



Implementing Gamification to Enhance Reading Engagement and Reading Comprehension of Thai EFL University Students

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ABSTRACT

Gamification is one of the innovative teaching approaches implemented in English classrooms nowadays. However, using gamification to enhance reading engagement and reading comprehension in language classrooms at the university level has not been much explored. This present study investigated gamification's effects on enhancing reading engagement, reading comprehension, as well as perceptions of gamification among Thai EFL university students. The participants in the research were 70 first-year students selected randomly. A mixed-methods research design was adopted to examine the effects of gamification between control and experimental groups. The quantitative results collected by the pre-test, post-test, pre-survey, and post-survey showed that the experimental group significantly improved reading comprehension and

	<p>higher reading engagement after the implementation of gamification, compared to the control group that studied traditionally. Furthermore, the participants in the experimental group reported positive perceptions towards gamification, such as promoting reading engagement and creating a fun learning environment. Therefore, this study supports an alternative and innovative way to shift a reading class from a teacher-centered approach to a student-centered approach through gamification.</p> <p>Keywords: gamification, reading comprehension, reading engagement</p>
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Introduction

Reading is one of the macro skills that provides learners with great amounts of input in learning English (January & Nima, 2018). It serves as a salient tool in the meaning-making process. Specifically, reading is used to extract and construct meaning from all types of text (Snow, 2002). With such importance, close attention has been paid to developing competent readers, in order to enhance their English abilities. One prominent approach is to improve reading engagement through gamification. In this paper, we argue that the implementation of gamification in the English classroom may improve learners' reading engagement and comprehension. In the sections that follow, we discuss the importance of reading in the development of English, the significance of English in Thailand, and the benefits of gamification.

A flurry of studies have found that learners demonstrate improved English abilities, such as language skills and comprehension skills, through reading (Muhid et al., 2020). It has also been discovered that competent reading skills accelerate one's progress in English learning, as evidenced by the acquisition of complex vocabulary and structures (Floris & Divina, 2015; Hunt & Beglar, 2005; Muhid et al., 2020). In addition, learners show better comprehension skills when exposed to reading texts. Comprehension – a salient and sophisticated task (Elleman & Oslund, 2019) – when developed, helps ensure successful learning in any subject (Nuttall, 1996). In other words, reading is vital to academic progress, to understand the content area in all subjects.

However, one roadblock in developing reading skills is that reading English materials has always been seen as the most challenging. Such is the case among Thai graduates, where Hayikaleng et al. (2016) stressed that lack of motivation to read English materials is a key concern. Most of the

participants in that study perceived reading English texts as difficult and time-consuming. Another challenge is the learners' inability to relate the reading material to their personal goals. Thus, the development of reading skills, along with English ability, remains a serious academic predicament.

The problem of developing English abilities among Thai learners has been a widely discussed topic among scholars. This is due to the undeniable salience of such abilities in addressing the demands of internationalization upon the Thai educational system across all levels (Khamkhong, 2018). For one thing, the Office of Higher Education Commission (OHEC), the organization responsible for overseeing higher education institutions in Thailand, has announced that higher education institutions need to equip students with a working knowledge of English, and implement English exit exams before graduation. Given this directive, the English language curriculum in Thailand will have to emphasize the importance of reading, by giving clear guidance on reading skill development (Sitthitikul, 2010). This means that reading has to be integrated into the English curriculum at tertiary level.

In accordance with the OHEC directive, the university students in the present study are required to read learning materials in English, as the university's policy is to promote internationalization and provide a working knowledge of English, as stated, due to the significance of English reading skills. Unfortunately, English language skills have always been viewed as challenges by Thai EFL university students (Suraprajit, 2019). Not surprisingly, the students struggle with it, even though they have been learning English for over five years. Based on an in-house proficiency test (WUTEP), their English proficiency is still between A1 and A2 on the CEFR scale (Waluyo, 2019). This is in line with another study that demonstrated that they were aware of their struggles in effectively mastering reading comprehension, since this ability is extremely important for successful learning (Rajprasit et al., 2015). Besides, Lekwilai (2014) pointed out that Thai students only read in English in the classroom, where teachers direct their reading, help them make sense of the text, and assign reading exercises. Some students may eventually be able to comprehend the text, but they may lack the engagement to read any other text, not assigned by their instructors, let alone English books for pleasure. Thus, there is a need for English classes to be motivating and engaging, to help EFL students read materials for their academic success.

Reading engagement plays a crucial role in reading comprehension. Wigfield and Guthrie (2000) discussed the idea that reading engagement is a reader's interaction with the reading material that is both strategic and motivated. So, Wigfield et al. (2008) proposed that students' engagement in reading is enhanced when the contexts in which reading occurs foster it.

There were several studies investigated students' reading engagement at school level (Guthrie & Klauda, 2014; Ho & Lau, 2018; Jones & Brown, 2011). All of them indicated the favorable impacts of integrating reading engagement in reading class. Nevertheless, those studies implemented only reading texts to explore the reading engagement without any innovative instructional models.

In response to learning in the technological era, Fullan and Gallagher (2020) proposed an alternative redesigning of education amidst the COVID-19 pandemic. They proposed that the idea of 'education for all should' be put into practice through the use of technology and the principles of a student-centered approach. Gamification is just one such approach to enhancing learning performance that can be integrated with the technology that is already used in classrooms. Likewise, it helps motivate students to achieve set learning outcomes, through the various game elements, such as rewards and challenges (Sailer & Homner, 2019). Sailer and Homner's students found ingenious ways to answer questions correctly, in order to get their rewards. Moreover, they also indicated that the competitive-collaborative elements of gamified learning fostered a sense of community among them, thereby increasing their performance, motivation, and engagement in the learning.

In the context of English language teaching specifically, gamification is a promising approach to fostering students' reading engagement and reading comprehension (Dehghanzadeh et al., 2021). The elements of gamification are beneficial to learning improvement, and it should be implemented in English classrooms, as well. It has already proven to assist senior high school students' reading comprehension in the form of quiz tools, because their surfaces, features, and game elements are engaging and interactive, compared to traditional media (Ratnasari et al., 2019). Moreover, gamification has been used to improve students' vocabulary knowledge (Panmei & Waluyo, 2023; Yu, 2023), and, insofar as vocabulary is the key for reading comprehension, this is very significant. When it comes to developing university students' reading engagement and reading comprehension, it is thought that redirecting them to enhance their reading engagement will consequently help them with their reading comprehension. However, empirical research on the effect of classroom practice using gamification, and its effects on reading engagement and comprehension, especially at the tertiary level in the EFL context, is still limited. This study intends to apply gamification such as Quizzes and Kahoot in a reading course to increase reading engagement along with reading comprehension of Thai EFL university students. Thus, it prompts the following research questions:

1. To what extent does gamification help Thai EFL university students improve their reading engagement?

2. To what extent does gamification help Thai EFL university students improve their reading comprehension?
3. What are their perceptions of using gamification to enhance reading engagement and comprehension in their reading class?

Literature Review

Reading Engagement

According to Wigfield and Guthrie (2000), reading engagement refers to an interaction with a reading material that is both strategic and motivated. Guthrie et al. (2004) suggested that engaged reading depends on the cognitive and motivational traits of the reader. It emphasizes the affection surrounding engagement, which consists of goal-directed, adaptable, constructive, persistent, and centered interactions with social and physical contexts.

Building on this notion, motivational and strategic engagement becomes paramount, as it correlates with success in reading comprehension. Motivational and strategic engagement is vital, and required. Engaged readers are motivated to read, strategic in comprehending what they read, knowledgeable in constructing meaning from texts, and socially participatory when reading (Guthrie et al., 2004; Guthrie et al., 2012). Guthrie and Klauda (2014) stated that reading engagement is built through reading and encouraging achievement inducing motivated behaviors which include emotions, interests, goals, and other psychological processes, in addition to consistent and diligent performance. This engagement is manifest in the cognitive effort, tenacity, and self-direction of readers during reading. In other words, when students can set their goals in reading and believe in themselves as readers, they are more immersed in reading-related activities. It also leads to deep reading comprehension through building the various cognitive processes. Consequently, support for cognitive and motivational reading strategy will help improve reading engagement and comprehension (Guthrie et al., 2004).

Many research studies have found a positive relationship between achievement and engagement (Grabe, 2009; Guthrie & Klauda, 2014; Guthrie et al., 2013; Guthrie et al., 2004; Guthrie et al., 2000). In other words, reading achievement is unquestionably a result of students' participation. As students meet and digest various reading texts, their reading proficiency grows. Engaged readers master all the cognitive processes, including word recognition, sentence processing, paragraph structuring, and integrating new material with prior knowledge (Grabe & Stoller, 2019). Even though reading engagement has been explored in young students, including elementary,

middle, or secondary school students, it has not been much explored at the university level.

Reading Comprehension

Reading comprehension is defined as the capacity to comprehend a written text, process that information, and understand the meaning of what was read (Delgado et al., 2018). Additionally, reading comprehension requires two essential abilities: word-level reading, which involves decoding the symbols or meaning of the words; and language comprehension, which involves comprehending the meaning of the sentences. Moreover, McNamara and Magliano (2009) has given considerable thought to the concept of reading comprehension as the dynamic interaction between the characteristics of the reader, the content and design of the text, and the instructions given to the reader. Yet, according to Smith et al. (2021) and Snow (2002), reading comprehension is simply the ability to extract meaning from what one has read, and the development of this ability is the ultimate purpose of reading. Reading requires the reader to engage in a number of activities in order to fully absorb what he is reading. Some of these activities include questioning, making inferences, visualizing, predicting, finding the key idea, and summarizing the text.

More importantly, reading has been counted as one of the major domains of those knowledge and skills that are essential for academic achievement. Especially in today's educational world, where information changes rapidly, literacy is a key skill for lifelong learning, if one is going to utilize such information effectively for a superior quality of life (Ho & Lau, 2018; Ng & Bartlett, 2017). However, several studies have pointed out that Thai EFL graduates often find reading in English difficult, and their proficiency is considered relatively low (Hayikaleng et al., 2016; Rajprasit et al., 2015; Suraprajit, 2019). Subsequent problems related to ineffective reading include a lack of motivation, limited understanding of reading strategies, and weak language skills. Kennedy and Chinokul (2020) also add the further concern that Thai students do not read at a sustained level, since they find it time-consuming. Ultimately, avoidant students may encounter significant difficulties in comprehending written texts, which will tend to make them have no interest in learning whatsoever. Even though teachers may teach reading in an English language classroom, they usually introduce reading strategies to students merely in order to assist them in achieving performance, without helping them develop any engagement.

In the development of both reading comprehension and engagement, Wigfield and Guthrie (2000) demonstrated that instructional processes, such as teacher involvement, evaluation, rewards, praise, collaboration, real-world

interaction, and learning and knowledge goals, influenced engagement that supported the reading and learning outcomes. As comprehension and engagement are the primary focuses of the present study, it is crucial to implement an approach using what Wigfield and Guthrie (2000) suggested, by integrating gamification, as well as elements of the instructional processes, in such a way as to enhance students' reading engagement and comprehension.

Gamification

When it comes to enhancing learning effectiveness, promoting motivation, engagement, and collaboration cannot be overlooked. One commonly employed approach in recent years is gamification, which helps support those aspects (Dichev et al., 2020). Generally, "gamification" is defined as the use of game design elements in non-game contexts (Deterding et al., 2011). In recent years, gamification has been widely applied in education, especially in English language learning and teaching, since it is effective in making learning more interesting and joyful in a digital environment (Dehghanzadeh et al., 2021). Chen et al. (2020) also demonstrated that game mechanisms or elements (e.g., points, badges, levels, and leaderboards) can be integrated to create more motivating lessons, and extended to accommodate language skill improvements. Likewise, studies show that the game elements in gamification create an interesting way to learn (Castillo-Cuesta, 2022; Urh et al., 2015). Game elements such as rewards, praise, and challenges, motivate students to achieve learning outcomes (Sailer & Homner, 2019). Moreover, the competitive-collaborative elements of gamified learning can foster a sense of community among learners, thereby increasing performance and motivation in learning. The studies cited above illustrate the advantages and benefits of gamified elements in enhancing learning experience.

Apart from creating an enjoyable interactive digital environment that supports learning, there are ample recent studies conducted using gamification in English language classrooms that show that gamification improves students' vocabulary knowledge (Panmei & Waluyo, 2023; Yu, 2023), speaking skills (Rahmani, 2020; Thanh Thuy & Quoc Hung, 2021) and listening skills (Syafii et al., 2020). In addition to these improvements, the findings from these studies reveal that employing gamification results in more interesting and fun learning experiences in class. Even though gamification has been implemented generally in English language classrooms at large, it has not yet been explored in English reading classrooms, specifically at the university level. Therefore, it can be seen that an opportunity exists to

evaluate gamification as one of the potential approaches for enhancing reading engagement and comprehension.

Related Studies on Gamification and Reading

Comprehending a text with engaging tools or effective strategies makes students become motivated (Samat & Aziz, 2020). One of the noteworthy characteristics of gamification is its use of the aforementioned game elements. Chen et al. (2020) employed game mechanisms to investigate 55 fifth-grade students' reading comprehension; however, the results did not show any significant difference between the experiment and control groups. By contrast, Kaban (2021) has developed e-reading tools based on gamified electronic reading devices, to help improve the reading ability of secondary school EFL learners in Turkey. Encouragingly, the results reveal that Kaban's students possessed higher levels of reading comprehension, as well as favorable reading attitudes.

Additionally, Abusa'alek and Baniabdelrahman (2020) investigated the effect of using gamification on Jordanian sixth-grade EFL students' reading comprehension. The study revealed that using gamification had a significant positive effect on students' reading comprehension performance. Also, Nitiasih et al. (2022) indicated that the use of gamification with local wisdom stories significantly improved the reading comprehension of students in grades 4, 5, and 6, during emergency remote teaching. According to these studies, gamification positively affects students' reading performance. The results are encouraging, because, in them, the use of game mechanisms was key to achieving the set learning outcomes. The game elements promoted reading strategies and facilitated reading through their game-like styles.

Nevertheless, these prior studies have limited their subject populations exclusively to young EFL students. Studies examining the use of gamification on reading performance at higher education levels is so limited as to be nearly non-existent. Moreover, there is little research investigating students' reading engagement using an innovative teaching approach such as gamification. Previous studies have recommended further study of gamification, suggesting that it is one of the effective early indicators of reading achievement.

In sum, the acquisition of proficient reading abilities is of utmost significance for university students, as it directly impacts their ability to grasp English reading materials, and, ultimately, influences their academic success. In order to enhance their comprehension of texts, students are expected to exhibit reading engagement, which necessitates both motivation and the utilization of reading strategies to actively interact with the texts. As a result, the implementation of an innovative teaching approach, such as gamification,

could potentially contribute to the improvement of reading engagement, and thereby, promote reading comprehension. This can be achieved by incorporating gamified features, such as points, ranks, awards, and collaborative competition. The present study aims to investigate the impacts of gamification on Thai EFL university students in a university-level reading class, to measure its capacity to enhance their reading engagement and reading comprehension, and to collect and review their perceptions towards the implementation of gamification.

Methodology

Research Design

The present study employed a mixed-methods research design. Mixed-methods research involves the collection and analysis of both quantitative and qualitative data, in order to provide a more comprehensive answer to research questions (Creswell & Creswell, 2017). Therefore, this study collected data quantitatively, to investigate the improvement of reading engagement, by using pre- and post-surveys, and reading comprehension, by using a reading pre-test, and a post-test after the implementation of gamification. The quantitative data were collected, and then used to supplement the qualitative findings that came from a focus-group interview, in order to gain a more insightful picture of the full range of gamification's effects on the students' reading.

Participants

The population of this study was drawn from 317 first-year students majoring in English, who enrolled in a reading course at a public university in the southern part of Thailand. Their ages ranged from 18 to 19 years old. Their English proficiency scored lower than intermediate to upper-intermediate, based on an in-house proficiency test called WUTEP (Waluyo, 2019), even though they had been studying English for over 10 years. The study involved 70 students (14 males and 56 females), selected using the random sampling method (Creswell & Creswell, 2017). The researcher put them randomly into two sections by drawing their numbers. The two sections then became the experimental and control groups, respectively. There were close to 35 participants in both groups, 6 males and 29 females in the experimental section who learned with gamification, and 8 males and 28 females in the control group who learned traditionally.

Research Instruments

Reading Comprehension Test

Both quantitative and qualitative data were collected. For the quantitative data, the researchers developed a set of tests (a pre-test and post-test) for comparing reading comprehension. The test contained three passages, consisting of 300-500 words. The themes of the reading included food and health, traditions and rituals, and identity, and were taken from the retail textbook for A2 level students that was being used as the learning material for their course. The test included 30 multiple-choice items, i.e. 10 questions for each reading passage. The reading skills assessed were main idea (3 items), primary purpose (3 items), inference (6 items), vocabulary in context (9 items), and factual information (9 items). Prior to application, the readability level and vocabulary level of the passages were checked, and determined to be at CEFR A2. Three experts in English Language Teaching validated the test, using the item-objective congruence index (IOC), with a result of 0.90, meaning that the instruments were valid.

Reading Engagement Questionnaire

The researchers selected the domain of reading engagement to investigate, after implementing gamification. Thus, a reading engagement questionnaire, adapted from Guthrie and Wigfield (2005) and Guthrie and Davis (2003), was used to compare the level of reading engagement, before and after the implementation of gamification. It was a self-rated questionnaire, with a 4-Likert scale, ranging from 4 to 1 (strongly agree, agree, disagree to strongly disagree). It was divided into five dimensions, namely, knowledge goal (items 1-4), autonomy support (items 5-8), real-world interaction (items 9-12), interaction with peers (items 13-16), and direct strategy instruction (items 17-20). There were 20 items in total. The three experts in English Language Teaching validated the questionnaire, using the item-objective congruence index (IOC), with a result of 0.93, which means the instruments were valid. Moreover, the result of the reliability analysis (Cronbach's alpha) was 0.76, which means acceptable.

Interview Questions

For the qualitative data, the researchers used four semi-structured interview questions to ask about the perceptions of the students towards the gamification. The three experts in English Language Teaching validated the

interview questions, using the item-objective congruence index (IOC), with a result of 0.90, which means the instruments were valid. For the interview protocol, the researchers randomly selected six students, two each from the high performance, middle performance, and low performance groups, respectively, based on their scores in the post-test and their grades. To eliminate any language barrier to getting insightful information, the focus-group interview was conducted in both English and Thai. The interviews lasted approximately 20 minutes per group. The questions were focused on reading engagement and their perceptions towards the gamification.

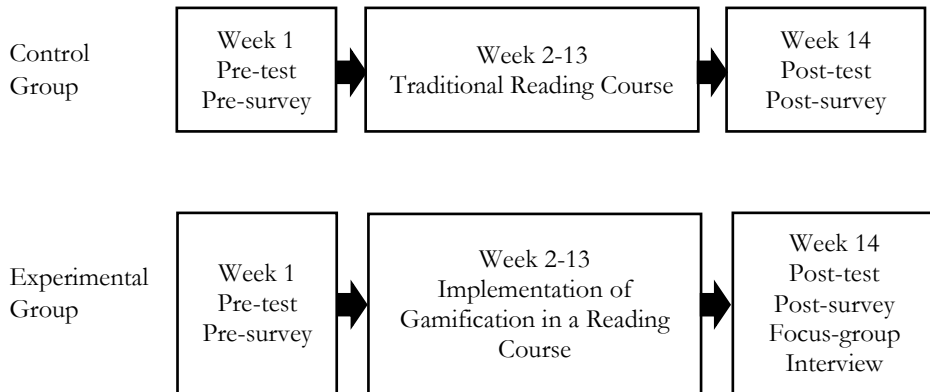
Data Collection

The process of data collection was divided into 1) the instrument development phase, and 2) the implementation phase. In the instrument development phase, the researchers studied all the related concepts to develop the research instruments, checked the validity, and conducted a pilot study with ten students with the same characteristics as the participants. The participants in the pilot study did not participate in the actual study. The expert reviewers' comments and the pilot study's findings were taken to adjust the instruments before the implementation. Before any data was collected, the researchers sought and received approval by the ethics committee. In the implementation phase, the researchers collected the data for 14 weeks, including the pre-test, post-test, pre-questionnaire, and post-questionnaire. (See Figure 1.) The data collected in this study were kept confidential.

On week 1, a consent form was obtained from the participants. More importantly, they were informed that their participation had no effect on their grades. Then, the researchers administered the pre-test and the pre-questionnaire. The test took two hours, and the questionnaire took twenty minutes for the participants to complete, after the test.

From weeks 2 to 13, the researchers conducted the reading classes, using the commercial book and game mechanisms on Quizzes and Kahoot! as the teaching materials for the students in the experimental group. By contrast, the control group studied traditionally, with no gamification, and only used the commercial textbook as the teaching material for the course. The themes of the reading included food and health, traditions and rituals, and identity. The duration of both classes was two hours a week for both groups.

On week 14, the researchers administered the post-test, which took two hours, and the post-questionnaire, which again took twenty minutes for the students to complete after the test. Finally, the researchers followed up with the interview protocol, which took approximately twenty minutes per group.

Figure 1*Gamification Data Collection Process for Enhancing Reading Engagement and Reading Comprehension***Data Analysis**

The data were analyzed as either quantitative or qualitative data. The former was analyzed using a paired-sample t-test to compare the pre-test and post-test findings to investigate the students' reading comprehension in both the control and experimental groups. In addition, an independent t-test was employed to compare the mean scores of the post-test between the experimental and control groups. Moreover, descriptive statistical analysis, i.e., mean and standard deviation, was used to explore the students' responses to the reading engagement questionnaire to indicate their perceived level of reading engagement. The reading engagement were then interpreted according to the following criteria:

3.25 - 4.00 – very high level of reading engagement

2.50 - 3.24 – high level of reading engagement

1.75 - 2.49 – low level of reading engagement

1.00 - 1.74 – very low level of reading engagement

Finally, qualitative data were analyzed using content analysis to investigate students' perceptions of gamification in the reading class in the areas of reading engagement and their perceptions towards gamification.

Results

The present study aimed to investigate the effects of gamification on the reading engagement and reading comprehension of Thai EFL university

students and their perceptions towards the implementation of gamification. The results from the study are as follows.

Gamification and the Enhancement of Reading Engagement

With respect to the effects of gamification on the reading engagement of Thai EFL university students, the mean scores from the experimental group in the post-survey were favorably higher than the pre-survey for all items. By contrast, the reading engagement mean scores of the control group that studied in the traditional way seemed to be slightly lower, as shown in Figure 2. All items indicated from high to very high level.

Figure 2

Summary Table of Reading Engagement Mean Scores

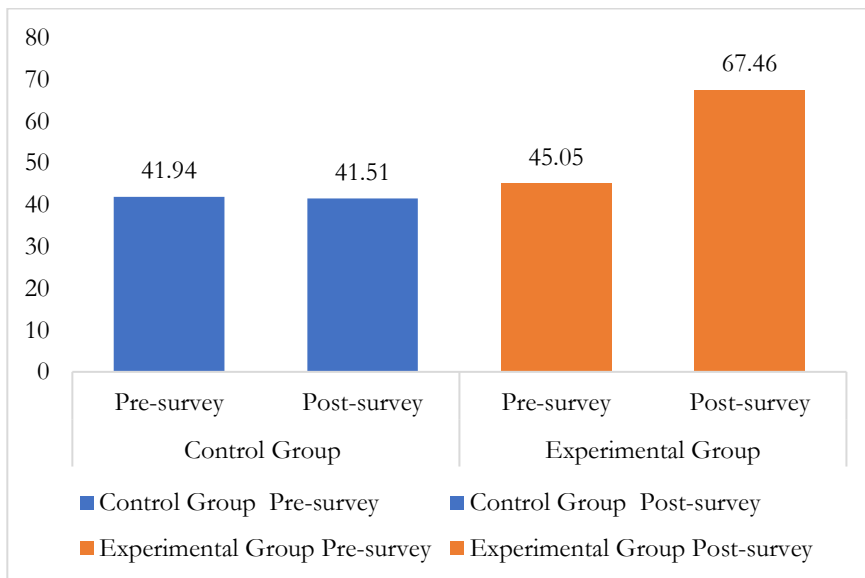


Table 1 shows the self-rated mean scores for both the control and experimental groups, before and after taking the reading course. The questionnaire collected data to investigate the level of reading engagement in the specific categories of knowledge goal, autonomy support, real-world interaction, interaction with peers, and strategy instruction. The overall post-survey results rendered scores between “high” and “very high” in all categories, e.g. knowledge goal (M=3.53, SD=.54), autonomy support (M=3.19, SD=.58), real-world interaction (M=3.17, SD=.66), interaction with peers (M=3.49, SD=.68), and strategy instruction (M=3.49, SD=.57).

For the first area, conceptual knowledge, or knowledge goal (items 1-4), the mean scores from the experimental group were higher than the control group for all items, e.g. item 1 (M=3.31, SD=.63), item 2 (M=3.66, SD=.48), item 3 (M=3.51, SD=.56), and item 4 (M=3.63, SD=.49). These scores indicate a very high level of reading engagement.

Additionally, for autonomy support (items 5-8), all the students in the experimental group totally agreed that, when they could be the ones who selected their choice of reading using the gamification, it helped them be engaged readers, as shown in item 5 (M=3.71, SD=.46) and item 6 (M=3.29, SD=.57). Thus, both item 5 and 6 were rated “very high”, while item 7 (M=3.23, SD=.69) and item 8 (M=2.51, SD=.61) were rated “high”.

When the students in the experimental group interacted with authentic texts or reading texts that reflected the real world (items 9-12), they notably agreed that they were highly engaged in reading, as described in item 9 (M=3.06, SD=.73) “high”, item 10 (M=3.37, SD=.65) “very high”, item 11 (M=3.46, SD=.61) “very high”, and item 12 (M=2.80, SD=.68) “high”.

Furthermore, gamification allowed the students to work in groups with their peers (items 13-16). Those in the experimental group reported that they were highly engaged with their peers during reading tasks, as described statistically in item 13 (M=3.34, SD=.73), item 14 (M=3.69, SD=.47), item 15 (M=3.49, SD=.88), and item 16 (M=3.43, SD=.66), all “very high”.

Finally, those who learned with gamification agreed that, when they learned reading strategies directly, it gave them a “very high” level of reading engagement, as seen in item 17 (M=3.66, SD=.48), item 18 (M=3.51, SD=.51), item 19 (M=3.40, SD=.70), and item 20 (M=3.40, SD=.60). Gamification helped them engage with the reading texts, using the strategies learned in class.

Table 1

Reading Engagement Pre-survey and Post-survey Mean Scores

Items	Control Group		Level	Experimental Group		Level
	Pre-survey	Post-survey		Pre-survey	Post-survey	
	M (SD)	M (SD)		M (SD)	M (SD)	
Conceptual knowledge or knowledge goal						
1. I am so interested in topics that I selected in class, and I look for more information on those topics.	1.71 (.46)	1.69 (.53)	Very low	2.29 (.57)	3.31 (.63)	Very high

Items	Control Group		Level	Experimental Group		Level
	Pre-survey	Post-survey		Pre-survey	Post-survey	
	M (SD)	M (SD)		M (SD)	M (SD)	
2. The topics in class enrich my understanding in content areas of interests.	1.69 (.47)	1.54 (.51)	Very low	1.69 (.47)	3.66 (.48)	Very high
3. I feel motivated to read more often because topics are interesting.	2.17 (.57)	1.94 (.84)	Low	2.60 (.50)	3.51 (.56)	Very high
4. I enjoy the new knowledge when I read the texts under the selected topic.	1.77 (.69)	1.69 (.58)	Very low	1.89 (.87)	3.63 (.49)	Very high
Overall	1.84 (.55)	1.72 (.61)	Very low	2.12 (.60)	3.53 (.54)	Very high
Autonomy support						
5. I am satisfied when the teacher let me choose the texts to read.	1.49 (.51)	1.54 (.51)	Very low	1.49 (.51)	3.71 (.46)	Very high
6. I have enough choices of reading.	2.03 (.75)	1.97 (.57)	Low	2.03 (.75)	3.29 (.57)	Very high
7. I enjoy discovering interesting texts through group-selected reading.	2.23 (.49)	2.03 (.57)	Low	2.29 (.57)	3.23 (.69)	High
8. Reading choices in the course motivate me to read more.	1.91 (.66)	1.80 (.58)	Low	1.91 (.66)	2.51 (.61)	High
Overall	1.92 (.60)	1.84 (.56)	Low	1.93 (.62)	3.19 (.58)	High
Real-world interaction						
9. The reading is meaningful and related to the real world.	2.00 (.77)	1.83 (.75)	Low	2.00 (.77)	3.06 (.73)	High
10. The meaningful texts establish a personally significant purpose for reading to me.	1.77 (.65)	1.91 (.66)	Low	1.94 (.73)	3.37 (.65)	Very high
11. I enjoy reading the texts that reflect the real world.	2.91 (.61)	3.20 (.63)	High	2.89 (.68)	3.46 (.61)	Very high
12. I feel more motivated to read the authentic texts than fiction.	2.14 (.77)	2.06 (.64)	Low	2.20 (.80)	2.80 (.68)	High
Overall	2.21 (.70)	2.25 (.67)	Low	2.26 (.74)	3.17 (.66)	High
Interaction with peers						

Items	Control Group		Level	Experimental Group		Level
	Pre-survey	Post-survey		Pre-survey	Post-survey	
	M (SD)	M (SD)		M (SD)	M (SD)	
13. I enjoy working with group members on the reading tasks	2.80 (.72)	2.80 (.83)	High	3.20 (.83)	3.34 (.73)	Very high
14. I see the importance of achieving the team goal in accomplishing the reading task.	2.26 (.78)	2.37 (.77)	Low	2.26 (.78)	3.69 (.47)	Very high
15. I enjoy exchanging ideas with group members about what we read.	2.14 (.55)	1.91 (.37)	Low	2.14 (.55)	3.49 (.88)	Very high
16. I feel motivated to read when I discuss the texts with group members.	2.63 (.84)	2.71 (.86)	High	2.83 (.79)	3.43 (.66)	Very high
Overall	2.46 (.72)	2.45 (.71)	Low	2.61 (.74)	3.49 (0.68)	Very high
Direct strategy instruction						
17. I think learning reading strategies helps improve my English reading.	1.80 (.53)	2.09 (.74)	Low	2.31 (.68)	3.66 (.48)	Very high
18. I think learning reading strategies in class is helpful.	2.26 (.74)	2.29 (.75)	Low	2.46 (.82)	3.51 (.51)	Very high
19. I use the reading strategies that I learned when I read texts in English.	2.03 (.64)	2.03 (.62)	Low	2.43 (.98)	3.40 (.70)	Very high
20. I read more fluently in English when I use reading strategies.	2.20 (.83)	2.11 (.89)	Low	2.20 (.83)	3.40 (.60)	Very high
Overall	2.07 (.69)	2.13 (.75)	Low	2.35 (.81)	3.49 (.57)	Very high

Gamification and the Enhancement of Reading Comprehension

With respect to the effects of gamification on the reading comprehension of Thai EFL university students, Table 2 illustrates the findings from the pre-test and post-test from the control and experimental groups. The experimental group's pre-test mean score was 10.63 (SD = 1.44), whereas the control group's was 11.51 (SD = 1.12). After 12 weeks of study, the experimental group improved significantly, with a post-test mean score of 15.71 (SD = 1.32). The paired-sample t-test also revealed that the

difference between the two mean scores was significant ($t=27.49$, $p<.001$). Meanwhile, there was no significant change in the control group ($t=1.47$, $p = .15$).

Table 2

Reading Comprehension Pre-test and Post-test Mean Scores Using Paired-sample t-test

Groups	Tests	M	SD	t	df	p-value	Effect Size
Control Group (N = 35)	Pre-test	11.51	1.12	1.47	34	.15	0.20
	Post-test	11.26	1.38				
Experimental Group (N = 35)	Pre-test	10.63	1.44	27.49	34	<.001	3.68
	Post-test	15.71	1.32				

Table 3 compares the post-test mean scores of the control and experimental groups, analyzed using an independent t-test. It reveals that the experimental group's score was significantly higher (Mean = 15.71, SD = 1.32, $t=13.82$, $p<.001$). What is more, the effect size, measured using Cohen's d , was a value of 0.89, which indicates a large difference.

Table 3

Pre-test and Post-test Reading Comprehension Mean Scores Using Independent t-test

Groups	M	SD	t	df	p-value	Effect Size
Control Group (N = 35)	11.26	1.38	13.82	68	<.001	0.89
Experimental Group (N = 35)	15.71	1.32				

Perceptions of Gamification and Reading

The present research also aimed to study the perceptions of the students, after implementing gamification. The qualitative data gained from the interview are provided below.

As for reading engagement, students reported positively that gamification in the reading course helped them develop their understanding of their selected topics.

“Playing Quizzes game in class helped me a lot with understanding every topic in class. The game helped me read more and usually search for more information on the internet.” (S1)

Moreover, they also reported that gamification gave them an opportunity to develop their motivation and enjoyment in reading with autonomy support.

“It was comfortable when the teacher gave me choices to read. So, I select what I am interested in and enjoy it. I feel like I want to know more about that, so I keep reading and finding more information about the topic.” (S3)

For real-world interactions, the students revealed that they enjoyed reading texts related to real-world issues or real life, because they could discuss what they had read with others.

“There are a lot of things I have learned by reading the texts concerning real-world or social issues. I think I spent more time reading about those and could discuss the issues with others.” (S2)

In addition to the peer interaction, the students reported that they were motivated when they could interact socially with the group, when discussing and working on the reading texts and gamified tasks.

“I enjoy working with my friends and group members during games. It helps me learn more by discussing with them. Plus, I can finish the reading and the tasks faster.” (S5)

Lastly, the direct strategy instruction in the reading course using gamification helped students be more confident to read, when they knew the reading strategies.

“Reading strategies help me read more fluently and confidently. I think they are useful for me. I always use context clues, finding the main idea and summarizing every time.” (S6)

After the implementation of gamification in the reading classroom, the students reported that they perceived their reading comprehension to be better, because of the game elements such as scores and ranks.

“I feel like I want to get a higher score for the better rank, so I try to comprehend the reading text quickly. And I think every time I play the game in class, my reading comprehension gets better and better.” (S2)

Moreover, they also mentioned that using digital tools, like the gamification application on a website or application, helped them collaborate with peers to comprehend the texts and complete the tasks happily.

“The application is easily accessible. I really like that. Moreover, I love the way I can play it with my friends, and I also have a chance to discuss with them for better understanding by negotiating unknown vocabulary to finish the tasks in class.” (S4)

Gamification created an engaging classroom environment, because the students perceived that gamification lessened the boredom of the reading class, and so the students felt motivated to read and try to comprehend the texts.

“I always have the perception that reading is boring and it is hard to comprehend or understand the reading passages. But I feel reading is fun and enjoyable when I study in this course. I really like playing games during reading. It makes me comprehend the texts better in this way. And I don’t want to miss even a class.” (S5)

Discussion

The primary objective of this research was to investigate the effects of gamification on enhancing the reading engagement and reading comprehension of Thai EFL university students. In terms of reading engagement, the mean scores gathered from the experimental group in all categories, namely, knowledge goal, autonomy support, real-world interaction, interaction with peers, and direct strategy instruction (Guthrie & Davis, 2003; Guthrie & Wigfield, 2005) were notably higher than those of the students who studied reading in the traditional way, according to the post-survey. Moreover, the qualitative data also supported the quantitative findings, in that the students were more engaged, motivated, and enjoyed studying with gamification. Previous studies (Chen et al., 2020; Nitiasih et al., 2022) have also reported that innovative instruction, such as gamification, helps students to be motivated and engaged. Without integrating innovative instruction, the students’ level of reading engagement will more likely be low or very low because the students in the control group were less likely to put an effort in reading texts as they did not have rewards to motivate and engage in reading the given texts.

In addition, when the teacher provides enough choices of topic in a gamified reading class, the students tend to feel more engaged, and motivated to select reading texts or topics of interest, and will have better conceptual knowledge in reading achievement, which corresponds with what Barber and Klauda (2020) and Park (2011) suggested, that building motivation and engagement by arousing students' interests is key to gaining knowledge and reading performance, since it supports the reading skill. In this study, the traditional reading class did not provide students with enough choices within the themes. Consequently, the level of reading engagement in the control group was noticeably lower than the experimental group.

The game mechanisms, such as the ranking and scores in Quizzes and Kahoot, helped the students engage with the texts. Previous research has found that game elements make students engage in reading texts and reading activities, and promote reading comprehension (Chen et al., 2020). By contrast, the students in the control group tended to have a lower level of reading engagement, because the traditional classroom did not provide many opportunities for them to search for more information on the Internet, and did not have activities using the game mechanisms.

More importantly, a positive finding in the qualitative data revealed that when the students needed to compete with others or work with peers in reading activities, they read faster, using strategies learned in class to accomplish the tasks, for better scores and higher ranks. Integrating the mechanism of competitive collaboration turned out to be beneficial in a reading class. Barber and Klauda (2020) also emphasized that social connection in reading activities promotes reading engagement. On the other hand, in the traditional classroom, the students did not have a chance to work with their peers that much. As a result, the overall results indicated a low level of reading engagement. Thus, it has been shown that gamification plays an important role in students' engagement and motivation to read and learn in class, by integrating gamified elements in reading activities.

The results also revealed that the reading comprehension of the experimental group was significantly higher. This is also in line with prior research that identified the enhancement of reading comprehension as one of the effects of gamification (Abusa'aleek & Baniabdelrahman, 2020; Nitiasih et al., 2022). When students learn with gamification, they can demonstrate their understanding of the reading texts, and also relate them to their real-world experience. Martinez and Schilling (2010) highlighted that innovative instruction fosters students' positive perception that they are able to transfer authentic tasks to the real world, because they perceive what they are doing as important. Moreover, motivation plays a crucial role, and positively affects reading comprehension, when students learn via gamification (Li & Chu, 2021). In the present study, the students were more engaged and motivated

when they learned with gamification. Consequently, the post-test results of the experimental group were significantly higher. Gamification, therefore, has been shown to be one of the teaching approaches to implement in a reading course, in order to enhance students' reading engagement and reading comprehension for university students.

Conclusion

The results of the present study show conclusively that the implementation of gamification has significantly positive impacts on reading engagement and reading comprehension on Thai EFL university students. This is confirmed by the higher mean scores in the post-survey. The experimental group showed a significantly higher level in autonomy support and real-world interaction, and a very high level in knowledge goals, interaction with peers, and direct strategy instruction. Furthermore, gamification noticeably enhanced the students' reading comprehension, based on the comparison between the pre-test and post-test scores. The post-test scores were significantly higher after implementing gamification applications such as Quizzes and Kahoot for fourteen weeks. Moreover, the students also reported positive perceptions of gamification in the reading class. For them, gamification created an interesting and joyful environment of learning, by allowing the game elements to arouse their interest and motivation to learn. In summary, the favorable effects of implementing gamification were obvious in enhancing the level of reading engagement and achievement in reading comprehension. Therefore, gamification is considered as an effective and engaging new approach to teaching English reading at university level.

Limitations and Further Research

There were several limitations found in the present study. First, this research only collected data from Thai universities in southern Thailand, which may not represent, or be generalizable to, other student populations. Collecting data from larger groups, and comparing the differences between differently sized groups, would be recommended. In addition, the researchers were only able to deploy the one questionnaire and conduct the semi-structured interview. To deepen the findings, collecting data from a variety of quantitative approaches, such as observations or checklists, would be beneficial. Moreover, the limitations and challenges of the applications such as Quizzes and Kahoot used in the study were not explored. If we had known the limitations, we could have justified using the gamified platforms for a more appropriate level of students and activities. Therefore, further research

should be conducted to investigate the limitations and challenges of the applications to enhance students' readiness and support teachers in selecting gamified platforms appropriately.

Implications

The results of the present study have practical implications for teachers, students, course developers, and other educational stakeholders. Firstly, teachers need to employ an innovative teaching approach, using digital platforms, such as Quizzes and Kahoot to enhance students' engagement and learning process. By doing this, the teachers can shift the paradigm from a teacher-centered approach to a student-centered approach, along with promoting 21st century skills. They should provide this gamification quiz weekly for effective development, as well as engaging students with the various learning topics. Moreover, gamification helps both the teachers and students see the progress of learning as a formative assessment since the gamified applications can provide the immediate feedback. Apart from these benefits of Quizzes and Kahoot, teachers should study how to use such applications, and their functions, whether they are suitable for one's classes, or not. But be advised that some of the functions require users to pay; otherwise, one cannot maximize the applications with one's students. Teachers who have not practiced with the applications ahead of time may struggle to implement them in class. Therefore, teachers should be well-prepared, and try out the apps before implementing them in the classroom.

As for students, the immediate feedback loop inherent in Quizzes and Kahoot allows students to recognize their areas of strength, and where they might need further practice. This not only fosters a sense of autonomy, but also promotes resilience, as students are encouraged to overcome challenges and strive for mastery. Apart from the benefits of the immediate feedback, teachers should also have their students familiarize themselves with the applications by holding an orientation for students on how to use the applications; otherwise, the students will struggle to use them. More importantly, gamified applications require students to use the Internet. Therefore, students should be made aware and be informed that they will need a connection to the Internet, before using the applications.

Lastly, gamification also helps course developers and other educational stakeholders to develop courses that will serve a 21st-century learning atmosphere, with the implementation of innovative instruction and innovative assessment, to integrate gamified courses as a part of the curriculum. Practical integration of gamification means introducing a point-based system of task completion, and other game elements, into the language curriculum, especially for the reading skills. Gamified elements will not only

make the curriculum more engaging, but will also promote learning outcomes.

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