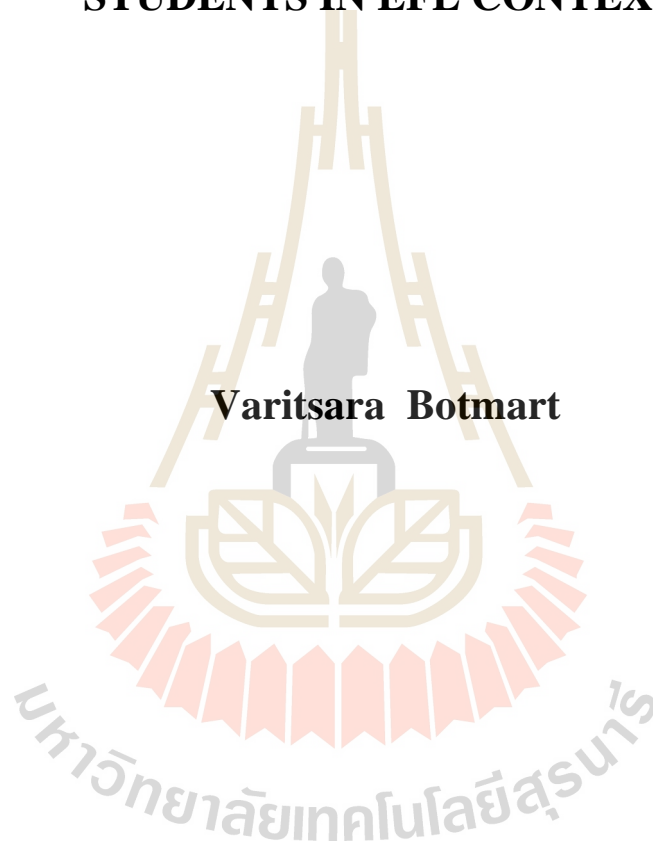# THE EFFECTS OF GAMIFIED FLIPPED CLASSROOM

APPLICATION ON LEARNING ENGLISH

VOCABULARY FOR THAI UNIVERSITY

STUDENTS IN EFL CONTEXT

Varitsara Botmart

A Thesis Submitted in Partial Fulfillment of the Requirements for

the Degree of Master of Arts in English Language Studies

Suranaree University of Technology

Academic Year 2019

ผลของการใช้โปรแกรมประยุกต์เกมในรูปแบบห้องเรียนกลับด้านที่มีต่อการเรียนรู้คำศัพท์ภาษาอังกฤษสำหรับนักศึกษาไทยในระดับมหาวิทยาลัยในบริบทที่เรียนภาษาอังกฤษในฐานะภาษาต่างประเทศ

นางสาววริศรา บทมาตย์

THE EFFECTS OF GAMIFIED FLIPPED CLASSROOM

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Suranaree University of Technology has approved this thesis submitted in partial fulfillment of the requirements for a Master's Degree.

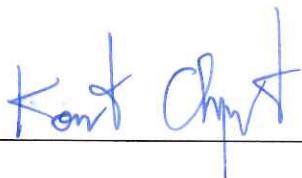Thesis Examining Committee

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(Dr. Peerasak Siriyothin)

Chairperson

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(Dr. Suksan Suppasetseree)

Member (Thesis Advisor)

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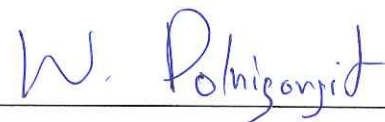
(Assoc. Prof. Dr. Pragasit Sitthitikul)

Member

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(Assoc. Prof. Flt. Lt. Dr. Kontorn Chamniprasart) (Assoc. Prof. Dr. Weerapong Polnigongit)

Vice Rector for Academic Affairs Dean of Institute of Social Technology

and Internationalization

วริศรา บทมาตย์ : ผลของการใช้โปรแกรมประยุกต์เกมในรูปแบบห้องเรียนกลับด้านที่มีต่อ
การเรียนรู้คำศัพท์ภาษาอังกฤษสำหรับนักศึกษาไทยในระดับมหาวิทยาลัยในบริบทที่เรียน
ภาษาอังกฤษในฐานะภาษาต่างประเทศ (THE EFFECTS OF GAMIFIED FLIPPED
CLASSROOM APPLICATION ON LEARNING ENGLISH VOCABULARYFOR THAI
UNIVERSITY STUDENTS IN EFL CONTEXT) อาจารย์ที่ปรึกษา : อาจารย์ ดร.สุขสรรพ์
ศุภเศรษฐเสรี, 172 หน้า

ความรู้คำศัพท์มีความสำคัญอย่างยิ่งถือเป็นองค์ประกอบสำคัญสำหรับการเรียนในทุกๆ
ทักษะภาษาอังกฤษ. เพื่อที่จะสามารถสื่อสารและนำเสนอความคิดนั้น นักศึกษาจะต้องมีความรู้
คำศัพท์ที่เพียงพอ. อย่างไรก็ตาม พบว่านักศึกษาไทยในระดับมหาวิทยาลัยในบริบทที่เรียน
ภาษาอังกฤษในฐานะภาษาต่างประเทศมีความรู้ด้านคำศัพท์ค่อนข้างต่ำ อันมีเหตุผลหลัก
ประกอบด้วย วิธีการเรียนการสอนที่ไม่น่าสนใจ โอกาสในการใช้ภาษานอกห้องเรียนที่จำกัดและ
การมีความรู้คำศัพท์ที่ไม่เพียงพอ ในการศึกษาครั้งนี้ การใช้โปรแกรมประยุกต์เกมในรูปแบบ
ห้องเรียนกลับด้าน (GFCA) ได้ถูกนำมาใช้เพื่อให้นักศึกษาเรียนอย่างสนุกสนานและเปิดโอกาสใน
การเรียนนอกห้องเรียนให้เพิ่มมากขึ้น โดยงานวิจัยฉบับนี้มีวัตถุประสงค์เพื่อ (1) พัฒนาโปรแกรม
ประยุกต์เกมในรูปแบบห้องเรียนกลับด้าน (2) เพื่อศึกษาผลของการใช้โปรแกรมประยุกต์เกมใน
รูปแบบห้องเรียนกลับด้านเพื่อการเรียนรู้คำศัพท์ของนักศึกษา (3) เพื่อสำรวจความคิดเห็นของ
นักศึกษาที่มีต่อการใช้โปรแกรมประยุกต์เกมในรูปแบบห้องเรียนกลับด้านเพื่อการเรียนรู้คำศัพท์

ผู้มีส่วนร่วมกับงานวิจัยครั้งนี้คือ นักศึกษานักศึกษาไทยในระดับมหาวิทยาลัยในบริบทที่
เรียนภาษาอังกฤษในฐานะภาษาต่างประเทศจำนวน 74 คน ซึ่งเป็นผู้ที่ลงทะเบียนเรียนรายวิชา
ภาษาอังกฤษเพื่อวัตถุประสงค์เฉพาะ ในปีการศึกษา 2562 ที่มหาวิทยาลัยเทคโนโลยีสุรนารี
วิธีการเชิงคุณภาพและเชิงปริมาณได้ถูกนำมาใช้ในงานวิจัยครั้งนี้เพื่อเก็บรวบรวมข้อมูลตลอด
ระยะเวลาการทดลอง โดยหลังจากการทดสอบก่อนเรียน นักศึกษาในการทดลองได้รับการเรียนการ
สอนโดยใช้โปรแกรมประยุกต์เกมในรูปแบบห้องเรียนกลับด้านเพื่อการเรียนรู้คำศัพท์ หลังจากการ
ทดลองสิ้นสุด นักศึกษากลุ่มนี้ได้รับการทดสอบหลังเรียน ตอบแบบสอบถามและเข้ารับการ
สัมภาษณ์แบบกึ่งโครงสร้าง

ผลการวิจัยครั้งนี้พบว่า

(1) สำหรับการพัฒนาโปรแกรมประยุกต์เกมในรูปแบบห้องเรียนกลับด้านนั้น ได้ถูกออกแบบและสร้างโดยอาศัยทฤษฎีการเรียนรู้ของ เกมิฟิเคชั่น และ การเรียนรู้แบบห้องเรียนกลับด้านมาผสมผสานกันเพื่อสนับสนุนการเรียนรู้คำศัพท์ของนักศึกษา ยิ่งไปกว่านั้นเนื้อหาของโปรแกรมประยุกต์ในรูปแบบห้องเรียนกลับด้านได้ถูกส่งให้ผู้เชี่ยวชาญทางด้านการสอนภาษาต่างประเทศเพื่อประเมินถึงความเหมาะสมก่อนที่จะนำมาใช้ในการทดลอง

(2) เพื่อให้ทราบถึงผลของการใช้โปรแกรมประยุกต์เกมในรูปแบบห้องเรียนกลับด้านเพื่อการเรียนรู้คำศัพท์ของนักศึกษา ผลสัมฤทธิ์ทางการเรียนรู้คำศัพท์ของนักศึกษาก่อนและหลังเรียนด้วยโปรแกรมประยุกต์ในรูปแบบห้องเรียนกลับด้านได้ถูกนำมาเปรียบเทียบ สถิติที่นำมาใช้เพื่อเปรียบเทียบคือ pair sample t-test โดยผลสัมฤทธิ์ทางการเรียนรู้คำศัพท์ที่ได้จากการวิเคราะห์การทดสอบหลังเรียน (ค่าเฉลี่ย = 18.65) ของนักศึกษานั้นสูงกว่าผลการทดสอบก่อนเรียน(ค่าเฉลี่ย = 11.22) อย่างมีนัยสำคัญทางสถิติที่ระดับ .05

(3) ในส่วนของแบบสอบถามและการสัมภาษณ์แบบกึ่งโครงสร้าง ผลการวิจัยชี้ว่านักศึกษามีความคิดเห็นที่ดีต่อการใช้โปรแกรมประยุกต์เกมในรูปแบบห้องเรียนกลับด้านโดยมีค่าเฉลี่ยเท่ากับ 4.02 (S.D. =0.90) นอกจากนี้ ผลจากการสำรวจความคิดเห็นของนักศึกษายังเผยให้ทราบว่า นักศึกษาชอบการเรียนรู้คำศัพท์ด้วยโปรแกรมประยุกต์ในรูปแบบห้องเรียนกลับด้านเพราะว่าโปรแกรมนั้นมีความสนุก และสะดวกต่อการเรียนรู้ อีกทั้งยังช่วยพัฒนาการเรียนรู้คำศัพท์ภาษาอังกฤษของนักศึกษาอีกด้วย

จากผลการศึกษา อาจกล่าวได้ว่า โปรแกรมประยุกต์ในรูปแบบห้องเรียนกลับด้าน เป็นวิธีการเรียนการสอนที่สามารถใช้เพื่อส่งเสริมการเรียนรู้คำศัพท์ภาษาอังกฤษของนักศึกษาได้

สาขาวิชาภาษาต่างประเทศ

ปีการศึกษา 2562

ลายมือชื่อนักศึกษา _วริศรา บทมาทย์_

ลายมือชื่ออาจารย์ที่ปรึกษา _สุนสรรค์ ศุภเศวตร_

VARITSARA BOTMART : THE EFFECTS OF GAMIFIED FLIPPED

CLASSROOM APPLICATION ON LEARNING ENGLISH VOCABULARY

FOR THAI UNIVERSITY STUDENTS IN EFL CONTEXT. THESIS

ADVISOR : SUKSAN SUPPASETSEREE, Ph.D., 172 PP.

GAMIFIED FLIPPED CLASSROOM/ GAMIFICATION/ FLIPPED

CLASSROOM/ VOCABULARY LEARNING

Vocabulary is considered as an essential element for all English language skills. In order to communicate and express the idea, students should have enough vocabulary knowledge. However, some Thai EFL university students have been found to have low vocabulary knowledge. Major cause included; unattractive instructional method, limited exposure to the English language outside the classroom, and inadequate vocabulary knowledge. In this study, Gamified Flipped Classroom Application (GFCA) was used to allow students to learn with fun and also provide more opportunities to learn outside the classroom. The purposes of this study were to develop the GFCA; to investigate the effects of GFCA on learning English vocabulary, and to explore students' opinion towards the use of GFCA on learning English vocabulary.

The present study was conducted with 74 Thai EFL university students, who enrolled in English for Specific Purposes Course in the academic year 2019, Suranaree University of Technology (SUT). A combined qualitative and quantitative methodology was implemented as sources for collecting data over the period of the experiment. After taking a pretest, students in the main experiment learned vocabulary through GFCA for both outside and inside the classroom. After the ends of the experiment, students were asked to do the posttest. Later, the questionnaire and a semi-structured interview were

administered.

The present study was (1) regarding the development of GFCA, It was designed and developed systematically based on learning theories of gamification and flipped classroom method, which aimed to support students in learning English vocabulary. Additionally, the contents of GFCA were sent to the experts in the English Language Teaching (ELT) field to evaluate for the appropriateness of the GFCA before employing in the experiment.

(2) In response to the investigation of the effects of GFCA on English vocabulary knowledge, students' English vocabulary achievement before and after learning with GFCA were compared. A paired sample t-test was used to determine their difference. The results of the English vocabulary achievements of the students in the posttest ($\bar{x}$=18.65) were higher than those in the pretest ($\bar{x}$=11.22) with statistically significant differences (p=.000, p<.05).

(3) In regards to the questionnaire and semi-structured interview, the finding indicated that students had a good opinion towards to use of GFCA at the average score of $\bar{x}$=4.02 (S.D = 0.90). Moreover, the results of students' opinions also revealed that students liked learning English vocabulary through GFCA since it was fun and convenient for their learning.

The results of the study suggest that GFCA is an instructional method that can be used to enhance students' English vocabulary knowledge.

School of Foreign Languages

Academic Year 2019

Student's Signature _____

Advisor's Signature _____

ACKNOWLEDGEMENTS

I would like to take this opportunity to acknowledge all the people who have greatly contributed and supported the completion of this dissertation. Completing this study has had a big impact on me on both personal and professional levels.

I wish to express my sincere gratitude to my advisor, Dr. Suksan Suppasetseree, for his support, guidance, patience and time. Without my advisor, my academic success would not be possible.

I am pleased to acknowledge all members of my dissertation committee, Dr. Peerasak Siriyothin, Dr. Suksan Suppasetseree, and Assoc. Prof. Dr. Pragasit Sitthitikul for their valuable comments and suggestions which have contributed greatly to the improvement of this dissertation.

I am also grateful to all the teachers in the School of Foreign Languages for all the knowledge I have learned which led to the completion of my dissertation.

Finally, my heartfelt thanks go to my beloved family and friends for all the mental supports that got me through the whole period of my study.

<div align="right">Varitsara Botmart</div>

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CHAPTER 1

INTRODUCTION

The present study aims to develop an English vocabulary application to support students in learning vocabulary for Thai university students in the EFL context. The researcher develops the Gamified Flipped Classroom Application (GFCA) by integrating technology into traditional classroom teaching, aiming to enhance students' vocabulary knowledge. This chapter presents background of the study, rationale of the study, statement of the problems, purposes of the study, research questions, significance of the study, and the definition of key terms used in the study.

1.1 Background of the Study

In the world of globalization, the role of the English language has become more important since it is the medium in every domain of communication, trades, and education. In other words, English is contributed to education worldwide to meet the growth of career advancement, economic success, and academic advancement. One of the significances for future success is proficiency in English. (Prapphal, 2004; Foley, 2005; Khamkhien, 2010)

According to the Education First English Proficiency Index 2018 published in Bangkok-Post online, Thailand is ranked 65th among the 88 countries in the EF English Proficiency Index 2018. The surveys were operated by Switzerland-based Education First, a language school with worldwide branches. Thailand has a score of 48.54 which

was classified as low proficiency and has dropped 11 spots in the proficiency ranging from 2017 which Thailand was at the 53rd of the rankings. However, the English language has been taught in Thailand as a Foreign Language (EFL), for a long time, still students have some difficulties in using English.

The students' difficulties in learning the English language may come from an ineffective English teaching method, a limited exposure to English in daily life, a low achievement level of English teachers and the most important one is lack of vocabulary knowledge (Ministry of Education, 2006; Wannarak, 2008; Khamkhien, 2010; Liangphanit, 2002; Poonpon, 2011). This can be illustrated by a study from Khuvasanond, Sildus, Hurford, and Lipka (2012), the result showed that vocabulary in Thailand was taught by repeating, memorizing and spelling the meaning of the words, which seems to be passive learning. Through this method, students may remember the words but they still cannot use it effectively in a real context.

Moreover, the result from one research in Thailand showed that only a small number of students can choose the words to explain the meaning correctly, and more than fifty percent cannot choose the proper words to fill in the gaps activities. (Wangkangwan, 2007; Yimwilai, 2008). The findings indicated that vocabulary is the major difficulty for Thai students in learning English in the EFL context. Likewise, many research studies at Suranaree University of Technology (SUT) revealed that SUT students have low essential vocabulary knowledge (Ward, 2000; Saitakham, 2010; Linh, 2015). Additionally, Suppasetseree (2005) stated that many of the first-year students in SUT have very low English proficiency scores and this issue needs to be solved in order to help Thai EFL students improve English vocabulary knowledge.

Many English language instructors in SUT also confirm that students seem to have problems with vocabulary and grammar when they have to do writing tasks (Kongsuebchart and Suppasetseree, 2016).

Additionally, a survey of students' difficulties in learning English was conducted by a researcher in order to examine students' needs and problems in learning English. The finding showed that the causes of students' difficulties in learning English come from insufficient English vocabulary knowledge, ineffective English learning materials and limited opportunity to English exposure outside the classroom. These findings of lacking vocabulary knowledge can lead to many difficulties in learning other English skills. Therefore, in order to improve SUT students' vocabulary knowledge and provide more opportunities to learn vocabulary outside the classroom, effective learning materials should be designed and implemented with students.

1.2 Rationale of the Study

One of the most important factors associated with the learning process is motivation and engagement which can increase positive learning outcomes (Klem and Cornell, 2004; Portelli and McMahon, 2004). In other words, the more students involved in learning, the more they can learn. In order to increase a positive learning outcome of students, integrating gamification or game elements into the classroom perhaps helpful, since game entertainment is an effective tool for students' learning (Poondej and Lerdpornkurat, 2016). Games and entertainment" were reported as the most searchers keywords of any search engine in Thailand (Poonsri, 2014). Crucially, students spend more than 80 percent of their time using computers playing games.

Thus, as there is a growth of game, internet, and technology, gamification is suggested from the Ministry of Education of Thailand to use in the classroom and to promote students learning (Ministry of Information and Communication Technology of Thailand, 2013). The ministry of education of Thailand emphasizes that the advances, capabilities of technology and online learning such as gamification are recommended for classroom 4.0 where the role of students shifted from passive learning to active learning. The Thai government reported that "playing online games" was the most favored activity of Thai internet users (Ministry of Information and Communication Technology of Thailand, 2013). This can be interpreted that playing computer games has become a normal part of students in Thailand. As many existing studies have found that integrating gamification concepts into the classroom can increase students' learning (Brown, 2012; Stanley, 2014). Therefore, this present study employs gamification into the classroom to encourage students to learn in a playful environment as well as spend more time on education rather than entertainment.

According to the English proficiency Index rankings 2018, Thailand was classified at the low proficiency band, therefore, there is an attempt to improve the English learning of Thai students (Mala, 2018). Many instructions and schools in Thailand had developed the course curriculum by following Thailand 4.0 policy. The classroom in education 4.0 focuses more on student-centered, shifted from passive learning to active learning which allows students to engage more with their learning and can increase the positive effects on learning outcomes. Therefore, a flipped-classroom approach where students can manage their own learning before coming to class, and the usefulness of the concept of the lesson at home, homework at school. In other words, a flipped classroom can help to transfer knowledge to students outside the classroom, practicing

the lesson before coming to class and controlling their own learning. (Bermann and Sams, 2012). Therefore, the flipped classroom approach has been suggested to integrate into the classroom to help students learn more outside the classroom. (Division of Research Administration and Educational Quality Assurance, 2017).

There are many existing studies that have been conducted to increase students' engagement, motivation in learning employing gamification and flipped classroom (Thorne, 2008; Peterson, 2010; Ting and Li, 2012). Nevertheless, there is still a need for a study to report the potential in teaching and learning language aspects, especially in Thailand. Therefore, this present study aims to investigate the effects of Gamified Flipped Classroom Application on learning English vocabulary learning that would be fulfilled in this study.

1.3 Statements of the Problem

One of the weaknesses of Thai EFL learners is that after many years of learning, they still have insufficient English vocabulary to communicate or express the idea effectively (Marukarat, 2012). Additionally, the crucial problem in learning English in Thailand comes from insufficient vocabulary knowledge as found in many studies. (Linh, 2012). Punthumasen (2007) also found that Thai EFL students did not like learning English because the subjects' matter was boring, the teaching methodology in the classroom was not interesting, the English textbooks and materials were not interesting enough to courage them to study. Prapphal (2007) states that all language teachers should pay attention to classroom activities that integrate with the use of technology, web-based projects or online self-tests into the classroom since technology is a good instruction to help students learn. Indeed, the study on the use of a well-

designed vocabulary instruction that integrates the gamification and flipped classroom approach is needed to be developed in order to help students to feel the new ways of learning according to their interests.

Responding to the students' difficulties in learning English vocabulary at Suranaree University of Technology (SUT) where the majority of students are from rural areas in Northeastern provinces in Thailand and the exposure of the English language is limited, therefore most of the students have low proficiency in English. (Ward, 2000; Saitakham, 2010; Linh, 201). Moreover, the surveys of students' difficulties in learning English at SUT, conducted by the researcher showed that students lack vocabulary knowledge because students found that an English learning material is not interesting for them, and also the limited to English exposure outside the classroom might be the reasons of lacking vocabulary knowledge. To cope with students' difficulties and help them improve English vocabulary knowledge, the development of an effective learning tool on learning English vocabulary at SUT is needed.

Due to these reasons, the researcher proposes the use of Gamified Flipped classroom Application (GFCA) to help students improve English vocabulary, by employing the use of gamification and flipped classroom approach, which provide students a pleasurable learning environment as well as offer more opportunity to learn the language outside the classroom, in order to increase the positive learning outcome and improve students' vocabulary knowledge.

1.4 Purposes of the Study

In an attempt to help SUT students improve their vocabulary learning, the purposes of the study were as follows;

1.4.1 To develop the GFCA on learning English vocabulary.

1.4.2 To investigate the effects of the use of GFCA on learning English vocabulary.

1.4.3 To explore students' opinion towards the use of GFCA on learning English vocabulary.

1.5 Research Questions

To achieve the purposes mentioned above, this study was conducted to search for the answer to the following research questions;

1.5.1 What are the elements and steps for developing the GFCA on learning English vocabulary?

1.5.2 What are the effects of the use of GFCA on learning English vocabulary?

1.5.3 What is the students' opinion towards the use of GFCA on learning English vocabulary?

1.6 Significance of the Study

The results of this study might contribute to a significant change in EFL students' English performance and opinions in learning English vocabulary through gamified flipped classroom application (GFCA). Aligning with purposes of the study, the

possibility that the effects of the GFCA could enhance students' vocabulary knowledge as well as create a positive opinion of the students in learning English vocabulary.

The features such as 'mission' and 'quest' might provide more opportunities for students to learn the English vocabulary via the GFCA outside the classroom. This might be contributed to a significant change in the EFL classroom environment because students can learn at their own pace whenever or wherever they need. Kapp (2012) states that the system adds game-like elements to classroom instruction that can drive motivation, participation, and learning engagement in the classroom. The teacher acts as a facilitator or a game master to provide students a clear guideline, while the student acts as a player or competitor response for distinguishing the choice, coordinate and interact with peers to find the best answer and testing their rules by playing the game. This can create an enjoyable learning environment that might increase the positive learning outcome.

With technology advancement, students can explore the lesson online through GFCA before going to class, this might offer students more class-time to do class activities with their friends. Since students already learn the lesson online, the lecture period will be minimized and the class time will be contributed to the group activities or discussion which allows students to become more active learners. Moreover, they can also practice vocabulary as many times as they want. With this repeatable abilities, students' vocabulary knowledge will be improved.

Additionally, this study provided the steps of developing the GFCA using Classcraft in order to improve students' English vocabulary knowledge. To create an effective vocabulary instruction, the logical and systematic steps in developing is

important as much as the content. The lesson plans and content in this study might practically provide guidance in the development of the English vocabulary instruction and the findings might also be useful for other researchers who want to develop a vocabulary instruction in a flipped classroom learning environment.

Up to the present, many research studies have been conducted to investigate the use of gamification to increase students' motivation and engagement in learning. There have been little empirical researches on developing GFCA on learning English vocabulary in Thailand. The present study fills in the gap with the aim to investigate whether gamified flipped classroom applications can help students improve vocabulary knowledge, especially at SUT where students learn English as a foreign language. This study can be used as guidance for the development of the instructional design for vocabulary learning by using gamification elements and flipped classrooms. Moreover, any positive results from the present study can be the implications for developing curriculum design and also be used as alternative teaching and learning activities in the EFL classroom.

1.7 Definitions of Key Terms

Gamification: Gamification in this present study refers to the use of Classcraft application which consists of game-based elements such as game dynamics (e.g. the points-scoring system, competition with others, award of rewards, badges for levels of achievement and display of the leaderboards) and game mechanics (e.g. reputation and social mechanics as a service to motivate, engage and generate loyalty among players), in non-game contexts to increase students experience, engagement motivation and to create a sense of playfulness.

Flipped classroom: The Flipped classroom is an instructional method that intends to reverse the role of classroom activities and homework. Students have more opportunity for the advanced preparation of the lesson. The class time can be contributed to face-to-face activities, interactions, and discussions with peers and teachers. In the present study, a flipped classroom refers to the activities in gamified flipped classroom application (GFCA) that students have to complete outside the classroom. To gain the points and pass each stage, students have to finish different tasks in each stage, according to the game master's command.

Vocabulary learning: In this present study, vocabulary learning refers to knowing and understanding English vocabulary and be able to use the word correctly. Vocabulary is an essential part of language learning because it is the core component of language proficiency and determines how well students can achieve in other languages. As Nation (1990) mentioned, repetition and exposure to the language at least 5-16 times are essential for the retention of new vocabulary. Therefore, learning vocabulary through gamified flipped classroom application (GFCA) allow students to repeat the lesson as much as they want.

Students: Students in the present study refer to Thai university students who learn English as a foreign language and enroll English for Specific Purposes course (213204) at Suranaree University of Technology. The students have an average of fifteen years in English learning before entering university.

Gamified Flipped Classroom Application (GFCA): The Gamified Flipped Classroom Application or GFCA is the application that combined game elements and flipped classroom method into a learning application. In this study, "Classcraft" is used

in learning English vocabulary for EFL students. Classcraft is a gamification application that available free online and is able to apply to any classroom with all subjects. The software is developed by following the game elements that have an effect on students' motivation and engagement which can increase the positive learning outcomes.

In this chapter, a description of the background of the study has been given to provide an overview of vocabulary learning in Thailand. And due to the growth of technology, the integrating of gamification and flipped classrooms is given to explain the situation of vocabulary learning in SUT. Later, purposes of the study, research questions, and significance of the study and definition of key terms are then presented. In the next chapter, the theoretical framework, the existing research studies related to vocabulary learning, gamification and flipped classroom will be discussed
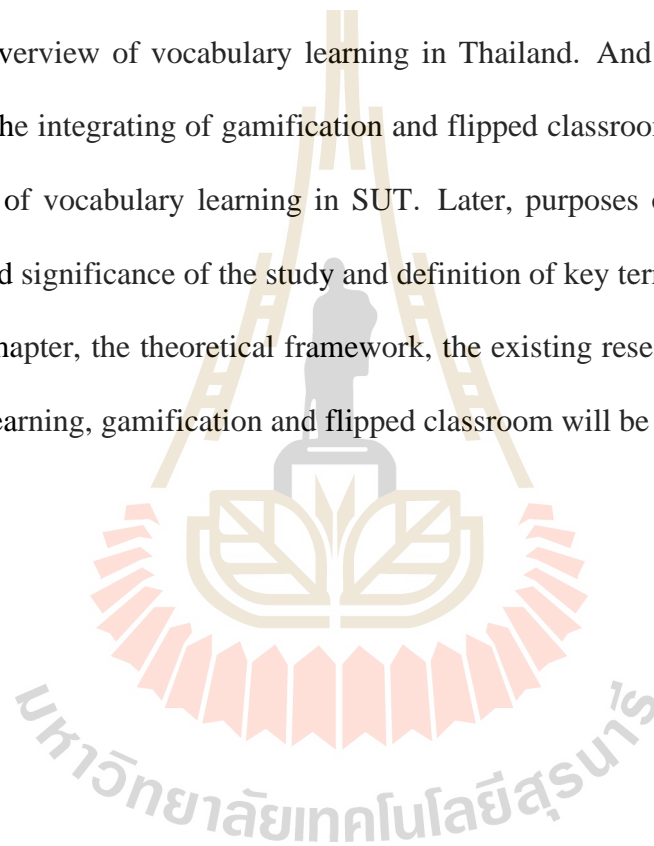
CHAPTER 2

LITERATURE REVIEW

The main purpose of this chapter is to review the related literature in the present study. Initially, the chapter presents the theoretical framework, Malone's theory of intrinsically motivating instruction, the taxonomy of intrinsic motivations for learning, operant conditioning, distributed practice, and self-determination, which are used to develop the Gamified Flipped Classroom Application (GFCA). Then, definitions of vocabulary, the importance of vocabulary and vocabulary teaching and learning are explained. Next, the definitions of gamification, principles of gamification and gamification in language learning are discussed. After that, the flipped classroom, principles and flipped classroom in language learning are described.

2.1 Theoretical Framework

There is a rapid increase in in-game playing frequency as the improvement of the accessibility and portability of the smart devices (Efe, 2014). Hence, there is an attempt to integrate technology such as games into education. Game in education or gamification allows students to learn in entertaining, effective and creative situations which can create more possibility of a positive learning outcome. Since entertainment and motivation are key concepts of gameplay, in this section how learning theory is used to support and develop the Gamified Flipped Classroom Application (GFCA) is

discussed. Four main learning theories namely, motivation learning, operant conditioning, self-determination, and distributed practice are discussed on the impact of game design for each element.

Table 2.1 Theories and their impact on gamification design

Theory	Impact on Gamification Design
Malone's Theory of Intrinsically Motivating Instruction.	The elements of challenge, fantasy, and curiosity in a game can drive the intrinsic motivation of students in learning.
The Taxonomy of Intrinsic Motivations for Learning	Challenge, curiosity, control, fantasy, cooperation, competition, and recognition are the elements in a game that can drive both internal and external motivational of students.
Operant Conditioning	Provide appropriate rewards, points, and badges on a variable basis to maintain learners' interest.
Self-determination Theory	Provide the learner with the opportunities for autonomy, a feeling of competence, and relatedness with others.
Distributed Practice	Play out over time to provide spaced repetition of the content within the game.

Note: Adapted from the gamification of learning and instruction: game-based methods and strategies for training and education, by Karl M. Kapp (2012).

2.1.1 Malone's Theory of Intrinsically Motivating Instruction

In the gamification concept, two main elements of motivation are focused. To understand the elements of gamification it is important to distinguish between intrinsic and extrinsic motivation. The intrinsic motivation which is driven from within the learner while the extrinsic motivation comes from some external factor.

Malone (1981) studied why games are so much fun, in other words motivating. Malone suggested three key elements that make game motivational: challenge, fantasy, and curiosity. **The challenge** always depends on the goals with uncertain outcomes. And to make the uncertain outcomes the game should include difficulty level, multiple goals, hidden information, and randomness. **Fantasy** is

described as an environment in games that evokes mental images of things that is not present in the normal sense. The Fantasy elements can make the instructional environment more interesting and more educational since it has both cognitive and emotional advantages for designing instructional environments. The cognitive advantage of using fantasy is when students can apply new knowledge in understanding new things, and the emotional advantage of fantasy in-game is deriving when students satisfy while playing a game. **Curiosity** is one element that can evoke students in exciting environments. The sensory curiosity such as light or sound has a high impact on attracting students' attention. Moreover, cognitive curiosity or the way the game makes students feel that their knowledge is incomplete by modifying the higher-level cognitive structures, and then students are motivated to learn more.

2.1.2 The Taxonomy of Intrinsic Motivations for Learning

Later, Malone and Lepper (1988) proposed the taxonomy of intrinsic motivation to examine how each element support students' motivation in gameplay. The taxonomy of intrinsic motivation is divided into two sections, the first section focuses on intrinsic motivation included challenge in terms of the uncertain goals or outcomes, curiosity in terms of sensory and cognitive, control in terms a sense of allowing students to control their learning, and fantasy in terms of emotional and cognitive that students can learn in the game. In the second section, the focus is on interpersonal motivations included cooperation in terms of playing as a team to achieve the goals, competition in terms of competing against another player, and recognition in terms of making achievements to become masters of the games.

2.1.3 Operant Conditioning

Operant Conditioning is another way to motivate people by driving the external motivation. The concept was introduced by Skinner in the 1930s, in order to keep players' engaging of times in games a variable ratio reinforcement schedule or the reward schedule is needed. There are four types of reward schedules. (i) The variable-ratio refers to the reinforcement for behavior that is provided in unpredictable intervals. For example, sometimes players might get the gold coin when hitting the mushroom and sometimes not. (ii) Fixed ration refers to the reinforcement provided after a pre-selected number of ties a behavior is exhibited. The players know that if they collect enough coins, tokens or points they will receive an award or power-up. (iii) Fixed interval refers to the reinforcement for behavior is provided after a fixed amount of time has passed. The players can get a reward after amount of time has elapsed which encourage them to respond faster and faster until another reward is given, for example, a player knows that a magic shield always appear every fifteen minutes after it was destroyed, while waiting for another magic shield to appear again the player may explore other parts of the game faster to come back and see whether the magic shield had appeared. (iv) Variable interval refers to the reinforcement for a behavior that is provided after a variable amount of time has passed but the time is not fixed. For example, the magic umbrella in the game appears every so many minutes, sometimes it appears every two minutes and other times it appears every five minutes.

2.1.4 Self-Determination Theory

The Self-Determination Theory (SDT) explains how people perform activity in-game. The first element of SDT is autonomy which refers to the feeling that one can control and determine the outcome of their actions. The second element is competence

which refers to the need for challenging to become masters of those specific actions. And the last element is relatedness which refers to the feeling of connectivity of other players, especially when two or more friends play a game together. In fact, the study tries to explain that SDT and gameplay supported each other. The players are autonomous and take control of their actions. Moreover, the competition they experience in the game to achieve the goal and the feeling of relatedness with others in the game are the elements of crafting motivation. As a result, game autonomy, competence, and relatedness associated with game enjoyment, preferences, and well-being as an outcome.

2.1.5 Distributed Practice

The distributed practice always refers to space when players come to replay the game to get higher scores. This is the technique of distributing study and learning efforts over multiple short times. The focus is on the subjects matter to be learned. A study from Howard-Jones & Demetriou (2008) indicated that the distributed practice is heavily support learning which retains access to memorized information for long-term retention and recall of content. This means that distributed practice that is built into a game experience or the game that design for playing again and again with the varying storylines helping the player to make the retention and recall the learning more effective in long term

This section presents the learning theories that were used as a foundation for developing the GFCA to help SUT students improve their English vocabulary knowledge. The activities of GFCA were developed based on the elements of both intrinsic and extrinsic motivation, operant conditioning theory, self-determination theory and distributed practice theory. As the five elements presented, a well-developed

GFCA was used in the present study to help students improve their learning, especially English vocabulary which is very important for learning the language. How English vocabulary is important in learning language is discussed in the next section.

2.2 Vocabulary in Language Learning

2.2.1 Definitions of Vocabulary

In an attempt to learn foreign languages, language learners need to consider what vocabulary means. The term 'word' and 'vocabulary' is proposed its meaning in a comparative way. According to Read's (2000, p. 1) words are "the basic building blocks of language, the units of meaning from which larger structures, such as sentences, paragraphs, and whole texts are forms" while vocabulary consists of "more than just single words". Richards, Platt, and Platt (1992, p. 406) defined words as "the smallest semantically independent linguistic unit which can occur in speech or writing", whereas vocabulary is "a set of lexemes which includes single and compound words as well as idioms." Carter (1987), argued that the most accurate definition of a word will be definition regard to the meaning of the word which is the minimum meaningful unit of language. Similarly, Brown (2001, p.1127) offers a definition of a word as "a single distinct meaningful element of speech or writing, used to form sentences with others." Richards and Schmidt (2002, p. 558) see a word as "the smallest of the linguistic units which can occur on its own in speech or writing" As Boonkongsaen (2012), mentioned a word is a form which can occur alone known to have meaning by itself. Though many scholars define the term 'word' in a slightly different way, still there is one thing in common in the definitions. All of them mention the meaning of vocabulary.

Vocabulary, on the other hand, different scholars have defined the term vocabulary upon different perspectives. Merriam- Webster's collegiate dictionary (1999) defines the term vocabulary as a list or collection of words or words and phrases usually alphabetically arranged and explained or defined. While Brown (2001, p. 1098) sees vocabulary as "the body of words used in a particular language or in a particular sphere". Vocabulary is the words used by a particular person and learning vocabulary is learning of word, or a set of words along with its various aspects related to it, such as forms, meanings and functions (Boonkonsaen, 2013). Based on the scholars' viewpoint, the term vocabulary in the present study can refer to a word or a set of words used concerns with its meaning and knowledge.

2.2.2 The Importance of Vocabulary in Language Learning

Vocabulary is central to language learning, whether it is the first or second language because without sufficient vocabulary students cannot understand, communicate or express themselves. If the goal is only to survive in a foreign country on a short vacation, perhaps only a good phrasebook (e.g. numbers, WH question words, and basic lexis) is enough. However, if the students aim to communicate in everyday activities (e.g. buying and bargaining, reading signs, and ordering food), a "survival list" of 120 items need to pay attention to (Nation and Crabbe, 1991). As we can see that most of the students need to achieve more than survival level. They need to be able to express themselves in the second language, enable a conversation in every topic and the most serious one is to pass the test.

In learning any languages, vocabulary seems to be the focal point of acquisition. As many scholars have explained how vocabulary is important for language learning. Wilkins (1972, pp. 111-112) said: "without grammar little can be conveyed,

without vocabulary, nothing can be conveyed". one systematic exploration to support Wilkins's idea is the DIALANG tests. The test is conducted to explore the relationship between vocabulary knowledge and language proficiency and the data supports that vocabulary is important for language use. A study in China was conducted to investigate the pattern of English vocabulary learning strategies used by the non-English major students in Chinese Independent Colleges. Students were asked to complete the questionnaire online about how they learn vocabulary. The results showed that in any language test, the vocabulary size of students is relevant to their performance (Lui, 2010). The findings support Wilkins' idea that without vocabulary the skills of language learning such as listening, speaking, reading and writing cannot be successful.

Many researchers have investigated the importance of vocabulary in learning for all four skills; listening, speaking, reading and writing can be discussed as follow. For listening skills, there is a belief that a broad range of vocabulary can help the listener to understand more. According to Staehr's (2008) study that aims to investigate the relationship between vocabulary size and the skills of listening, reading and writing in English as a foreign language (EFL). After the experiment, the results from the pretest and posttest were analyzed, and the finding emphasizes the importance of vocabulary size for language proficiency since students did not know the most frequent 2,000 words in English that's why they cannot perform well. As Adolphs and Schmitt (2000) have calculated the number of words that students should know, students need to master at least a vocabulary of 2,000 words families to understand around 90 percent and 94 percent of the conversation in different situations. It can be seen that vocabulary plays an important role in the listener's comprehension. The more vocabulary students learned; the better listening performance will be.

For speaking skills, to communicate in English students should know at least 2,000 words families as the threshold for basic conversations (Schmitt, 2000). Vocabulary is very important for L2 students because without vocabulary students cannot express what they want to communicate with others. Vocabulary is a useful tool in communication as its function is to support students when they communicate in the target language. Lacking vocabulary may cause some difficulties for students to find the right words in conversation which might affect their confidence in speaking English as well. Instead of finding the right words to say students seem to avoid speaking English because they don't want to make a mistake. The significance of vocabulary in communication is stated by McCarthy (1990, p.viii) that "no matter how well the student learns grammar, no matter how successfully the sounds of L2 are mastered, without words to express a wider range of meanings, communication in L2 just cannot happen in any meaningful way." It can be concluded that vocabulary also plays a key role in communication and the wide range of vocabulary size allows the speaker to communicate effectively.

For reading skills, vocabulary knowledge is considered as an important and useful part for readers because all text is made up of vocabulary items. If students have inadequate vocabulary knowledge, they may not be able to comprehend the text they come across. Nation (2006) states that to comprehend the text one should have 6,000 to 7,000-word families to understand about 98% of the text. Chall (1987) mentions that the relationship between reading and vocabulary supports each other in terms of language learning because students use vocabulary to comprehend the text. The more vocabulary students know, the better he or she can understand the text. It can be

interpreted that reading comprehension and vocabulary have been directly linked to each other in the language learning aspects.

For writing skills, vocabulary is necessary as it helps the writers to express the ideas. When students are assigned to complete the writing task, vocabulary is very important for doing the task. If the students have a lot of vocabulary in their minds, it is very useful for them to choose the right words to convey the message. Many teachers seem to focus on grammatical points when students compost a writing task, however, lexical errors can impede students' comprehension more than grammatical errors. Ellis (1994) mentions that native-speaking judges seem to rate lexical errors as more serious than grammatical errors. According to Nation (2006), a small number of 2,000 – 3,000 words are adequate and enough to convey several ideas. It can be concluded that vocabulary is important in writing. And for L2 students, the limitation of vocabulary can also be a serious frustration when completing the writing task as well.

2.2.3 Teaching and Learning Vocabulary

A) Teaching Vocabulary

Vocabulary is important for any language skills since it is used as a basic tool for communication. One key issue that has been raised is how much vocabulary students should know in learning a language to enable communication. The answer is it depends on the objective of the one in learning language. If the goal is to achieve natives like then the vocabulary size should similar to native speakers with the vocabulary size between 16,000 - 20,000 words families. However, Nation (2006) reveals that to use English well-achieving native-like is not the only way, one's might want to only communicate orally in daily life (e.g. asking direction to the train station,

describing one's holiday) and to complete this goal only 6,000 - 7,000-word families are adequate. Moreover, knowing a word is far beyond knowing the meaning of the word as Nation (1990) suggested that teachers and students are expected to know the vocabulary depth or the aspects of each new word (e.g. meaning, written form, spoken form, part of speech, frequency, collocations, register, associations). However, the role of vocabulary instruction has changed over time. Schmitt (2000) investigates the vocabulary instruction in six main approaches to language learning. First, the grammar-translation method which requires students to translate text into mother tongue and vocabulary instruction is limited to its definition. Second, the reform approach that selecting vocabulary according to word simplicity and usefulness so the word is mostly simple and practical. Third, the direct method that choosing vocabulary according to students' familiarity and the use in classroom interaction. In other words, the classroom context is the criteria for vocabulary selection. Fourth, the reading approach which emphasized language instruction and vocabulary are selected according to their usefulness and frequency than were introduced as a list of frequency words. Fifth, audiolingual which focus on syntax and structure of the language that vocabulary is viewed as an object of illustrating grammatical points. However, in this approach, too much focus on words is avoided because students might miss the concept of knowing the language since they know only the words. Sixth, a communicative language that selects the words from authentic materials according to their usefulness in real life communicating situations. Teaching vocabulary explicitly might benefit students but it also takes a lot of time. Therefore, due to the time limit in class, it would be better to teach students how to learn those words by themselves or provide activities that allow them to complete a self-study actively outside the classroom.

B) Learning Vocabulary

Vocabulary learning is also essential to language learning as much as vocabulary instruction. Gu (2003) suggested that there has not been the best method that can enhance vocabulary learning. Therefore, many research studies suggest effective vocabulary instruction consisting of four tasks for vocabulary learning.

First is repetition, the number of repeated exposures to the target word is necessary for vocabulary learning therefore, students should meet the target word about 8-10 times to acquire full word knowledge.

Second is focus on meaning and form, it is important to provide students opportunities to focus on the four strands; meaning-focused input, meaning-focused output, language-focused learning, and fluency development, to balance between meaning and form when learning vocabulary (Nation, 2008).

Third is engagement when students pay enough attention to the words they learned, they tend to learn or do the task more effectively. Stirling (2003) asserts that students who used the target words in their writing task seem to remember better than one who only saw them in the reading book. It is probably because students have to understand that word before using it and that in the end, they will acquire the word.

Fourth is interaction and negotiation, words learning is the consequence of exposure, attention, time, and manipulation which means students learn better when they interact with the target word and they lean nothing by only seeing the word on the worksheet (Zimmerman, 1997).

In the vocabulary learning process, students involve both intentional and incidental learning. Intentional or explicit learning is focused on the study of words, on

the other hand, incidental learning believes that learning happens when words are picked up while students ' attention is on the language. The maximum exposure to language is the key to an incidental approach **(**Schmitt, 2000**).** Additionally, vocabulary acquisition is an incremental process, the teacher should not only on introducing new words, but also enhancing students**'** opportunity to review the prior vocabulary learned**. (** Schmitt, 2000**).** Therefore, demonstrating the number of encounters with a new word can affect students**'** retention of vocabulary knowledge**. (** McLeod & McDade, 2011; Pigada & Schmitt, 2006; Rott, 200**7).** Chen & Teng **(** 2017**)** , measured the four dimensions of vocabulary learning, namely the recognition of word form, the recognition of word meaning, the recall of word form, the recall of word meaning is examined**.** 15 words occurred repeatedly while students reading the text given**.** The results showed that the more students encounter the words the more they can recognize and recall the words**.**

Nevertheless, vocabulary learning is an on- going process that requires a lot of time to master. Since the more students encounter with the words, the more vocabulary they can learn. It is necessary to provide students more opportunities to learn vocabulary as much as they can, especially outside the classroom where they can access the lesson anywhere and anytime.

In this section, the definition of vocabulary, the importance of vocabulary in language learning, and teaching and learning vocabulary are explained. In the following part, the Definition of a Flipped classroom, and the principles of a flipped classroom are presented.

2.3 Flipped Classroom

2.3.1 Definitions of Flipped Classroom

Flipped classroom or inverted classroom is defined in Lage, Platt & Treglia (2000, p. 32) as "events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa". Moreover, Bergmann, Overmyer & Wilie (2011) state that a flipped classroom is an approach that transfers learning responsibility from the teacher to the student. In other words, a flipped classroom is student-centered learning which allows students to prepare themselves for the lesson by watching videos, listening online as well as group discussion and applications during class time. However, a flipped classroom is not about using the videos instead of teachers, but it is about how to use class time with students effectively and actively. During the class time student achieve supporting activities such as finding the answer for questions together, group working, problem-solving are recommended.

Bergmann and Sams (2012, p. 13) state that "Basically, the concept of a flipped class is that which is traditionally done in class is now done as homework". Moreover, Schmitt (2000) mentions that teaching in class is not the only effective way of teaching vocabulary, but assigning student homework which introduces them to new words would be a more productive approach for students. Students can learn a new lesson through the assignment and when they come to the class teacher can elaborate and give more explanation about the lesson and consolidate them into classroom activities. Since students can preview the lesson or learn by themselves before coming to class, then teachers have more time for time to do class activities such as application exercises, team-based learning or game-based learning. These learning approaches are highly moving students from passive receivers to become active learners. Thus, the

teachers' roles in a flipped classroom are only to monitor student learning progress, check for understanding and provide feedback when necessary. Since a flipped-classroom approach has been growing and attracting attention in the educational setting. Therefore, many teachers have started to blend the flipped classroom approach into the classroom.

The theoretical foundations underpinning flipped classroom include Blended Learning Theory (BLT) which may be considered to be under the umbrella of Active Learning Theory. Blended learning is the theoretical precursor for the flipped classroom as it is an approach that combines face- to- face instruction, computer-mediated activities, and online learning (Alonzo, Lopez, Marinque, &Vines, 2005). Blended learning was proposed to minimize the weakness of a fully online course. Blended learning allows students to meet the instructor and peers for discussing the difficult concepts or assignments. Matsumoto (2016) mentioned that the flipped classroom is a kind of blended learning because of its combined face-to-face and out of class learning environment together. Active learning is a key aspect of the flipped classroom because, in flipped classrooms, students watch videos and online lectures outside of class. Therefore, class time is used to solve problems and other activities.

Flipped classroom is also supported by the theory of Bloom's revised taxonomy by Anderson and Krathwohl (2001) that students can practice lower levels of cognition such as remembering and understanding outside the class hour, and more focusing on the higher levels cognitive thinking activities in class because they can refer directly to the instructor for guidance and feedback. Since the out of class resources can help students to develop their understanding and remembering level, therefore, in-class

time can be more contributed to activities and students' participation in class (McCarthy, 2016).

2.3.2 Principles of Flipped Classroom

Flipped Classroom is one of the blended learning approaches which has been known as an alternative instructional strategy. It is intentionally moving lectures and content into the online out-of-class learning environment, while in-class time is devoted to face-to-face active learning which aims to increase students' engagement by asking questions and discuss with their friends. To use the flipped classroom effectively, the University of Houston-Downtown (2018) suggests the principles of the successful flipped classroom as follows.

1. Provide an opportunity for students to gain first exposure, prior class

2. Provide an incentive for students to prepare for class

3. Provide a mechanism to assess student understanding

4. Provide a clear connection between in-class and out-of-class activities

5. Provide clearly defined and well-structured flipped classroom activities

6. Provide adequate time for students to carry out their assignments

7. Provide facilitation and guidance that supports a learning community

8. Provide prompt and adaptive feedback on group and project work

9. Provide technologies familiar and easy to access

Moreover, there are four elements of a flipped classroom approach that was proposed by the Flipped Learning Network™ (FLN, 2014). The 'FLIP' is explained as follow;

"F" refers to flexible environments that provide students flexible time of learning.

"L" refers to learning culture that the role of a teacher has shifted from leader to guider or facilitator. The class becomes more student-centered.

" I" refers to intentional content which means the decision of content choosing whether it should be taught in class or student can learn it out of class. To maximize class time in teaching.

"P" refers to professional educator which means teacher act like an educator but not the leader, observe students during the course, and sometimes give them instant feedback.

According to Bergmann and Sams (2012), instead of transferring knowledge directly, the teacher should act as a guide to make learning easy and creating a learning condition based on questioning. Class time should be contributed to correcting students' misunderstandings, increasing participation as well as creating interactive discussion conditions. In terms of students, instead of receiving knowledge passively, they become more active in learning by taking their learning responsibilities, participating in class and team working. (Bergmann & Sams, 2012). Therefore, the roles of teachers and students in the flipped classroom are shifted from the traditional. Flipped classroom transfers learning responsibility from the teacher to the student classroom.

In this section, the definition of the flipped classroom, the principles of a flipped classroom, and the flipped classroom in language are presented. In the next part, the definition of gamification, the principles of gamification, and the gamification in language learning are described.

2.4 Gamification

2.4.1 Definitions of Gamification

Gamification is normally referring to the use of game elements in a non-game context. However, the definitions of "gamification" are described by many scholars. For example, Zichermann (2011) said that gamification is the "process of using game thinking and mechanics to engage audiences and solve problems." Similar to Kim (2011), who states gamification as "using game techniques to make activities more engaging and fun" Later, Kapp (2012) combines elements from several definitions and give a new explanation as "Gamification is using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems". In other words, using gamification can help students to a thing they normally consider boring and engage more with the task in a classroom setting.

2.4.2 Principles of Gamification

Kapp (2012) elaborates each element of gamification as follow:

Game-Based. The goal is to create a system in which learners, players, engage in an abstract challenge, defined by rules, interactivity, and feedback that results in a quantifiable outcome ideally eliciting an emotional reaction. The goal is to create a game in which people want to invest brain share, time, and energy.

Mechanics. The mechanics of playing a game include levels, earning badges, point systems, scores, and time constraints. These are the elements that are used in many games. Mechanics alone are insufficient to turn a boring experience into a game-like engaging experience, but they are crucial building blocks used during the gamification process.

Aesthetics. Without engaging graphics or a well- designed experience, gamification cannot be successful. The user interface or the look and feel of an experience is an essential element in the process of gamification. How experience is aesthetically perceived by a person greatly influences his or her willingness to accept gamification.

Game Thinking. This is perhaps the most important element of gamification. It is the idea of thinking about everyday experiences like jogging or running. Then convert it into an activity that has elements of competition, cooperation, exploration, and storytelling.

Engage. An explicit goal of the gamification process is to gain a person's attention and to involve him or her in the process you have created.

People. These can be learners or players who will be engaged in the created process and who will be motivated to take action.

Motivate Action. Motivation is a process that energizes and gives direction, purpose or meaning to behavior and actions. For individuals to be motivated, the challenge must not be too hard or too simple. Driving participation in an action or activity is a core element in gamification.

Promote Learning. Gamification can be used to promote learning because many of the elements of gamification are based on educational psychology and are techniques that teachers have been using for years. Items such as assigning points to activities, presenting corrective feedback, and encouraging collaboration on projects have been the staples of many educational practitioners.

Solve Problems. Gamification has a high potential to help solve problems. The competitive nature of games encourages many to do their best to accomplish the goal of winning

In sum, Kapp (2012) concludes that when gamification is employed properly in a classroom setting it can create the power to engage, inform, and educate. The use of game-like or fun in gamification can promote the learning and engagement of the students. Moreover, in the classroom setting the positive outcome and behavior changes can be seen as the result of the gamification process.

In this part, the definition of gamification and the principles of gamification are explained. The previous studies of flipped classroom and gamification in language learning will be presented in the following section.

2.5 Related Studies

2.5.1 Flipped Classroom in Language Learning

In recent years, the flipped classroom approach has grown and attracted attention in education. Many instructors started to blend a flipped classroom approach into their course. Since the instructional methodologies may not always suit the changing needs of students, the flipped classroom provides student's opportunity to learn at their own pace. Repeated exposure to the learning materials is the strength of the flipped classroom. Focusing on language learning, Chen Hsieh (2017) studied the benefits of a flipped classroom model for learners of English as a foreign language. The students were required to learn idioms by verbal communication, and use the LINE smartphone application to complete the out of class activity. During eight weeks of the

experiment, students had to use the Line Application for extensive online written for learning Idioms. At the end of the course, students took the tests and questionnaires, and the results showed that the flipped classroom model is not only enhanced students' motivation but also make them become more active in using idioms in class. Therefore, the flipped classroom was successful in achieving the instructional goals of this class.

Another study by Leis, Cooke, and Tohei (2015), who studied the use of flipped classroom in EFL writing class. Students complete the writing task through the flipped classroom, which allows students to practice and learn the language, before class. After learning through this method for the whole semester. Students' pretest and posttest scores were analyzed, and the results revealed that students favored the ability to repeat the task in a flipped classroom because they can re-watch or replay the online sources anytime. Moreover, when coming to class students were more active in learning and discussing with friends.

Sung (2015) also conducted a study on a flipped classroom in an EFL content course. Before class, the students were guided to preview lessons on an online platform called the "Kakao Talk" application. Then, in class, they did the group work, collaborative activities and shared the idea. After fifteen weeks of the quantitative research, students have to give feedback through reflective learning logs. The finding revealed that students view the flipped classroom positively despite they face the difficulties to adjust themselves at first. Additionally, the learning performance of students also improved after the use of the flipped classroom.

Ekmekci (2017), conducted a study in Turkey aiming at developing Turkish EFL students writing performance. The flipped writing class model was applied to 23

students for fifteen weeks. Students required to watch the brief video of tomorrow's topic online, then discuss it with peers or teachers for more explanation. In class, students have more time to complete the writing task since they have prepared for the class activities at home. After fifteen weeks of the experiment, students took the tests to see how the flipped classroom helps them learn. The result indicated that students who study with a flipped writing class model were outperformed on writing performance compared to the others who study in a traditional class.

In Thailand, there was an attempt to integrate flipped classroom instruction into language classrooms as well. The study was conducted by Thaichay and Sitthitikul (2016), who investigated the effects of flipped classroom instruction on language accuracy and active learning environment with the Thai upper-secondary students. Students learn by themselves outside the classroom by watching videos and reading the texts before coming to class. After ten weeks of the experiment, the findings from the study reported that the flipped classroom instruction helped students improve their language accuracy. Moreover, the results also revealed that students had a positive attitude towards the use of flipped classroom instruction.

Many studies above have shown that flipped classroom significantly enhances students' learning performance, students' engagement and also students' motivation (Day & Foley, 2006; Hung, 2015; Dill, 2012; Strayer, 2012). As Klem and Cornell (2004) state that students' engagement contributes to successful learning performance, which means the more students involved in the learning process the more progress learning they gain. To sum up, in an EFL environment, students can learn the target

language most when they use it (Mehring, 2016). Thus, students should have more time to practice the language outside the classroom.

Regarding the benefits of the flipped classroom which can help teachers maximize the teaching time and allow students to learn the lesson outside before the class, the researcher proposes the GFCA to help SUT students improve their English vocabulary learning. Due to the reasons mentioned above, the class time was contributed to the activities such as group discussion, sharing the idea and asking questions which help students to use and practice their English vocabulary as much as possible.

In this section how the flipped classroom is integrated and used in the language, the classroom is discussed. Next, how gamification plays a role in language learning will be presented.

2.5.2 Gamification in Language Learning

According to Brown (2009), motivation is an important factor that students need to learn a second language. Moreover, to set positive changes in behavior, students need to be motivated to learn. From all strategies that exist gamification is the one that deals with both intrinsic and extrinsic motivation, which can help the student enhance the language learning experience as well as solving the task or challenge in the class. In this regard, gamification has been applied in the field of education and a second language to facilitate learning and adjust students' behavior. The engagement that student experience in-game and educational context help in increasing their knowledge. Focusing on foreign language, gamified the ESL classroom by telling the students in the first class that they all had an "F". To receive "A" students need to gain XP and

read a specific level. The students learning a language by playing games and activities in class. At the end of the class, the findings show that students gain more knowledge compared to the normal classroom. (Wichadee & Pattanapichet 2018).

Danowska-Florczyk & Mostowski (2012) presented the finding of their study to support the use of gamification as a supplement in teaching Polish as a foreign language. The researchers revealed that the elements of games (good competition, character development, improvement, inspiring and creative challenges, activity) were adapted and integrated as a milestone in teaching Polish as a foreign language. The results also showed that students' motivation is increased as well as the rate of memorizing new language structures.

Chik, 2012, also investigated the relationship between digital gameplay and second language learning in Hong Kong. All participants speak Cantonese or Mandarin as their first language and learn English as their second language. The researcher explores how a Chinese-speaking gamer managed their digital gameplay for learning a second language by interviewing and analyzing the recorded gameplay sessions. The results showed that students' English proficiency has been improved.

Bakar and Nosratirad (2013), who investigate the vocabulary learning among ESL adult learners by employing the computer game called "SIM 3". Students were examined on how they learn the language while playing the game. After two months of experimental, the data from the playing session observations, interviews and tests were analyzed. The findings revealed that the participants learn the vocabulary they experienced in-game and their vocabulary knowledge was improved

One study from Garcia (2013), the "Duolingo" a free online language site, was used to supplement the teaching of Polish as foreign languages. The students gain points by translating texts in their second language. The study aims to examine the Duolingo's effectiveness concluded that the element of gamification had a definite positive impact on learning. The positive impact in this study can be contributed to the elements of gamification since the students feel a sense of achievement when getting points and challenged when not. Therefore, students are motivated to learn more and more to win the game and learning the language at the same time.

Anyaegu, Ting and Li (2012) investigated how a serious game called 'Mingoville' could motivate, engage, and arouse the EFL Chinese learner interest. Students learn the English language through the activity of the Mingoville game application for the whole semester. After students had learned with the game activities for the whole semester, the findings indicated that students preferred learning English with Mingoville because the game was fun and made them feel relaxed. Similarly, a study from Lam (2014), who investigated the usefulness of using web 2.0 games to help students in Macau learn English vocabulary. After learning with the web 2.0 game for one semester, students have to give feedback about how their opinion and attitude towards the use of web 2.0 games in learning English vocabulary. The results also supported that students favored using the gamification when learning vocabulary since it was more fun and exciting.

Another evidence from Shatz (2015) conducted a study by using gamification to promote the risk-taking of students in learning foreign vocabulary. The students were all English natives who learn Finnish as a second language. Students had

learned vocabulary through gamification methods for the one-semester. Then, the results from students' tests were analyzed to see whether their vocabulary knowledge has been promoted. The result of the study highlights that gamification can be used to promote students' risk-taking in learning vocabulary. The increase in students' risk-taking in the study is contributed to gamification. As a player, students are engaged in a target language environment. And the game environment also helps students to reduce the anxiety levels while completing the task.

As the 21st century, the field of language learning has become more technology-oriented as well as adopted the concepts of gamification to support the digital natives learning styles. The students who are "digital natives" were described by Prensky (2001) that they have different styles of their learning process which the traditional classroom does not fit their needs. Therefore, the use of gamification or game elements in a non-game context, which allows them to learn on their own in a joyful environment, can promote positive learning compared to the traditional classroom. As in the One Computer Classroom (OCC) by the primary Education Service Office in Thailand. The project was launched in 2013 to analyzed teachers' needs and innovative pedagogies. The result discovered that the students learn best when they are in control of their learning. To do that, integrating game elements into the classroom is needed. Gamification is generally be understood as the use of the game-based element, such as game mechanics and game dynamics in a non-game context which can create a sense of playfulness, with the sense of playfulness students can learn better. (Burke, 2014). Moreover, role-playing in gamification which allows students to interact actively and take control of their learning while playing games could increase the positive learning outcome. Therefore, many teachers are challenged to design appropriate learning tools

by integrating game elements or gamification in learning activities. In this study, the researcher used the gamified flipped classroom application (GFCA) to support both in-class and out-of-class activities to help students on learning English vocabulary.

In this section how the gamification or game elements are integrated into the language classroom is discussed. In the following section, how gamification and flipped classrooms are combined into a language classroom are then presented.

2.5.3 Gamified Flipped Classroom in Language Learning

The result of the rapid change in technology developments has affected all areas of human life. Especially, in the educational setting which many learning environments have been changed and reformed. Many teachers try to integrated technology into class and searching for a new teaching model to fulfill the changes of classroom objectives that have been changed by the developments of technology. Language learning is also expected to benefit from the use of technology in the classroom since it can provide more active learning activities and learning environments that encourage students to learn (Tayebinik and Puteh 2012). In response to that, the combination of gamification and flipped classrooms might be the answer to this context.

The design of the GFCA consists of two main areas. Firstly, the out-of-class activities which allow students to explore the lesson through GFCA. This environment allows students to experience the game mechanics system such as points, badges, leaderboard and feedback which motivate them to learn. Secondly, the in- class activities that are more focused on group discussion and problem-solving. In this session, students can generally ask a question in class and contribute the time to discuss

with their teammates. Due to these reasons, game-based learning or gamification becomes one of the most interesting learning approaches that many teachers attempt to integrate into the classroom.

Applying a portable technology such as mobile phones, tablets, and laptops is a modern way of learning in the 21st century. It is easy and flexible so that students can learn anywhere anytime. To promote a more flexible learning environment a flipped classroom is suggested by many researchers. By taking the advantages of technology, a flipped classroom allows students to control their learning outside the classroom which leads to the increasing of student-centered learning. Matsumoto (2016) conducted a study where the flipped classroom is used as a technology to access instructional outside the classroom and supported by the use of game-based learning. Similar to many previous studies, the findings show that students' learning has improved and students have perceived positive perceptions towards a flipped classroom (Matsumoto, 2016; Butler 2015).

In recent years, it is common to see students using technology such as laptops smartphones to play a game in the classroom. As in Kose, Cimen and Mede's (2016) study, they investigate the effects of Quizlet, an online game website, on vocabulary development of Turkish EFL students. After seven weeks of learning with Quizlet, they took the vocabulary tests to whether their vocabulary has improved. The results of the study indicated that using Quizlet had a great impact on students' vocabulary development because they encounter the vocabulary more frequently than in the traditional classroom. Moreover, students become more active in learning since the Quizlet is more fun and motivated when it was integrated into learning vocabulary. It is shown that games become one activity that students spend most of their free time on.

The elements of the game can motivate students to play and want to pass each state with the highest score since they have to compete with their friends. Similar to Butler (2015), who conducted a study that aims to investigate students' perception towards the use of a flipped classroom and gamified approach. After the experimental periods where students learn with the flipped classroom approach and gamification students took the tests and respond to the questionnaires. The results show that students favored the flipped gamified classroom because this allows them to progress at a self-determined pace and structure manner. Moreover, students can access their achievements and review their progress. In terms of collaborative learning, game mechanisms also encourage students to engage more in group work to gain team awards.

Many of the previous studies rely on attitudes and motivations. Only a few showed students' improvements in achievement and understanding of learning outcomes when using gamification in the classroom. Therefore, more studies need to focus on measuring improvements in learning. Additional studies should also focus to clarify best practices for integrating technology into classrooms. To fulfill this gap, the researcher would like to integrate technology into language classrooms in Thailand by proposing the use of gamified flipped classroom application (GFCA), as a tool for better learning and teaching experience, to help SUT students improve their English vocabulary learning.

In the next chapter, the research methodology including subjects of the study, research instruments, research methodology, and research design, data collection, data analysis, and the pilot study are then discussed.

CHAPTER 3

METHODOLOGY

The purpose of this chapter is to describe how the study is carried out. It explains the background of the subjects, constructions of research instruments. Then research methodology, research design, and variables of the study are presented. Later, data collection and data analysis are explained. Finally, the pilot study is discussed.

3.1 Subjects

The subject in this study was a group of students who enrolled in English for Specific Purposes course (213204) in the first trimester, the academic year of 2019 at Suranaree University of Technology (SUT). There were 74 students, which are 41 male and 33 females, participated in this study. The average ages of students are 20 years old, with an average of 15 years of English study. The non-English major students from the School of Management Technology were purposively selected as the subjects of this study. The researcher chooses a purposive sampling method because this method allows the researcher to select the subjects based on the objective of this study (Crossman, 2019). Therefore, the subjects of this study were selected from two intact classes of the English for Specific purposes course.

3.2 Research Instruments

The constructions of the research instruments were carried out after a consultation with research professionals and research experts in the English language teaching field. Five research instruments of this study are presented as follows.

3.2.1 Gamified Flipped Classroom Application

The Gamified Flipped Classroom Application (GFCA) was developed by the researcher to help students who enrolled in English for Specific Purposes course (213204) learning English vocabulary. The GFCA was designed based on gamification techniques and elements to make learning activity more fun and engaged. In this study, the concepts and game designs of the "Classcraft" application were used as instruments. Classcraft is an educational online platform that employs techniques of role-playing games to create a collaborative and supportive environment in learning (Milyakani, 2016). The following are the details of how GFCA is constructed.

Step 1: Conducting a survey of student's difficulties in learning English. The researcher conducted a survey of students' difficulties in learning English in order to explore the students' difficulties and students' needs for English language learning.

Step 2: Designing the contents and lessons for GFCA. The researcher studied the current curriculum of English for Specific Purposes course, which is one of the English courses for students at Suranaree University of Technology, before designing lesson plans and content of the GFCA.

Step 3: Developing the GFCA. The researcher developed the initial draft of the GFCA prototype. Before launching in the pilot study.

Step 4: Conducting the pilot study. The GFCA was used for in-class and out-of-class activities in the pilot study to find out if there were any problems. Then, the GFCA was changed and modified according to the problems found.

Step 5: Finalizing the GFCA. After the completion of modifications of the prototype based on results from the pilot study, the researcher finalized the GFCA for use in the main experiment. (see Appendix E)

3.2.2 Lesson Plans

In the traditional classroom, most of the class time are devoted to teacher lecturing, workbooks, and much paper- based homework. The Gamified Flipped Classroom Application (GFCA) is, on the other hand, the face-to-face activities and out of class learning environment are integrated to allow students to take control of their own learning and the class time can contribute to discussion or group work.

In the present study, the lesson plans are developed based on the learning theories, namely learning motivation, operant conditioning, self- determination, distributed practice, and blended learning, in order to support students learning activity and create a new experience of learning.

Table 3.1 GFCA's activities

GFCA	Activity	Description
Out-of-class (Flipped stage)	Trial	Students learn new vocabulary through PowerPoint slides and explore words' meaning and synonyms before go to the "Mission" activity.
Out-of-class (Flipped stage)	Mission	Students practice vocabulary learn by playing matching vocabulary games. After finishing, the "Mission" students can proceed to the "Quest" activity.
Out-of-class (Flipped stage)	Quest	Students practice vocabulary learn by answering the question in "Quest". Students have to choose the correct answer and type one word to complete the sentence then submitted it to the teacher.
In-class activity (Face to face)	Boss battle	Students review vocabulary learn in the "Boss battle" activity which the teacher can use as a formative review to evaluate students after they have learned on their own outside the classroom.

As shown in Table 3.1, the out of class activities such as "Mission" and "Quest" allows students to learn at their own pace. These activities provide students more opportunities to expose to the language since they can repeat the task over and over again. As a result, students will be able to learn more because they can control their own learning and become more active learners. Additionally, in-class activities such as "Boss Battle", "the Wheel of Destiny", "the Riders of Wheels" and "the White Mountain" allow students to participate in class and interact more with their friends and teachers, which can promote students their learning in class. Details of each course are explained in Table 3.2

Table 3.2 Course timeline

Week	Out-of-class activity	In-class activity
Pretest and training hour	-	-
Week 1 Unit 1 Animals	First Trail 1 Mission 1	Boss Battle Unit 1
Week 2 Unit 1 Animals	Quest 1	Boss Battle Unit 1
Week 3 Unit 2 Environment	First Trail 2 Mission 2	Boss Battle Unit 2
Week 4 Unit 2 Environment	Quest 2	Boss Battle Unit 2
Week 5 Unit 3 Health and Fitness	First Trail 3 Mission 3	Boss Battle Unit 3
Week 6 Unit 2 Health and Fitness	Quest 3	Boss Battle Unit 3
Week 7 Unit 4 Discovery and innovation	First Trail 4 Mission 4	Boss Battle Unit 4
Week 8 Unit 4 Discovery and innovation	Quest 4	Boss Battle Unit 4
Week 9 Reviewing 4 unit	The last treasure	Boss Battle
Week 10 Post-test	-	-

As shown in Table 3.2, the researcher containing the contents from the English for Specific Purposes course developed the course timeline and the lesson plans. And the steps to construct the lesson plans were as follow;

Step 1: The researcher studied English for the Specific Purpose (213204) course syllabus that currently used at the School of Foreign Languages, Suranaree University of Technology.

Step 2: The researcher developed lesson plans that learning activities were supported by the use of a GFCA.

Step 3: The lesson plans were examined by the three experts in the English language teaching field who has been teaching English courses at SUT. The experts examined the lesson plans based on the criteria evaluation form.

Step 4: The researcher improved and revised the lesson plan before using with the subjects.

3.2.3 Vocabulary Test

The vocabulary test developed by the researcher was employed as a parallel of the pre-test and post-test for the subjects. The tests were used for measuring the students' vocabulary learning achievement before and after the experiment. The test was multiple choices. There were fifty items total, twenty-five items each for pretest and posttest. The twenty-five items consist of two parts, nineteen items were sentence completion and six items were text completion. The experts in the English language teaching field examined the test to measure their validity and reliability (IOC), then the test was tested in the try-out process again before using it in the real experiment. The test development was conducted as follows.

Step 1: The researcher studied English for Specific Purposes (213204) course syllabus, then set the testing objective corresponding to the learning objective for GFCA.

Step 2: The researcher studied and consulted with the experts in the English language teaching field about the testing principles and procedures of the test construction.

Step 3: The researcher specified the test specifications.

Step 4: The researcher developed a multiple-choice test for 80 items.

Step 5: The tests were sent to the three experts who were academically qualified for a content validity check. The experts in this study were English teachers who have several years of experience in integrating technology in teaching English courses at SUT. The Item-Objective Congruence (IOC) was used to evaluate the items of the test based on the score range from -1 to +1. Congruent = + 1 Questionable = 0 Incongruent = -1. The items that had scored lower than 0.5 were revised. On the other hand, the items that had scores higher than or equal to 0.5 were reserved (Lambensa, 2017). In this study, the average IOC scores of the test item are 0.83 (see Appendix A). The contents were then adjusted from their advice and the test results, respectively.

The Index of Item – Objective Congruence Formula.

$$IOC = \frac{\sum R}{N}$$

∑R = Total scores from the experts are

N = Number of the experts

Step 6: A test pilot was conducted with 85 students, who were not the subjects of the study, in the second trimester of the academic year 2018.

Step 7: Based on the data obtained from the test pilot, an item analysis was carried out. Each question was analyzed for the level of difficulty and discrimination index.

Test Difficulty Formula

$$P = \frac{R_H + R_L}{N_H + N_L}$$

p = Difficulty of the test

RH = Number of students who answer a test item correctly in the high group

RL = Number of students who answer a test item correctly in the low group

NH = Number of students in the high group

NL = Number of students in the low group

Discrimination Formula

$$r = \frac{R_H - R_L}{N_H + N_L}$$

r = Discrimination index

RH = Number of students who correctly answered in the high group

RL = Number of students who correctly answered in the low group

NH = Number of students in the high group

NL = Number of students in the low group

Step 8: Test items were selected as a pre-test and a post-test with 25 items in each, according to the levels of difficulty and discrimination index. In general, the acceptable range for levels of difficulty is between 0.2-0.8 (Kelly, 1939). In this study, the level of difficulty of pre-test and post-test was 0.65 and 0.66 respectively. This means both pre-test and post-test contain the test items that were acceptable. Moreover,

the levels of difficulty that are slightly higher than midway also have more chances to differentiating students. (see Appendix A)

For the discrimination index of the test, the values can range from -1.0 to +1.0, where the values between 0.1-0.3 are acceptable and higher than 0.3 is good (Kelly, 1939). In this study, the discrimination index of pre-test and post-test was 0.38 and 0.37 respectively. This means the discrimination index of both pre-test and post-test was good and can be used to differentiate between students who know the subject matter and who do not (see Appendix A).

Step 9: The reliability of the tests was checked, using the coefficient method of Kuder-Richadson20 (KR-20). The score ranges from 0 to 1, the closer the score is to 1 the more reliable the test. In general, the acceptable scores of KR-20 is above 0.5 and usually considered reasonable (Kelly, 1939). In this study, the reliability score of the pre-test and post-test was 0.8096 and 0.8012 respectively. This means the reliability of both pre-test and post-test was acceptable (see Appendix A).

3.2.4 Questionnaire

The questionnaire was designed to gather more information from the subjects of the study. There were two-part in this questionnaire. The first part was about general information of the students, including age, gender, and English language background. The second part was about the students' opinions towards the use of Gamified Flipped Classroom Application (GFCA) on learning English vocabulary, including 15 items adapted from Wichadee (2018). For each item, students gave their opinion by selecting one out of five levels of their agreement. In order to gain the depth information from the subjects, the questionnaire was conducted in the native language to prevent the

language barrier to happen. The Likert scale (Five-point scale) was used to measure students' opinions level. The five Likert scale consists of two parts: a declarative statement and a list of responses level ranging from "Strongly Agree" to "Strongly Disagree".

5	refers to	Strongly agree
4	refers to	Agree
3	refers to	Undecided
2	refers to	Disagree
1	refers to	Strongly Disagree

Based on the Likert scale form, the statement in the questionnaire was constructed and developed using the following steps.

Step 1: The researcher studied literature and reviewed a document about how to construct the questionnaire.

Step 2: The researcher constructed fifteen statements based on the use of GFCA.

Step 3: All of the statements were examined by three experts in the English language teaching field for content validity.

Step 4: The questionnaire was sent to the three experts to check the content validity by using the Index of Item-Objective Congruence (IOC) formula. The questionnaire was checked by three experts in the language field. The Item-Objective Congruence (IOC) is used to evaluate the items of the questionnaire based on the score range from -1 to +1. Congruent = +1 Questionable = 0 Incongruent = -1. The items that had scored lower than 0.5 were revised. On the other hand, the items that had scores

higher than or equal to 0.5 were reserved (Lambensa, 2017). In this study, the average IOC scores of the questionnaire were 0.98 (see Appendix B), therefore, All Items in the questionnaire of the present study were reserved.

3.2.5 Semi-Structured Interview

In this study, the semi-structured interview was used to gain in-depth data of students' opinions after using a Gamified Flipped Classroom Application (GFCA) on learning English vocabulary. The semi- structured interviewed was used to extract student's responses regarding their opinions towards the use of GFCA and their experience. In the present study, student's opinion was understood as to how students evaluate the use of GFCA and how students value the experiences learning through GFCA in relation to their learning success. As Johnson (1998) mentioned if the goal of the interview is to share perception, belief or behavior among the relatively homogeneous group, the researcher does not need many participants because the number of twelve is likely to be sufficient. Additionally, to reach the saturation of the data collection, Bertaux (1981) stated that fifteen interviews are likely to be sufficient for describing interviewee's experiences, since the researcher is learned a great deal from the first few interviews already, therefore, more interviews confirmed what the researcher has already sensed. Therefore, in this study, nineteen students were purposively selected as the interviewee.

The interview traditionally is conducted face to face and one-on-one with the researcher taking directly to one interviewee at a time. (Thomas, 2003), therefore, in this study, the interview was held by the researcher asking the interviewee a question individually, the interview was held in the interviewee's native language (Thai) and

each interview lasted three to five minutes. Four guided questions of the interview were predetermined and there was sufficient flexibility to allow the interviewees an opportunity to shape the flow of information. The data from the interviews were useful to confirm and triangulate the results from the preliminary findings of this study

The guided questions were sent to the three experts to find content validity. The Item- Objective Congruence (IOC) is used to evaluate the questions based on the score range from -1 to +1. Congruent = + 1 Questionable = 0 Incongruent = -1. The items that had scored lower than 0.5 were revised. On the other hand, the items that had scores higher than or equal to 0. 5 were reserved (Lambensa, 2017). In this study, the average IOC scores of the questionnaire are 1. 00 (see appendix C), therefore, all questions were reserved.

3.3 Research Design

The study was an experimental research with both qualitative and quantitative methods. The researcher developed the Gamified Flipped Classroom Application (GFCA) to help students improve their vocabulary learning. The purposes of this study were (i) to develop the GFCA for learning English vocabulary, (ii) to investigate the effects of GFCA on learning English vocabulary, and (iii) to explore students' opinions towards learning English vocabulary through the GFCA. The experiment was conducted by the researcher in the first trimester of the academic year 2019. The researcher developed the Gamified Flipped Classroom Application (GFCA) employing the Classcraft application for students' vocabulary learning. This research design includes a pretest, followed by a treatment, and a post-test for a single group (Creswell, 2003). The students' vocabulary learning achievement before and after the experiment

was measured by pretest and posttest. Then, the data obtained were analyzed to find out the statistics outcome whether the vocabulary learning achievement has any significant differences. Later, the questionnaire and semi-structured interviews were administered to the subjects to gain in-depth information. The study is pre-experimental research using a one-group pretest-posttest design.

$$O1 \text{---} X \text{----} O2$$

X = an experimental variable, the effects of which are to be measured.

O = the measurement recorded from pre-test and post-test

3.4 Research Procedure

Before learning English vocabulary through Gamified Flipped Classroom Application (GFCA) students have to take pretest which was a 25 items vocabulary test. Then, students learn by themselves from the out-of-class activity, which allows them to explore new vocabulary and practice vocabulary learn online through the GFCA prior class. Once students come to class, class time is dedicated to face to face activity which allows students to participate and interact more with classmates. After 10 weeks of experiments, students have to take a posttest (25 items, vocabulary test). Later, a questionnaire, and a semi-structured interview was administered. The research procedure can be illustrated as in figure 3.1
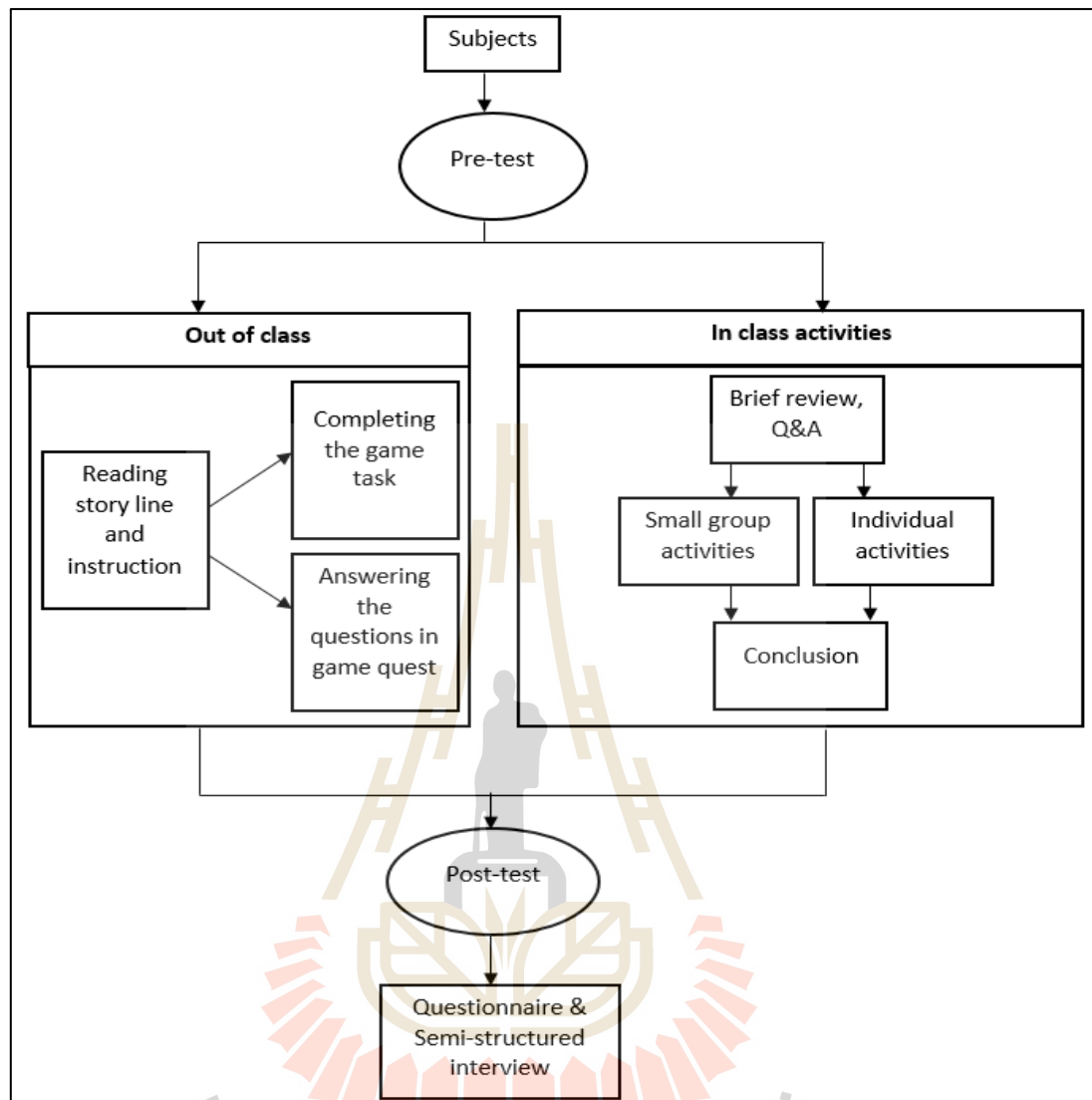
Figure 3.1 Research procedure of the present study

3.5 Variables of the Study

There were two main types of variables in this study; independent and dependent variables. The independent variable was the Gamified Flipped Classroom Application (GFCA). The dependent variables include; (i) vocabulary learning achievement which was measured by the pre-test and post-test scores of the students, (ii) students' opinion on learning English vocabulary through GFCA which was interpreted by the data obtained from questionnaire and interview.

3.6 Data Collection

The procedures of data collection were as follows;

Step 1. The researcher conducted the pretest with the students in the first week of the course.

Step 2. The gamified flipped classroom application (GFCA) was introduced to students. Then, the teaching methods were executed followed by the lesson plan with 10 weeks of the experimental period.

Step 3. The researcher conducted the posttest with the students at the end of the course.

Step 4. Later, students responded to the questionnaire about their opinions towards the use of GFCA on learning English vocabulary.

Step 5. The interview was held with the students to gain more in-depth information about students' opinions towards the use of GFCA on learning English vocabulary.

3.7 Data Analysis

The data obtained from different methods were analyzed and interpreted as follows.

3.7.1 Quantitative Data

The data were analyzed by means of the Statistical Package of Social Sciences (SPSS). The T-test was used for testing the pretest and posttest and analyzing the difference between pre-test and post-test scores. The questionnaires were analyzed

and interpreted by mean ($\bar{x}$) and standard deviation (S.D.) using Microsoft Excel. The

data from the Likert scale were calculated and interpreted by the criteria in Table 3.3.

Table 3.3 **The criteria for Likert scale interpretation**

Means ($\bar{x}$)	Interpretation
4.21- 5.00	Very good opinion
3.41 - 4.20	Good opinion
2.61- 3.40	Moderate opinion
1.81- 2.60	Bad opinion
1.00- 1.80	Very bad opinion

The criteria for interpreting the data was taken from a range divided by

numbers of levels created. This is $(5-1) \div 5 = 0.80$. and the means were increased by

0.80 for each level (Ruengprapan, 1996).

3.7.2 Qualitative Data

The semi-structured interview was held in the students' native language.

Each interview lasted three to five minutes. While interviewing, an audio-recorder was

used then the data was transcribed. Then the students' answers are grouped and

categorized in themes.

3.8 Pilot Study

The subjects in the pilot study were twenty-five second-year students with an

average of fifteen years of English studying, from the Institute of Engineering, who

were taking English for Careers (213305) course in the third trimester, the academic

year 2018 at Suranaree University of Technology. They had already studied the content

of English for Specific Purposes (213204) before taking this course. The pilot study

was designed to collect both qualitative and quantitative data. The purpose of the pilot

study is to evaluate the accessibility, feasibility, and appropriateness of the Gamified

Flipped Classroom Application (GFCA) and other instruments (pre-test, post-test, questionnaire, and interview). Moreover, the results from the pilot study were expected to provide significant data for developing and refining the instruments before the main experiment. The pilot study was done under the same conditions that were employed in the main experiment. In order to make the process effective, the steps of piloting were conducted as follows.

Step 1. The researcher reviewed and studied how to conduct a pilot study.

Step 2. The researcher defined the objectives of conducting a pilot study.

Step 3. The researcher consulted with experts about the appropriateness of a gamified flipped classroom application (GFCA) for teaching English vocabulary. Then the GFCA was modified according to the comments.

Step 4. The researcher specified a group of subjects, a timeline, and an evaluation approach and conducted the pilot study.

Step 5. After the pilot study was done, the questionnaire was administered to the students and the semi-structured interview also was held.

3.8.1 Results from Pilot Study

After leaning with a Gamified Flipped Classroom Application (GFCA), students' vocabulary knowledge had been improved as shown in table 3.4

Table 3.4 Students' mean scores after learning with GFCA

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	posttest - pretest	4.24000	4.19603	.83921	2.50796	5.97204	5.052	24	*.000

*p<0.05

According to table 3.4, the mean score of the post-test is different from the

pre-test and the p-value was lower than 0.05. Therefore, it can be concluded that there

was a statistically significant difference between the pretest and posttest mean scores,

and the use of GFCA help students improved their vocabulary knowledge. Moreover,

the results from the questionnaire also showed that students favored the use of GFCA

on learning English vocabulary, as shown in Table 3.5

Table 3.5 Students' opinion towards the use of GFCA on learning English vocabulary

No.	Items	Mean	S.D.	Interpretation
1.	Students think learning English vocabulary through GFCA makes them ready for class activities and group discussions.	3.96	0.735	Good Opinion
2.	Students think learning English vocabulary through GFCA makes them more confident to ask the question in class.	3.84	0.688	Good Opinion
3.	Learning English vocabulary through GFCA encourages students to participate more in class.	3.88	0.881	Good Opinion
4.	Students like learning English vocabulary GFCA because they can manage their own learning.	4.08	0.702	Good Opinion
5.	Learning English vocabulary through GFCA gives students more opportunities to study outside the classroom.	4.28	0.614	Very Good Opinion
6.	Students believe that leaning English vocabulary through a gamified flipped classroom app helps them remember English vocabulary better.	4.32	0.557	Very Good Opinion
7.	Students think leaning English vocabulary through GFCA helps them understand the lesson better because they have more chances to practice English vocabulary.	4.04	0.790	Good Opinion
8.	Learning English vocabulary through GFCA has improved students' English vocabulary.	4.32	0.627	Very Good Opinion
9.	Students have more motivation in learning English vocabulary through a gamified flipped classroom app.	4.16	0.688	Good Opinion
10.	Students believe that leaning English vocabulary through GFCA is more fun.	3.96	0.676	Good Opinion
11.	Learning English vocabulary through GFCA is convenient for students because they can access learning anywhere, anytime.	4.12	0.781	Good Opinion

Table 3.5 Students' opinion towards the use of GFCA on learning English vocabulary (Cont.)

No.	Items	Mean	S.D.	Interpretation
12.	Students interest in learning English vocabulary through GFCA because they want to know how the game can support their learning.	4.08	0.812	Good Opinion
13.	Students enjoy learning English vocabulary through GFCA very much	4.00	0.913	Good Opinion
14.	Students like the point system (XP, HP, AP, GP) very much because they always feel excited when learning English vocabulary through GFCA.	3.80	1.000	Good Opinion
15.	Students like seeing the avatar's evolution in GFCA because the more mission they can complete, the more their avatar can evolve.	4.08	0.862	Good Opinion
	Total	**4.06**	**0.755**	**Good Opinion**

The Likert scale was used for rating students' opinion towards the use of GFCA on learning English vocabulary. Students expressed their opinions towards the use of GFCA by rating each statement in the questionnaire according to their level of agreement. There is five points rating scale in the questionnaire, 5 = Strongly agree, 4 = Agree, 3 = Undecided, 2= Disagree and, 1= Strongly Disagree.

According to table 3.5, the results from the questionnaire were grouped into three themes. Firstly, the language gain, 86.4% of the students rated item 6 ($\bar{x}$ = 4.32, S.D. =0.557) and item 8 ($\bar{x}$=4.32, S.D.=0.627) as the first highest score. It indicated that students strongly agreed that learning English vocabulary through GFCA can help them to remember English vocabulary as well as improve their vocabulary knowledge.

Secondly, the game design, 85.6% of the students rated item 5 ($\bar{x}$=4.28, S.D.=0.614) as the second-highest score. It showed that students have a good attitude towards the use of GFCA on learning English vocabulary because they strongly

believed that learning English vocabulary through GFCA allowed them to learn more outside the classroom.

Thirdly the learning experience, 83.2 % of students rated item 9 ($\bar{x}$=4.16, S.D.=0.688) as the third-highest scores. This meant that students have a good attitude towards learning through a gamified flipped classroom application because it was more motivated compared to the normal classroom.

According to the total mean scores from the questionnaire ($\bar{x}$= 4. 06, S.D.=0.755), This can be concluded that students had a good opinion towards learning through GFCA. Students also mentioned in the interview that the avatar, the sound, and the scenery in GFCA motivated them to learn better, since, these features were found to fun so students did not feel like they are learning at all. Moreover, students enjoyed completing "Quest" and "Mission" in GFCA very much. Students knew that they needed to earn more points to level up and dress up the avatar. One student also added in the interview that the most important reason for completing the "Quest" or "Mission" is *'I don't want to lose my friend, and I want my avatar to be at the higher level so I need to study harder to answer correctly and earn the points- s_4'*. This showed that students liked the GFCA because they believe that learning through this GFCA allow them to learn in a pleasurable and playful environment, which also helped them improved their vocabulary knowledge as well.

3.8.2 Summary of the Pilot Study

During the pilot study, there were some issues about the use of the gamified flipped classroom application (GFCA) and the solutions found by the researcher were discussed as follows.

Firstly, the delayed loading while log-in to the GFCA. Students pointed out in the interview that at the first accessing, it took a few minutes to load and get into the game. The researcher suggested students change the internet connection from SUT Wi-Fi to students' internet package (4G). After changing the internet connection, the application was loading faster. Therefore, the researcher concluded that the problem of a delayed loading might come from a poor internet connection. In the main experiment, at the training hour, the researcher should be ensured that the internet connection is strong enough to load the application and access the game.

Secondly, students mentioned in class that they would like to have immediate feedback from the teacher when answering the question or at home. In this study, the GFCA was employed the application Classcraft which included two main features called "Quests" and "Missions" that the researcher used for providing students the opportunity to learn English vocabulary by themselves. They can learn anywhere anytime by logging into GFCA, exploring the vocabulary, then checking their understanding by answering the question in "Quest" and "Mission". Unfortunately, it was a limitation of Classcraft that the immediate feedback feature was not provided in the application. In this study, to give students feedback, the researcher set the time for giving feedback to students one by one. However, giving feedback manually can be done with a small class with twenty to thirty people. Once the class is bigger than thirty teachers might have a hard time to handle. Another way to give students immediate feedback was by putting the link to another website that immediate feedback feature is available. The "Educaplay" is a website that allows the teacher to create the games and activities in the simplest way. After putting the contents into the platform, an education game with immediate feedback from the teacher was ready to use. In this study, the

researcher used "educaplay" as a supplement activity for giving student immediate feedback.

Thirdly, the complicated answering question in the GFCA. To complete the "Quest" and win the game, students have to read the question carefully and submit their answers by typing the vocabulary. Some students said that they preferred answering by clicking the correct answer instead of typing because they thought it was complicated. However, some students mentioned in the interview that *'I really like to complete the "Quest" because typing the answer can help me in remembering the vocabulary more than just clicking- s5'*. Additionally, one student also added that *'To earn the points, I need to find the correct answer by searching for the meaning of all choices before submitting. I think this really helps me to remember the vocabulary - s2'*

Surprisingly, an unexpected result was also found from the pretest-posttest score. There were some students who got the posttest score lower than their pretest score. Therefore, the researcher called students to interview. The student mentioned that *"I think the time given for the test is not enough so I was worried about the time back then- s11"* and one student also added, *"I think I need more time to read the question and finish all items in the test- s7"*. Due to these reasons, in the main experiment, the researcher needed to consider the time given in order to help students to be more focused and complete the test.

3.8.3. The Improvement After Pilot Study

When asking students about the suggestions for improving the gamified flipped classroom application (GFCA), here were the responses;

- The application was too slow due to the internet connection.

- The feedback should come right after the answer was submitted.

- The style of answering the question should be done by just clicking the answer.

After the students suggested for the improvement, here were the solutions that the researcher found.

- Students change the internet connection from Wi-Fi to 4G.

- The "educaplay" website was used in some activities since the website can provide students immediate feedback.

- Students can also check their feedback through the feedback box (feedback were given by the teacher)

- Most students mentioned that typing the answer helps them remember vocabulary better, therefore the researcher keeps this style for answering the question.

To sum up, conducting a pilot study help the researcher to find some problems that might occur in the main experiment. Some might come from technology or the internet which is uncontrollable. The researcher expected that the solutions found in the pilot study might reduce some problems which could happen in the main experiment. Nevertheless, after the pilot study was done the overall results from the vocabulary test, questionnaire, and interview showed that learning English vocabulary through GFCA helped students improve their vocabulary knowledge.

In summary, this chapter has provided details on the research methodology employed in the present study. It presented the subjects of the study, the instruments used to collect data, and the research design of the study. Then, the data collection and the analysis methods of the study were explained. And finally, the pilot study is discussed. In the next chapter, the results of the study and discussions will be presented.

CHAPTER 4

RESULTS AND DISCUSSIONS

This chapter presents the results and discussions of the study. The first section reports the elements and steps in developing the Gamified Flipped Classroom Application (GFCA). Then, the findings from students' pretest and posttest scores on learning English vocabulary through the GFCA are shown. Later, the questionnaires and the semi-structured interviews on the students' opinion towards the GFCA are reported and discussed.

4.1 Results

4.1.1 Results of the Elements and Steps for Developing the Gamified Flipped Classroom Application (GFCA)

The following results are in relation to research Question 1: *What are the elements and steps for developing the GFCA on learning English vocabulary?* The Gamified Flipped Classroom Application (GFCA) was developed for English vocabulary learning, where students learned and explored English vocabulary online through a flipped classroom method. Whether GFCA enhances students' English vocabulary knowledge will be reflected by the improvement of students' vocabulary knowledge after learning.

A) Elements of GFCA

The activities in GFCA were developed by the researcher based on learning theory and game elements as shown in Table 4.1

Table 4.1 Elements of GFCA

Learning Theory	Impact on Gamification Design	Activities of the GFCA
Malone's Theory of Intrinsically Motivating Instruction	The elements of challenge, fantasy, and curiosity in-game can drive the intrinsic motivation of students in learning.	Game feed and Avatar
The Taxonomy of Intrinsic Motivations for Learning	Challenge, curiosity, control, fantasy, cooperation, competition, and recognition are the elements in-game that can drive both internal and external motivational of students.	
Operant Conditioning	Provide appropriate rewards, points, and badges on a variable basis to maintain learners 'interest.	Treasure box
Self-determination Theory	Provide the learner with the opportunities for autonomy, a feeling of competence, and relatedness with others	Avatar
Distributed Practice	Play out over time to provide spaced repetition of the content within the game	Mission & Quest

The activities of GFCA were developed based on these learning theories in order to offer students the opportunity to practice the vocabulary learned at their own pace, especially, outside the classroom. To develop the most appropriate GFCA activities for students, the systematic steps of developing also important, thus, the steps for developing GFCA are presented in the next section.

B) Steps for Developing GFCA

Step 1: Conducting a Survey of Student's Difficulties in Learning English. After the researcher conducted a survey of student's difficulties in learning English at Suranaree University of Technology (SUT), the findings indicated that students wanted to improve their English vocabulary knowledge the most. Moreover, students also needed effective learning tools that allow them to learn at their own pace outside the classroom. Due to these reasons, the researcher came up with the GFCA to help students improve English vocabulary knowledge.

Step 2: Designing the Contents and Lessons for GFCA. This step is the foundation for developing the GFCA to help students improve English vocabulary. Three sub-steps are presented as follows.

    i) Analyze the Setting. After conducted the students' survey in step 1, the researcher found that GFCA might be one of the most appropriate ways for helping students to learn vocabulary since there are many activities in the GFCA that allow students to explore the lesson with joy and fun. The researcher analyzed the course curriculum and learning context to see how to help students improve their English vocabulary. The GFCA was used as the supplementary for students who took English for Specific Purposes course (213204) at Suranaree University of Technology, the academic year of 2019. The contents of the lessons were constructed based on the course material, which consists of four topic Animals, Environment, Health and Fitness, and Discovery and Innovation.

    ii) Setting the Learning and Teaching Goals in the Lesson Plans. The learning and teaching goals were set in the lesson plans. What the teacher expects the learner to achieve was set to be appropriate for the students' learning context. The objectives of the present study included, (i) students should be able to remember and know the meaning of vocabulary, (ii) students should be able to identify the synonyms of the given words and use appropriate words in different context. Moreover, what the teacher planned to teach and include in the content of the lesson for GFCA also were identified in the lesson plans (See appendix D). In the out-of-class activities, a matching vocabulary game that allows students to practice vocabulary learned, and sentence completion activity that allows students to recall what they have learned from the class are available online in the GFCA. For the in-class activities, some features of the GFCA

also was used as a formative review to see whether students miss the concepts of the lesson if so, the teacher can help them correct their ideas.

iii) Setting the Evaluation. It is necessary to evaluate the learning process and outcomes. The GFCA might not be completed until it shows the students' improvement, other words, students can reach the goals that have been set. There were two types of evaluation includes in this study, formative and summative evaluation. The formative evaluation was measured by the in-class activity called 'Boss Battle', where teachers can evaluate students' performance and also check their comprehension by allowing students to answer the questions about the vocabulary learned. Later, the summative evaluation was conducted at the end of the course. Data from the post-test were collected to evaluate and analyze.

Step 3: Developing the GFCA. After the researcher designed the contents and lessons of the GFCA, then the researcher developed the activities based on the course objectives which aimed to improve students' vocabulary knowledge. The appropriate out-of-class and in-class activities through which students learn both individually and group work were focused on the GFCA. The GFCA was developed by employing the Classcraft application as a main online platform for all activities. Moreover, Microsoft PowerPoint and Educaplay were integrated to create GFCA activities. The Microsoft PowerPoint and Educaplay were integrated into the instruction to add value and effectively support the learning activities in the GFCA.

Steps 4: Piloting the GFCA. The FGCA was used as a supplementary online course in order to help students learning English vocabulary. The rules of using GFCA in class and assessment methods also need to establish. Students can utilize their computer, laptop, tablet or any mobile devices that can access the internet to learn with

GFCA. The activities in GFCA demonstrated to students in the class to show them how to learn in each activity. First Students learned the online lesson through the Power-point presentation which contained a list of vocabulary with their meaning, synonyms, and example of the words in a sentence. Moreover, students can also listen to how to pronounce the words. Later, once the students finished learning the lesson, they can go to the first activity "Mission"-a matching game, "Quest"- complete the sentence with the appropriate vocabulary.

Step 5: Finalizing the GFCA. After the GFCA was launched for a pilot study, the GFCA was redeveloped based on the problems found. Moreover, whenever the researcher finds any parts of the GFCA was unclear or hard to access, the revision was done immediately to adjust the lessons for students. Finally, the final version of GFCA was ready to be used in the main experiment.

To sum up, the GFCA can help students improve vocabulary knowledge that might result from the ability of feature designing that the researcher used for developing the GFCA. This in line with one study from Gee (2012), the result indicated that students can improve their language learning because the digital game-based provided the ability of design features that are particularly relevant to language learning which plays a role in supporting the language learning and acquisition. Therefore, this can be illustrated that students' vocabulary improvement is the result of GFCA which was developed based on these elements and steps.

4. 1. 2 Results of the Effects of GFCA on Students' English Vocabulary Knowledge.

The following results are in relation to research question 2: *What are the effects of the use of gamified flipped classroom applications on learning English*

vocabulary? Results from the study showed that students' English vocabulary knowledge

has improved after learning with GFCA. Students' English vocabulary knowledge was

measured in the form of scores in the pre-test and posttest. The results are shown

in Table 4.2

Table 4.2 Paired sample statistics of students' pretest and posttest scores

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	post	18.65	74	4.314	.502
	pre	11.22	74	4.045	.470

As shown in Table 4.2, the students' average score for the pretest and posttest

was 18.65 and 11.22 respectively. The results indicated that the posttest score was higher

than the pretest score. In order to investigate whether there was a significant difference

between the pretest score and posttest score, a paired sample t-test was utilized to

compare. The results of the t-test are shown in Table 4.3

Table 4.3 Paired sample test of students' pretest and posttest score scores

Paired Samples Test

		Paired Differences							Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	post - pre	7.432	3.679	.428	6.580	8.285	17.378	73	*.000

*p<0.05

From Table 4.3, the paired-samples test shows the improvement of the

students' vocabulary knowledge before and after learning with GFCA. Students took a

posttest at the end of the experimental period, the results of students' posttest score

increased from the pretest score at 7.432 (p = .000). The score was found to be significantly different showing by the p-value is lower than 0.05. Therefore, this can be concluded that GFCA can enhance students' vocabulary knowledge because students performed better after learning English vocabulary through GFCA.

4.1.3 Results of Students' Opinion Towards the Use of GFCA on learning English vocabulary

This section presents the results in relation to the research Question 3: *What is the students' opinion towards the use of gamified flipped classroom on learning English vocabulary?* The results of the students' opinion were drawn from both quantitative and qualitative data. Quantitative results were analyzed from the responses of the questionnaire, while qualitative results were drawn from semi-structured interviews.

A) Quantitative Results of Students' Opinion Towards the Use of GFCA on Learning English Vocabulary.

The questionnaire is designed to gather more information which consisted of two parts: The first part is about general information of the students, including 4 questions. The second part is about the students' opinions in learning English vocabulary through a gamified flipped classroom application, including 15 questions. The Likert Scale (Five-point scale) was used to measure students' opinions level (Ruengprapan, 1996).

There are two parts of the questionnaire included in the study. The first part is the student background. A purposive sampling method was used to select the subjects of the study. There were 74 Thai EFL university students from two intact classes, including 41 males and 33 females, participated in this study. The subjects of the study,

who enrolled English for Specific Purpose course in the first trimester of the academic

year 2019, come from the school of Management Technology, Suranaree University of

Technology. The average ages of students are 20 years old, with an average of 15 years

of English study.

Table 4.4 Students, opinion towards the use of GFCA

No.	Items	Mean	S.D.	Interpretation
1.	Students think learning English vocabulary through GFCA makes them ready for class activities and group discussions.	4.04	0.730	Good Opinion
2.	Students think learning English vocabulary through GFCA makes them more confident to ask the question in class.	3.93	0.941	Good Opinion
3.	Learning English vocabulary through GFCA encourages students to participate more in class.	3.81	1.016	Good Opinion
4.	Students like learning English vocabulary GFCA because they can manage their own learning.	4.00	0.951	Good Opinion
5.	Learning English vocabulary through GFCA gives students more opportunities to study outside the classroom.	4.05	0.809	Good Opinion
6.	Students believe that leaning English vocabulary through a gamified flipped classroom app helps them remember English vocabulary better.	**4.23**	0.750	Very Good Opinion
7.	Students think leaning English vocabulary through GFCA helps them understand the lesson better because they have more chances to practice English vocabulary.	4.15	0.871	Good Opinion
8.	Learning English vocabulary through GFCA has improved students' English vocabulary.	4.15	0.794	Good Opinion
9.	Students have more motivation in learning English vocabulary through a gamified flipped classroom app.	4.01	0.852	Good Opinion
10.	Students believe that leaning English vocabulary through GFCA is more fun.	**4.32**	0.724	Very Good Opinion
11.	Learning English vocabulary through GFCA is convenient for students because they can access learning anywhere, anytime.	**4.18**	0.942	Good Opinion
12.	Students interest in learning English vocabulary through GFCA because they want to know how the game can support their learning.	3.82	0.970	Good Opinion
13.	Students enjoy learning English vocabulary through GFCA very much	3.92	0.968	Good Opinion
14.	Students like the point system (XP, HP, AP, GP) very much because they always feel excited when learning English vocabulary through GFCA.	3.77	1.177	Good Opinion
15.	Students like seeing the avatar's evolution in GFCA because the more mission they can complete, the more their avatar can evolve.	3.97	1.033	Good Opinion
	Total	**4.02**	**0.90**	**Good Opinion**

Table 4.4. shows students' respond to a questionnaire about their opinion towards the use of Gamified Flipped Classroom Application (GFCA) on learning English vocabulary. The results revealed that students agreed with all fifteen statements from the questionnaire. Considering the mean scores for all fifteen items ($\bar{x}$ = 4.02, S.D. = 0.90), it is obviously indicated that students have a good opinion towards the use of GFCA on learning English vocabulary.

In this section, the results from the second part of the questionnaire were reported. Firstly, the first three highest-rated items from the questionnaire were reported regarding students' opinion towards the use of GFCA on learning English vocabulary respectively. The first highest rated was item 10 ($\bar{x}$ = 4.32, S.D. = 0.72) "Students believe that leaning English vocabulary through gamified flipped classroom app is more fun". The second highest-rated was item 6 ($\bar{x}$ = 4.23, S.D. = 0.75) "Students believe that leaning English vocabulary through gamified flipped classroom app helps me remember English vocabulary better". The third highest-rated was item 11 ($\bar{x}$ = 4.18, S.D. = 0.94) "Learning English vocabulary through gamified flipped classroom app is convenient for students because they can access learning anywhere, anytime".

Secondly, the first three lowest-rated items from the questionnaire considering students' opinion towards the use of GFCA on learning English vocabulary were also reported respectively. The first lowest rated was item 14 ($\bar{x}$ = 3.77, S.D.= 1.17) "Students like the point system (XP, HP, AP, GP) very much because they always feel excited when learning English vocabulary through a gamified flipped classroom app". The second-lowest rated was item 3 ($\bar{x}$ = 3.81, S.D.= 1.01) "Learning English vocabulary through gamified flipped classroom app encourages students to participate more in class ".And the third-lowest rated was item 12 ($\bar{x}$ = 3.82, S.D.= 0.94) " Students

interested in learning English vocabulary through gamified flipped classroom app because they want to know how the game can support their learning**.** As shown in Table 4**.**3**.**1, these three items had lowest mean scores rated by the students, however, the mean scores were at above 3**.**40-4**.**02 which can be interpreted at the **"**good opinion**"** level **(**Ruengprapan, 1996**).** Therefore, the overall students favored GFCA and had a good opinion towards the use of GFCA on learning English vocabulary**.**

B) Qualitative Results of Students' Opinion Towards the Use of GFCA on Learning English Vocabulary

The semi-structured interview is used in this study to gain in-depth data of students' opinions after using a gamified flipped classroom application on learning English vocabulary**.** Nineteen students in the class were purposively selected as the interviewee**.** Four interview questions are predetermined**.** The results are reported in relation to four questions from the interview**.**

1) Playful Learning Experience

In question 1, students were asked whether they like learning English vocabulary through GFCA or not**.** All of the students **(**100**%**, N =19**)** answered that they like learning English vocabulary through GFCA with different aspects**.** The following themes were emerged from students' answers in the interviews, consisting of **"**GFCA was not boring and interesting, and GFCA provided new learning experiences respectively**.**

Firstly, students pointed out that learning English vocabulary through GFCA was not boring and interesting, another word is fun**.** From the interviews, this reason was the most mentioned by 63**.**16 percent of students **(**N=12**).** This can be reflected that the majority of students liked learning English vocabulary through GFCA

because it was fun, not boring and interesting for them. As one student stated that **"***I like learning English vocabulary through GFCA because it is fun and I never feel bored***" (S2).** Similar to one student added, **"***GFCA is interesting, I think the game is interesting and it attracts me to learn more***" (S9).**

Secondly, around 36.84 percent of students **(**N=7**)** mentioned that learning English vocabulary through GFCA was a new learning experience for them. From the interviews, this reason was mentioned by the students that they liked learning English vocabulary through GFCA because this kind of learning created new learning experiences, which allowed them to learn and play at the same time. As one student said in the interview that **"***I like the GFCA because I like playing the game and learning English vocabulary through GFCA provided me a new experience of learning because I can both learn and play at the same time***" (S6).**

2) Vocabulary Improving

In question 2, students were asked whether they think learning English vocabulary through GFCA helps them improve vocabulary knowledge or not. All of the students **(**100**%**, N =19**)** answered that GFCA can help improve their English vocabulary knowledge with different aspects. The following themes were emerged from students**'** answers in the interviews, consisting of **"**GFCA can help remember vocabulary better, GFCA was a friendly user interface, and GFCA was more motivating**"** respectively.

Firstly, around 57.90 percent of students **(**N=11**)** reported that they thought GFCA help them remember English vocabulary better than learning from the books only. Students believed that GFCA can improve their English vocabulary knowledge because of the Quests and Missions in-game, which allow them to explore

new vocabulary and practice vocabulary learned**.** This can be illustrated by students**'** comment that **"***I need to know the meaning of all vocabulary in order to choose the correct answer, so I find the meanings of those words before submitting the answer in the quest***" (***S14***).**

Secondly, around 31**.**58 percent of students **(**N=6**)** believed that GFCA can help them improve vocabulary because GFCA was an easy friendly user interface**.** Students mentioned they can preview vocabulary through the PowerPoint slide that available in-game, furthermore, they can also listen to the pronunciation of the words which is easy for them to learn and remember vocabulary**.** Therefore, the GFCA help students improve vocabulary because it was easy to use, access and learn**.** This can be illustrated by one comment in the interview **"***I think learning vocabulary from the PowerPoint slide that available in-game help me in remembering and improving English vocabulary***" (***S5***).**

Thirdly, around 10**.**53 percent of students **(**N=2**)** thought GFCA can help them improve vocabulary because it was more motivating**.** Students reported in the interviews that **"***I think GFCA can improve my vocabulary knowledge because it is more motivating, interesting and more fun not like in the traditional classroom***" (***S16***).** Some students also reported that level up the Avatar in**-**game was fun and motivated them to learn more, this can be exemplified by **"***I don't want to lose my friend, I want my avatar to be at the higher level so I need to study harder to answer correctly***" (***S10***).**

3) Convenient Learning Environment

In question 3, students were asked whether they think learning English vocabulary through GFCA is convenient for their learning or not**.** All of the students **(**100**%**, N=19**)** answered that GFCA was convenient for them**.** The following themes

were emerged from students' answers in the interviews, consisting of **"GFCA was** <u>self-determined learning</u>, GFCA was a <u>paperless classroom</u>**"** respectively**.**

Firstly, around 78**.**95 percent of students **(**N=15**)** thought that GFCA was convenient for learning English vocabulary because it can create a self**-**determined learning environment**.** In other words, students can take control of their learning or make a decision on what and when they want to learn**.** This reason was reported by students in the interviews that they can access the lessons easily anywhere and anytime**.** As one student mentioned, *"I like learning with this gamified flipped classroom application a lot because it is convenient, I can learn vocabulary at home or even on the bus by myself (S8)"***.** Another student also added that *"I think GFCA is easy to use and the important thing is I can learn by myself outside the classroom" (S3).*

Secondly, around 21**.**05 percent of students **(**N=4**)** also thought that learning English vocabulary through GFCA was convenient for them because it was a paperless classroom**.** Four students reported that GFCA was convenient for their learning because they can access lessons online through mobile without carrying the book around**.** Moreover, students don't need to photocopy textbooks and materials when learning through GFCA**.** This can be illustrated by students' answer from the interview *"I think the application is convenient because I can save cost for the photocopying" (S4)*

4) Problems Found while Using GFCA

In question 4, students were asked whether they have any problems while learning English vocabulary through GFCA**.** Around 63**.**16 percent of students **(**N=12**)** answered that they did not found any problems while using the GFCA**.** However, there were only seven students **(**36**.**84**%**, N=7**)** reported that they found some

problems while using the GFCA. The following themes were emerged from students'
answers in the interviews, consisting of "poor internet connection, and need more time
to study" respectively.

   Firstly, around 26.32 percent of students (N=5) had problems while
using GFCA reported that a poor internet connection can affect the loading time of the
application. As one student said in the interview that *"when I am in the area that
internet connection is poor, it takes about one minute for loading game" (S8.).*

   Secondly, around 10.53 percent of students (N=2) mentioned that they
need more time to learn with the GFCA for the in-class activity. As shown by one
student answer *"I need more time to learn and do some activities with friends in the
boss battle" (S5).* Another student also mentioned that *"Maybe the class size is too big,
there is not enough time for all students to participate in the in-class activities" (S6).*

   To sum up, this section reports the results of the study regarding three
research questions. In the next section, the discussions of the results are then presented.

4.2 Discussions

  The results of the study showed that the Gamified Flipped Classroom Application
(GFCA) can help students improve English vocabulary knowledge. In this part,
discussions with regard to the research purposes and research questions are presented
as follows:

4.2.1 Discussion on Elements and Steps of Developing the GFCA

A) Elements of GFCA

   One of the purposes of this present study was to develop a gamified
flipped classroom application (GFCA) to help students improve English vocabulary. In

this study, the activities of GFCA were developed based on the game elements by the researcher. After reviewing, analyzing and synthesizing the four learning theories namely learning motivation, operant conditioning, self-determination and distributed practice, the GFCA's activities were developed. In the following section, how each learning theory supports GFCA activities are then discussed.

Firstly, the "Game feed and Avatar" feature created the feeling of competition. Students don't want to become higher in-game rank, they don't' want to lose their friend. They want to beat the boss of the game to become the winner or even they want to dress up their avatar in the fanciest look. Therefore, Students need to learn the lesson and answer choose the correct answer to earn points so that they can become the top of the game rank and feed. As Kapp (2012) mentioned that this kind of feeling will drive both internal and external motivation of students to play and learn more. Moreover, though students know each other and they probably can easily tell which avatar represented which students, still a degree of projection have made students feel more comfortable for communicating, participating and making mistakes.

Secondly, the "Treasure box" feature which was developed under the operant conditioning theory. The XP, GP, HP, and AP that were given to students in every stage, or the bonus that they earn once they compete for mission and quests are very important. As Skinner's emphasis that the rewarding good habit can reinforcement good behavior (Lombardi, 2011), therefore, to keep students engaging in-game the appropriate points or rewards is necessary. In line with the previous study by Boyinbode (2018). The finding indicated that students love the rewards, badges, and points given by the games. In this present study, students know that if they collect enough coins, tokens, items, or points they will receive an award or level up. Therefore, after reaching

one level students tend to starts all over again to receive the next rewards and move to

the next level.

Thirdly, the "Avatar" feature. Avatar is normally understood as a

characteristic that students manipulate in-game. The avatar feature allows students to

customize the character in-game to resemble him or her in some way (Kapp, 2012.) In

this study, the avatar in the GFCA was developed under the self-determination theory

(STD), which consists of autonomy – the feeling that students are in control of their

own avatar and when they want to access the GFCA, competence – they need to become

the top of the rank or get the fanciest avatar of the GFCA, and relatedness – the feeling

of relatedness or connected when students in class talk about the experience in the

GFCA. These three elements are associated with the game enjoyment and the

immersion that students experienced while playing GFCA. This can be supported by a

study from Peterson (2011), the study revealed that the avatar is not only provided

students the feeling of autonomy but also reduce anxiety and improve self-confidence.

Fourthly, the "Quest and Mission" feature in the GFCA was developed

under the distributed practice theory. Distributed practice is the space between times

that the game is played. This happens when the student replayed the quest and mission

to accomplished the goals or get a higher score. This technique of distributing learning

was employed in GFCA to increase students learning efforts over multiple short

sessions called "mission and quest", focusing on the subjects matter to be learned. The

activities in GFCA offer students the opportunity to learn the content, explore the

vocabulary as much as they desire. The ability of repetition in GFCA that allow students

to practice vocabulary infinitely repeated trying is one factor to help students to improve

their vocabulary knowledge. As a result, the distributed practice can support learning

for students as shown in the present study that students' vocabulary knowledge has improved. This can be supported by the finding of the previous study by Reinders and Wattana (2014), as part of playing a number of 'Quest' in the game, students had more opportunities to learn and practice the vocabulary and language skills they studied in class. moreover, when students played and worked through the language learning and game elements included in the quests, therefore, students had more opportunities to develop their comprehension of what they have learned.

　　　　To sum up, students' vocabulary improvement might result from the fact that GFCA was carefully designed and developed based on the elements which were mention above. The four learning theories present earlier could support students on learning English vocabulary by allowing them to learn and practice the lesson in a sense of playfulness which can promote students to learn better as reported in many previous studies (Cornille, Clarebout & Desmet, 2011; Rama, Black, Van &Warshauer, 2012; Alyaz, Spaniel-Weise & Gursoy, 2017. In the next section, the steps of developing GFCA for helping students improve their English vocabulary are discussed.

B) Steps for Developing GFCA

　　　　Besides the four elements of learning theories, the GFCA's activities also developed in five systematic steps including, (i) conducting a surveys of students' difficulties and needs on English learning, (ii)designing contents and lessons for GFCA, (iii) developing the GFCA, (iv) then Piloting and (v) Finalizing the GFCA for helping students improve their English vocabulary. Regarding to the improvement of students' English vocabulary knowledge, this might result from the systematic development of the GFCA, which was developed and designed as a systematic process of the design, development, implementation, and evaluation (Dick, Carey, & Carey, 2005; Reiser &

Demsey, 2007, Linh & Suppasetseree, 2012,**)**

In order to optimize the efficiency of GFCA in the classroom, the systematically developing and designing activities is essential**.** To do that the GFCA lesson also was sent and evaluated by the expert in the field of English Language Teaching**.** After receiving the evaluation results from the expert, the GFCA was revised accordingly to expert advice**.** Then, the GFCA was used in the classroom **(**Pilot study**)** to find out if there were any problems, then the application was changed and modified to improve according to the problems found**.** The reason why the pilot study is important is explained by a study of Reinsers and Wattana **(**2012**)**, who conducted a study to investigate whether the use of game-based can enhance students**'** willingness to communicate in the second language or not**.** Before the main experiment took place, the pilot study was conducted to ensure that the tool they developed could lead to more interaction before using in the real experiment**.** From the results of the pilot study, the researcher would be able to reduce the chance of unexpected issues that might happen in the real experiment **(**Alyaz, Speniel-Weise, and Gursoy, 2017**)**, therefore, this is the reason why the pilot study is necessary**.**

In this present study, after the pilot study, there were some problems found by the students while using the GFCA**.** The following part is how the researcher acted upon the problems found**.** Students mentioned in the pilot study that they need immediate feedback right after when they submitting the answer**.** To provide students the feedback, the researcher integrated the educaplay**-** the website for creating games and activities, into the GFCA and it was used in the real experiment of the present study**.**

To sum up, the improvement of students**'** vocabulary knowledge can be contributed to the well**-**developed of GFCA, since The GFCA was developed in

compliance with the systematic steps together with the four learning theories, which has been analyzed and synthesized for developing the GFCA activities that most appropriate with students learning environment. As expected, the students' English vocabulary knowledge has been improved. In the next section, the results of the effects of GFCA on students' English vocabulary achievement are then discussed.

4.2.2 Discussion on the Effects of GFCA on Students' English Vocabulary Knowledge

Another purpose of this present study was to investigate the effects of gamified flipped classroom application (GFCA) on learning English vocabulary. In this part, the results of students' pretest and posttest were discussed. The results showed that the average scores of the posttest (x=18.65) were higher than the pretest (x=11.22). And there was a statistically significant difference between the average scores of the pretest and posttest (p =.000, p< .05). It indicated that students' vocabulary knowledge was improved after the experiment provided by the GFCA. This indicated that the GFCA had a positive effect on students' vocabulary knowledge. The reasons why students' vocabulary knowledge was significantly great after applying the GFCA might be explained as follows. According to the results, the improvement of the student's English vocabulary might result from that the lessons were approved by the experts (IOC) to be appropriated for improved students' English vocabulary. Moreover, the lessons also were launched for testing before the main experiment (pilot study) to confirmed that the GFCA was efficient for improving students' English vocabulary.

Another reason for the improvement of students' vocabulary might be because the GFCA was developed to specifically improve students' vocabulary knowledge by utilizing two main features: gamification and flipped classroom. These

two features were integrated into the development of GFCA**.** The reason why the researcher decided to combine the gamification and flipped classroom together was because the key elements of gamification are found to be fun and entertaining, and the nature of game that allows students to interact or take control of their learning while playing games can increase the learning outcome as found in much existing research **(**Danowska**-**Florczyk & Mostows**,** 2012**).** Moreover, integrating flipped classroom also provide students the opportunity to gain first exposure before class and more practice time, since the lesson available online they can repeat the task multiple times**.** The findings from the present study were in line with the previous studies **(**Sung, 2015; Ekmekci,2017**)** who found that students performed better after learning with flipped classroom instruction, since, students can prepare the lesson at home**.** Moreover, the ability to replay and re**-**watch the online source through the flipped classroom also helps students improved their language learning as well as increase the active learning environment**.**

In this study, the GFCA was applied for both out**-**of**-**class and in**-**class activities**.** For out of class activities, which were normally done at home, students could access online learning through application anytime**.** Students could explore new vocabulary, practice vocabulary learned repeatedly through the quest and mission in**-**game**.** As explained in the distributed practice theory, the ability to play again and again in the game can help students to make retention and recall learning more effective **(**Kapp, 2012**).** Moreover, the GFCA used in this study was developed by employing the self**-**determination theory, which described the feeling that one can take control and determine the outcome of their actions is important for learning**.** Additionally, the feeling of taking control of their own learning **(**autonomy**),** which allows students to

complete the task anywhere and anytime also has been found to be important for students' satisfaction in learning (Kapp, 2012).

For in-class activities, Classcraft application also was used to gamify the classroom. Students played a role according to their avatars in completing group activities in class. For example, one team was randomly selected to go on a mission, students would have to help team members in answering the question on the screen to complete the mission and earn more points. The result was consistent with the findings from previous studies, (Matsumoto, 2016; Wichadee & Pattanapichet, 2018), who integrated game into language classroom by having students play games through reading activities in class. The finding shows that students gain more knowledge after learning through games.

To sum up, the improvement of students' vocabulary knowledge of the present study was claimed to be the results of the appropriate lessons, in-class and out-of-class activities, and a well-developed GFCA that offers students more opportunity to expose to the language and repeat the task over and over again. As a result, students can learn more by themselves, especially, on their own pace. In the following section, the discussions of the results of students' opinion towards the use of GFCA are then discussed.

4.2.3 Discussion on Students' Opinion Towards the Use of GFCA on Learning English Vocabulary

The third purpose of this present study was to explore the students' opinions towards the use of flipped classroom application (GFCA) on learning English vocabulary. Thus, in this part, the students' opinion towards the use of GFCA on learning English vocabulary are discussed. As revealed from the questionnaire and

semi-structured interviews that were held after the experiment. As a whole, the results from the questionnaire and interviews indicated that students had **'good opinion'** towards the use of GFCA. As students responded in the questionnaire that **(i)** students liked learning English vocabulary through the GFCA because it was fun, **(ii)** students believed that GFCA improved their English vocabulary because it helped them remember vocabulary better, and **(iii)** students agreed that GFCA was convenient for learning English vocabulary because they can learn anywhere anytime. This can be interpreted that students enjoy learning with the GFCA because the GFCA can improve students learning and also offers students unlimited access to the lessons as shown in the interviews' results. Since the results of the questionnaire were consistent with the interview data, the following themes are the explanations of why students had a good opinion towards the use of GFCA on learning English vocabulary.

A) Students Favor the Use of GFCA

Students showed their favor on learning English vocabulary through the GFCA by Responding to the questionnaire that the GFCA was fun **($\bar{x}$=4.32)**. And the result from the interviews also showed that a hundred percent of students **(N=19)** agreed that they liked learning English vocabulary through GFCA because it was fun, entertaining, and provided a new learning experience. Students indicated that GFCA was fun and entertaining because GFCA allowed them to think about what they normally consider boring to become more interesting. This sense of fun and entertaining might be partially from the usefulness of participation in the game that can enhance students' enjoyment for their learning. **(Thorne, 2008).** This finding was in line with the existing studies **(Anyaegu, Ting and Li, 2012; Lam, 2014)** the findings indicated that students preferred learning English with the game because the game was fun and

made them feel relaxed when learning. Additionally, students also favored the use the gamification when learning vocabulary, since it was more fun and exciting for their learning.

In terms of a learning experience, students revealed that GFCA provided them a new experience of learning because the games' activities such as collecting points and hunts the monster are found to be a new way of learning for students. As reported by many previous studies (Reinders and Sykes, 2014; Stephen and Rumley, 2005; Baker and Nosratirad, 2013) that the playfulness of game and the stress-free environment, which students can sense in the game, provided the meaningful learning experience that encourages them to learn more. Hence, the present study suggested that games can be implemented as supplementary exercises to help students to learn vocabulary in a fun learning environment.

B) GFCA Help Improve Vocabulary Knowledge

The student believed that learning English vocabulary through the GFCA helped them improve their English vocabulary knowledge. Students expressed in the results of the questionnaire that the GFCA help them remember vocabulary better ($\bar{x}$=4.32). Furthermore, the results of the semi-structured interviews also revealed that 100% of students in the interviews agreed that GFCA can improve their vocabulary knowledge because of the GFCA had friendly user interface and more motivating. This can be explained as the engagement and motivation that students experienced in-game and education context can help in increasing students' knowledge. (Kapp, 2012). The finding was consistent with the study from Bakar and Nosratirad (2013), who investigate the vocabulary learning among ESL adult learners by employing the computer game called "SIM 3". After two months of experimental, the findings

revealed that the participants learn the vocabulary they experienced in-game and their vocabulary knowledge was improved. Likewise, Shatz (2015) also found that gamification can be used to promote students' vocabulary learning. As a player, students were engaged in a target language and gain some knowledge unconsciously. In addition, the results also pointed out that students really found that the GFCA was attractive and motivate them to learn more. The findings from the present study revealed that GFCA activities that allow students to encounter new vocabulary in the game, which can be used outside the game or in daily life, might be one of the factors that motivated them to play the game as well as to learn English. This result was consistent with the findings of previous studies that have been examined with regard to the game influence on the learning process, and positive outcomes were often reported (Cornillie, Clarebout, Desmet, 2012; Rama, Black, Van, and Warschauer, 2012; Thaichay and Sitthitikul, 2016; Alyaz, Speniel-Weise, and Gursoy, 2017; Franciosi, 2017). Moreover, the use of gamification have been proved to be a learning motivational tool because it can motivate students to play and interact more in English (Stephenson and Rumley, 2005; Baker and Nosratirad, 2013) and provide more opportunity to practice the vocabulary which can help students sustain the language learning since they are actively learned in the meaningful activities.

C) GFCA is Convenient for Vocabulary Learning

Students expressed in the results of the questionnaire that GFCA was convenient for learning English vocabulary ($\bar{x}$=4.18) and the results of the semi-structured interviews revealed that 100% of students agreed that GFCA was convenient for learning English vocabulary learning because it provided them the self-determined learning. This result might be explained as the ability to tack control their own learning.

Through the GFCA, students can make a decision of what, where and when they want to learn. The self-determined learning environment of the GFCA offers students a sense of autonomous learning, which helps students to manage their learning time according to their convenience (Alyaz, Speniel-Weise, and Gursoy, 2017). For the university students who might have restricted time, the GFCA might be one way to help them learn English vocabulary outside the classroom. This finding was in line with the results from previous studies (Chik, 2012; Baker and Nosratirad, 2013) autonomy provided in-game, such as self-organizing and time managed on learning the second language, is one of the keys to facilitate their language learning. Moreover, the results also suggested that game can be used as a self-study tool, since it can provide students a great deal of control, freedom, and the flexibility to learn on their own paces and interest. Through the feeling of lack of teacher control, the freedom in their learning without any restraint from the course encouraged them to learn better in a self-determined learning environment.

In addition, the GFCA was a convenient tool for learning English vocabulary because it was a paperless classroom. Students don't need to carry textbooks around since they can access the lesson anywhere anytime using their smart devices. Students only needed smart devices such as mobile phone, tablet or laptop with an internet connection to learn in the GFCA (Reinders and Sykes 2014). This convenience of students might be partially from the almost ubiquitous existence of the smart devices, which allow students to access the lesson and learn on their own easily outside of the classroom.

D) Problems Found while Using GFCA

In addition to students' opinion towards the use of GFCA on learning

English vocabulary, there were some problems found by the students while learning English vocabulary through GFCA. Students expressed in the semi-structured interviews that the GFCA was affected by the poor internet connection. It took a few minutes for loading to the next page this might be because the university Wi-Fi appears to be slow, therefore, it took a long time to download the GFCA. This sort of problem can be found when integrating technology into the classroom. This can be illustrated by Boinbode (2018), who developed the gamification-based English vocabulary mobile learning system for Nigerian students and found that students have some problems with the mobile learning system due to the internet connection. The finding suggested that when technology or the internet were employed as a teaching or learning tool, the researcher should think about the second plan in case there are any unexpected problems that occur.

Another problem found in the results of the study was students expressed in the interviews that they need more in-class time to learn with the GFCA activities. This finding might result from the class-size was quite large. In this study, there were seventy-four students, hence, not all students can participate in the class activities. This finding was in line with the results from previous studies (Mukundan, Kalajani, and Naghdipour, 2014; Boinbede, 2018) that students found the time trial for learning was limited. It was discovered that the time provided for the in-class activities was too little, therefore, they were unable to complete a particular level. Due to this finding, to help students to complete the tasks the researcher suggested that adequate time should be provided for students in the world of digital game-based learning.

To sum up, this part explained the reasons why students had a good opinion about the use of GFCA in learning English vocabulary. It might be from

students enjoy learning with the GFCA because the GFCA helped them improve vocabulary, and also provided the unlimited source for their learning which was considered as a convenient tool for their learning. However, some problems found by students while using the GFCA were also reported and discussed.

This chapter has presented and discussed the results of the study. The elements and steps for developing the GFCA, the effects of the use of GFCA on English vocabulary learning, and the students' opinion towards the use of GFCA were examined. In the next chapter, the conclusion, implications, and limitations of the study are then presented.
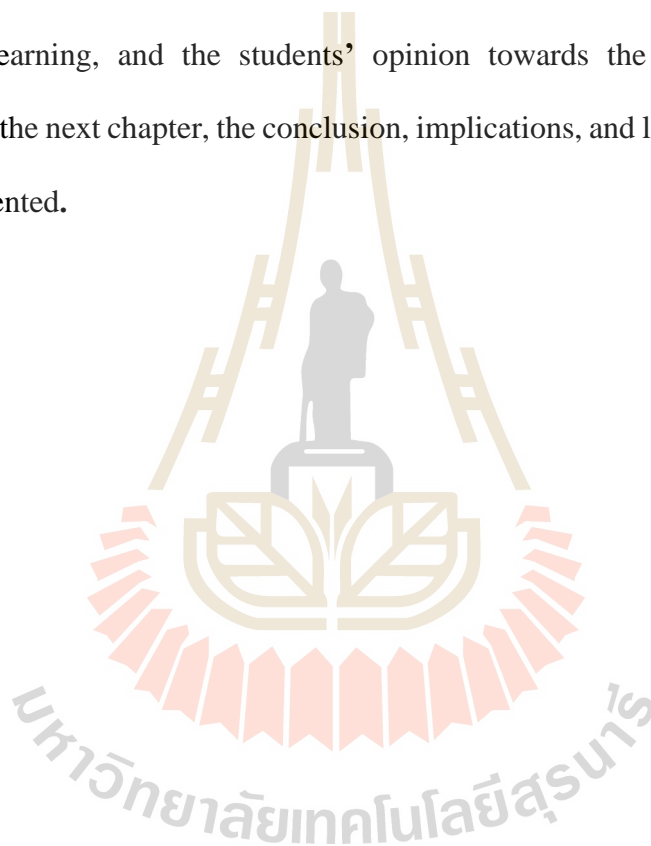
CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents, the findings of the study are summarized as well as the implications, limitations, recommendations of the study and conclusion.

5.1 Findings

The present study was conducted 1) to develop the Gamified Flipped Classroom Application (GFCA) on learning English vocabulary; 2) to investigate the effects of the use of GFCA on learning English vocabulary; 3) to explore students' opinion towards the use of GFCA on learning English vocabulary. Based on these objectives, the study was carried out to answer the following research questions:

1. What are the elements and steps for developing the GFCA on learning English vocabulary?

2. What are the effects of the use of GFCA on learning English vocabulary?

3. What are the students' opinion towards the use of GFCA on learning English vocabulary?

To examine these research questions, a mixed-method was applied in this study. The quantitative research method was used to investigate the effects of GFCA on students' English vocabulary learning. The qualitative research method also was used to explore students' opinion towards the use of GFCA on learning English vocabulary. The study tool included the GFCA, lesson plans, pretest and posttest, questionnaire and semi-

structured interview**.** The results of the present study can be summarized as follows**:**

1**)** The GFCA was developed based on the four elements of learning theories consisted of 1**)** learning motivation, 2**)** operant conditioning, 3**)** self-determination and 4**)** Distributed practice**.** Furthermore, the GFCA was also developed in 5 systematic steps includes**:** 1**)** conducting a survey of students**'** difficulties and needs on English learning, 2**)** designing contents and lessons for GFCA, 3**)** developing the GFCA, 4**)** then Piloting and 5**)** Finalizing the GFCA**.** All of the elements and systematic steps were used to design and develop the GFCA to improve Thai University students**'** vocabulary knowledge**.**

2**)** The scores of pretest and posttest were compared and analyzed with a pair sample t**-**test**.** The results revealed that there was a significant difference between the pretest scores and posttest scores **(**p=**.**000, p<**.**05**.** This also showed that students**'** English vocabulary knowledge had progressed and improved significantly**.**

3**)** The results of the questionnaire and semi**-**structured interviews revealed that the students had a good opinion towards the use of GFCA on learning English vocabulary **(**$\bar{x}$ = 4.02**).** This implied that the students favored the use of GFCA because it was suitable to enhance students**'** English vocabulary knowledge**.**

To sum up, the GFCA was developed based on learning theories and systematics steps, therefore, a well-developed GFCA can help students improve their vocabulary knowledge. This can be illustrated by the average posttest score which higher than the pretest score. It is indicated that after learning English vocabulary through GFCA students' vocabulary knowledge has been improved. Moreover, the results from the questionnaire and semi-structured interview revealed that students had a good opinion towards the use of GFCA since it was fun, convenient and also enhance students' English vocabulary knowledge.

5.2 Implications of the Study

In this section, the implications of this study are as follows:

1) Implications for Course Developer. When developing the GFCA model, the systematic process of designing the tool was very crucial to help it reach the learning goals. Therefore, the course developer should carefully decide which learning theories to apply as well as which materials should be analyzed to reach the students' needs. In this study, the GFCA has been developed based on the gamification and flipped classroom elements. There are various points for the course developers to utilize the GFCA. For example, the developers may consider developing a course using different types of games. This study employed the features of the Classcraft application to manage the lessons and activities, especially, the online parts. There are several digital game-based or serious games available, thus, the developers can choose the one that suits the course context.

2) Pedagogical Implication. As the GFCA has been found to be a good learning tool for learning English vocabulary, the instructors of the English language may consider GFCA as an alternative method for teaching similar subjects. The study has shown that GFCA can motivate students to learn and engage with the subject matter. Moreover, the ability to access the lessons before class also plays an important role in improving students' English vocabulary knowledge. Therefore, GFCA should be applied in the other course as a means to help students master and understand the essential knowledge of a particular lesson before coming to the classroom. In this study, the researcher creates the exercises and quizzes called Mission and Quests for ensuring that learning did occur properly before the classroom time.

3) Implications for Further Study. The results of this study revealed the improvement of students' English vocabulary and students also had a good opinion towards the use of GFCA on learning English vocabulary. Nevertheless, some suggestions are also made from students regarding points to be improved if the GFCA is used in the other course. Therefore, there are some rooms for further research to investigate. For instance, the researcher may use different learning theories for developing activities to support students learning. Moreover, the researcher may consider investigating the use of GFCA in different contexts, subjects' areas, students' levels of study.

5.3 Limitations of the Study

In this study, the GFCA was developed to improve English vocabulary for Thai EFL university students, hence, the limitations of this study were as follows:

1) The relatively small sample size (two intact classes) may not be able to generalize into the whole population of the EFL students in Thailand. Additionally, the findings were used to examine only the subjects of this study, the students who enrolled in English for Specific Purpose Courses (213204) at Suranaree University of Technology (SUT). Therefore, the subjects of this study cannot represent the university students in the same fields at other universities since students had different backgrounds, learning experiences and needs.

2) The GFCA, which was rated by the experts in the field of English Language Teaching, was used as a tool with the expected to improve students' English vocabulary knowledge only at SUT. Therefore, the results might not be applicable to other skills.

5.4 Recommendations for Further Study

According to the limitations and the results of this study, the following suggestions may be taken into considerations for future research.

1. The findings of the present study indicated that learning English vocabulary through GFCA could improve students' English vocabulary. This suggests that the development of the GFCA to improve student's vocabulary should be conducted for other English skills (listening speaking reading writing grammar).

2. The findings from interviews revealed that students also had a good opinion about the use of GFCA. Students liked to learn with GFCA because GFCA's activities provided new learning experiences (playfulness and enjoyment). Moreover, students found that GFCA allows them to participate and engage more in their learning. Therefore, This GFCA should be used in different learning contexts or subject matter to offer students a new experience of learning.

5.5 Conclusions

The findings of the present study were consistent with other previous studies, and they suggest that the GFCA can be considered as a teaching and learning tool for improving students' English vocabulary knowledge. However, this study revealed findings that allow a more specific explanation regarding how gamification and flipped classroom elements could support students' English vocabulary achievement. Researcher suggests that many other aspects need to be investigated for the effectiveness of the Gamified Flipped Classroom in various contexts.

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APPENDICES
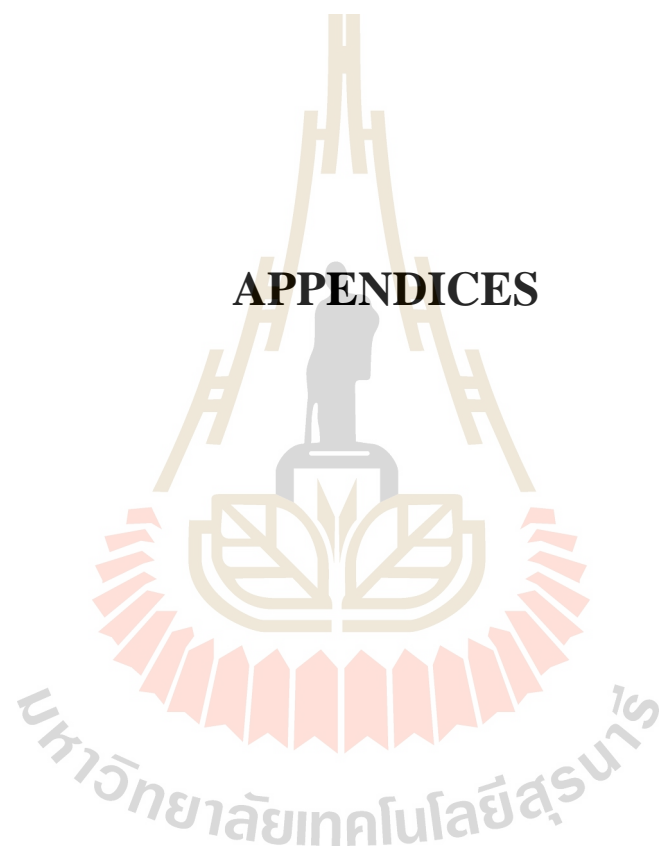
APPENDIX A
VOCABULARY TEST

A) Table of test specifications

Test Specifications

Students: EFL university students who take English for specific

                            purpose course at SUT

Purpose of test: To investigate the effects of a gamified flipped

                            classroom app in learning English vocabulary

Type of test: Multiple choices

Scoring: 1 point for correct answer; 0 point for incorrect answer

	Vocabulary		# of items	% of items
	Sentence completion	Text completion		
1. Animals	8	4	12	24
2. Environment	13	1	14	28
3. Health and Fitness	9	5	14	28
4. Discovery and Innovation	8	2	10	20
# of items	25	25	50	
% of items per section	50	50		100

Time: 30 minutes

B) IOC values of the vocabulary test from the experts

The 80 items were sent to the experts to find the content validity. All items have the IOC values higher than 0.5 which means all items can be reserved.

Item	Expert 1	Expert 2	Expert 3	Total score	The IOC	Interpretation
1	1	1	0	2	0.67	Reserved
2	1	1	0	2	0.67	Reserved
3	1	1	1	3	1.00	Reserved
4	1	1	1	3	1.00	Reserved
5	1	1	0	2	0.67	Reserved
6	1	1	1	3	1.00	Reserved
7	1	1	0	2	0.67	Reserved
8	1	1	1	3	1.00	Reserved
9	1	0	1	2	0.67	Reserved
10	1	1	1	3	1.00	Reserved
11	1	1	1	3	1.00	Reserved
12	1	1	0	2	0.67	Reserved
13	1	1	1	3	1.00	Reserved
14	1	1	0	2	0.67	Reserved
15	1	1	1	3	1.00	Reserved
16	1	1	1	3	1.00	Reserved
17	0	1	1	2	0.67	Reserved
18	1	1	1	3	1.00	Reserved
19	0	1	1	2	0.67	Reserved
20	1	1	0	2	0.67	Reserved
21	0	1	1	2	0.67	Reserved
22	1	1	0	2	0.67	Reserved
23	0	1	1	2	0.67	Reserved
24	1	1	0	2	0.67	Reserved
25	1	1	1	3	1.00	Reserved
26	1	1	1	3	1.00	Reserved
27	1	1	1	3	1.00	Reserved
28	1	1	1	3	1.00	Reserved
29	1	1	0	2	0.67	Reserved
30	0	1	1	2	0.67	Reserved
31	1	1	1	3	1.00	Reserved
32	1	1	1	3	1.00	Reserved
33	1	1	1	3	1.00	Reserved
34	1	1	0	2	0.67	Reserved
35	0	1	1	2	0.67	Reserved
36	1	1	0	2	0.67	Reserved
37	1	1	1	3	1.00	Reserved
38	1	1	1	3	1.00	Reserved
39	1	1	1	3	1.00	Reserved
40	1	1	0	2	0.67	Reserved

Item	Expert 1	Expert 2	Expert 3	Total score	The IOC	Interpretation
41	1	1	0	2	0.67	Reserved
42	1	1	1	3	1.00	Reserved
43	1	1	1	3	1.00	Reserved
44	1	1	1	3	1.00	Reserved
45	1	1	1	3	1.00	Reserved
46	1	1	0	2	0.67	Reserved
47	1	1	1	3	1.00	Reserved
48	1	1	1	3	1.00	Reserved
49	1	0	1	2	0.67	Reserved
50	1	1	1	3	1.00	Reserved
51	1	1	1	3	1.00	Reserved
52	1	1	0	2	0.67	Reserved
53	1	1	1	3	1.00	Reserved
54	1	1	0	2	0.67	Reserved
55	1	1	0	2	0.67	Reserved
56	1	1	1	3	1.00	Reserved
57	1	1	1	3	1.00	Reserved
58	1	0	1	2	0.67	Reserved
59	1	1	1	3	1.00	Reserved
60	1	0	1	2	0.67	Reserved
61	1	1	0	2	0.67	Reserved
62	1	1	1	3	1.00	Reserved
63	1	1	1	3	1.00	Reserved
64	1	1	1	3	1.00	Reserved
65	1	1	1	3	1.00	Reserved
66	1	1	1	3	1.00	Reserved
67	1	1	0	2	0.67	Reserved
68	1	1	1	3	1.00	Reserved
69	1	1	1	3	1.00	Reserved
70	1	1	0	2	0.67	Reserved
71	0	1	1	2	0.67	Reserved
72	0	1	1	2	0.67	Reserved
73	0	1	1	2	0.67	Reserved
74	0	1	1	2	0.67	Reserved
75	0	1	1	2	0.67	Reserved
76	1	1	1	3	1.00	Reserved
77	1	1	0	2	0.67	Reserved
78	1	1	0	2	0.67	Reserved
79	1	1	0	2	0.67	Reserved
80	1	1	0	2	0.67	Reserved
				Average	0.83	Reserved

C) Item analysis for vocabulary test (80 items)

      The item analysis results present the level of difficulty (p) and the discrimination index ® of the Pre-test and Post-test.

Items	Level of Difficulty (p)	Discrimination Index ®	Pre-test	Post-test
1	0.9294	0.0000		
2	0.9302	0.0714		
3	0.8837	0.2500	✓	
4	0.6395	0.6429	✓	
5	0.3605	0.2500	✓	
6	0.8372	0.3214		✓
7	0.0465	-0.0714		
8	0.9070	0.1786		
9	0.5930	0.3571	✓	
10	0.6744	0.2143	✓	
11	0.8953	0.2857	✓	
12	0.5698	0.5357	✓	
13	0.8605	0.2857	✓	
14	0.9186	0.1786		
15	0.8256	0.1429		
16	0.8256	0.2143	✓	
17	0.8721	0.0714		
18	0.8372	0.3214	✓	
19	0.9419	0.1071		
20	0.7791	-0.0714		
21	0.7209	0.3214	✓	
22	0.9419	0.1071		
23	0.3953	0.3571		✓
24	0.7791	0.4643		✓
25	0.9419	0.0714		
26	0.9419	0.1071		
27	0.7093	0.2500	✓	
28	0.3256	0.4286		✓
29	0.4419	0.5000	✓	
30	0.5116	0.5357	✓	
31	0.7907	0.3214		
32	0.5233	0.7500	✓	
33	0.4535	0.3571	✓	
34	0.4070	0.5714		✓
35	0.4186	0.6071		
36	0.3837	0.4643	✓	
37	0.7093	0.3929		
38	0.6977	0.5000	✓	
39	0.5698	0.4643		
40	0.5581	0.5714	✓	
41	0.8721	0.2857		✓
42	0.9186	0.1429		
43	0.8256	0.2143	✓	
44	0.4651	0.5000		✓
45	0.4884	0.5357		✓
46	0.7442	0.3214		✓
47	0.7791	0.4643		✓
48	0.8953	0.1429		

Items	Level of Difficulty (p)	Discrimination Index ®	Pre-test	Post-test
49	0.8837	0.2857		✓
50	0.8372	0.2500		✓
51	0.8837	0.2500		✓
52	0.7093	0.3214		✓
53	0.7674	0.2500		✓
54	0.4070	0.4286		✓
55	0.5465	0.4286		
56	0.6744	0.5357		✓
57	0.7674	0.2143		✓
58	0.6628	0.2857		
59	0.6628	0.6071		
60	0.5233	0.5357		✓
61	0.9070	0.1786		
62	0.9651	0.0714		
63	0.9767	0.0357		
64	0.5000	0.4286	✓	
65	0.8372	0.2500	✓	
66	0.8372	0.2500		✓
67	0.8837	0.2857		✓
68	0.8256	0.3929		✓
69	0.5000	0.6071		
70	0.2442	0.4643		
71	0.8953	0.1071		
72	0.8837	0.2500		✓
73	0.7209	0.2857		✓
74	0.7558	0.5000		✓
75	0.5349	0.0357		
76	0.4186	0.4286	✓	
77	0.9302	0.1786	✓	
78	0.5930	0.3214		
79	0.6860	0.4286		
80	0.7674	0.4286	✓	
	Reliability (KR-20) = 0.99		**25 items**	**25 items**

D) Item analysis for pre-test (25 items)

The item analysis results present the level of difficulty (p) and the discrimination index (r) of the Pre-test.

Items	Level of Difficulty (p)	Discrimination Index (r)	Pre-test
1	0.8837	0.2500	✓
2	0.6395	0.6429	✓
3	0.3605	0.2500	✓
4	0.5930	0.3571	✓
5	0.6744	0.2143	✓
6	0.8953	0.2857	✓
7	0.5698	0.5357	✓
8	0.8605	0.2857	✓
9	0.8256	0.2143	✓
10	0.8372	0.3214	✓
11	0.7209	0.3214	✓
12	0.7093	0.2500	✓
13	0.4419	0.5000	✓
14	0.5116	0.5357	✓
15	0.5233	0.7500	✓
16	0.4535	0.3571	✓
17	0.3837	0.4643	✓
18	0.6977	0.5000	✓
19	0.5581	0.5714	✓
20	0.8256	0.2143	✓
21	0.5000	0.4286	✓
22	0.8372	0.2500	✓
23	0.4186	0.4286	✓
24	0.9302	0.1786	✓
25	0.7674	0.4286	✓
	Reliability (KR-20) = 0.8095		**25 items**

E) Item analysis for post-test (25 items)

The item analysis results present the level of difficulty (p) and the discrimination index (r) of the Pre-test on English for specific purposes.

Items	Level of Difficulty (p)	Discrimination Index (r)	Post-test
1	0.8372	0.3214	✓
2	0.3953	0.3571	✓
3	0.7791	0.4643	✓
4	0.3256	0.4286	✓
5	0.4070	0.5714	✓
6	0.8721	0.2857	✓
7	0.4651	0.5000	✓
8	0.4884	0.5357	✓
9	0.7442	0.3214	✓
10	0.7791	0.4643	✓
11	0.8837	0.2857	✓
12	0.8372	0.2500	✓
13	0.8837	0.2500	✓
14	0.7093	0.3214	✓
15	0.7674	0.2500	✓
16	0.4070	0.4286	✓
17	0.6744	0.5357	✓
18	0.7674	0.2143	✓
19	0.5233	0.5357	✓
20	0.8372	0.2500	✓
21	0.8837	0.2857	✓
22	0.8256	0.3929	✓
23	0.8837	0.2500	✓
24	0.7209	0.2857	✓
25	0.7558	0.5000	✓
Reliability (KR-20) = 0. 8012			**25 items**

F) Pre-test (Vocabulary Test)

213204 English for Specific Purposes   Questions: 25 items   Duration: 30 min

Instructions: Read the sentences carefully and choose the best answers to fill in the blanks.

1. The _____of dinosaur is caused by climate and geological changes around sixty-five million years ago.

　　　　　a. extinction　　　　　　　　b. revolution

　　　　　c. affection　　　　　　　　　d. formation

2. The World Animal Protection mentions that raising crocodiles in the farm for making bags and shoes is _____.

　　　　　a. famous　　　　　　　　　b. cruel

　　　　　c. pleasant　　　　　　　　　d. brave

3. Since the population of Black Panther in Thailand becomes lower each year, they are now categorized as _____species.

　　　　　a. extinct　　　　　　　　　b. local

　　　　　c. strange　　　　　　　　　d. endangered

4. John has lived in Chiang Mai for decades, so he is _____ with the cold weather.

　　　　　a. unfriendly　　　　　　　　b. familiar

　　　　　c. unusual　　　　　　　　　d. abnormal

5. Planting new trees to replace the old one, is one way to prevent the _____.

　　　　　a. deforestation　　　　　　　b. thunder storm

　　　　　c. soil erosion　　　　　　　　d. forest fire

6. The Amazon rainforest has been recognized as the richest ecosystem on earth because of its _____.

    a. agriculture   b. biodiversity

    c. population   d. temperature

7. This year the annual rainfall is lower than last year and that can cause the _____problem to various areas of Thailand.

    a. financial   b. drought

    c. political   d. erosion

8. The south of Thailand had_____ because of the heavy rain last week.

    a. forest fire   b. flooding

    c. drought   d. earthquakes

9. Oil is a _____ which comes from natural sources and cannot be replaced.

    a. substance   b. mineral

    c. molecule   d. fossil fuel

10. Susan plans to join a marathon program because she wants to _____ herself.

    a. bother   b. upset

    c. challenge   d. damage

11. Exercising for 150 min/week can help _____the risk of illness.

    a. increase   b. reduce

    c. stop   d. improve

12. Toon Bodyslam finished the 2,215 kilometers running for charity last year, but his projects still inspired and_____, Thai people, to go running more and more.

    a. improved   b. reduced

    c. challenged   d. encouraged

13. Exercise is good for your body, but too much work out can make you get
_____.

      a. involved   b. impacted

      c. injured   d. imaged

14. In Thailand, there is a blind teacher "Kru Ice" who does not let his _____
prevent him from being a teacher.

      a. direction   b. discovery

      c. disability   d. division

15. One _____of GMOs papaya is fasting a growth rate, therefore, the farmer
can collect and reproduce the products many times.

      a. package   b. storage

      c. advantage   d. average

16. The _____ of electrons is one of the biggest things in the world because
without this study, we wouldn't have electricity.

      a. collection   b. invention
      c. discovery   d. evidence

17.   Frankenstein is one of the most famous_____ novel that turned in to
many version of movies.

      a. scientific   b. realistic

      c. romance   d. detective

18. According to the _____ on ancient building in Buriram province, it can
prove that Thailand had a lot of Khmer influence in the past.

      a. destination   b. mystery

      c. explosion   d. evidence

19. 7-Eleven has launched the "reduce and stop" project which aims to reduce the use of the plastic bag since plastic production has much negative health and environmental_____.

        a. effects   b. directions

        c. community   d. investments

Passage 1: Exercising is very trendy in Thailand, especially when actors and actresses show their workout routine through Instagram. _____ (20) is one way to keep illness away. Moreover, limiting your food no more than 2,000 calories, avoiding junk food such as hamburger which can increase the cholesterol, and eating lots of fruits that_____ (21) good vitamins and minerals to your body. If you follow these steps, you will keep your body in good shape and also the risk of many long term illnesses such as _____(22).

20.   a. Eating junk food   b. Drinking soda

           c. Balancing diet   d. Oversleeping

21.   a. provide   b. include

           c. increase   d. repeat

22.   a. toothache   b. stomachache

           c. headache   d. obesity

Passage 2: Normally, the polar bears will find _____ (23) animals such as fish, which is easily found around their habitats to feed themselves. However, when the earth is warmer and the glaciers are melting. The polar bears have to move down closer to people's villages to get food. There is a report that people in Russia were _____ (24) by polar bears and the situation is getting worse. Concerning this issue, the campaign encouraging people to reduce the use of plastic bags in order to help the climate change crisis was launched. Recycling 1 tin of plastic _____ (25) for us in terms of energy-saving, since it can save electric energy around 5,774 kilowatts/hour.

23.   a. weaker   b. harder

           c. stronger   d. smarter

24.   a. crashed   b. damaged

              c. attacked   d. cracked

25.   a. benefits   b. harms

              c. troubles   d. threatens

G) Post-test (Vocabulary Test)

213204 English for Specific Purposes   Questions: 25 items   Duration: 30 min

Instructions: Read the sentences carefully and choose the best answers to fill in the blanks.

1. In the jungle, the newborn birds are very small and _____ so the mother keeps their baby up on the tree to be safe from the predators.

      a. heavy   b. weak

      c. healthy   d. strong

2. Swimming is good for your body and health since it helps release stress, improves your_____ and increases the good mood.

      a. disease   b. weight

      c. self-esteem   d. pressure

3. People who drink a lot of sugary drinking have higher risk of_____ than one who doesn't drink.

      a. heart attack   b. headache

      c. obesity   d. stomachache

4.   People in China_____ that Facebook and YouTube are banned in their country by the government.

      a. involve   b. adopt

      c. preview   d. realize

5.   Facebook messenger application is the _____of technology and internet which helps people to get closer.

      a. problem   b. benefit

      c. issue   d. moment

6.   The saltwater crocodile is one of the most dangerous animals in the world and it will become more_____ when get attacked.

      a. cruel   b. friendly

      c. calm   d. gentle

7. The farmer had little to sell at the market, due to the heavy rain last week that
_____the damage to the farmers' crops.

        a. protected   b. attended

        c. caused   d. cured

8. We are now facing with the _____ crisis. So the government decided to do
the "royal rain" by dropping chemicals from aircraft on clouds to cause the rain.

        a. flood   b. rainstorm

        c. drought   d. windstorm

9. Bhumiphol dam in Tak province, which can store 5,647 million cubic of water, was
built to store water and prevent _____.

        a. forest fire   b. flooding

        c. landslide   c. hurricane

10. Thai police arrested a man who was suspected of_____ after he was seen
in the forest trying to cut down the trees.

        a. deforestation   b. tree plantation

        c. animal hunting   d. reforestation

11. Burning _____, which was formed many hundreds of millions of years
ago, can release carbon dioxide into the air which becomes the cause of climate
change.

        a. fossil fuel   b. fatty acid

        c. energy   d. substance

12. Animal _____ are the places where animals live and survive in the
specific areas, which basically have air, water, food and shelter.

        a. organs   b. conditions

        c. products   d. habitats

13. You can find many colorful birds in Amazon rainforest, due to the variety of
_____ and ecosystem, which often considers as a sign of the healthiness of
the forest in the world.

        a. simulation   b. biodiversity

        c. department   d. institution

14. The car accident last night was extremely strong, the car was destroyed but the
passengers were all right. Surprisingly no one get_____.

        a. caught   b. injured

        c. fired   d. broken

15. I told my brother not to bother me because I am reading books for
the_____ test tomorrow, the test is about Albert Einstein and his experiment,
so I need to prepare well.

        a. mathematics   b. scientific

        c. historic   d. ethics

16. If you see some mushrooms that you are not_____ while walking in the
forest, please don't eat them because they will be poisonous.

        a. familiar   b. friendly

        c. useful   d. common

17. Christopher Columbus _____ America in 1492, before that most
people did not know about the other lands and believe that the Earth was flat.

        a. discovered   b. protected

        c. destroyed   d. Appeared

18. My father will give me a concert ticket if I get A for all subjects. It motivates and
_____me to read books vary hard.

        a. encourages   b. initiates

        c. hesitates   d. duplicates.

19. People with _____ such as deaf-blindness, usually have poorer health and lower education compare to people who are normal.

        a. disorder   b. disability

        c. discovery   d. disease

Passage 1: Last year, the police found Mr. Premchai and three men were reported to be caught in Thung Yai Naresuan _____ (20). They killed the black panther which is _____ (21) animal in Thailand, so they faced charges of illegal _____ (23). However, the evidence found in the forest was too weak therefore they did not get arrested.

20.   a. area   b. path

          c. event   d. venue

21.   a. a friendly   b. a simple

          c. an endangered   d. a tame

22.   a. eating   b. hunting

          c. riding   d. feeding

Passage 2: Overweight is always an issue for teenagers, they want to look skinny as much as they can. There is a project called "10 days work out fat burning" which is one of the most popular trends on the internet. The actress who owns this project wants to challenge herself and encourage people to _____ (23) with her. Exercising has lots of _____ (24) such as improving emotions, releasing stress and losing weight. Moreover, it can decrease the risk of_____(25) like heart failure or heart attack.

23.   a. travel   b. drink

          c. exercise   d. eat

24.   a. advance   b. advantages

          c. disadvantages   d. advice

25. a. heart disease   b. headache

     c. obesity   d. flue

H) Results of students' vocabulary achievement (Pretest-Posttest scores)

No	Pre-test	Post-test	Differences
1	9	11	2
2	10	19	9
3	9	13	4
4	5	14	9
5	12	24	12
6	13	24	11
7	10	19	9
8	22	25	3
9	15	23	8
10	21	22	1
11	12	14	2
12	11	17	6
13	14	22	8
14	8	14	6
15	8	12	4
16	14	23	9
17	11	15	4
18	9	20	11
19	13	20	7
20	16	16	0
21	22	25	3
22	10	15	5
23	5	10	5
24	12	16	4
25	7	14	7
26	13	21	8
27	13	22	9
28	14	23	9
29	15	25	10
30	20	24	4
31	8	20	12
32	11	23	12
33	11	21	10
34	6	10	4
35	16	22	6
36	9	19	10

No	Pre-test	Post-test	Differences
37	11	22	11
38	11	17	6
39	9	12	3
40	9	17	8
41	8	15	7
42	14	24	10
44	9	14	5
45	11	15	4
46	8	21	13
47	10	22	12
48	9	15	6
49	10	22	12
50	9	18	9
51	15	20	5
52	7	14	7
53	9	17	8
54	3	15	12
55	10	23	13
56	12	19	7
57	3	18	15
58	12	15	3
59	18	24	6
60	8	25	17
61	13	15	2
62	10	19	9
63	8	16	8
64	6	19	13
65	12	23	11
66	13	24	11
67	6	15	9
68	8	9	1
69	18	19	1
70	8	16	8
71	13	24	11
72	16	21	5
73	11	20	9
74	11	14	3
Mean	**11**	**18.65**	**7.432**

APPENDIX B

QUESTIONNAIRE

A) The IOC scores of the questionnaire from the experts

The 19 items of the questionnaire were sent to the experts to find the content validity. 19 items have the IOC values higher than 0.5 which means all items can be reserved.

Part	No	Expert 1	Expert 2	Expert 3	Total score	The IOC Index	Interpretation
1	1	1	1	1	3	1.00	Reserved
	2	1	1	1	3	1.00	Reserved
	3	1	1	1	3	1.00	Reserved
	4	1	1	1	3	1.00	Reserved
2	1	1	1	1	3	1.00	Reserved
	2	1	1	1	3	1.00	Reserved
	3	1	1	1	3	1.00	Reserved
	4	1	1	1	3	1.00	Reserved
	5	1	1	1	3	1.00	Reserved
	6	1	1	1	3	1.00	Reserved
	7	1	1	1	3	1.00	Reserved
	8	1	1	1	3	1.00	Reserved
	9	1	1	1	3	1.00	Reserved
	10	1	1	1	3	1.00	Reserved
	11	1	1	1	3	1.00	Reserved
	12	1	1	1	3	1.00	Reserved
	13	1	0	1	2	0.67	Reserved
	14	1	1	1	3	1.00	Reserved
	15	1	1	1	3	1.00	Reserved
					Average	0.98	

B) An English version of the questionnaire for asking students' opinions in learning English vocabulary through a gamified flipped classroom application.

Questionnaire: Students' opinions in learning English vocabulary through a gamified flipped classroom application.

The questionnaire intends to collect information related to students' opinions in learning English vocabulary through a gamified flipped classroom application. The questionnaire consists of 2 parts:

Part 1 Personal Information

Part 2 Students' opinions in learning English vocabulary through a gamified flipped classroom app

Note: Your answers are ANONYMOUS and Confidential. There is no effect on your English course grading.

Directions: Please read each statement and ✓ in the rating box that most describes your idea.

Part 1 General Information

1. Gender ☐ Male ☐ Female

2. School of.............................. Institute of.................................... Year...............

3. Age.............................

4. What English course you are taking in this trimester?..

Part 2: Students' opinions in learning English vocabulary through gamified flipped classroom application.

5= strongly agree, 4=agree, 3=undecided, 2=disagree, 1= strongly disagree

Statement	5	4	3	2	1	Note
1. I think learning English vocabulary through a gamified flipped classroom app makes me ready for the class activities and group discussion.						
2. I think learning English vocabulary through gamified flipped classroom app makes me more confident to ask the question in class.						
3. Learning English vocabulary through a gamified flipped classroom app encourages me to participate more in class.						

Statement	5	4	3	2	1	Note
4. I like learning English vocabulary through a gamified flipped classroom app because I can manage my own learning.						
5. Learning English vocabulary through a gamified flipped classroom app gives me more opportunities to study outside the classroom.						
6. I believe that learning English vocabulary through a gamified flipped classroom app helps me remember English vocabulary better.						
7. I think learning English vocabulary through a gamified flipped classroom app helps me understand the lesson better because I have more chances to practice English vocabulary.						
8. Learning English vocabulary through a gamified flipped classroom app has not improved my vocabulary learning.						
9. I have more motivation in learning English vocabulary through a gamified flipped classroom app compared to a normal classroom.						
10. I believe that learning English vocabulary through a gamified flipped classroom app is more enjoyable than a normal classroom.						
11. Learning English vocabulary through a gamified flipped classroom app is convenient for me because I can access learning anywhere, anytime.						
12. I am interested in learning English vocabulary through a gamified flipped classroom app because I want to know how the game can support my learning.						
13. I enjoy learning English vocabulary through gamified flipped classroom app very much						
14. I like the point system (XP, HP, AP, GP) very much because I always feel excited when learning English vocabulary through a gamified flipped classroom app.						
15. I like seeing the avatar's evolution in gamified flipped classroom app because the more mission I can complete, the more my avatar can evolve.						

C) A Thai version of the questionnaire for asking students᾿ opinions in learning English vocabulary through a gamified flipped classroom application.

แบบสอบถาม: ความพึงพอใจของนักศึกษาในการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้าน

แบบสอบถามชุดนี้จัดทำขึ้นเพื่อสำรวจความพึงพอใจในการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกม ห้องเรียนกลับด้าน โดยแบ่งออกเป็น 2 ส่วนคือ

ส่วนที่ 1 ข้อมูลทั่วไป

ส่วนที่ 2 ความพึงพอใจของนักศึกษาในการใช้โปรแกรมประยุกต์เกมห้องเรียนกลับด้านเพื่อการเรียนรู้คำศัพท์

ภาษาอังกฤษ

<u>หมายเหตุ</u> ข้อมูลที่ได้จะถูกเก็บเป็นความลับ และไม่มีผลกระทบต่อคะแนนในรายวิชาภาษาอังกฤษ

<u>คำชี้แจง</u> กรุณากรอกข้อมูลส่วนตัวของท่าน และทำเครื่องหมาย ✔ หน้าคำตอบที่ตรงกับความคิดของท่านมากที่สุด

<u>ส่วนที่ 1</u> ข้อมูลทั่วไป

1. เพศ ☐ ชาย ☐ หญิง

2. สำนักวิชา...............................สาขาวิชา..............................ชั้นปี.......................

3. อายุ.................................ปี

4. ท่านกำลังเรียนภาษาอังกฤษวิชาใดในภาคการศึกษานี้...

<u>ส่วนที่ 2:</u> ความพึงพอใจของนักศึกษาในการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้าน

5 = เห็นด้วยอย่างยิ่ง, 4= เห็นด้วย, 3= ไม่แน่ใจ, 2= ไม่เห็นด้วย, 1= ไม่เห็นด้วยอย่างยิ่ง

ความคิดเห็น	5	4	3	2	1	หมายเหตุ
1.ฉันคิดว่าการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านทำให้ฉันมีความพร้อมสำหรับกิจกรรมในห้องเรียน และการอภิปรายกลุ่ม						
2.ฉันคิดว่าการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านทำให้ฉันมีความมั่นใจในการถามคำถามในห้องเรียนมากขึ้น						
3. การเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านกระตุ้นให้ฉันมีส่วนร่วมในห้องเรียนมากขึ้น						
4. ฉันชอบการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านเพราะว่าฉันสามารถจัดการการเรียนของตัวเองได้						

ความคิดเห็น	5	4	3	2	1	หมายเหตุ
5. การเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้าน ให้โอกาสฉันได้เรียนรู้นอกห้องเรียนมากขึ้น						
6. ฉันเชื่อว่าการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านช่วยให้ฉันจดจำคำศัพท์ภาษาอังกฤษได้ดีขึ้น						
7.ฉันคิดว่าการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านช่วยให้ฉันเข้าใจบทเรียนได้ดีขึ้นเพราะฉันมีโอกาสในการฝึกฝนคำศัพท์ภาษาอังกฤษที่มากขึ้น						
8. การเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านไม่ได้ช่วยให้ฉันพัฒนาการเรียนรู้คำศัพท์						
9. ฉันมีแรงจูงใจที่มากขึ้น ในการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านเปรียบเทียบกับห้องเรียนแบบปกติ						
10. ฉันเชื่อว่าการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านสนุกกว่าการเรียนแบบห้องเรียนปกติ						
11. การเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านเป็นสิ่งที่สะดวกสำหรับฉัน เพราะฉันสามารถเข้าถึงการเรียนได้ทุกที่ ทุกเวลา						
12. ฉันรู้สึกสนใจในการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้าน เพราะฉันอยากรู้ว่าเกมจะช่วยสนับสนุนการเรียนรู้ของฉันอย่างไร						
13. ฉันสนุกกับการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านเป็นอย่างมาก						
14. ฉันชอบระบบคะแนน (XP, HP, AP, GP) เป็นอย่างมาก เพราะนั่นทำให้ฉันตื่นเต้นเมื่อเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้าน						
15. ฉันชอบเห็นความก้าวหน้าของอวาตาร์ ในโปรแกรมประยุกต์เกมห้องเรียนกลับด้าน เพราะยิ่งฉันทำภารกิจสำเร็จมากเท่าไหร่อวาตาร์ของฉันก็จะพัฒนามากขึ้นเท่านั้น						

D) The results of the questionnaire showed students' opinion towards the use of

GFCA on learning English vocabulary

No	Items	Mean	S.D.	Interpretation
1	Students think learning English vocabulary through GFCA makes them ready for class activities and group discussions.	4.04	0.730	Good Opinion
2	Students think learning English vocabulary through GFCA makes them more confident to ask the question in class.	3.93	0.941	Good Opinion
3	Learning English vocabulary through GFCA encourages the student to participate more in class.	3.81	1.016	Good Opinion
4	Students like learning English vocabulary GFCA because they can manage their own learning.	4.00	0.951	Good Opinion
5	Learning English vocabulary through GFCA gives students more opportunities to study outside the classroom.	4.05	0.809	Good Opinion
6	Students believe that leaning English vocabulary through a gamified flipped classroom app helps them remember English vocabulary better.	4.23	0.750	Good Opinion
7	Students think leaning English vocabulary through GFCA helps them understand the lesson better because they have more chances to practice English vocabulary.	4.15	0.871	Good Opinion
8	Learning English vocabulary through GFCA has not improved students' English vocabulary.	4.15	0.794	Good Opinion
9	Students have more motivation in learning English vocabulary through a gamified flipped classroom app.	4.01	0.852	Good Opinion
10	Students believe that leaning English vocabulary through GFCA is more fun.	4.32	0.724	Good Opinion
11	Learning English vocabulary through GFCA is convenient for students because they can access learning anywhere, anytime.	4.18	0.942	Good Opinion
12	Students interest in learning English vocabulary through GFCA because they want to know how the game can support their learning.	3.82	0.970	Good Opinion

No	Items	Mean	S.D.	Interpretation
13	Students enjoy learning English vocabulary through GFCA very much	3.92	0.968	Good Opinion
14	Students like the point system (XP, HP, AP, GP) very much because they always feel excited when learning English vocabulary through GFCA.	3.77	1.177	Good Opinion
15	Students like seeing the avatar's evolution in GFCA because the more mission they can complete, the more their avatar can evolve.	3.97	1.033	Good Opinion
	Total	**4.02**	**0.90**	**Good Opinion**

APPENDIX C

SEMI-STRUCTURED INTERVIEW

A) The IOC value for the guided questions of semi-structured interviews.

The 4 guided questions for the semi-structured interview were sent to the experts to find the content validity. All 4 questions have the IOC values higher than 0.5 which means all items can be reserved.

Question	Expert 1	Expert 2	Expert 3	Total score	The IOC Index	Interpretation
1	1	1	1	3	1.00	Reserved
2	1	1	1	3	1.00	Reserved
3	1	1	1	3	1.00	Reserved
4	1	1	1	3	1.00	Reserved
				Average	1.00	Reserved

B) An English version of the guided questions in the semi-structured interview.

1. Do you like learning English vocabulary through a gamified flipped classroom app? Why? Why not?

2. Do you think learning English vocabulary through a gamified flipped classroom app helps you improve your vocabulary knowledge? Why? Why not?

3. Do you think a gamified flipped classroom app is convenient for learning English vocabulary? Why? Why not?

4. Do you have any problems while learning English vocabulary through a gamified flipped classroom app? If yes, what are they?

C) A Thai version of the guided questions of the semi-structured interview.

1. คุณชอบการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านหรือไม่? ชอบเพราะอะไร? ไม่ชอบเพราะอะไร?

2. คุณคิดว่าการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านช่วยท่านพัฒนาคำศัพท์หรือไม่? คิดว่าใช่เพราะอะไร? คิดว่าไม่ใช่เพราะอะไร?

3. คุณคิดว่าโปรแกรมประยุกต์เกมห้องเรียนกลับด้าน สะดวกต่อการเรียนคำศัพท์ภาษาอังกฤษ? คิดว่าใช่เพราะอะไร? คิดว่าไม่ใช่เพราะอะไร?

4. คุณพบปัญหาอะไรในระหว่างการเรียนคำศัพท์ภาษาอังกฤษผ่านทางโปรแกรมประยุกต์เกมห้องเรียนกลับด้านหรือไม่? ถ้ามี ได่แก่อะไรบ้าง?

D) Results of the semi-structured interviews

Question 1 "Do you like learning English vocabulary through a gamified flipped classroom app? Why? Why not?"

No	Answer	Reasons
1	Yes	attractive, not boring inter
2	Yes	the new experience, not boring
3	Yes	new experience
4	Yes	not boring
5	Yes	A new experience of learning
6	Yes	interesting, prepare before class help to understand the lesson
7	Yes	the new experience of learning, the game can be used in learning
8	Yes	not boring, new experience
9	Yes	the new experience, interesting, flexible environment, easy to use
10	Yes	not boring, not feel like learning
11	Yes	the new experience, really like the games
12	Yes	not boring, help remember better
13	Yes	interesting, the example of using and pronunciation help to learn better
14	Yes	new ways of learning
15	Yes	it's ok to use, some feature is interesting but still need some times to load
16	Yes	learning through is more relaxed, doesn't feel like learning so it can help improve vocabulary
17	Yes	new experience, fun
18	Yes	attractive, not boring
19	Yes	fun, compete with friends
N=19	**100%**	**N=12 Interesting, Not boring** **N= 7 New experience**

Question 2 "Do you think learning English vocabulary through gamified flipped classroom application helps you improve your vocabulary knowledge? Why? Why not?"

No	Answer	Reasons
1	Yes	help remember more vocab
2	Yes	easy to remember with game, fun
3	Yes	playing a lot of help remember vocab
4	Yes	motivated by the costumes of avatar
5	Yes	answering in quest and mission help them remember vocab better
6	Yes	find word s' meaning to answer correctly, points are motivated to learn more
7	Yes	frequency of words appearing help in remember
8	Yes	frequency of words appearing help in remember and be ready to use in-class activities
9	Yes	easy to review vocab learn, new ways of learning
10	Yes	after learning with ppt, the vocab will be used in quest and mission whether they understand or not, help remember
11	Yes	remember vocab to answer in quest help remember knowledge
12	Yes	class activities help to remember the words
13	Yes	know more vocab, improve vocab knowledge, remember more with the game
14	Yes	some vocab are new but need to find the meaning to answer correctly so know more vocab, easy to remember
15	Yes	easy to learn
16	Yes	not like the traditional classroom
17	Yes	easy to review vocab learn,
18	Yes	after learning with ppt, the vocab will be used in quest and mission whether they understand or not, help remember
19	Yes	after learning with ppt, the vocab will be used in quest and mission whether they understand or not, help remember
N=19	**100%**	**N= 11 Help remember vocabulary better** **N= 6 Friendly user interface** **N =2 More motivating**

Question 3 "Do you think a gamified flipped classroom app is convenient for learning English vocabulary? Why? Why not?"

No	Answer	Reasons
1	Yes	manage their own time
2	Yes	can play anytime, convenient
3	Yes	able to learn outside the classroom on their own pace
4	Yes	don't have to bring any textbooks, so it saves cost and convenient
5	Yes	it is necessary to pass the stage so need to learn and answer correctly by practicing vocabulary learn on the free time
6	Yes	it comes in a mobile app so it is easy to learn and can access anytime self-determined
7	Yes	Quest and Mission help prepare for learning, test knowledge after learning, and can learn on free time self-determined
8	Yes	convenient, don't need books, internet technology can help in saving cost for document sheet
9	Yes	good for the digital age of learning, easy to access, convenient, be able to learn anywhere anytime self-determined
10	Yes	easy to learn by themselves self-determined
11	Yes	convenient, easy to remember learning from the book, don't need to carry a book around
12	Yes	self-determined enjoy learning with the game
13	Yes	access learning anywhere anytime, see the improvement through the development of avatar
14	Yes	I can learn by myself, the sentence example in the game help to remember vocab and know-how that words are used in the sentence.
15	Yes	easy to learn, can control the time for self-learning
16	Yes	can learn anywhere anytime, self-determined
17	Yes	convenient self-determined, managed my own time to complete Quest a Mission
18	Yes	convenient, don't need books, internet technology can help in saving cost for photocopy
19	Yes	convenient because I can access anywhere anytime, creates self-determined learning
N=19	**100%**	**N=15 Self-determined learning** **N= 4 Paperless classroom**

Questionnaire 4 "Do you have any problems while learning English vocabulary through a gamified flipped classroom app? If yes, what are they?"

No	Answer	Reasons
1	No	-
2	No	-
3	Yes	Bad internet connection cause delay problems when connecting to the game
4	No	-
5	Yes	need more time to play the game in class
6	No	-
7	Yes	class size might be too big, some students don't get a chance to play, only 1 hr might not enough for everyone to participate
8	No	-
9	Yes	accessing the game through a web browser through the laptop is faster
10	Yes	the notification delay sometimes
11	No	-
12	No	-
13	No	-
14	Yes	some page of the game loading slowly
15	Yes	download slowly for dressing up page
16	No	-
17	No	-
18	No	-
19	No	-
N=19	**36.84 %**	**N= 5 Poor internet connection** **N= 2 Need more time to study**

APPENDIX D

LESSON PLANS

A) The IOC value for the lesson plans.

The 7 statements of the evaluation list of the lesson plan were sent to the experts to find the content validity. All 7 questions have the IOC values higher than 0.5 which means all items can be reserved.

Item	Expert 1	Expert 2	Expert 3	Total score	The IOC Index	Interpretation
1	1	1	1	3	1.00	Reserved
2	1	0	1	2	0.67	Reserved
3	1	1	0	2	0.67	Reserved
4	1	1	1	3	1.00	Reserved
5	1	1	0	2	0.67	Reserved
6	1	1	0	2	0.67	Reserved
7	1	1	1	3	1.00	Reserved
				Average	0.80	Reserved

B) An evaluation form of the lesson plans

Direction: Please read each statement of the evaluation form and then (✓) in the rating box that describes your opinions about each statement. The criteria for rating are as follows:

+1 = The statement is appropriate to the purpose of the questionnaire

0 = The statement seems irrelevant to the purpose of the questionnaire

-1 = The statement is not appropriate to the purpose of the questionnaire

Item	Evaluation List	+1	0	-1	Notes
1	Studying time is suitable.				
2	The activity is relevant to the objectives.				
3	The activity is appropriate for the students				
4	The objectives conform to the contents that the students learn.				
5	The evaluation aligns with the objectives				
6	The activities of gamified flipped classroom app can motivate students in learning vocabulary				
7	The activities in class such as "Boss Battle" can encourage students to participate in class actively				

C) Lesson plans

Lesson Plans

Vocabulary Learning

Objectives/Outcome: At the end of the class, the activities should promote students' vocabulary knowledge. Students should have the ability to; remember and know the meaning of vocabulary, identify the synonyms of the given vocabulary and use vocabulary appropriate with their context.

Course Description: This course focuses on improving students' vocabulary knowledge. All skills are integrated into a whole lesson. The out of class activities such as Mission and Quest allow students to learn at their own pace. These activities provide students more opportunities to expose to the language since they can repeat the task over and over again. As a result, students will be able to learn more because they can control their own learning and become more active learners. Additionally, In-class activities such as Boss Battle, the Wheel of Destiny, the Riders of Wheels and the White Mountain allow students to participate in class and interact more with their friends and teachers. These activities can promote students' engagement and motivation in class.

Out of Class Activities: Focusing on remembering and understanding levels. Students have to complete the missions and quests in Classcraft- a gamified flipped classroom app. There are four missions and four quests, the contents are created based on the classroom material. In each "Mission" students have to match vocabulary with their meanings to get points. This activity aims to test students' vocabulary recognition. In the "Quest", students have to read the question, type their answer then submit to the teacher, before proceeding to the next level. This activity aims to test a student's comprehension of vocabulary learned (Words in context). Once the missions and quests

are completed students will earn the bonus points (XP and GP).

In-Class Activities: Focusing on activity that allows students to discuss and work in a group. After students learn the language in Classcraft before coming to class, the in-class activities such as Boss Battles can be applied as a formative review. The "boss battles" activity aims to check students' understanding of what they have learned. If the students have a wrong concept of knowledge, the teacher can correct their misunderstanding. Moreover, other activities such as "the wheel of destiny" can be used to random students to work as a team, or "the Riders of wheels" can be used at the beginning of the class to warn students to be ready for the learning.

Activities	Theories	Description
Mission	Distributed Practice Self-determination	The "Mission" is an out of a class activity which is designed based on the distributed practice and self-determination framework. With the use of the distributed practice, students have more opportunities to encounter vocabulary learned outside the classroom and also can practice vocabulary learned by themselves. Employing the self-determination in the activity allow students to take control of their own learning (autonomous learning) and can help them to come up with the well-being outcome.
Quest	Learning Motivation, Operant conditioning	The "Quest" is an out of a class activity which is basically designed based on learning motivation theory, and operant conditioning.
Boss battle	Active learning, Operant conditioning,	The "Boss battle" is an in-class activity which allows students to interact with classmate and teacher more in class. The vocabulary learned will be checked by using the boss battle activity. Students have to choose the correct answer in order to beat the boss of the game. In this stage, the teacher can monitor and check whether students misunderstand the concepts of the lesson or not, if so the teacher can help them correct the answer.

Pre-test and Training Hour

Date: 22/07/19   **Duration: 1 hour**

Objectives: After finish the class, students are capable to use a gamified flipped classroom app "Classcraft" to learn English vocabulary at their own pace.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Pre-test	• Students take the pre-test before leaning with the gamified flipped classroom app	20 min	Paper-Based
Training hour	• Show the student how to log in to Classcraft and how to complete the mission and quest.	15 min	PPT, Classcraft
	• Demonstrate students how to submit the assignment or answer in Classcraft.	15 min	
	• Explain the point system (XP, GP, and AP) to students and how to get the point.	10 min	

Week 1: Out of class activities "Unit 1 Animals"

Date: At students' convenience   **Duration: 1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 1. The lists of vocabulary are; attack, hunter, extinction, cruel, endangered, weak, common, habitat, and familiar.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Mission 1"	- Students log in to Classcraft to explore new vocabulary in unit 1. - Students complete Mission 1 in Classcraft. - Students learn by matching vocabulary with their meanings and synonyms. (The task can be repeated) - After completing the mission students earn XP and GP points.	1hr or more	Classcraft and other online sources

Week 1: In-class activities "Unit 1 Animals"

Date: 31/07/19   **Duration**: **1 hour**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 1. The lists of vocabulary are; attack, hunter, extinction, cruel, endangered, weak, common, habitat, and familiar

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	5 min	
Warm-Up	• Show students the list of vocabulary and pictures in unit 1 (using PowerPoint Slide) • Use "The Wheel of Destiny" to the random individual student or random the team to answer the question and gain XP. • Ask students to match pictures with vocabulary, then let students guess what today day's class is about. • Ask students to guess the topic of the class • Use "The Wheel of Destiny" to the random student or random the team to answer the question and gain XP	7 min	PPTX, Classcraft
	• Giving students an overview of the lesson. "Today's lesson is about endangered species……" (explain endangered if necessary) • The teacher asks the students about the endangered species in Thailand "Does anybody know what is the endangered animals in Thailand" • Give 50 XP to students who answer the question.	5 min	
Practice	• Students watch the video *"Thailand's "elephant whisperer" devoted to saving endangered species"*	5 min	https://www.youtube.com/watch?v=c-mi3gL8xzE
Topic/Theme	**Techniques/Instructional Activities**	**Time**	**Materials**
	• Ask the student to work in small group "discuss why elephant in Thailand is an endangered animal and how to protected them	8 min	

Topic/Theme	Techniques/Instructional Activities	Time	Materials
	• Teacher monitors by a walk around the classroom and facilitates each group while they discuss	8 min	
	• Students in each group are selected randomly by using "The wheel of destiny" feature in Classcraft to present their idea to the class. • Students earn extra GP for the presentation.	20 min	
Homework	• Have students go to Classcraft and complete "Quest 1". Students who complete the quest early the due date will gain double XP points	5 min	Classcraft
Closing	• Teachers close the day's class and wrap-up what students have learned	5 min	

Week 2: Out of class activities "Unit 1 Animals"

Date : At students' convenience   **Duration: 1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 1. The lists of vocabulary are; attack, hunter, extinction, cruel, endangered, weak, common, habitat, and familiar.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Quest 1"	• Students log in to Classcraft to complete the Quest 1. • Students need to choose one answer and submit their answers to earn a point. There is ten-item in each quest (an item refers to a question). The content of the quest is chosen based on unit 1. • After completing the mission students earn XP and GP points.	1 or more	Classcraft and other online sources

Week 2: In-class activities "Unit 1 Animals"

Date: 07/08/19   **Duration**: 1 hour

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 1. The lists of vocabulary are; attack, hunter, extinction, cruel, endangered, weak, common, habitat, and familiar.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	5 min	
Warm-up	• Use the "The Riders of Wheels" in Classcraft to create a random event in class to draw students' attention to the lesson.	5 min	Classcraft
	• The example of a random event is "Have the student choose one word from the lesson and explain the meaning to get an extra point"	5 min	
Boss battle	• Check students' understanding of the words learned by using "Boss Battle" in Classcraft.	10 min	Classcraft
	• Students have to answer the question to gain XP and win the boss of the game. This activity requires the student to choose the appropriate word to complete the sentence. Students earn 50 XP for answering correctly and minus 50 XP if their answer is incorrect.	15 min	
	• There are 10 questions (or more) in the Boss Battle activity. Vocabulary is chosen based on the unit vocabulary in unit 1	10 min	
Homework	• Have students go to Classcraft and complete the mission 2. Students who complete the quest within 2 days will gain double points of XP	5 min	Classcraft
Closing	• Teachers close the day's class and wrap-up what students have learned today.	5 min	

Week 3: Out of class activities "Unit 2 Environment2"

Date: : At students' convenience   **Duration: 1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 2. The lists of vocabulary are; Deforestation, biodiversity, drought, flooding, glaciers, cause, fossil fuel, global warming, challenge, area, and effect.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Mission 2"	• Students log in to Classcraft to explore new vocabulary in Unit 2. • The student goes to complete Mission 2 in Classcraft. • Students learn by matching vocabulary with their meanings and synonyms. (The task can be repeated) • After completing the mission students earn XP and GP points.	1hr or more	Classcraft and other online sources

Week 3: In-class activities "2 Environment"

Date: **21/08/19**   **Duration**: **1 hour**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 2. The lists of vocabulary are; Deforestation, biodiversity, drought, flooding, glaciers, cause, fossil fuel, global warming, challenge, area, and effect.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	3 min	
Warm-Up	• Show students the list of vocabulary and pictures in unit 2	2 min	PPT, Classcraft
	• Use "The Wheel of Destiny" to the random student or random the team to answer and gain XP.	5 min	
	• Ask students to match pictures with vocabulary, then let students guess what today day's class is about	8 min	
Practice	• Students watch the video *"The effects of global warming"* which is related to the theme of unit 2.	7 min	https://www.youtube.com/watch?v=G4H1N_yXBiA
	• Use "The wheel of destiny" feature is used to random students to work in a small group.	5 min	
	• After watching the video, a group of students has to choose one effect of global warming and discuss how to save to world from the global warming crisis then present it to the class.	20 min	
	Teacher monitors by walking around the classroom and facilitates each group while they discuss	5 min	
Homework	• Have students go to Classcraft and complete "Quest 2". Students who complete the quest early the due date will gain double XP points	3 min	Classcraft
Closing	• Teachers close the day's class and wrap-up what students have learned today.	2 min	

Week 4: Out of class activities "Unit 2 Environment"

Date: : At students' convenience   **Duration: 1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 2. The lists of vocabulary are; Deforestation, biodiversity, drought, flooding, glaciers, cause, fossil fuel, global warming, challenge, area, and effect.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Quest 2"	• Students log in to Classcraft to complete the Quest 2. • Students need to choose one answer and submit their answers to earn a point. • There are ten items in each quest (an item refers to a question). The content of the quest is chosen based on unit 2. • After completing the mission students earn XP and GP points.	1hr or more	Classcraft and other online sources

Week 4: In-class activities "Unit 2 Environment"

Date: 28/08/19   **Duration**: 1 hour

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 2. The lists of vocabulary are; Deforestation, biodiversity, drought, flooding, glaciers, cause, fossil fuel, global warming, challenge, area, and effect.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	5 min	
Warm-up activity	• Use the "The Riders of Wheels" in Classcraft to create a random event in class to draw students' attention to the lesson. • The example of a random event is "a student who volunteers to complete a special quest in class gain 100 XP"	10 min	PPT, Classcraft
Boss battle	• Check students' understanding of the words learned in unit 2 by using "Boss Battle" in Classcraft. • Students have to answer the question to gain XP and win the boss of the game. This activity requires the student to choose the appropriate word to complete the sentence. Students earn 50 XP for answering correctly and minus 50 XP if their answer is incorrect. • There are 10 questions (or more) in the Boss Battle activity. Vocabulary is chosen based on the unit vocabulary in unit 2	30 min	Classcraft
Homework	• Have students go to Classcraft and complete the mission 3 • Students who complete the quest within 2 days will gain double points of XP	10 min	Classcraft
Closing	• Teachers close the day's class and wrap-up what students have learned today	5 min	

Week 5: Out of class activity "Unit 3 Health and Fitness"

Date: : At students' convenience   **Duration: 1 hours or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; reduce, exercise, self-esteem, obesity, junk food, calories, balancing diet, realize, encourage, and injure

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Mission 3"	• Students log in Classcraft to explore new vocabulary in unit 3 • The student goes to complete Mission 3 in Classcraft. • Students learn by matching vocabulary with their meanings and synonyms. (The task can be repeated) • After completing the mission students earn 500 XP and 500 GP points.	1hr or more	Classcraft and other online sources

Week 5: In-class activities "Unit 3 Health and Fitness"

Date: 11/09/19   **Duration: 1 hour**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; reduce, exercise, self-esteem, obesity, junk food, calories, balancing diet, realize, encourage, and injure.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	2 min	
Warm-Up activity	• Show students the pictures and let the students guess the topic of today.	3 min	PPT, Classcraft
	• Use "The Wheel of Destiny" in Classcraft to the random student or random the team to answer and gain 50 XP.	5 min	
	• Use the "the white mountain in Classcraft to countdown the time then ask students to match pictures with vocabulary.	5 min	
Practice	• Students watch the video about the *"10 Benefits of Exercise on The Brain And Body"* the content is related to the vocabulary in unit 3, then use the "The wheel of destiny" to random students into 10 small groups.	20 min	https://www.youtube.com/watch?v=yTL_bNvXJ9s
	• Let student discuss in a group and write down what are 10 benefits of Exercise in the video they have watched. • Teacher monitors by walking around the classroom and facilitates each group while they discuss. • The answers are shown in front of the class and students earn 100 XP for the correct answer. (100 XP for 1 correct answer	15 min	
Homework	• Have students go to Classcraft and complete the Quest 3	5 min	Classcraft
	• Students who complete the quest within 2 days will gain double points of XP		
Closing	• Teachers close the day's class and wrap-up what students have learned today.	5 min	

Week 6: Out of class activities "Unit 3 Health and Fitness"

Date: At students' convenience   **Duration: 1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; reduce, exercise, self-esteem, obesity, junk food, calories, balancing diet, realize, encourage, and injure.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Quest 3"	• Students log in to Classcraft to complete the Quest 3. • Students need to choose one answer and submit their answers to earn the point. • There is ten-item in each quest (an item refers to a question). The content of the quest is chosen based on unit 3. • After completing the mission students earn XP and GP points.	1hr or more	Classcraft and other online sources

Week 6: In-class activities "Unit 3 Health and Fitness"

Date: 18/09/19   **Duration**: 1 hour

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; reduce, exercise, self-esteem, obesity, junk food, calories, balancing diet, realize, encourage, and injure.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	5 min	
Warm-Up activity	• Use the "The Riders of Wheels" in Classcraft to create a random event in class to draw students' attention to the lesson.	5 min	PPT, Classcraft
	• The example of a random event is "a student who volunteers to complete a special quest in class gain 100 XP" (the special quest asks the student to choose a hidden picture and matches with it meaning)	10 min	
Practice	• Check students' understanding of the words learned in unit 3 by using "Boss Battle" in Classcraft. • Students have to answer the question to gain XP and win the boss of the game. This activity requires the student to choose the appropriate word to complete the sentence. Students earn 50 XP for answering correctly and minus 50 XP if their answer is incorrect. • There are 10 questions (or more) in the Boss Battle activity. Vocabulary is chosen based on the unit vocabulary in unit 3	30 min	Classcraft
Homework	• Have students go to Classcraft and complete the "Mission 4" • Students who complete the quest within 2 days will gain double points of XP	5 min	Classcraft
Closing	• Teachers close the day's class and wrap-up what students have learned today.	5 min	

Week 7: Out of class activities "Unit 4 Discovery and Innovation"

Date: : At students' convenience   **Duration: 1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; biofuel, disability, advantage, benefit, concern, discovery, innovation, scientific, provide, and evidence.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Mission 4"	• Students log in Classcraft to explore new vocabulary in unit4. • The student goes to complete Mission 4 in Classcraft. • Students learn by matching vocabulary with their meanings and synonyms. (The task can be repeated) • After completing the mission students earn 500 XP and 500 GP points.	1 or more	Classcraft and other online sources

Week 7: In-class activities "Unit 4 Discovery and Innovation"

Date: **25/09/19**   **Duration**: **1 hour**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; biofuel, disability, advantage, benefit, concern, discovery, innovation, scientific, provide, and evidence.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	5 min	
Warm-Up activity	• Show students the pictures and let the students guess the topic of today.	3 min	PPT, Classcraft
	• Use "The Wheel of Destiny" in Classcraft to the random student or random the team to answer and gain 50 XP.	2 min	
	• Use the "the white mountain in Classcraft to countdown the time then ask students to match pictures with vocabulary.	10 min	
Practice	Students watch the video about the *"Welcome to future"* the content is related to the vocabulary in unit 4, then use the "The wheel of destiny" to random students as a team.	10 min	https://www.youtube.com/watch?v=f3NWvUV8MD8
	• After watching, let students choose one innovation they like in the video and discuss and present to the class whether the innovation they choose can become real in the future, why or why not.	20 min	
	• Teacher monitors by walking around the classroom and facilitates each group while they discuss. • Each group earns 500 XP for the presentation.	5 min	
Homework	• Have students go to Classcraft and complete the quest 4 Students who complete the quest within 2 days will gain double points of XP	3 min	Classcraft
Closing	• Teachers close the day's class and wrap-up what students have learned today.	2 min	

Week 8: Out of class activities "Unit 4 Discovery and Innovation"

Date: **: At students' convenience**   **Duration**: **1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; biofuel, disability, advantage, benefit, concern, discovery, innovation, scientific, provide, and evidence.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "Quest 4"	• Students log in to Classcraft to complete the Quest 4. • Students need to choose one answer and submit their answers to earn the point. • There is ten-item in each quest (an item refers to a question). The content of the quest is chosen based on unit 4. • After completing the mission students earn XP and GP points.	1hr or more	Classcraft and other online sources

Week 8: In-class activities "Unit 4 Discovery and Innovation"

Date: **25/09/19**   **Duration**: **1 hour**

Objectives: After finish the class, students are capable to describe and remember the meaning of vocabulary learned in unit 3. The lists of vocabulary are; biofuel, disability, advantage, benefit, concern, discovery, innovation, scientific, provide, and evidence.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	3 min	
Warm-Up activity	• Use the "The Riders of Wheels" in Classcraft to create a random event in class to draw students' attention to the lesson.	2 min	PPT, Classcraft
	• The example of a random event is "a student who volunteers to complete a special quest in class gain 100 XP" (the special quest asks the student to choose a hidden picture and matches with it meaning)	10 min	
Practice	• Check students' understanding of the words learned in unit 4 by using "Boss Battle" in Classcraft.	20 min	Classcraft
	• Students have to answer the the question to gain XP and win the boss of the game. This activity requires the student to choose the appropriate word to complete the sentence. Students earn 50 XP for answering correctly and minus 50 XP if their answer is incorrect.	10 min	
	• There are 10 questions (or more) in the Boss Battle activity. Vocabulary is chosen based on the unit vocabulary in unit	10 min	
Homework	• Have students go to Classcraft and complete "the last treasure" • Students who complete the quest within 2 days will gain double points of XP	3 min	Classcraft
Closing	• Teachers close the day's class and wrap-up what students have learned today.	2 min	

Week 9: Out of class activities "Reviewing 4 unit"

**Date: : At students' convenience**   **Duration: 1 hour or more**

Objectives: After finish the class, students are capable to describe and remember the

meaning of vocabulary leaned in all four units.

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Individual practice "The last treasure"	• Students log in to Classcraft to review all vocabulary learned in four units. The activities such as matching, gap filling, and text completion are available in Classcraft. • The student goes to complete the "The last treasure" in Classcraft. • After completing the mission students earn XP and GP points.	1hr or more	Classcraft and other online sources

Post-test

Date: **02/10/19**   **Duration**: **1 hour**

Topic/Theme	Techniques/Instructional Activities	Time	Materials
Lesson Opener	Greeting	5 min	
Post-test	• Students take the post-test after leaning with the gamified flipped classroom app	40 min	Paper-Based
The winner of the game	• After learning with a gamified flipped classroom app called Classcraft, students earn a point through classroom activities, missions, and quest in-game. • At the end of the class, the teacher announces a student who has the highest level and points as a winner of the game.	10 min	PPT, Classcraft
Closing	• Teachers close the day's class.	5 min	
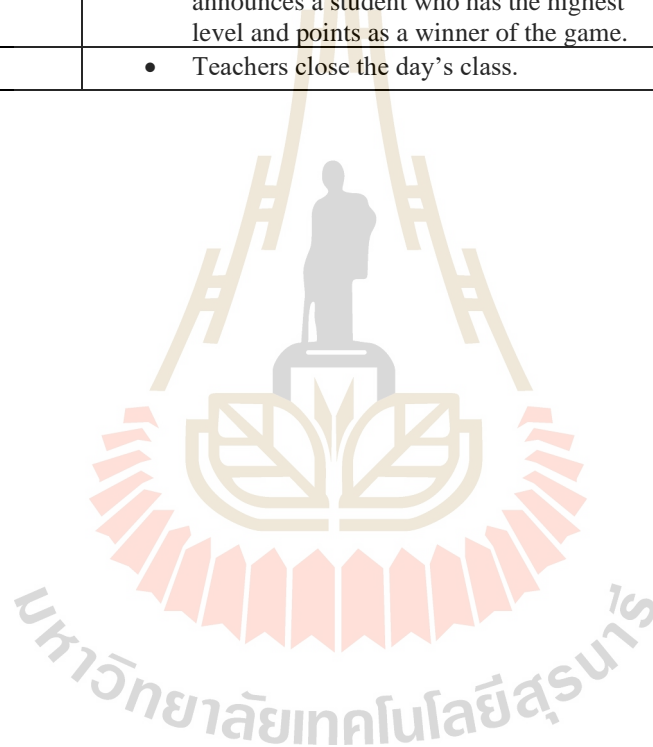
APPENDIX E

GAMIFIED FLIPPED CLASSROOM APPLICATION

A) Manual for training hour
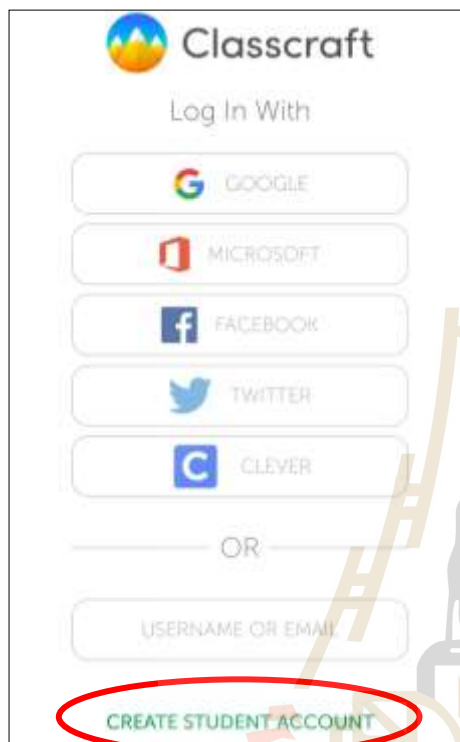
1. เลือก username or email (ช่องล่างสุด)

2. กรอก username, password

และ student code

1. กรอกชื่อ username ที่จะใช้ในเกม

2. ตั้ง password

3. ใส่ Password เดิมอีกครั้งที่ confirm password
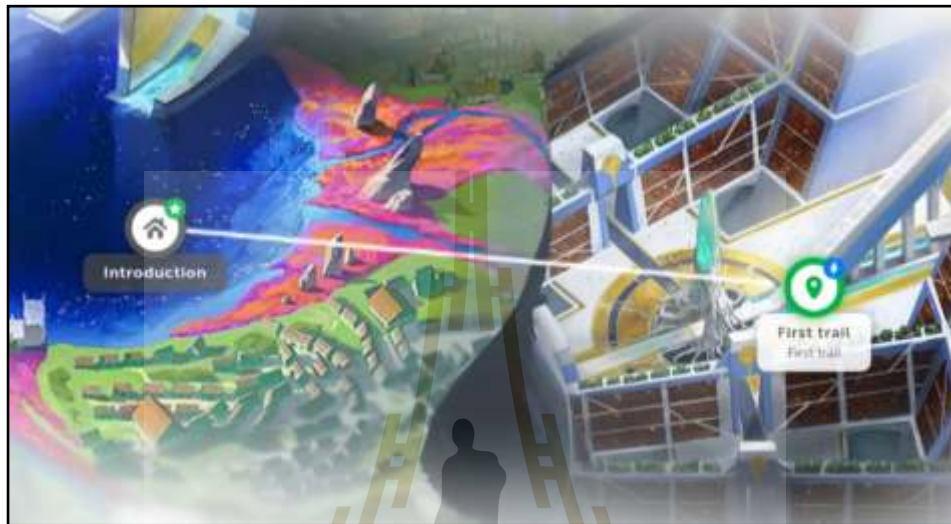
4. ใส่ student code ที่ game's master มอบให้

เมื่อเข้ามาแล้วจะพบกับหน้าแรกที่เป็นอวาตารของเรา (คาแรกเตอร์ที่ได้แต่ละคนแตกต่างกัน Mage, Warrior, Healer)
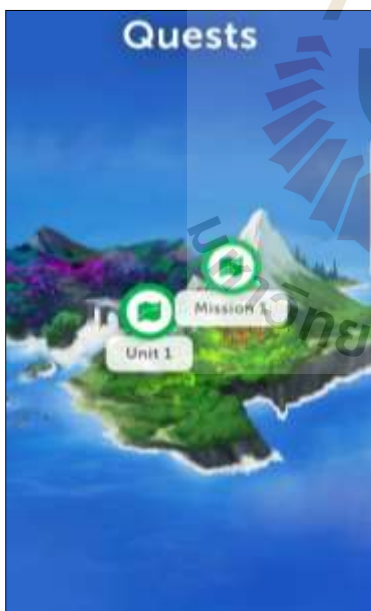
1.จากนั้นให้เลือก สัญลักษณ์รูปแผนที่ [image] มุมขวาล่างเพื่อทำ Quests

2. เมื่อเข้าไปที่หน้า quest แล้วให้เลือกที่ mission ก่อนเสมอ

ตัวอย่างบทเรียน

1. คลิก introduction เพื่อทำการเปิด map

2. คลิก first trail เพื่อเข้าสู่บทเรียน และทำ mission quest ตามลำดับ

CURRICULUM VITAE

Varitsara Botmart was born on 10 December 1992. She is currently a teacher assistant at the Foreign Languages Resource Unit (FLRU) at Suranaree University of Technology, Nakhon Ratchasima, Thailand. She graduated with her Bachelor's degree in English major with first-class honors from KhonKaen University in 2015. She has been studied Master of Arts in English Language Studies from Suranaree University of Technology since 2016. Her research interests include English Language Teaching, Technology-enhanced language learning, Gamification, Gamified flipped classroom.