children's vocabulary learning. The process of DGBL was pleasing and by appealing children in such game, the stresses in the learning process were reduced. This is also supported by Chaiyo and Nokham(2017) that the application of digital game called *Kahoot!* could strengthen learners' engagement, concentration, enjoyment, motivation, satisfaction and it could provide the environment where learners actively participate in the classroom activities. Similarly, the previous study (see Wichadee & Pattanapichet, 2018) has shown that digital game not only increased Thai undergraduate students' motivation, but also enhanced their learning outcomes. In their study, it was found that after the treatment of DGBL called "*Kahoot!*" for 14 weeks, there was a significant difference in post-test scores between the two groups of students and the motivation of the students in experimental group was much higher than that of the control group.

In this regard, the present study lends further support to such findings with Thai upper primary school students. While the duration of the treatment in this study became longer (15weeks), both groups of the participants were further compared their vocabulary gain and retention by using the digital game called "*Kahoot! online*" and "*Kahoot! offline*" which shared the same nature and purposes of the game. However, the result of this study was not surprising in their learning achievement and their learning motivation since they revealed statistical differences among the two groups.

Another aspect is the learning motivation which was retrieved from the quantitative data of motivation questionnaires and also was supported by the qualitative data from the students' perceptions toward the use of games in an English classroom. According to the findings, the students in the experimental group had higher learning motivation than those who were in the control group. However, the sample students of both groups revealed five positive perceptions toward the

treatments including: enjoyment learning atmosphere, effective method for vocabulary learning and language skills, socialization, learning motivation and technology skills while the experimental groups had more impression since they could learn technological skills from digital game which are required for the digital world that they are living in now. It suggested that the DGBL could provide superior perceptions and motivation of learners comparing to the non-digital game because the students nowadays are more enthusiastic to use the technological equipment that offers them with more attractive learning atmosphere and motivate them to remember English vocabulary with enjoyment. The effectiveness of the games in this study aligns well with the sociocultural theory of learning of Vygotsky (1978) who affirmed that learning happens when it is social, active and situated. Also, he added that play can promote learning. In this study, leaners can experience the social roles and also social learning with their friends through the exploration of game. Moreover, the successful of DGBL in this study is in accordance with the flow theory of Csikzentmihayi (1990). He claimed that in game playing and learning, flow theory is an ordinary basis for motivation since learners are willing to lose their time with their pure desire to play games rather than external rewards. Although both groups of the students knew that learning vocabulary in this research projects would not affect their grades and they would not get any prizes if they won the game, all participants were eager and were engaged to the lessons.

Many researchers (Lee& Hammer, 2011; Liu & Chu, 2010; Muntean, 2011; Poondej &Lerdpornkulrat, 2016) claimed that using DGBL can not only lead learners to better learning, but also enhance their learning motivation. A previous study (see Llerena Medina and Rodríguez Hurtado, 2017) also claimed that digital game could motivate learners to learn and raise their satisfaction in learning. In Shahriarpour and Kafi (2015) study, they revealed that digital games could change the learners' ways of learning from rote learning to meaningful learning. In addition, students could both acquire more words from playing digital games and they could enhance their motivation and interaction. Several reasons should be brought to discuss as follows:

One possible reason for the higher vocabulary gain of the experimental group would probably due to their engagement in learning. Based on the results, greater motivation was found in the experimental group for almost every item on the

questionnaire. The finding is also consistent with Lee and Hammer (2011). In their study, digital games helped promote and stimulate learning. They also claimed that digital games have impacts on mental and social condition. Hence, this may well be true that digital games can draw students' attention and boost their interest. The more they pay attention to the lessons, the more they are likely to increase their motivation in learning. The similar result was also found in the study of Alsharafat et al. (2017) who asserted electronic instructional games could raise young learners' motivation and they perceived positive interaction while learning English vocabulary.

Although intentional vocabulary teaching seems to bring boredom to Thai EFL class since the students are expected to remember a large size of vocabulary, surprisingly, in this current study, students in both groups were satisfied with the course and actively participated in the class activities. This is in congruence with the principles of Beck et al. (2002) in combining instruction to enhance students learning. Their principles were designing a child-friendly direct words explanation, increasing active engagement in learning, providing variety of examples in various contexts and restructuring the words or tasks when required. Also, according to Greenwood et al. (2002) the most essential part of these principles is that teachers should be certain that they have provided the students with adequate opportunities to respond in the class activities. Therefore, without doubts, the students in the experimental group of this study could gain more vocabulary than those who have learned through non-digital game since the teaching materials used in the classroom is appropriate with their age and could boost their interests throughout the study and no one was left behind because every individual student had chances to join the class activities. As Yip and Kwan (2006) indicated that if games were fun, students' interests are more likely to be aroused. This explained why in this study, only students in the experimental group significantly had higher learning motivation and had positive attitude toward this teaching method. Additionally, after using digital games, experimental students were likely to see the importance of vocabulary learning which is considered as challenging task for most of EFL learners. Not only the higher motivation in learning that digital game could provide to young learners who are at the beginning stage of English learning, but also their willingness to learn other four language skill might increase since they have felt pleasure in the learning process.

Second reason would be that the control group students who have reviewed the lessons by using "*Kahoot! offline*" were not involved in the lessons as much as those students who were in experimental group. This is probably due to the fact that students in the experimental group knew how many scores they earned immediately after each question which depended on the rapidity of answering, while the control group knew only whether or not their answers were correct but the speed of responding was not taken into account to get the score. Moreover, if their answers were wrong, other students could notice their failure in public which could demotivate them to get the correct answer. The experimental students, in contrast, did not perceive the negative attitude toward the game since nobody could see their answer were correct or wrong because it only appeared on their personal screen. Therefore, control group students were not get much engaged in learning when compared to their counterparts did. However, the atmosphere in experimental class was more competitive because the students wanted to see their names on the scoreboard if they got the top five highest scores at the end of each question and at the end of the game, the top three highest score students' names would be leveled. According to Zichermann and Cunningham (2011), levels serve as a marker for players to know where they stand in a gaming experience over time. Therefore, it can be implied that the application of "*Kahoot! online*" enhanced learners to become more active and get engaged in the learning process.

Lastly, another reason is a superiority of learning method using DGBL might due to the exciting features (e.g. screen, music, and scoreboard) of the application *Kahoot! online* which are more suitable for young learners who are considered as "digital natives". Although this study has put the effort in designing another non-digial game which was comparable in the nature and purposes of the game, the results remain unchanged as compared to previous study (see Llerena Medina & Rodríguez Hurtado, 2017). They affirmed that students were excited to use their mobile phone or tablets in the classroom which provided them more pleasant classroom atmosphere because they could rise learners' energy and enhance more enjoyable. Such a finding is also in accordance with Alsharafat et al. (2017) who admitted that through motion, colors, stimulation and images of electronic educational game could facilitate children' vocabulary learning and increased interaction. Therefore, although the

researcher has tried to imitate the application of *Kahoot!* to make an alternative way in designing teaching material for some schools that are not provided with enough technology equipment in their classroom as *Kahoot! offline*, it could not capture students' motivation and improve vocabulary learning as much as the online version did.

Consequently, this study has proved that in this digital era, DGBL seem to be favored among young EFL learners in Thai context since it offers them with more amusing learning environment and they can make use of DGBL in improving their vocabulary skill and increase their motivation in language learning. Technology has immersed in everyday life of the new generation, as such, teachers should prepare the teaching materials that could meet their needs and correspond to today's world.

6. Pedagogical Implications

Based on the findings of the study, there are three major implications for teachers, educators, course designers and scholars stated as follows.

First, the findings on students' vocabulary gain could help teachers and course designers to pay attention to the application of DGBL in English language classrooms that have been proven to be an effective means for upper primary students in enlarging students' vocabulary size and ease their learning through intentional vocabulary learning. However, the rates of vocabulary retention in the experimental group students were still comparable to the control group. Consequently, it may be suggested that teachers and educators should put more focus on some aspects such as competitive learning environment and duration of the game that may affect students' capability in remembering vocabulary.

Second, this study indicated that DGBL can promote the learning motivation and positive perceptions of learners. Teachers and educators should be aware that young learners are the beginners of second language learning. Hence, in order to assure their lifelong learning, teachers should prepare learning activities that can motivate them to learn and create the enjoyment learning atmosphere so that learners will perceive English learning as interesting lessons.

Finally, with the great merits that DGBL have brought into the English language class, still teachers in Thai context do not tend to apply it in the classroom. Teachers are recommended to design the course outlines and prepare the new teaching materials which are up-to-date and suitable with the digital native learners. In addition, teachers may apply the DGBL with other language skills so that their learners will get more engaged to the lessons.

7. Limitation and Recommendation for Further Studies

The present study has valuable contributions to DGBL research; however there are several questions to be addressed. First, since there are only few research projects that have investigated the effects of DGBL on young learners in Thailand, future research should explore the same context with other English proficiency levels of EFL learners in order to find the factors that affect students' vocabulary gain and retention. Second, future study may be conducted to compare two applications of digital games with extensive data and with other language skills, for example, speaking or writing. Third, a comparative study between applying DGBL with intentional vocabulary learning and incidental vocabulary learning is suggested. Fourth, it is necessary for further research to investigate the in-depth perceptions of the learners toward the application of both games with qualitative data from the semi-structure interview to support the quantitative results.

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Appendix A
Vocabulary Knowledge Checklist

ชื่อ_____ ชั้น_____ เลขที่_____

แบบสอบถามความรู้ด้านคำศัพท์

คำชี้แจง

1. ให้นักเรียนทำเครื่องหมาย ✔ ในช่องใดช่องหนึ่งต่อไปนี้ ต่อคำศัพท์ 1 คำจนครบ
ทุกข้อ

    - ช่อง "รู้แล้ว" หมายถึง   นักเรียนรู้จักคำศัพท์และสามารถแปลความหมายได้

                       ในช่อง "แปลว่า" ที่มีเครื่องหมายเท่ากับ (=)

    - ช่อง "ไม่แน่ใจ"   หมายถึง   นักเรียนไม่แน่ใจว่าเคยรู้จักคำศัพท์มาก่อน

    - ช่อง "ไม่รู้เลย"   หมายถึง   นักเรียนไม่รู้จักหรือรู้ความหมายมาก่อน

2. การทำแบบสอบถามในครั้งนี้ไม่มีผลต่อการเรียนหรือผลอื่นใดต่อนักเรียน

                                          ขอบคุณในความร่วมมือ

                                          นางสาวธนาภรณ์ คงปราบ

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
1	accident		=		
2	actor		=		
3	actress		=		
4	adventure		=		
5	age		=		
6	airport		=		
7	angry		=		
8	ankle		=		
9	aquarium		=		
10	artist		=		
11	backpack		=		
12	bake		=		
13	bald		=		
14	bean		=		
15	beard		=		
16	bench		=		
17	blanket		=		
18	blouse		=		
19	boil		=		
20	building		=		
21	burn		=		
22	butter		=		
23	cage		=		
24	camera		=		

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
25	canal		=		
26	candle		=		
27	carry		=		
28	cave		=		
29	ceiling		=		
30	cheap		=		
31	chew		=		
32	cinema		=		
33	clever		=		
34	coin		=		
35	crayon		=		
36	dark		=		
37	deep		=		
38	dentist		=		
39	dessert		=		
40	diary		=		
41	diamond		=		
42	difficult		=		
43	dirty		=		
44	dress up		=		
45	dry		=		
46	earth		=		
47	easy		=		
48	elbow		=		
49	engineer		=		
50	enjoy		=		
51	enough		=		

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
52	excellent		=		
53	exercise		=		
54	expensive		=		
55	eyelash		=		
56	false		=		
57	family		=		
58	far		=		
59	favorite		=		
60	feed		=		
61	fence		=		
62	ferry		=		
63	fill		=		
64	finish		=		
65	fisherman		=		
66	garage		=		
67	garlic		=		
68	get up		=		
69	glad		=		
70	glove		=		
71	grandparent		=		
72	grass		=		
73	grow		=		
74	guava		=		
75	handbag		=		
76	handsome		=		
77	happy		=		
78	hate		=		

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
79	hear		=		
80	heavy		=		
81	hobby		=		
83	holiday		=		
84	honey		=		
85	hospital		=		
86	housework		=		
87	hungry		=		
88	ill		=		
89	important		=		
90	insect		=		
91	jacket		=		
92	jasmine		=		
93	jeans		=		
94	job		=		
95	jog		=		
96	juice		=		
97	jump		=		
98	jungle		=		
99	kangaroo		=		
100	keep		=		
101	key chain		=		
102	kick		=		
103	king		=		
104	kite		=		
105	knee		=		
106	knife		=		

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
107	knock		=		
108	know		=		
109	lady		=		
110	lake		=		
111	lamp		=		
112	land		=		
113	large		=		
114	laugh		=		
115	lazy		=		
116	leader		=		
117	learn		=		
118	life		=		
119	listen to		=		
120	long		=		
121	lucky		=		
122	magazine		=		
123	make		=		
124	marry		=		
125	meat		=		
126	member		=		
127	mix		=		
128	money		=		
129	mountain		=		
130	movie		=		
131	narrow		=		
132	nature		=		
133	near		=		

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
134	necklace		=		
135	nest		=		
136	noodle		=		
137	ocean		=		
138	octopus		=		
139	ostrich		=		
140	paint		=		
141	pajamas		=		
142	park		=		
143	peanut		=		
144	peel		=		
145	people		=		
146	pillow		=		
147	plant		=		
148	pocket		=		
149	poor		=		
150	pray		=		
151	queen		=		
152	quiet		=		
153	radio		=		
154	read		=		
155	ready		=		
156	relax		=		
157	repair		=		
158	repeat		=		
159	rich		=		
160	river		=		

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
161	robot		=		
162	roof		=		
163	rubbish		=		
164	sad		=		
165	same		=		
166	say		=		
167	seahorse		=		
168	season		=		
169	soap		=		
170	special		=		
171	spell		=		
172	stair		=		
173	sunglasses		=		
174	tall		=		
175	teach		=		
176	temple		=		
177	thief		=		
178	throw		=		
179	ticket		=		
180	travel		=		
181	ugly		=		
182	understand		=		
183	use		=		
184	vegetable		=		
185	vehicle		=		
186	village		=		
187	visit		=		

คำที่	คำศัพท์	รู้แล้ว	แปลว่า	ไม่แน่ใจ	ไม่รู้เลย
188	voice		=		
189	vote		=		
190	wait		=		
191	warm		=		
192	wash		=		
193	watch		=		
194	waterfall		=		
195	wear		=		
196	weekend		=		
197	whale		=		
198	wing		=		
199	wood		=		
200	yard		=		

Appendix B
Lesson Plans
(Experimental Group)

LESSON PLAN Week 1 (experimental group)
Time: 120 minutes   Primary 6   Anuban Pabon School
Topic: Myself   Teacher: Tanaporn Kongprab   Date: 9 Nov. 2018

___

I.   **Indicator: (1)** Students will be able to tell the meaning, spell and make new sentence by using the vocabulary learnt correctly.

II.   **Terminal Objective:** Students will be able to form sentences by using the vocabulary learnt.

III.   **Enabling Objectives:**
            At the end of the lesson, students will be able to:
a.   Tell the meaning of the vocabulary learnt.
b.   Spell the vocabulary learnt correctly.
c.   Write new sentences by using the vocabulary learnt.

IV.   **Background knowledge**
a.   Parts of body

V.   **Content**
a.   Myself

1. Ankle	2. Elbow
3. Handsome	4. Necklace
5. Wear	6. Beard
7. Bald	8. Grow
9. Lady	10. Eyelash

VI.   **Task/ Project:**
a.   *Kahoot!*

VII.   **Evaluation/ Assessment:**
Assessor:
☑ Teacher   ☐ Students   ☐ Friends   ☐ Parents

Task/ Project	Measurement	Topic	Rubric score
Kahoot!	Correctness	Myself	**Pass** = students answer the quizzes by using the vocabulary learnt correctly. **Need to improve**= students answer the quizzes by using the vocabulary learnt at less than 60% (0-6 out of 10)

VIII. **Learning Materials:**
　✔2 markers
　✔Printed pictures and vocabulary
　✔Printed sentences

IX. **Procedure:**

Time	Stage	Teacher	Students	Purpose
20 mins	**Presentation**	1. T greets students and introduces the gestures for dancing and open the song.	1. Ss greet T and listen to T. Ss follow how to do each gesture and dance.	1. Clear Ss' minds and warm them up in order to get both physical and mental ready.
		2. T gradually shows parts of body pictures and asks whether or not they know the vocabulary in English.	2. Ss. listen and try to answer or guess the words in English.	2. Arouse Ss' attention.
		3.T shows the pictures again, this time T. shows them one by one and tells Ss how to pronounce each word (3-4 times/ word). T asks Ss to spell each word.	3. Ss look at the pictures and repeat each word after T. Then, Ss spell the word out loud together.	3. Get Ss to know the words' meanings and their forms.
40 mins	**Practice**	1. T shows Ss the pictures one by one and asks them What part of body is it?"	1. Ss answer T "It is a/an……"	1. Have Ss practice how to answer.
		2. T asks Ss "How to spell this word?"	2. Ss answer T "It spells……."	2. Have Ss practice how to spell.
		3. T writes the all words on the white board and asks Ss to pronounce and spell each word together.	3. Ss repeat each word after teacher and spell together.	3. Have Ss practice to pronounce and spell each word.
		4. T asks Ss to writes all the vocabulary learnt on their own notebook.	4. Ss write all the vocabulary on their own notebook.	4. Ss can review vocabulary learnt later on/ after class.
		5.T teaches how to form sentence by sticking the printed sentences on the whiteboard	5. Ss listen to teacher and look at the whiteboard.	5. Get Ss to know how to form sentences.

		" A: What part of body is it?" "B: It is a/an……"		
		6. T divides Ss into 4 groups Group 1 talks with group 2 while group 3 talks with group 4 back and forth.	6. Each group practice the conversation back and forth.	6. Have Ss practice real life conversation.
		7. T asks individual Ss to talk with their pair	7. Ss work in pair.	7. Encourage the whole class Ss to speak.
		8. T asks for volunteers Ss to come in front of the class and have a conversation with their partner.	8. Ss volunteer to show their conversation with their partner.	8. Motivate Ss to show their performance after having a good practice.
60 mins	**Production**	1. T and Ss moves to computer room. T asks Ss to turn on their own computer which is provided one by one and go to website: www.kahoot.it. The game pin will be shown on the overhead screen. Then, Ss sign in their username by using their name. 	1. Ss follow T's instructions.	1. Have students set up their own computer and their username.
		2. Ss' names will be shown and when the whole class is ready, T can start the game. 	2. Ss wait until the whole class has signed in.	2. Get whole class ready
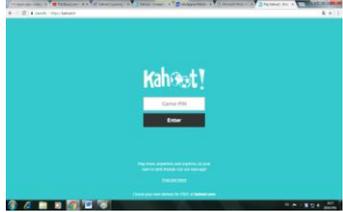
| | | 3. T. starts the game.

4. T. encourages the students to choose the correct answer as fast as possible since the game will be designed to have only 20 seconds to answer each question. The faster they can answer, the higher the point they will get.

5. After all students answer the question; the overhead screen will show how many students answer each question. At the stage, teacher will describe why other three choices are incorrect and why should they students answer the correct choice. T gives Ss some clues to find the correct answer.

 | 3. Ss concentrate on their own computer screen and look at the overhead screen to see the question.

4. Ss try to answer the question as fast as they can.

5. Ss pay attention to T. | 3. Start the game

4. Motivate the Ss to get involve in learning.

5. Provide clues and techniques to answer the question. |

		6. After making sure that Ss understand and get some concepts to answer the question in the future, T shows the score board so that Ss will know who get the top 5 highest scores.	6. Ss listen to T. and clap their hands for the top 5 students who have got the highest score of each question.	6. Give compliments as a reward to boost other students to get correct answer in the next questions.
		7. After finish 10 questions of the quiz, the podium of top 3 students will be shown on the overhead screen.	7. Ss congratulate three of their friends who got the highest score in this quiz.	7. Congratulate Ss who have tried their best on learning and their success on this lesson. Motivate others to try for next class so that they can be the winner.
		8. T asks students to rate their satisfaction of today's quiz, their learning, feeling and recommendation which will be provided by the application of the game after the game finish.	8. Ss rate their satisfaction on their own computer.	8. Get rating and feedback.
		9. T gets the overall performance and feedback from the website which will be provided in Excel file.	9. Ss shut down their	9. Keep record of the students' performances and their improvements.
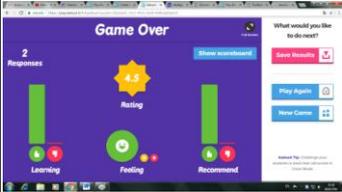
X.   Activities used

Compulsory activities

1) Students' oral interaction during class
2) Quiz on *Kahoot!*

XI.   Assessment

Areas of assessment

1) Students' interaction to teachers
2) Students' conversations with their pair
3) Quiz on *Kahoot!*

Criteria of assessment

1) Students co-operate during the instructional process, having interaction with

   teachers and friends. Pass criteria is not less than 60 percent.
2) Quiz on *Kahoot!*. Pass criteria is not less than 60 percent.
3) Students' oral practice in practice stage.

Appendix C
Lesson Plans
(Control Group)

LESSON PLAN Week 1 (control group)
Time: 120 minutes   Primary 6   Anuban Pabon School
Topic: Myself   Teacher: Tanaporn Kongprab   Date: 9 Nov. 2018

I. **Indicator: (1)** Students will be able to tell the meaning, spell and make new sentence by using the vocabulary learnt correctly.

II. **Terminal Objective:** Students will be able to form sentences by using the vocabulary learnt.

III. **Enabling Objectives:**
        At the end of the lesson, students will be able to:
    d. Tell the meaning of the vocabulary learnt.
    e. Spell the vocabulary learnt correctly.
    f. Write new sentences by using the vocabulary learnt.

IV. **Background knowledge**
    b. Parts of body

V. **Content**
    b. Myself
        1. Ankle   2. Elbow
        3. Handsome   4. Necklace
        5. Wear   6. Beard
        7. Bald   8. Grow
        9. Lady   10. Eyelash

VI. **Task/ Project:**
    b. *Kahoot! offline game*

VII. **Evaluation/ Assessment:**
    Assessor:
    ☑ Teacher   ☐ Students   ☐ Friends   ☐ Parents

Task/ Project	Measurement	Topic	Rubric score
Kahoot! offline game	Correctness	Myself	**Pass** = students answer the quizzes by using the vocabulary learnt correctly. **Need to improve**= students answer the quizzes by using the vocabulary learnt at less than 60% (0-6 out of 10)

VIII. **Learning Materials:**
- ✔ 2 markers
- ✔ Printed pictures and vocabulary
- ✔ Printed sentences
- ✔ PowerPoint slides
- ✔ Projector screen

IX. **Procedure:**

Time/ Stage	Teacher	Students	Purpose
20 mins **Presentation**	1. T greets students and introduces the gestures for dancing and open the song.	1. Ss greet T and listen to T. Ss follow how to do each gesture and dance.	1. Clear Ss' minds and warm them up in order to get both physical and mental ready.
	2. T gradually shows Ss parts of body pictures and asks whether or not they know the vocabulary in English.	2. Ss. listen and try to answer or guess the words in English.	2. Arouse Ss' attention.
	3.T shows the pictures again, this time T. shows them one by one and tells Ss how to pronounce each word (3-4 times/ word). T asks Ss to spell each word.	3. Ss look at the pictures and repeat each word after T. Then, Ss spell the word out loud together.	3. Get Ss to know the words' meanings and their forms.
40 mins **Practice**	1. T shows Ss the pictures one by one and asks them "What part of body is it?"	1. Ss answer T "It is a/an……"	1. Have Ss practice how to answer.
	2. T asks Ss "How to spell this word?"	2. Ss answer T "It spells……."	2. Have Ss practice how to spell.
	3. T writes the all words on the white board and asks Ss to pronounce and spell each word together.	3. Ss repeat each word after teacher and spell together.	3. Have Ss practice to pronounce and spell each word.
	4. T asks Ss to writes all the vocabulary learnt on their own notebook.	4. Ss write all the vocabulary on their own notebook.	4. Ss can review vocabulary learnt later on/ after class.
	5.T teaches how to form sentence by sticking the printed sentences on the whiteboard " A: What part of body is it?" "B: It is a/an……"	5. Ss listen to teacher and look at the whiteboard.	5. Get Ss to know how to form sentences.
	6. T divides Ss into 4 groups	6. Each group practice	6. Have Ss

	Group 1 talks with group 2 while group 3 talks with group 4 back and forth.	the conversation back and forth.	practice real life conversation.
	7. T asks individual Ss to talk with their pair	7. Ss work in pair.	7. Encourage the whole class Ss to speak.
	8. T asks for volunteers Ss to come in front of the class and have a conversation with their partner.	8. Ss volunteer to show their conversation with their partner.	8. Motivate Ss to show their performance after having a good practice.
60 mins **Production**	1. T gradually introduces the rules of the game to Ss. T tells Ss that they are going to play game. It's *Kahoot!* which is normally can be played online with their mobile phone or PCs, but today it is *Kahoot! offline game*. So, Ss don't need to use wireless to log in.	1. Ss listen to T.	1. Introduce the game.
	2. T gives four sticks to each student which are stick with 4 difference shapes and color (same as 4 choices in *Kahoot!* online).	2.Ss get 4 sticks each	2. Give materials to Ss.
	3. T explains Ss that there will be 10 vocabulary quizzes which they have to choose the correct answer by showing the same shape and color as on the projector screen.	3. Ss listen and wait until the whole class is ready.	3. Get the whole class ready
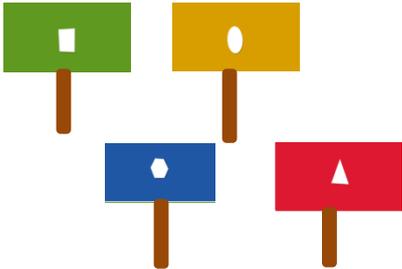
	When the whole class is ready, T can start the game.		
	4. T. starts the game by showing the first PowerPoint slide which have	4. Ss concentrate on their 4 multiple choices sticks and look at the overhead screen to see the question.	4. Start the game
	5. T. encourages the students to choose the correct answer as fast as possible.	5. Ss try to answer the question as fast as they can.	5. Motivate the Ss to get involve in learning.
	6. After all students answer the question, T will keep record the number of students who answer each choice on students' name lists. Then, T will describe which answer is correct and why other three choices are not correct. T gives Ss some clues to find the correct answer.	6. Ss pay attention to T.	6. Provide clues and techniques to answer the question.
	7. After making sure that Ss understand and get some concepts to answer the question in the future, T moves forward to the next question.	7. Ss listen to T. and clap their hands for those who answer correctly.	7. Give compliments as a reward to boost other students to get correct answer in the next questions.
	8. After finish 10 questions of the quiz, T will announce who got the highest score (get correct answers the most).	8. Ss congratulate three of their friends who got the highest score in this quiz.	8. Congratulate Ss who have tried their best on learning and their success on this lesson. Motivate others to try for next class so that they can be the winner.
	9. T concludes the entire learnt lesson today and asks Ss to summarize together before saying good bye.	9.. Ss listen to T and summarize the learnt lesson. Ss say good bye to T.	9. Conclude the lesson.

X.   **Activities used**

Compulsory activities

    1) Students' oral interaction during class

    2) Quiz on *Kahoot!* offline game.

XI.   **Assessment**

Areas of assessment

    1) Students' interaction to teachers

    2) Students' conversations with their pair

    3) Quiz on *Kahoot!* offline game

Criteria of assessment

    1) Students co-operate during the instructional process, having interaction with

      teachers and friends. Pass criteria is not less than 60 percent.

    2) Quiz on *Kahoot!* offline game. Pass criteria is not less than 60 percent.

    3) Students' oral practice in practice stage.

Appendix D
Vocabulary Achievement Tests
(Pre-Test)

ชื่อ.. ชั้น............. เลขที่........

แบบทดสอบก่อนเรียน (Pre-test)

ตอนที่ 1   จงเขียนความหมายของคำศัพท์ต่อไปนี้ (Meaning)

> *ตัวอย่าง*   adventure = การผจญภัย

1. handsome = ...

2. cage = ...

3. laugh = ...

4. favorite = ...

5. narrow = ...

6. difficult = ...

7. village = ...

8. repair = ...

9. weekend = ...

10. enough = ...

ตอนที่ 2 จงจับคู่คำศัพท์กับภาพที่กำหนดให้ (Meaning)

radio	rubbish	wood	fence
ferry	peanut	octopus	lady
feed	dessert	building	

ตัวอย่าง Radio

11._____

12._____

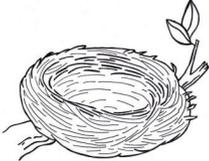13._____

14._____

15._____

16._____

17._____

18._____

19._____

20._____

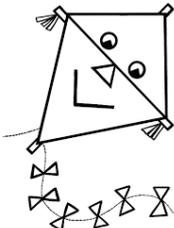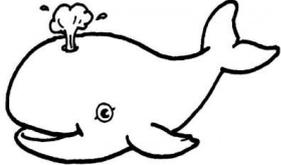**ตอนที่ 3** จงเติมพยัญชนะที่หายไปลงในช่องว่าง (Form)

ตัวอย่าง b e a r d	**21.** __ a __ p	**22.** n __ o __ l __ s
23 c r __ __ o n	**24.** __ __ a d	**25.** n __ __ t
26. g __ o __	**27.** t h __ e __	**28.** j __ __
29. k i __ __	**30.** __ h a __ __	
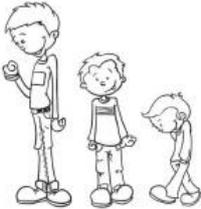
ตอนที่ 4 จงทำเครื่องหมายวงกลม ⬭ ล้อมรอบคำตอบที่ถูกต้อง (Form)

ตัวอย่าง ถือหิ้ว ,แบก ,

a. marry   (b.) carry   c. kerry   d. cherry

31. ข้อศอก

a. eblow   b. elbwo   c. elbow   d.elwob

32. เพดาน

a. ceilling   b. ceiling   c. sibling   d. sibing

33. งานบ้าน

a. homework   b. housework   c. workhome   d. workhouse

34. เคี้ยว

a. chill   b. shill   c. cheel   d. chew

35. ผู้นำ, หัวหน้า

a. readre   b. reader   c. leadre   d. leader

36. ผิด, ไม่จริง

a. false   b. fasle   c. fesla   d. fales

37. ธรรมชาติ

a. nutare   b. nature   c.netaur   d. nateur

38. ยานพาหนะ

a. vehicle   b. vihecle   c. veehich   d. vihicle

39. ม้าน้ำ

a. seehorse   b. horsesee   c. seahorse   d. horsesea

40. กระเทียม

a. garlic   b. carlic   c. karlic   d. kharlic

ตอนที่ 5   จงเติมคำศัพท์ที่กำหนดให้ลงในช่องว่าง (Usage)

diary	guava	blanket	ostrich
poor	listen to	ankle	boil
wash	same	yard	

ตัวอย่าง   A: What do you do in the evening?

B: I write…………diary………………

41. A: What part of body is it?

   B: It is………………………………………

42. A: How many ……………………………………are there on the bed?

   B: There is only one.

43. A: What do you do after you get up?

   B: I ……………………………………… my face.

44. A: How do I cook noodles?

   B: You have to ……………………………………… water first.
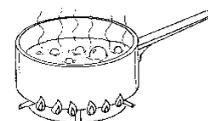
45. There is a large ………………………………. in my school.

46. A: Oh, look at this!
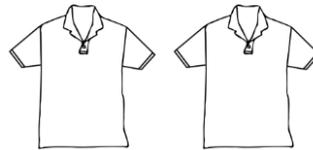
B: Wow, we bought the ……………………………… shirt.

47. They don't have money to buy food.

They are…………………………………

48. A: What do you like to do on holiday?

B: I like to ……………………………… music.

49. A: What animal is it?

B: It is a/an…………………………………
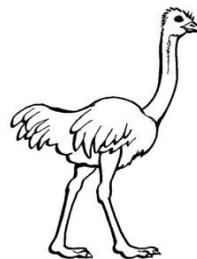
50. A: What do you want to buy?

B: I want to buy a/an ………………………………
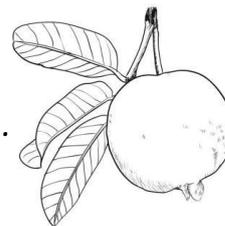
ตอนที่ 6   จงเติมคำศัพท์ที่กำหนดให้ลงในช่องว่าง (Usage)

~~learn~~	quiet	garage	dress up
bake	eyelashes	teach	magazine
ticket	necklace	pocket	

Teacher Jenny

This is my teacher. Her name is Jenny.

ตัวอย่าง I like to ......learn...... with her.

51. She has long ....

52. Teacher Jenny and Teacher Anna......................... English.

53. She likes to .... a cake.

54. She has a beautiful ....

55. She is reading a/an...

56. Her car is in front of the ....

57. She says "Be ...."
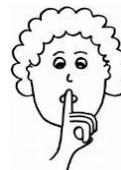
58. Teacher Jenny and her son ....

   in the morning.

59. She buys a/ an.................................. for the bus every day.

60. She puts money in the ....

Appendix E
Language Proficiency Tests
(Post-Test)

ชื่อ.. ชั้น........... เลขที่.........

แบบทดสอบหลังเรียน(Post-test)

ตอนที่ 1   จงเขียนความหมายของคำศัพท์ต่อไปนี้ (Meaning)

> *ตัวอย่าง*   Adventure = การผจญภัย

1. beard   = ...

2. grow   = ...

3. nature   = ...

4. ceiling   = ...

5. wood   = ...

6. building   = ...

7. garage   = ...

8. yard   = ...

9. lady   = ...

10. vehicle   = ...

ตอนที่ 2 จงจับคู่คำศัพท์กับภาพที่กำหนดให้ **(Meaning)**

radio	lamp	dress up	read
ankle	seahorse	garlic	ostrich
necklace	ticket	kite	

ตัวอย่าง __radio__

11._____

12._____

13._____

14._____

15._____

16._____

17._____

18._____

19._____

20._____

ตอนที่ 3 จงเติมพยัญชนะที่หายไปลงในช่องว่าง (Form)

	21.	22.
ตัวอย่าง b **e** a **r** d	d __ s __ e r t	f__ r r__

23.	24.	25.
r __ __ b i s h	__ e __ c e	g __ a v __

26.	27.	28.
p __ c k __ t	f a __ s __	t __ __ c h

29.	30.
e y __ l __ s h e s	b o __ __

ตอนที่ 4 จงทำเครื่องหมายวงกลม◯ ล้อมรอบคำตอบที่ถูกต้อง (Form)

ตัวอย่าง ถือหิ้ว ,แบก ,
a. marry　b. carry　c. kerry　d. cherry

31. ล้าง
a. watch　b. was　c. wash　d. what

32. ยากจน
a. pour　b. poor　c. pool　d. proud

33. โจร
a. thief　b. tip　c. theef　d. theif

34. อบ
a. cake　b. shake　c. make　d. bake

35. ยาก
a. difficult　b. difference　c. difficut　d. different

36. เงียบ
a. quite　b. quiet　c. quit　d. queit

37. ซ่อมแซม
a. reaction　b. reborn　c. repair　d. return

38. แคบ
a. arrow　b. pillow　c. shallow　d. narrow

39. เพียงพอ
a. enaf　b. enough　c. enarf　d. enaph
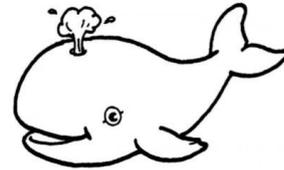
40. นิตยสาร
a. magazine　b. magasine　c. magazin　d. magasin
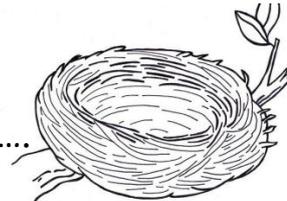
ตอนที่ 5　　　จงเติมคำศัพท์ที่กำหนดให้ลงในช่องว่าง (Usage)

diary	peanut	whale	chew
crayon	elbow	cage	housework
jog	handsome	nest	

ตัวอย่าง　　A: What do you do in the evening?

B: I write…………diary………………

41. A: What animal is it?

B: It is a/an …………………………………

42. A: What is it?

B: It is a/an …………………………………………

43. A: What do you like to do in the morning?

B: I like to ……………………………… in the morning

44. A: How many…………………………… do you have?

B: I have only three.

45. My dog loves to………………… bone.

46. A: What part of body is it?
    B: It is a/an …………………………………
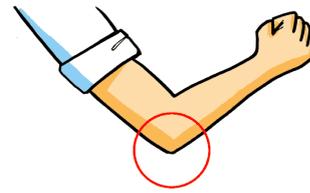
47. A: What do you like to eat?
    B: I like to eat …………………………………
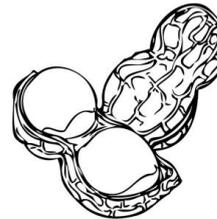
48. A: What do you like to do in your free time?
    B: I like to do …………………………………..

49. My brother is a ………………………………… man.
    Many girls like him.

50. There are two birds in a …………………………………

ตอนที่ ๖   จงเติมคำศัพท์ที่กำหนดให้ลงในช่องว่าง **(Usage)**

learn	village	favorite	weekend
laugh	leader	listen to	blanket
same	feed	noodles	

My father

This is my father. His name is Albert.

ตัวอย่าง He likes to ……………learn…………… everything.

51. He likes to eat …………………………………

52. His …………………………… fruit is apple.

53. He like to …………………… his animals.

54. He lives in the small …………………………………

55. On …………………………………, he doesn't have to go to work.

56. He bought a new …………………………………

57. He likes to …………………………………music.

58. He is a funny man. He always makes me ……………

59. He gave us the…………………… shirt.
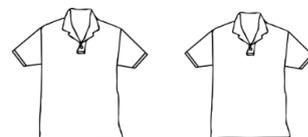
60. He is the ………………………………… of our family.

Appendix F
Language Proficiency Tests
(Delayed Post-Test)
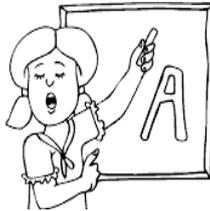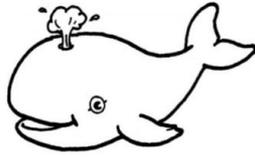
<u>แบบทดสอบความคงทน (Delayed Post-test)</u>

ตอนที่ 1 จงเขียนความหมายของคำศัพท์ต่อไปนี้ (Meaning)

ตัวอย่าง   Adventure = การผจญภัย

1. false   = ………………………………………………………………………………………

2. ceiling   = ………………………………………………………………………………………

3. poor   = ………………………………………………………………………………………

4. lamp   = ………………………………………………………………………………………

5. quiet   = ………………………………………………………………………………………

6. eyelash   = ………………………………………………………………………………………

7. blanket   = ………………………………………………………………………………………

8. bake   = ………………………………………………………………………………………

9. narrow   = ………………………………………………………………………………………

10. leader   = ………………………………………………………………………………………

ตอนที่ 2 จงจับคู่คำศัพท์กับภาพที่กำหนดให้ (Meaning)

radio	pocket	crayons	listen to
elbow	guava	noodles	teach
whale	ceiling	repair	

ตัวอย่าง __radio__

11._____

12._____

13._____

14._____

15._____

16._____

17._____

18._____

19._____

20._____

93

ตอนที่ 3 จงเติมพยัญชนะที่หายไปลงในช่องว่าง (Form)

ตัวอย่าง

b _e_ a _r_ d

21. d r __ s __ up

22. a __ k l __
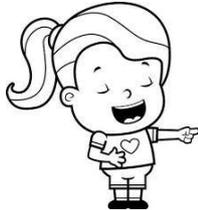
23. l __ __ g h
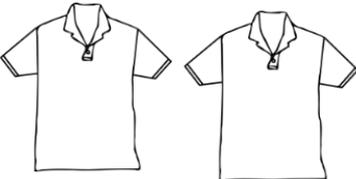
24. __ a __ e
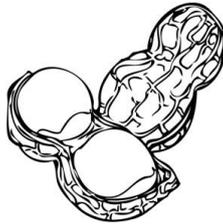
25. p __ a n __ t

26. __ __ g e

27. t i __ k e __

28. s __ a h __ r s e

29. n __ __ k l a c e

30. __ a n d s __ m e

┌─────────┐
│ ตอนที่ 4 │ จงทำเครื่องหมายวงกลม ◯ ล้อมรอบคำตอบที่ถูกต้อง (Form)
└─────────┘

ตัวอย่าง   ถือหิ้ว ,แบก ,

a. marry   b. carry   c. kerry   d. cherry

31. หมู่บ้าน

a. vellage   b. village   c. vallige   d. vilgage

32. รั้วบ้าน

a. fent   b. fance   c. fence   d. fen

33. เรือข้ามฟาก

a. merry   b. kerry   c. berry   d. ferry

34. ที่ชื่นชอบ, ที่โปรดปราน

a. favorite   b. fevorite   c. foverita   d. fevorate

35. สุดสัปดาห์

a. weekdays   b. weekend   c. week   d. weekly

36. ผู้หญิง

a. ready   b. lady   c. lazy   d. leady

37. สนามหญ้า

a. yerd   b. yad   c. yrad   d. yard

38. ไม้

a. wood   b. vood   c. rood   d. mood

39. ขยะ

a. rabbit   b. rabbish   c. rubbish   d. rubber

40. ปลาหมึกยักษ์

a. October   b. octagon   c. octopas   d. octopus

ตอนที่ 5   จงเติมคำศัพท์ที่กำหนดให้ลงในช่องว่าง (Usage)

~~diary~~	thief	nest	dessert
difficult	kite	grow	vehicles
feed	garlic	building	

ตัวอย่าง   A: What do you do in the evening?

B: I write a/an............diary...............

41. A: Who is he?

B: He is a/an ....

42. English test is very...
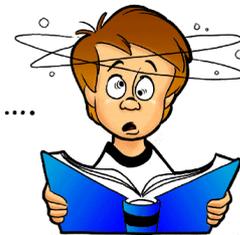
43. A: What do you want to buy?

B: I want to buy some ....

44. A: What do you like to eat?

B: I like to eat ....

45. There are a lot of ………………………

on the road.
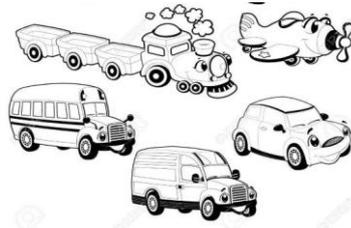
46. A: Is there any birds on the…………………………?

B: No, there is not.
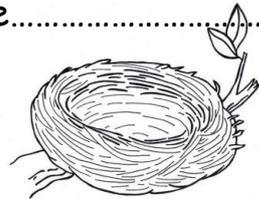
47. A: What will you do after school?

B: I will ……………………………the chickens.

48. A: What do you like to do in your free time?

B: I like flying ………………………………….
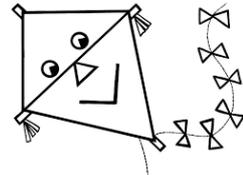
49. Children …………………… up so quickly.
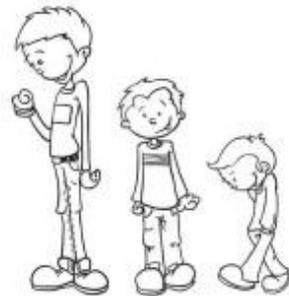
50. My classroom is on the 2nd floor

of that ………………………………………
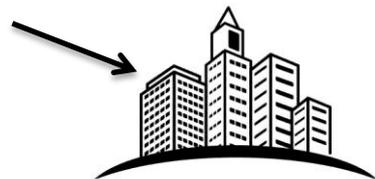
ตอนที่ ๖   จงเติมคำศัพท์ที่กำหนดให้ลงในช่องว่าง (Usage)

learn	read	ostrich	wash
housework	noodles	garage	chew
jog	nature	boil	

About me

I am a student. My name is Jenny.

ตัวอย่าง   I like to ......learn............ everything.

51. In my free time, I like to .... a book.

52. I always help my mother to do ....after school.

53. After I wake up, I.................my face.

54. Every day in the morning, I like to............in the park.

55. Mommy asks me to......................water

56. My favorite animal is a/an ....
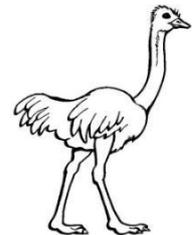
57. I like to eat ....

58. When you eat food, you should..........................it slowly.

59. I love to be with the.........................
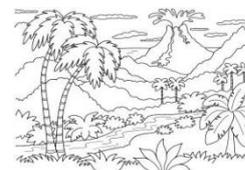
60. Yesterday, I park my car in the ....

Appendix G
Learning motivation questionnaires and the open-ended question

แบบสอบถามแรงจูงใจต่อการเรียน

แบบสอบถามนี้มีจุดมุ่งหมายเพื่อสอบถามความคิดเห็นของนักเรียนเกี่ยวกับการใช้ดิจิตอลเกมในการเรียนรู้คำศัพท์ภาษาอังกฤษ แบบสอบถามฉบับนี้ประกอบด้วย 3 ส่วน 1) ข้อมูลพื้นฐานของผู้ตอบแบบสอบถาม 2) แบบสอบถามแรงจูงใจของผู้เรียน 3) ความคิดเห็นต่อการเรียนคำศัพท์ภาษาอังกฤษแบบใช้เกมดิจิตอล โปรดอ่านและตอบแบบสอบตามคำชี้แจงและให้ข้อมูลที่เป็นจริง ข้อมูลที่ได้รับจากนักเรียนจะเป็นประโยชน์ต่อการปรับปรุงการเรียนการสอนให้ดียิ่งขึ้นและไม่มีผลใดๆต่อคะแนนของนักเรียน

<u>ข้อมูลพื้นฐาน</u>

นักเรียนชั้น ป.6/_____   เพศ: ☐ ชาย   ☐ หญิง

<u>คำชี้แจง</u> ทำเครื่องหมาย ✓ ลงในช่องตัวเลขที่ตรงกับความคิดเห็นของนักเรียนมากที่สุด ระดับการให้คะแนนมีดังต่อไปนี้

😁	🙂	😐	🙁	😭
5	4	3	2	1
เห็นด้วยมากที่สุด	เห็นด้วยมาก	เห็นด้วยปานกลาง	เห็นด้วยน้อย	เห็นด้วยน้อยที่สุด

ความคิดเห็น	😁	🙂	😐	🙁	😭
	5	4	3	2	1
1. นักเรียนสนุกกับการเรียนภาษาอังกฤษ					
2. นักเรียนมีส่วนร่วมในกิจกรรมต่างๆในชั้นเรียนอย่างเต็มที่					
3. กิจกรรมต่างๆในชั้นเรียนไม่ยากเกินไปสำหรับนักเรียน					
4. นักเรียนมีความพึงพอใจกับการเรียนรายวิชานี้					
5. นักเรียนมั่นใจว่านักเรียนสามารถทำได้ดีในการเรียนวิชานี้					
6. เนื้อหาของรายวิชานี้มีประโยชน์ต่อนักเรียน					

7. เนื้อหาของรายวิชานี้สร้างแรงจูงใจต่อการเรียนของ นักเรียน				
8. กิจกรรมของรายวิชานี้สามารถดึงดูดความสนใจของ นักเรียน				
9. รายวิชานี้ช่วยพัฒนาความสามารถทางด้าน ภาษาอังกฤษของนักเรียน				
10. ภาระงานของรายวิชานี้มีความเหมาะสม				

ความคิดเห็นของนักเรียนที่มีต่อการเรียนคำศัพท์ภาษาอังกฤษแบบใช้เกมดิจิทัล (*Kahoot!*)

....

....

....

....

....

....

ขอบคุณสำหรับความร่วมมือในการตอบแบบสอบถาม

Paper 1
(Presented at the Conference)

Effects of Digital Game-Based Learning on Vocabulary Gain and Motivation of Thai Upper Primary School Students

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Abstract

Although digital game-based learning (DGBL) has been proved to be an extremely valuable way of teaching English vocabulary in today's world, it was not an extensively researched area by scholars, especially with young learners in Thailand. To this respect, this study sets out to investigate how the application of a digital game called *Kahoot!* affects the upper primary school students' vocabulary gain and motivation. The study made use of a quasi-experimental research design. Sixty Thai upper primary school students, divided into two groups, participated in the study for twelve weeks. Vocabulary knowledge checklist, 10 lesson plans, pre-and post-tests and learning motivation questionnaires were used as the instruments to collect the data. The data of this study were analyzed through means, standard deviation and an independent sample t-test. The findings revealed that after applying DGBL in English language class, there were significant differences between the two groups with regard to their vocabulary gain at a significant level $p<0.05$. In addition, the learning motivation of experimental students was much higher than that of the control group and there was statistically different at a significant level $p<0.05$. The information obtained from the study could be beneficial to English language

teachers in Thailand as to integrate DGBL in English language class in order to motivate our 21st century students to learn English, to increase their vocabulary as well as other language skills with enjoyment.

Keywords: *Kahoot!*, digital game-based learning, motivation, vocabulary gain, upper Primary school student

1. Background

Learning a new language relies on learning its vocabulary which comprises thousands of words. Although Oxford (1990) affirmed that it is challenging for learners to memorize a huge number of vocabulary, limited vocabulary may negatively affect learners in achieving the four basic skills as it is the smallest component that learners need to know in order to use the target language meaningfully and appropriately (Ngan-ha, 2007; Kurniawan, 2009).

In Thailand, English is considered as a foreign language and it is taught as a core subject since primary schools level. However, the present English instructional methods are unsuccessful in helping learners to become experts in English (Kongkerd, 2013) since most classrooms are teacher-centered (Noytim, 2006). Students are not provided with sufficient opportunities to be exposed to authentic English and thus failed to accomplish the standards (Khamkhien, 2011). As Wiriyachitra (2002) mentioned that the difficulties of Thai English language learners particularly in the primary and secondary schools were because they were being passive learners who were poorly-motivated because of unchallenging English lessons and there were not adequate classrooms equipment and education technology. Moreover, most of Thai teachers seem to emphasis on teaching grammar, reading and writing rather than vocabulary (Sripetpun, 2000). It is probably due to the fact that vocabulary learning is considered as boring because most of Thai learners are taught to remember a large number of unfamiliar vocabulary by rote memorization which can demotivate them in learning English. Although it is helpful to use the correct form of words, students cannot apply vocabulary in the real context. Nation (2001) emphasized that incidental vocabulary learning activities are useful means of vocabulary learning. However, some studies indicated that reading practice or incidental learning was not sufficient to acquire vocabulary (Laufer, 1997; Laufer & Hulstijn, 2001) since only few words through reading and guessing were presented several times (Day, Omura & Hiramatsu, 1991). At the beginning level, intentional vocabulary learning is necessary for second language learners in order to build up their vocabulary store (Chedo, 2002) and due to its

focused repetition or memorization strategies, it can haste learners' process of lexical growth which can be accomplished by themselves in a short time (Hung, 2015). Therefore, if learners learn vocabulary knowledge intentionally through various exciting activities or different types of exercises, they will be able to gain more vocabulary.

Motivation is considered as an important factor in acquiring a new language for the reason that it can ascertain how learners are individually and actively engaged to the lesson (Oxford & Shearin, 1994). According to Gardner (1985) motivation is the primary desire of an individual's work to do something and a fulfillment achieved from the activities. It is often distinguished between two varieties: extrinsic and intrinsic motivation. The former is determined by the external rewards such as prizes, candy, grade or scores while the latter is done for its own sake without the external rewards (Broussard, 2012). Through the application of digital game-based learning, not only it extrinsically motivate students to compete and earn the higher points with feedback on their achievement, but also it can intrinsically motivate them because playing inherently provoke their interest and enjoyable and they can feel that it is worth doing so.

In teaching vocabulary to young learners, teachers have to prepare the lessons to meet their needs. Game-based learning, defined as an environment where game content and game play enhance knowledge and skills acquisition (Prensky, 2001), is one of an effective teaching approach. As play is a crucial part of a child's growth and it benefits to children's cognitive and psychological development (Farber, 2015; Gee, 2007). Children enjoy playing since it is fun and motivating. Once their curiosity is involved by the activity or game, they are capable to pay long period of attention. With these advantages in a variety of settings, instructors have appreciated and applied games as a teaching method for both children and adults (Hill et al, 2003; Kim, 2011) in order to encourage learners to actively participate in learning activities (Baid & Lambert, 2010)

In the 21st century, technology is increasingly developed all over the world. Teaching the "digital natives" who have exposed to information technology from

their birth (Buckley et al., 2017) with the ordinary learning environments or with the traditional method might be inefficient and can bring boredom into classroom because it cannot enhance their enthusiasm to get involved in learning. Rushkoff (1996) pointed out that young learners seemed to be more future oriented, more appropriate and aware of the use of technology than adults. Schools, therefore, have to prepare their learners to gain new skills corresponding to the new curriculum and to keep them up to date with continually changing world (Carroll, 2007; Fisher & Frey, 2008). The application of Information Technology (IT) in education has been more and more focused. According to Boyle and Nicol (2003), with more and more digital generation in the last decade, the use of interactive technologies in classroom has become more admired since it can response their needs.

Digital games can arouse learning. According to Kapp (2012) students can take in the element of conflict, attain sense of achievement or loss, and get immediate feedback. They can also obtain a sense of competition-driven system (Burke, 2014) which will motivate them to learn and to pay more attention to the lesson so that they can be the winner of the game. By learning through this activity, students are more likely to become active learners and pursuit knowledge by themselves. In addition, many re searchers indicated that digital games might be advantage, especially for vocabulary acquisition (Cheung& Harrison, 1992; Miller & Hegelheimer, 2006; Ranalli, 2008).

Recently in Thailand, many digital games are used in higher educational field since many classroom devices are available for teachers to create the lesson. Not only can it create interesting games which suit with learners' lifestyle (Wichadee & Pattanapichet, 2018), but also it plays such a crucial role in facilitating the students' learning, in rising students' motivation and in helping teachers to make the lessons more appealing and to increase students' comprehension. Digital game-based learning (DGBL) offers students with interactive and enjoyable learning opportunities (Prensky, 2001; Reinders, 2012).

In relation to digital game-based learning, *Kahoot!* is one of those well-known educational digital games which can be accessed with no cost via smartphones

and computers. This game-based learning platform can be applied with every subject and many languages. In English learning, it is largely used because it can make the learning more pleasant through competition, also it can ease and enhance students learning. Wang (2015) applied *Kahoot!* in the classroom teaching and the results revealed that the students who did *Kahoot!* learned more than those who did paper quiz. Thomas (2014) also claimed that *Kahoot!* helps motivate and involve learners because it can turn tired, colorless class into lively and highly exciting class.

As discussed above, in this digital era, traditional teaching approach is far-reaching shifted to incorporate with digital game-based learning. *Kahoot!* is the digital game in the 21st century. The technology in education has been proved to be a practical utensil to stimulate learners, improve their eagerness, rise and test their understanding (Kim, 2015; Simoes, Diaz Redondo & Fernandez vilas, 2013). In Thailand, however, few research projects have focused on primary school students whose characteristics are more suitable for this digital era teaching approach. This current study, therefore, aims to determine how the application of digital game affects upper primary school students' vocabulary gain and to investigate students' learning motivation after applying digital game in English language class.

2. Research Questions

1. To what extent does digital game-based learning affect students' vocabulary gain?
2. What are differences between learning motivation of students in the experimental group and students in the control group?

3. Research Methodology

3.1 Participants

Altogether 71 students from two classes of Primary 6 (Grade 6), aged between 11 and 12, at Anuban Pabon School in Phatthalung province participated in the study. They were accustomed to playing computer games, but

none of them had previously learned English through this medium. Since some participants were absent during the instruction and test sessions, the data of remaining 60 participants were analyzed in this study. A quasi-experimental design was adopted due to the school's situation and a few educational constraints; two classes of students were sampled based on purposive sampling from the intact groups. They were assigned to be in the control group and the experimental group within their own class in order to avoid disruption of the school policy since the study spanned across almost one full semester. One class comprising 30 students was selected to be the experimental group while another class (30 students) was chosen to be the control group.

3.2 Data collection method

This study employed a quasi-experimental research design. It intended to investigate how the application of digital game called *Kahoot!* affected the upper primary school students' vocabulary gain and their learning motivation.

Both groups of participants were involved in the same research procedure which lasted 12 weeks. One week before the treatment of digital game-based learning *Kahoot!* started, the pre-test was administered to all participants. According to the main objective of this study, which set out to investigate the effects of digital game-based learning on students' motivation and their vocabulary gain, both groups of participants had to get the treatment 2 hours a week for 10 weeks. Through intentional vocabulary teaching method taught by the researcher, each week, ten vocabulary quizzes were given to the students in the production stage which was in the second hour of lesson. However, the experimental group had the opportunity to review the learnt vocabulary with the quizzes of digital game called *"Kahoot! online"* at the computer room with their partners since there were not enough computers for every single students. The faster they could complete the quiz, the higher the scores they would get. They were able to see the scores they earned after each quiz which was shown the projector screen and at the end, the winner of the game was announced. On the other hand, the control group reviewed the learnt

lessons by non-digital game which had the same nature and purpose as *"Kahoot! online!"* game called *"Kahoot! offline"* game with the material to answer the quizzes provided by the researcher in their classroom. They only knew the scores they gained but the winner's name was not announced due to the time constraint. After the course, in the twelfth week, both groups did the post-test and learners' motivation questionnaire.

3.3 Research instruments

This study employed four research instruments to evaluate the effects of DGBL on vocabulary gain and motivation. The first instrument was vocabulary knowledge checklist. The words were chosen based on English O-NET (Ordinary National Educational Test) from the past few years, which was supervised by the National Institute of Educational Testing Service (Public Organization) or NIETS in 2017. In order to determine the exact unknown number of vocabulary of the sampled students, the checklist consisted of 200 words which were alphabetically randomized by the researcher. The students from both experimental and control groups were asked whether they knew, not sure or did not know these words. Furthermore, to ensure that the participants did not know the selected words, they had to write the meaning of the words they knew. The familiar words were excluded. A total number of words taught in this study were 100 words (10 words for each lesson) and they were grouped for each theme in each lesson.

The second instrument was lesson plan. The same contents, objectives and teaching stages were used in both groups. In the production stage, however, digital game- *Kahoot! online* was used by the students in the experimental group while non-digital game called *Kahoot! offline* was used in the control group. Before using the lesson plan in the real treatment, the same three experts were asked to approve, review and modify the lesson plan for its validity. Moreover, 30 students who were not the participants of this study but they were in the same level (Primary 6) from the same school, were invited to join the class to validate the lesson plan.

The third tools were pre-and post-tests. Students of both groups were required to do the tests which were randomly selected from the learnt vocabulary during the treatment. To examine the students' vocabulary gain, the tests measured their knowledge, comprehension and application. According to Nation (2005), for the deliberate teaching and learning of vocabulary, it is important to consider the learning burden which are meaning, form and use. The pre-test of 60 items therefore were constructed as follow: 20 items for meaning (word and meaning/picture matching), 20 items for form (spelling and filling missing alphabet in the gap) and 20 items for use (sentence completion). In order to avoid the test recognition effect, all 60 items of were rearrange into reverse order. The validity of the test items from both tests were approved, reviewed and modified by three experts from Prince of Songkla University. Then, 30 students who were not the participants of this study but they were in the same level (Primary 6) from the same school, were invited to join the pilot session.

The last instrument was the learning motivation questionnaires which were distributed to both experimental and control groups in the twelfth week after the post-test. The questionnaire consisting of 10 items which were modified from Keller's Course Interest Survey (Keller, 1987) and translated into Thai (see appendix), were used to examine learners' motivation. Each questionnaire statement was measured by using five-point Likert scales from "strongly agree" to "strongly disagree". The validity of the questionnaire was approved by three experts and it was piloted with the same group of the students in the vocabulary pilot test in order to measure the readability. The coefficient alpha technique was used to measure its reliability. Being at .87, hence, the questionnaire was found to be reliable.

3.4 Data analysis

For the vocabulary aspect, the data collected from pre-test and post-test in both groups were analyzed by using the Statistical Package for the Social Science (SPSS). The internal consistency of the participants' pre-test scores was first assured for the homogeneity and normality. Since the participants were not

randomly selected to receive the treatment, their prior knowledge could be differences among the classes. By means of descriptive statistics, the pre-tests of both groups were analyzed through an independent samples t-test which revealed no significant difference. Therefore, it can be assumed that before starting the treatment, two groups of participants were comparable in their learning performance and the result of post-test carried a significant difference. For the motivational aspect, the questionnaire was distributed to both groups at the end of the treatment. The mean scores of learning motivation were compared and an independent sample t-test was used to analyze if there was any significant difference of motivation between the two groups. The result yielded statistical significance.

4. Findings

4.1 Effects of Digital Game-Based Learning on students' vocabulary gain

Table 1: Descriptive statistics of pre-test and post-test

items	Control		Experimental		t		df	sig
	Mean	SD	Mean	SD				
Pre-test	7.60	3.47	9.93	5.74	-1.907		58	.06
Post-test	17.47	13.65	25.07	14.53	-2.088	*	58	.04

Prior to the use of digital game-based learning technique, the mean score of the control group was 7.60 with standard deviation of 3.47 and that of the experimental group was 9.93 with a higher standard deviation of 5.74. An independent sample t-test was employed to examine if there was any statistical significance. The finding suggested that there was no significant difference ($p >$ 0.05) between the two groups. Consequently, it is evident that both groups of students had equivalent prior knowledge before learning, indicating that the two groups were comparable in their learning performance.

Nevertheless, after receiving the treatment, the results showed that the experimental group (Mean = 25.07) significantly outperformed the control group (Mean= 17.47) on the post-test. According to the results ($p <$ 0.05), there was a

significant difference between the two groups; the students who used digital game-based learning, *Kahoot!* online, had higher learning achievement than those who used non-digital game-based learning, *Kahoot!* offline.

4.2 Effects of Digital Game-Based Learning on students' motivation

Table 2: Descriptive statistics of motivational questionnaire

Motivation	Control		Experimental		t	df	sig
	Mean	SD	Mean	SD			
1. I enjoy studying English.	4.50	.57	4.83	.46	-2.484*	55	.02
2. I actively participate in the activities of this course.	4.20	.81	4.50	.63	-1.608	58	.11
3. I think the given tasks are not too difficult.	4.10	.71	4.57	.73	-2.510**	58	.01
4. The amount of work in the course is suitable.	4.63	.56	4.57	.63	.436	58	.66
5. I feel confident that I will do well in this course.	3.80	.71	4.30	.84	-2.489*	58	.02
6. The content of this course is useful to me.	4.67	.48	4.93	.25	-2.693**	44	.01
7. The content in this course motivates me to learn.	4.30	.88	4.70	.47	-2.206*	44	.03
8. The activities in this course capture my attention.	4.47	.57	4.83	.38	-2.929**	50	.01
9. This course can develop my language proficiency.	4.20	.76	4.70	.53	-2.944**	52	.00
10. I am very satisfied with the course.	4.70	.47	4.77	.77	-.404	58	.69
Average	4.36	.37	4.67	.30	-3.587**	58	.00

To investigate students' learning motivation, the questionnaire was administered to both groups at the end of the course. Based on the findings, the average score of motivation of students in the experimental group (Mean= 4.67) was much higher than that of the control group (Mean = 4.36). It indicated that greater motivation was found in the experimental group for almost every item

on the questionnaire. The highest mean score of the experimental group was item number 6 ('The content of this course is useful to me', Mean = 4.93) while their counterparts selected item number 10 ('I am very satisfied with the course', Mean= 4.70). However, the analysis of mean scores of the questionnaire by comparing an independent sample t-test revealed a statistical difference in the motivation between the two groups ($p < .01$) as shown in Table 2.

Discussions

Many researchers (Lee& Hammer, 2011; Liu & Chu, 2010; Muntean, 2011; Poondej &Lerdpornkulrat, 2016) noted that using DGBL can lead learners to better learning and enhance their learning motivation. The major objective of the present study was to investigate the effects of DGBL on vocabulary gain and motivation of Thai upper primary school students. Based on the findings, it was found that the experimental students obtained higher scores than that of the control group in the post-test. The result was consistent with the study reported by Aghlara and Tamijid (2011). According to their study, digital game was effective in promoting Iranian children's vocabulary learning. They also indicated that the learning process of DGBL was pleasing and by appealing children in such game, the stresses in the learning process were reduced. Similarly, previous study (see Wichadee & Pattanapichet, 2018) has shown that digital game not only increased Thai undergraduate students' motivation, but also enhanced their learning outcomes. In their study, it was found that after the treatment of DGBL called "*Kahoot!*" for 14 weeks, there was a significant difference in post-test scores between the two groups of students and the motivation of the students in experimental group was much higher than that of the control group. In this regard, the present study lends further support to such findings with Thai upper primary school students. While the duration of the treatment in this study became smaller (12weeks), both groups of the participants were further compared their vocabulary learning performance by using the digital game called "*Kahoot! online*" and "*Kahoot! offline*" which shared the same nature and purposes of the game. However, the result of this study was not surprising in their learning achievement and their learning motivation since

they revealed statistical differences among the two groups. Several reasons should be brought to discuss as follows:

The first possible reason would be that the control group students who have reviewed the lessons by using "*Kahoot! offline*" did not get involved in the lesson as much as those students who were in experimental group. This is probably due to the fact that every student in the experimental group knew how much scores they earned right after each question which depended on the rapidity of answering, while the control group only knew whether or not their answers were correct but the speed of responding was not taken into account in order to get the score. Moreover, if their answers were wrong, other students could notice their failure publicly which could demotivate them to get the correct answer. The experimental students, in contrast, did not perceive the negative attitude toward the game since nobody could see their answer were correct or wrong because it only appeared on their personal screen. Therefore, control group students were not get much engaged in learning when compared to their counterparts did. Additionally, the atmosphere in this class was more competitive because the students wanted to see their names on the scoreboard if they got the top five highest scores at the end of each question and at the end of the game, the top three highest score students' names would be leveled. According to Zichermann and Cunningham (2011), levels serve as a marker for players to know where they stand in a gaming experience over time. Therefore, it can be implied that the application of "*Kahoot! online*" enhanced learners to become more active and get engaged in the learning process.

The second possible reason for the higher vocabulary gain of the experimental group would probably due to their higher motivation in learning. Based on the results, greater motivation was found in the experimental group for almost every item on the questionnaire. The finding is also consistent with Lee and Hammer (2011). In their study, digital games helped promote and stimulate learning. They also claimed that digital games have impacts on mental and social condition. Hence, this may well be true that digital game can draw students' attention and can boost their interest. The more they pay attention to the lesson,

the more they are likely to increase their motivation in learning. Similar result was also found in the study of Alsharafat et al. (2017) who asserted electronic instructional game could raise young learners' motivation and they perceived positive interaction while learning vocabulary in English. Although intentional vocabulary teaching seems to bring boredom to Thai EFL class since the students are expected to remember a large size of vocabulary, surprisingly, in this current study, students in the experimental group had positive perception toward this teaching method. After using digital game, students were likely to see the importance of vocabulary learning which is considered as challenging task for most of EFL learners. Not only the higher motivation in learning that digital game could provide to young learners who are at the beginning stage of English learning, but also their willingness to learn other four language skill might increase since they have felt pleasure in the learning process.

Last but not least, another reason superiority of learning method using DGBL might due to the exciting features (e.g. screen, music, and scoreboard) of the application *Kahoot! online* which are more suitable for young learners who are considered as "digital natives". Although this study has put the effort in designing another non- digial game which was comparable in the nature and purposes of the game, the results remain unchanged as compare to previous study (see Llerena Medina and Rodríguez Hurtado, 2017). They affirmed that students were excited to use their mobile phone or tablets in the classroom which provided them more pleasant classroom atmosphere because they could rise learners' energy and enhance more enjoyable. Similarly, Yip and Kwan (2006) indicated that if games were fun, students' interest was more likely to be aroused. Such finding is also in accordance with Alsharafat et al. (2017) who admitted that through motion, colors, stimulation and images of electronic educational game could facilitate children' vocabulary learning and increased interaction. Therefore, although the researcher has tried to imitate the application of *Kahoot!* to make an alternative way in designing teaching material for some schools that are not provided with enough technology equipment in

their classroom as *Kahoot! offline*, it could not capture students' motivation and improve vocabulary learning as much as the online version did.

Consequently, this study has proved that in this digital era, DGBL seem to be favored among young EFL learners in Thai context since it offers them with more amusing learning environment and they can make use of DGBL in improving their vocabulary skill and increase their motivation in language learning. Technology has immersed in everyday life of the new generation, as such, teachers should prepare the teaching materials that could meet their needs and correspond to today's world.

Recommendations

The present study has valuable contributions to DGBL research; however there are several questions to be addressed. First, since there are only few research projects that have investigated the effects of DGBL on young learners in Thailand, future research should explore with the same context as well as with other level of EFL learners. Second, future study may be conducted to compare this application of digital game and non-digital game with extensive data which is limited in this study. It is important to investigate the perception of the learners toward the application of both games with qualitative data in order to support the quantitative results. Third, to study effects of DGBL on learners' vocabulary retention is necessary for further research.

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Paper 2

(Submitted to the journal)

English Instruction Using Digital Game-Based Learning on Vocabulary Retention and Perceptions of Young Thai Learners*

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Abstract

This study was aimed to investigate the effects of using digital game-based learning on young Thai learners' vocabulary retention and to explore their perceptions toward the use of digital games in an English language classroom. The study employed a quasi-experimental research design. Within fifteen weeks, sixty students from two classes in Primary 6 at Anuban Pabon School in Phatthalung Province, participated in this study and were assigned to be in the experimental group and the control group.

Both quantitative and qualitative data were collected from the vocabulary achievement tests and the open-ended questions asking the students' perceptions toward the digital game. Through the statistics for analyzing the quantitative data, the results indicated that the students in the experimental group have increased more vocabulary ($\overline{x}$ = 25.07) than the students in the control group ($\overline{x}$ = 17.47) in the post-test. However, there was no statistical difference ($p > 0.05$) among the two groups in the vocabulary retention. For the qualitative data, both groups revealed five positive perceptions toward the treatments including: enjoyment learning atmosphere, effective method for vocabulary learning and language skills, socialization, learning

motivation and technology skills which were found only in the experimental group. However, the experimental students had more impression since they could learn the technology skills which are beneficial for this digital era.

Keywords: **Digital Game-Based Learning, vocabulary retention, students' perceptions toward the Digital Game-Based Learning, Young Thai learners**

Introduction

Language serves as the ability to communicate among people. Within each language vocabulary plays a crucial role in almost every area of communication. According to Nation (2001), "vocabulary learning is not a goal in itself; it is done to help learners listen, speak, read or write more effectively" (p. 362). Therefore, one of the common problems in second language learning is vocabulary because insufficient vocabulary and sentence structure are reflected as the main problems in learning language (Gunning, 2002; cited in Sripramong 2004). In Thailand where English language is taught as a fundamental subject from the primary school level, most of young Thai learners are not likely to be able to communicate in English appropriately. Two possible reasons might be due to the fact that Thai learners, even those at the university level, do not have enough vocabulary in applying with other skills (Sawangwaroros, 1984). Another reason is probably because English language instructional method in Thailand is not designed to get Thai learners ready for the continually changing world (Wiriyachitra, 2002). Moreover, according to Rochanasak et al. (2019), stated that Thailand is moving toward digitization since the new policy of Thailand 4.0 (Fourth industrial) has been carried out. Therefore, teaching Thai learners nowadays, teachers should prepare their students starting from the beginning level with the sufficient vocabulary store and new teaching techniques that could motivate learners to increase and to retain the large amount of vocabulary with enjoyment. In addition, young learners should be encouraged to learn through the means of digital technology in the classroom. This way they can get ready to apply 21st century skills in their real lives in responding to this digital era.

Since game is a nature part of children's lives, comparing to adults, they seem to enjoy playing more because they have a lot of energy and power to play and they do not have to work (Aghlara & Tamjid, 2011). Many psychologists assured that it benefits children's psychological development. Alsharafat et al. (2017), therefore, suggested that children need to learn by playing as it will ensure continuing education and lifelong learning. Researchers indicated that games can increase learners' problem solving skills and rise players' self-esteem and self-confidence (Gee, 2003; Griffiths, 2002; Haugland, 2000; Liu et al., 2011).

In the 21st century, new technological innovation is continuously increasing. The world is considered to be "a digital world" where people even in the remote area, can use computers and have access to the internet to surf for the information they want (Aghlara and Tamjid, 2011). Educational field is no exception. Digital games have gained more interests from people of all ages than the traditional games because they can easily access the games through their computers, tablets and mobile phones which are more comfortable in their daily lives. Prensky (2001), therefore, defined the term "digital game-based learning (DGBL)" as a tool to serve an educational purpose with the application of the entertaining impact of digital games. He also indicated that all DGBL is based on two key assumptions. The first one is that learners nowadays have changed radically as a result of the digital technology that they have grown up with. Another assumption is that computer games enhance motivation of today's young people to learn.

Digital games which are employed, particularly in vocabulary and grammar teaching, can vary in the materials and activities in class because they have been accepted as a hidden approach that offers students with interactive and enjoyable learning opportunities (Prensky, 2001). Yip and Kwan (2006) have conducted their study about using online vocabulary games as a tool for teaching and learning English vocabulary with undergraduate students in Hong Kong. Their results revealed that online games could increase the vocabulary assessment scores of students in experimental group. In addition, they favored more digital educational games than traditional lessons as they can gain a sense of autonomy and conduct their own learning.

To master a language, it is important for learners to acquire the vocabulary because it is a crucial component. As Hunt and Belglar (2005) believed that "the heart of language comprehension and use is the lexicon" (p.24). Since having inadequate vocabulary, speakers cannot express themselves and understand others. Consequently, it is possible that they will have failures to communicate meaningfully. According to Schmitt (2008), there are two types of vocabulary learning: intentional and incidental vocabulary learning. The former is to learn vocabulary explicitly while the latter is learning vocabulary as the consequence of other activities, namely reading or listening. Many researchers indicated that incidental learning from context can provide a fruitful outcome of vocabulary learning (Day et al., 1991; Jenkins et al., 1984). However, some scholars revealed that acquiring vocabulary through reading practice or incidental learning were not adequate (Laufer, 1997; Laufer & Hulstijn, 2001) because most of the vocabulary items are low frequency words which are suggested for advanced learners (O'Dell, 1997). Hence, it can be assumed that incidental vocabulary learning might be an effective method for excellent learners, while intentional method is fundamental for novices because they have such narrow skill in reading (Hunt and Beglar, 1998). Furthermore, comparing to incidental learning, the retention rates of intentional vocabulary learning are normally higher (Hulstijn, 2003). Consequently, if learners learn vocabulary knowledge intentionally through various interesting activities or different types of exercises activating motivation, they will be able to gain and retain more vocabulary.

While each approach has its advantages and disadvantages, intentional vocabulary learning is of a particular interest to this study. As Nation (2001) advised that teaching vocabulary for beginners should be aimed at enlarging their amount of the vocabulary through explicit vocabulary teaching. In addition, exercises are also one means of intentional vocabulary learning and it has a beneficial effect on vocabulary learning. This is because multiple exposures in various contexts can facilitate deeper word knowledge of learners than a single exposure (Bolger et al., 2008). Therefore, to enlarge the vocabulary store of young Thai learners who are at the beginning level of second language learning, it is necessary to adapt intentional vocabulary teaching approach together with vocabulary exercise that students can explore the real use and can motivate them to engage in learning.

In Turkey, Turgut and Irgin (2009) conducted a study with young language learners via the computer games at the internet cafés with the purpose to contribute to the social context where knowledge can be acquired outside of the school. In examining the effects of vocabulary instruction via online games, the results revealed that playing online games help promote learners not only engagement and entertainment, but also their language learning performance and particularly vocabulary skills because they can develop some strategies such as guessing words from a context, looking up for the meaning by online dictionary and asking people sitting near them. Accordingly, if young English as Foreign Language (EFL) learners who have such limited vocabulary and perceive it as a boring and challenging task are provided with DGBL classroom, they will definitely be able to increase their vocabulary.

In acquiring and retaining a new language, motivation is one of the essential factors since it can determine the engagement of learners to the lesson (Oxford & Shearin, 1994). Learners are able to recall the information and allocate it to other settings if they are engaged and interested in meaningful tasks (Kearsley & Shneiderman, 1998). Scholars have characterized engagement with various scopes including challenge, sensory appeal, attention, feedback, curiosity and interest (O'Brien & Toms, 2008; Trevino & Webster, 1992). Also, motivation in the context of language retention was described as the learner's perception toward the goal of language learning (Crookes & Schmidt, 1991).

Many studies indicated that digital games enhanced students' learning motivation and their enthusiasm to get involved in learning (Lee& Hammer, 2011; Liu & Chu, 2010; Muntean, 2011; Poondej & Lerdpornkulrat, 2016; Shahriarpour & Kafi, 2015). Since classroom experience is vital for the progress of young learners in learning a new language, the task used in class should be able to gain their attention which is quite short and their participation. According to Suleman (2018), students' enthusiastic and motivation were influenced by their positive or negative perceptions of learning. Therefore, teachers should create the activities to bridge them to the state that they wish to fulfill their need or motivation. With exciting features, digital games have brought into EFL classroom, students can get involved in the procedure of learning and initiate their goals to achieve during the class; they are more likely to put in their effort so that their learning performance becomes more satisfying. It is worth to further this study in Thai context where learners are poorly-motivated in learning English (Wiriyachitra, 2002).

Relating to DGBL, *Kahoot!* is known as a popular digital game-based which was first launched in 2013. It is an online educational brand recognized globally with more than 30 million users since it makes a fun learning environment for learners of all ages, in any subjects or topics and is freely available (Byrne, 2013; Cross, 2014; Plump & LaRosa, 2017, Thomas, 2014). Instructors can create DGBL with multiple-choice quizzes, discussions and surveys before the class. With the simple layout, colorful platform, music, pictures adding by instructor and moving answers, it can gain students' attention and get involved in learning. This can be supported by Schmidt (2005) who pointed out that sensual stimuli is valuable to

learning for all learners, or even learners with learning difficulties. Furthermore, students try to get the right answers so that their names can be seen on the scoreboard at the end of each question and the game. With this leveling and ranking system, students can gain a sense of failure, trial, error and success throughout the game. Nevertheless, failure scores of the respondents are not displayed on the centered screen so that it does not demotivate learners. In contrast, it allows them to develop and to maintain a positive relationship with their failures. According to Zichermann and Cunningham (2011), leveling system can be compared as the progress stairs that assure players to work together with challenges and other players at the level equivalent with their own capability. This is supported by Dominguez and others (2013) who claimed that the ranking system can motivate learners since their efforts can be seen in public and immediately recognized. Therefore, *Kahoot!* has been accepted as an effective tool in promoting learners' motivation and their learning performance of all levels since it first launched.

In Llerena Medina and Rodríguez Hurtado (2017) study, they applied *Kahoot!* as a tool to teach English vocabulary to undergraduate students from different faculties in the Republic of Ecuador. A quasi-experimental study was performed with two groups of students for 10 weeks. At the end of each unit, the platform *Kahoot!* with a ten-question game was conducted by the teacher of the course which was implemented in order to review learned vocabulary. The results revealed that it improved learners' engagement and interaction. Also, the application of *Kahoot!* in language classroom increased motivation and improved students' acquisition of vocabulary.

As we have seen that despite the effectiveness of DGBL which was proved to be beneficial in teaching English in today's world, its effects on young learners' vocabulary retention and perceptions in EFL context have been under-researched, especially in Thailand. Research in DGBL is, thus, significant as it has great impact to motivate students to learn English, and there has been only little research about digital game-based language learning conducted with young learners whose characteristics should be involved in this way of learning. Consequently, it is recommended that more studies should be done in this context as well.

Purpose of the study
1. To explore how the application of digital game and traditional game affect young Thai learners' vocabulary retention.
2. To investigate students' perceptions toward the use of DGBL.

Research questions
1. Is digital game-based learning more effective than traditional game in vocabulary retention?

2. What are students' perceptions towards application of digital game and traditional game in vocabulary learning?

Methodology

Research Design

This study employed a quasi-experimental research design, consisting of the quantitative and qualitative method. It aimed at investigating how the application of digital game called *Kahoot!* affects the upper primary school students' vocabulary retention and their perceptions toward the application of digital game.

Sample

In this study, a quasi-experimental approach was used. Based on purposive sampling, sixty participants, aged between 12-11 years old, were asked to join in this study. They were Primary 6 school students from two classes at Anuban Pabon School in Phatthalung Province. One class was arbitrarily selected to be in the experimental group and the other class was chosen to be in the control group (taught by the same teacher). They had not experienced in any DGBL class before.

Research instrument
Vocabulary specification

Prior to the data collection procedure, the vocabulary specification consisted of 200 words was selected based on English O-NET (Ordinary National Educational Test) from the past few years and the list of vocabulary was given to the sampled students in order to select the unfamiliar number of target words. Both experimental and control participants were asked to check the vocabulary specification whether they recognized, not certain or did not recognize these words. To warrant that the sampled students did not recognize the selection of words, they were further asked to translate the words they knew in Thai. The acquainted words were omitted. Therefore, only 100 words (10 words for each week) were chosen to be taught in each lesson. Then, the validity of vocabulary specification was approved of, reviewed and modified by three experts from the Faculty of Liberal Arts, Prince of Songkla University before allocating the vocabulary specification to sampled students.

Lesson plans and teaching stages

The students in both groups learned 10 words from the vocabulary specification for each lesson for 10 weeks (2 hours a week). The same vocabulary, objectives and teaching steps were used in both groups. In the production stage, however, the digital game- *Kahoot!* was used with the students in the

experimental group while the traditional game was used in the control group. Before using the lesson plans in the treatment, the same three experts were asked to approve, review and modify the lesson plans for their validity. It is necessary to validate the lesson plans and check the suitable time, activities, place and equipment used in the class so that the researcher could adjust and modify the lesson plans to be more complete and appealing. Moreover, the lesson plans were piloted to another class of the students who were not the participants of this study but were from the same level and shared the same characteristics.

Vocabulary achievement tests (Pre-test and post-test)

In order to investigate the students' performance on vocabulary learning ability, the vocabulary achievement tests were used to find out the effects of digital game. Both groups of students were required to do the tests which 60 vocabulary words were randomly selected from the learnt vocabulary during the treatment. The vocabulary tests of 120 items were designed to be 2 different versions but sharing the identical construction (60 items for pre-test and 60 items for post-test). In other words, these tests were probed to have the same construction from the test specification by using the parallel forms in order to have the reliability tests. The tests were used to determine the students' knowledge, comprehension and application of vocabulary learning in this study. Therefore, in order to test the students' vocabulary achievement, it is necessary to consider the learning burden which are meaning, form and use (Nation, .(2005Consequently, the tests were designed as follow: 40 items for meaning, 40 items for form, and 40 items for use. The researcher had created the Item-Objective Congruence form for the experts in order to ascertain that each item was in line with the objective. Therefore, the tests with the Item- Objective Congruence (IOC) forms of 120 items were given to three experts from Prince of Songkla University in order to approve, review and modify the tests. After that the IOC forms were proved to have scores higher than 0.5, which mean they were congruent and ready for piloting the test to 30 students who had joined in the lesson plans pilot session.

Vocabulary retention test

To evaluate the retention of learned vocabulary, the vocabulary retention test was administered to both experimental group and control group three weeks after the post-test. The same test for achievement tests was used as the retention test; however, in order to avoid the recognition effects from the post-test, 60 items of the test were shuffled.

Open-ended question

To explore the students' perceptions toward the games used as the treatments of this study, the open-ended questions were distributed to both groups of the participants after the treatments in the last week. The validity of the questions were approved by the same three experts and were piloted with the same group of students in the vocabulary pilot sessions in order to measure the readability.

Data analysis

For the vocabulary retention aspect, the Statistical Package for the Social Science (SPSS) was used to examine the data collected from vocabulary achievement tests and retention test of both groups of participants. First, the homogeneity and normality of the internal consistency of the participants' pre-test scores were analyzed. By means of descriptive statistics, the pre-tests of both groups were calculated through an independent samples t-test in order to investigate the differences of their prior knowledge since they were not randomly nominated to receive the treatment in each group. The results indicated that the learning performance of the two groups of participants were equivalent at the start of the study.

For the perception aspects, at the end of the treatment, the open-ended questions were administered to both groups of participants asking their perceptions to both types of game. The content analysis was employed to categorize the prominent themes.

Findings

Research question 1: Is digital game-based learning more effective than non-digital game in vocabulary retention?

4.1 Effects of Digital Game-Based Learning on students' vocabulary retention

Table 1: Descriptive statistics of pre-test and post-test

items	Control		Experimental		t		df	sig
	Mean	S.D.	Mean	S.D.				
Pre-test	7.60	3.47	9.93	5.74	-1.907		58	.06
Post-test	17.47	13.65	25.07	14.53	-2.088	*	58	.04

*Significance level 0.05

In order to answer research question 1 asking if digital game-based learning was more effective than non-digital game in vocabulary retention, before applying DGBL in English language class, the pre-test was administered to both experimental group and control group in order to check their prior knowledge. The findings showed that the mean

score of the experimental group was ($\overline{x}$ = 9.93 with S.D. of 5.74) higher than that of the control group ($\overline{x}$ = 7.60 with S.D. of 3.47). To analyze if there was any statistical significance between the two groups, the independent sample t-test was employed and the result revealed that there was no statistical difference ($p > 0.05$) between the two groups. Therefore, it is obvious that both groups of students had comparable prior knowledge. However, after having learned through the games for 10 weeks, the results showed that there was significant difference ($p < 0.05$) between the two groups. The experimental group ($\overline{x}$ = 25.07 with S.D. of 14.53) significantly outperformed the control group ($\overline{x}$ = 17.47with S.D. of 13.65) on the post-test indicating that DGBL used as the experimental medium in this study was proved to be a productive instrument in increasing the upper primary school students' vocabulary knowledge.

In order to discover the effectiveness of DGBL in vocabulary retention, three weeks after the post-test, the retention test was provided to the participants of both groups. Table 2 below shows that the score of delayed post-test of control group was $\overline{x}$ =17.70 which is 0.23 higher than their post-test while the score of retention test of the experimental group is $\overline{x}$ = 21.67 which is 3.4 less than their post-test score. The independent sample t-test was used to analyze the findings. It is suggested that there was no significant difference ($p > 0.05$) between the two groups in vocabulary retention. Therefore, DGBL is more effective than non-digital game in their post-test but not in vocabulary retention.

Table 2: Descriptive statistics of retention test

items	Control		Experimental		t		df	sig
	Mean	SD	Mean	SD				
Post-test	17.47	13.65	25.07	14.53	-2.088	*	58	.04
Delayed-test	17.70	13.23	21.67	16.50	-1.027		58	.31

*Significance level 0.05

Research question 2: What are students' perceptions towards DGBL in vocabulary learning?

After applying the DGBL and traditional games in the English language classroom for ten weeks, the open-ended question was provided to both groups of participants in order to obtain the qualitative data asking their perceptions toward using game in learning English vocabulary. The analysis from the open-ended question revealed five dominant themes, specifically, enjoyment learning atmosphere, effective method for vocabulary learning and language skills, socialization, technology skills, and learning motivation.

In the following part, the letters in each code refer to the group of the participants (EXP for experimental group and CTL for the control group) and their genders (B for boy and G for girl), while the number identifies the participant's number in this study.

First, for enjoyment learning atmosphere, most of the participants from both groups have seen the GBL as a tool to increase the enthusiasm in learning since playing games is fun and can motivate them to learn. EXP-B14 student was so happy that he could learn English through computer games together with his friends and teacher. EXP-G28 student also was pleased to play computer games because she could gain both knowledge and fun at the same time. The students had the following to say:

I was so glad and enjoyed playing the digital game with my friends and teacher. It helped me to gain more knowledge. Although we had learned it in a short time, it was meaningful to me. (EXP-B14)

I was so happy and enjoyed learning English. I gained more knowledge from the computer game and I found it amusing. (EXP-G28)

Likewise, CTL-B18 student was satisfied with the game because it was fun and he has learned something new which made him like the English subject more.

The activity in the class was fun. I really like it. I could gain more knowledge and it made me love to learn English more. (CTL-B18)

Second, GBL was found to be an effective method for vocabulary development and language skills because both groups of the students love to play games. Moreover, some students in the experimental group found that *Kahoot!* helped them to remember more of the vocabulary and also to improve other language skills. EXP-B19 student was impressed with *Kahoot!* since he could see his improvement in English. Additionally, his friend, EXP-G2, could read English more and could remember more vocabulary after learning through *Kahoot!* EXP-G20 indicated that not only *Kahoot!* could rise her ability in remembering vocabulary, but also helped her to make decisions quicker. The students had made the comments as follow:

I really enjoyed learning English with Teacher through computer game because
it
was so amusing and I could see my progress in English. (EXP-B19)

I love to study English, however, in the past I used to guess the meaning of the words and did not know how to read. Now I can read English more because the

teacher (the researcher) has taught me by using Kahoot! game. I was happy and had so much fun in the same time. Moreover, there were a lot of vocabulary that I remembered from this in the school exam. Kahoot! game turned difficulty words become easier. (EXP-G2)

It was really fun and Kahoot! helped me to increase the ability to remember the vocabulary. Also it helped me to rise the speed in thinking and make the decision in a short time. (EXP-G20)

On the other hand, one of the students (CTL-B4) in the control group revealed that he could only recall some vocabulary after playing games. While, his friend (CTL-G9) found the game was fun and she could remember more words which she can use when she has to do the English examination for entering to a well-known secondary school.

Through the games we played in the class, I can remember some vocabulary. (CTL-B4)

I was happy playing the game that you (researcher) has brought into the class. I have learned lots of words which will be beneficial for the exam that I will take for entering to secondary 1 in at Phatthalung school after I finished Primary 6. (CTL-G9)

Third, playing games is valuable for socialization. The students of both groups had a pleasurable time playing game with their friends. They engaged more to the lessons. However, their engagement was at different level. The students in the experimental group were eager to play the games with their friends since they could compete with themselves and their friends and could help each other to find the answer. As EXP-G1 said that she wanted to compete with herself and her friends with their friends. Also one of the students (EXP-G17) explained that by playing games in pair she could help her friend to find the answer which could help her to acquire more knowledge. Moreover, another student (EXP-G8) was contented playing the games with her friend.

Kahoot game made me enjoy learning because I can compete with myself and friends. I can do something new which can improve my English. The game was really fun. (EXP-G1)

When we played game in pair, we could help each other to find out the answer. We have gained more knowledge. I really enjoyed the game. (EXP-G17)

The digital game was enjoyable because I could learn new vocabulary with my friends. (EXP-G8)

Likewise, the students in the control group had amusing time playing the games with their classmate but some of them felt embarrassed when their answers were incorrect and some indicated that there were few limitations that they could not compete with their friends.

The pro of this game is that we could gain more vocabulary and enjoyed learning in the same time; however, the con is that when our answers were wrong, all of our friends could notice. We felt quite ashamed. (CTL-G21)

The game was good but there were some limitations that I could not win my friends. (CTL-G20)

Fourth, technology skills were one of the themes frequently found only in the experimental group. Since nowadays the trend of Thailand 4.0 is being promoted by the current government in order to bring awareness for Thai people to get ready for the rapid change of the world. This skill is important in the 21st century and the students themselves saw such importance that they wanted to prepare themselves to the digital era. They were enthusiastic to play the computer. The followings are their words:

I like the game so much because it is useful to me. Learning through computer is good because I can learn skills for "Thailand 4.0". (EXP-B3)

I know more vocabulary that I didn't know before and I can play the game with computer, it was so amusing. (EXP-G7)

I enjoyed learning this subject because I could play the computer game and answer the vocabulary quiz online. (EXP-B10)

The last theme was learning motivation. Although this study employed intentional vocabulary learning teaching method, the students of both groups were motivated to learn and remember the vocabulary without being forced by their teacher. For the experimental group, the students were both intrinsically and extrinsically motivated because they thought that it was worth for them to remember the vocabulary in the class so that they could get more scores when they played the digital game. Comments provided by the participants are as follow:

I really enjoyed learning English vocabulary in the classroom because if I focus on what I learn in the class, I will gain more points in the computer room when we play the game. (EXP-G12)

I love playing the computer game and answering the quiz in Kahoot! because if I win, not only I can learn new vocabulary but also I can get the prize. (EXP-B27)

Correspondingly, some of the students in the control group were both intrinsically and extrinsically motivated. For student CTL-B24, the games were very attractive to make him really like to learn English, however, due to the time constraint during the games play that the teacher (the researcher) could not provide the score depending on the rapidity of answer the quiz. Therefore, only the first student who got the correct answer could get the prize as student CTL-B23 stated that:

The game could draw our attention to learn English. It was really good and entertaining. I really like this game. (CTL-B24)

The game was fun, however, only the student who answered the first one could get the prize from teacher. The game could improve us to be good at answering the questions in English. (CTL-B23)

Conclusion

Vocabulary teaching using the DGBL was magnificently implemented in a natural teaching environment in Thailand. This current study has proved that the DGBL was effective teaching instruction for young learners in EFL context.

According to the quantitative results, DGBL could increase learners' vocabulary size comparing to the traditional game. Although intentional vocabulary learning is quite overloaded for young learners in order to remember a large amount of vocabulary, the experimental participants outperformed their counterparts. However, the rates of retention of both groups were comparable. The results of this study were consistent with the study of Aghlara and Tamjid (2011). In their study, digital games could lead learners to better learning motivation and could ease children's learning process. Moreover, they also indicated that digital game could increase Iranian children's vocabulary learning. This might due to the fact that the nature of children, they love to play the games. Whatever the games are employed in learning, the children will happily and excitedly enjoy them. This is also supported by Plump and LaRosa (2017) that the application of digital game called *kahoot!* could strengthen learners' engagement and it could provide the environment where learners actively participate in the classroom activities.

For the qualitative data, it suggested that the DGBL could provide superior perceptions of learners comparing to the traditional game because the students nowadays are more enthusiastic to use the technological equipment that offers them with more attractive learning atmosphere and motivate them to remember English vocabulary with enjoyment. Similarly, previous study (see Llerena Medina and Rodríguez Hurtado, 2017) also claimed that digital game could motive learners to learn and raised their satisfaction in learning. Such findings also found in Shahriarpour and Kafi (2015) study, they revealed that digital game could change the learners' ways of learning from rote learning to meaningful learning. In addition, not only students could acquire more words from playing digital games, but also they could enhance students' motivation and interaction.

The present study has great contributions to DGBL research; however, there are several limitations to be addressed for future studies. First, the effects of DGBL on English vocabulary learning with larger population has been under researched in Thai context, so future studies should be conducted in this context. Second, comparative studies should be carried out to compare the effects of DGBL on other language skills with other digital and non-digital game. Third, the quantitative data of learning motivation in learning of both experimental and control group should be further compared.

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