Interdisciplinary Academic and Research Journal, 5 (3), May-June 2025
Old ISSN 2774-0374: New ISSN 2985-2749
Website: https://so03.tci-thaijo.org/index.php/IARJ/index

The Development of A Digital Game to Enhance the English Receptive Skills and Learning Motivation of Mattayomsuksa 3 Students

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Received 29/11/2024 Revised 02/12/2024 Accepted 02/01/2025

Abstract

Background and Aims: This research developed and evaluated a digital game to enhance English receptive skills (listening and reading) and motivation among Mattayomsuksa 3 students in Thailand. Despite efforts to improve English education, students face challenges with receptive skills due to limited exposure and traditional methods. The objectives were to develop the digital game, validate its effectiveness, compare its impact with conventional methods, and analyze its influence on learning motivation.

Methodology: The study used a mixed-methods approach with a pre-test and post-test control group design, alongside qualitative interviews. The experimental group used a digital game on the Roblox platform, while the control group received traditional instruction.

Results: After six weeks, the experimental group showed a significant improvement in receptive skills, with a mean increase of 15 points compared to 11.34 points in the control group ($p < 0.05$). Interviews indicated the game increased motivation, particularly due to its competitive and interactive design. These findings suggest that digital game-based learning effectively improves receptive skills and engagement. Future research should explore productive skills, long-term effects, and broader applications in education.

Conclusion: Through interactive and competitive components, digital game-based learning dramatically improves students' motivation and receptive skills. Future research should look at how it affects long-term educational outcomes and productive skills.

Keywords: Teaching English as a Foreign Language (TEFL); English Receptive Skills; Digital Game; Roblox; Learning Motivation

Introduction

In today's globalized world, proficiency in English is essential for accessing international opportunities in business, technology, and education. For non-native English-speaking countries like Thailand, mastering English is particularly important for both economic and social mobility. However, despite ongoing efforts by the Thai government to integrate English education into the national curriculum, many students, particularly at the secondary school level, struggle to

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develop proficiency in the language. This issue is especially pronounced in receptive skills, such as listening and reading, which form the foundation for effective communication and further language development.

The results from the Ordinary National Educational Test (O-NET) and the English Proficiency Index (EPI) highlight the extent of the problem. Recent statistics show that Thai students' average English proficiency scores remain low, with Grade 9 students scoring approximately 33.3% and Grade 12 students at 29.2%. Moreover, Thailand ranks 101st out of 113 countries on the 2023 English Proficiency Index (EPI), underlining the country's challenges in English education. When compared to neighboring countries, such as Vietnam or Indonesia, where English proficiency levels are noticeably higher, these statistics emphasize the need for innovative and more effective teaching methods to address the gap.

Traditional teaching methods in Thailand, including rote memorization and a lack of authentic language exposure, often fail to engage students effectively in developing receptive skills. Digital game-based learning (GBL) has emerged as a promising solution to these challenges. By offering immersive and interactive experiences, digital games can provide immediate feedback, sustain motivation, and create authentic learning environments. The interactive nature of games engages students actively, making learning more enjoyable and less stressful compared to conventional classroom methods, which are often seen as rigid and exam-driven.

This study is grounded in Second Language Acquisition (SLA) theory, particularly the Input Hypothesis and the Affective Filter Hypothesis. According to Krashen's Input Hypothesis (1985), language acquisition occurs when learners are exposed to language input slightly above their current proficiency level, known as "i+1." Digital games can provide this type of input through engaging content that challenges learners without overwhelming them. Moreover, the Affective Filter Hypothesis suggests that emotional factors, such as motivation and anxiety, can significantly affect language learning. By creating a low-pressure, rewarding environment, digital games can lower the affective filter, increasing students' willingness to engage and learn.

The primary aim of this research is to explore the effectiveness of a digital game in improving English receptive skills—listening and reading—among Mattayomsuksa 3 students in Thailand, while also enhancing their motivation to learn. The study will investigate how game-based learning can address the limitations of traditional methods by increasing both student engagement and skill acquisition. Specifically, the research seeks to answer the following questions: (1) How does the use of a digital game improve receptive skills compared to traditional teaching methods? (2) How does game-based learning impact student motivation and engagement in learning English?

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Objectives

1. To study the development of a digital game for Mattayomsuksa 3 students to improve their English receptive skills

2. To validate the effectiveness of the digital game for Mattayomsuksa 3 students to improve their English receptive skills

3. To compare the difference in English receptive skills between the controlled group and the experimental group after using the digital game

4. To analyze the learning motivation of Mattayomsuksa 3 students toward the use of the digital game

Literature Review

This section reviews the relevant literature on game-based learning (GBL), Second Language Acquisition (SLA), and motivation in the context of language education. The goal is to provide a theoretical foundation for the study, which explores the effectiveness of a digital game in enhancing English receptive skills (listening and reading) and motivation among Mattayomsuksa 3 students in Thailand. The review will focus on key theories that inform the development of the digital game, the challenges of teaching English in Thailand, and the potential of game-based learning as a solution.

Second Language Acquisition (SLA) Theory and Receptive Skills

Receptive skills—listening and reading—are central to Second Language Acquisition (SLA), as they provide essential input for learners to process language and develop proficiency. According to Krashen's Input Hypothesis (1985), language acquisition occurs when learners are exposed to input that is slightly beyond their current proficiency level, termed "i+1". This principle aligns with the design of the digital game, where the content challenges students just beyond their current level, allowing them to acquire new language structures and vocabulary while playing. The game's interactive features, such as audio instructions and contextualized reading tasks, provide this type of input in an engaging, non-threatening way.

Krashen's Affective Filter Hypothesis (1985) also informs the use of digital games. This theory posits that emotional factors, such as motivation and anxiety, affect language learning. In the context of this study, the interactive nature of the game reduces anxiety and increases motivation by offering immediate feedback, rewards, and a sense of progression. These features are designed to lower the affective filter, creating an environment conducive to language acquisition.

In Thailand, students often struggle with receptive skills due to limited exposure to authentic language use outside the classroom and reliance on rote memorization (Singaravelu, 2008). As a result, students' performance in national assessments, such as the O-NET, is

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consistently low, especially in listening and reading. The digital game developed in this study seeks to address these challenges by providing immersive, authentic language input through interactive tasks.

Motivation in Language Learning

Motivation is a key factor in language learning, as it drives students to persist in their studies. According to Self-Determination Theory (SDT) by Deci and Ryan (1985), motivation can be intrinsic (driven by the inherent satisfaction of the activity) or extrinsic (driven by external rewards). Research suggests that intrinsic motivation is particularly important for sustained language learning (Ushioda, 2008). In traditional Thai classrooms, motivation is often extrinsic, driven by the pressure to pass exams rather than by a genuine interest in the language (Suksawasdi, 2015).

Game-based learning (GBL) has the potential to enhance both intrinsic and extrinsic motivation by providing an engaging, interactive environment with rewards, challenges, and immediate feedback. Gee (2003) notes that video games create "situated learning" environments, where students engage in problem-solving tasks that simulate real-life contexts. These features not only enhance motivation but also foster deeper engagement with the learning material.

Game-Based Learning (GBL) in Language Education

Game-based learning has proven to be an effective tool for language education. In particular, studies by Gee (2003) and Donmus (2010) have shown that games can improve language skills by offering contextualized learning opportunities. In a study by Riahipour and Saba (2012), game-oriented teaching methods improved vocabulary retention among nursing students, demonstrating the effectiveness of GBL in enhancing receptive skills. In the Thai context, GBL offers an interactive, engaging alternative to traditional methods, which often fail to capture students' interest or provide sufficient practice opportunities.

Despite its potential, GBL faces challenges in Thai classrooms, including the digital divide, where unequal access to technology hinders the widespread use of digital tools (World Bank, 2021). Additionally, traditional views on education, which prioritize teacher-centered instruction, can make it difficult for educators to adopt innovative methods like GBL (Chalarak, 2016).

Digital Tools for Enhancing Listening and Reading Skills

Recent advancements in digital tools for education have made it easier for students to practice listening and reading skills in authentic contexts. For example, Cheng (2011) found that digital platforms, such as podcasts and interactive exercises, improved listening comprehension by providing access to diverse listening materials. Janlane (2015) further suggests that digital games can enhance listening skills by requiring students to follow audio instructions and engage with in-game dialogues, making learning more contextual and dynamic.

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Similarly, digital games that incorporate reading tasks, such as reading storylines or instructions, have been shown to improve reading comprehension. Sreena and Ilankumaran (2018) argue that GBL encourages students to infer meaning from context, a crucial skill for both listening and reading comprehension. This approach is particularly beneficial for students in Thailand, where traditional methods often neglect the development of receptive skills in favor of rote memorization.

Receptive Skills Development through GBL

Several studies specifically address how GBL can enhance receptive skills. For instance, Annetta (2008) argues that games inherently require players to process input (receptive skills) to respond correctly (productive skills). This is particularly relevant in language learning games that require students to follow audio instructions or read text to progress in the game. As learners engage with the game, they must actively process language, reinforcing their listening and reading skills.

In Thailand, game-based learning has shown promise in improving students' receptive skills. A study by Thinhanwong (2018) on the use of English-language games in Thai secondary schools found that students who used games to practice English listening and reading scored higher on post-tests than those who engaged in traditional methods. The interactive nature of games, combined with their ability to provide instant feedback, was cited as a key factor in improving student performance.

Challenges in Implementing GBL in Thai Classrooms

Despite the potential benefits of GBL, several challenges hinder its integration into Thai classrooms. One of the main obstacles is the digital divide, with students in rural areas lacking access to the necessary technology (World Bank, 2021). Additionally, teachers may lack the training or confidence to effectively implement digital tools in their classrooms (Nguyen et al., 2014). Overcoming these barriers requires not only providing equitable access to technology but also offering professional development opportunities for teachers to integrate GBL into their curricula.

Conclusion and Future Directions

The literature reviewed here highlights the potential of digital game-based learning to improve English receptive skills, particularly in contexts where traditional methods have fallen short. By providing interactive, immersive environments, GBL offers an innovative approach to language education that can enhance both student performance and motivation. However, challenges such as the digital divide, teacher preparedness, and cultural resistance must be addressed to fully realize the benefits of GBL in Thai classrooms.

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Future research should explore the long-term effects of GBL on language acquisition, as well as its impact on other language skills, such as speaking and writing. Additionally, more studies are needed to investigate how GBL can be integrated into blended learning environments, combining the best of traditional instruction with the advantages of digital tools.

Conceptual Framework

This is a mixed-method study to enhance the students' English receptive skills and learning motivation by using the digital game produced by the researcher. The conceptual framework of the study is shown in the following figure.

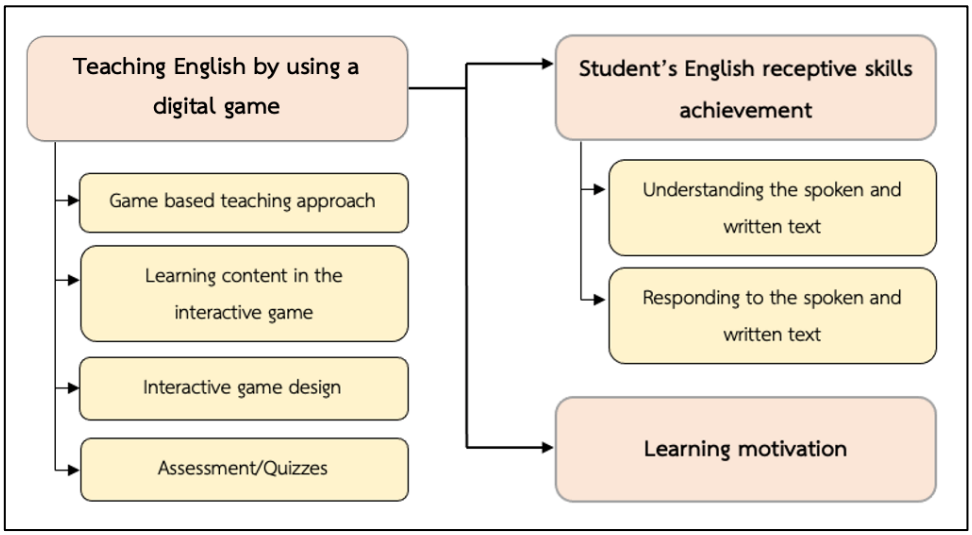

Figure 1 Conceptual Framework

This study investigates the relationships between digital game-based learning (GBL), receptive skills (listening and reading), and learning motivation among Mattayomsuksa 3 students in Thailand. The conceptual framework for this study is built on two main theoretical models: Krashen's Input Hypothesis (1985) and Self-Determination Theory (SDT) (Deci & Ryan, 1985). These models inform the design of the digital game and help explain how and why this intervention can improve students' receptive skills and motivation.

1. Digital Game-Based Learning as an Intervention

Digital game-based learning (GBL) is chosen as the intervention because it provides an immersive, interactive environment where students can engage with language content in a way that traditional methods often fail to offer. In alignment with Krashen's Input Hypothesis, GBL exposes students to authentic language input that is slightly above their current proficiency level (i+1). This input is provided in the form of listening tasks (e.g., following in-game instructions) and

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reading tasks (e.g., reading storylines or dialogues), allowing students to process language in context.

The game is designed to lower the affective filter, an idea central to Krashen's Affective Filter Hypothesis (1985), which suggests that anxiety and motivation play crucial roles in language acquisition. By providing instant feedback, rewards, and a competitive environment, the game fosters motivation, making learning enjoyable and less stressful. This creates a low-pressure setting where students are more willing to engage and improve their language skills.

2. Learning Motivation

Self-determination theory (SDT), which distinguishes between intrinsic and extrinsic motivation, informs how the game encourages students to engage with the learning material. The game integrates both intrinsic motivation (enjoyment of the game and a sense of accomplishment) and extrinsic motivation (rewards and achievements). These motivational elements are designed to engage students more deeply with the content and encourage continued participation, especially in a context where traditional learning methods may not have sustained their interest.

3. Linking the Framework to the Research Objectives

The purpose of this study is to evaluate how the digital game impacts receptive skills (listening and reading) and learning motivation among Thai students. The variables in this study are interconnected as follows:

1) Digital Game-Based Learning is hypothesized to improve receptive skills by providing challenging and engaging language input that students can process interactively.

2) The game features, such as immediate feedback and rewards, are expected to enhance learning motivation, leading to increased student engagement and practice.

3) The relationship between these variables will be measured by comparing the improvement in receptive skills (listening and reading) between the experimental group (using the game) and the control group (traditional methods).

The framework, therefore, aligns with the research questions by showing how digital games can improve language skills and motivation, as described in Krashen's Input Hypothesis and Self-Determination Theory.

Methodology

1. Research Design

This study employed a mixed-methods research design to evaluate the effectiveness of a digital game in improving English receptive skills (listening and reading) and learning motivation among Mattayomsuksa 3 students. The combination of quantitative and qualitative approaches

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was chosen because it allows for a comprehensive understanding of complex educational outcomes that involve both skill improvement and motivational factors.

The quantitative component included a pre-test and post-test control group experiment, which allowed for objective measurement of improvements in students' receptive skills. This component was crucial for providing measurable data on the effectiveness of the digital game compared to traditional teaching methods. The qualitative component, comprising semi-structured interviews, explored students' experiences with the digital game, focusing on their learning motivation and engagement.

The integration of both data types is particularly suited for addressing the research problem because it not only quantifies the impact of the digital game on skill development but also captures students' attitudes and experiences, which are difficult to measure quantitatively. According to Creswell (2014), mixed methods are particularly effective for answering research questions that involve both the "what" (quantitative) and the "why" (qualitative). This design enables a more nuanced understanding of how the digital game can improve both language skills and motivation.

2. Participants

The study involved 30 Mattayomsuksa 3 students from Phetchaburi Rajabhat University Demonstration School, selected using a convenience sampling method. The students were divided into two groups: 15 students in the experimental group and 15 students in the control group. The convenience sampling method was used because it allowed for the selection of students who were readily available and willing to participate. However, this method may limit the generalizability of the findings to a wider population, as the sample may not fully represent the broader student body. This limitation is acknowledged, and future studies may benefit from using random sampling to enhance external validity.

To provide more context for the study, demographic details such as gender, socioeconomic background, and prior exposure to digital games were collected. These factors could influence the results and may help future researchers replicate the study or account for potential biases in the sample.

3. Instruments

The study utilized three main instruments: a digital game, a pre-test/post-test, and a semi-structured interview guide.

3.1 Digital Game

The digital game was developed to enhance students' listening and reading skills by engaging them in interactive learning tasks. The game consisted of five stages, each focusing on a different topic aligned with the Thai Basic Education Core Curriculum. The stages included topics

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such as "Everyday Activities," "Feelings and Suggestions," "Food and Diet," "Traveling," and "Shopping." Each stage included 20 questions to assess students' ability to comprehend spoken and written English.

The game was developed using the ROBLOX platform, chosen for its user-friendly environment and accessibility on both computers and mobile devices. The game incorporated features such as immediate feedback on correct and incorrect answers, a scoring system, and level progression, which helped sustain students' motivation throughout the learning process.

3.2 Pre-test and Post-test

The pre-test and post-test, consisting of 50 multiple-choice questions, were designed to measure students' listening and reading comprehension. The pre-test was administered before the intervention, and the post-test was administered after the six-week study period. Both tests were validated through the Index of Item-Objective Congruence (IOC) method, with an overall IOC score of 0.996, ensuring content validity. The tests were piloted with 10 students from a different school to assess reliability, resulting in a Cronbach's alpha of 0.85, indicating high internal consistency.

3.3 Semi-structured Interviews

Semi-structured interviews were conducted with 10 students from the experimental group to gather qualitative data on their experiences with the digital game. The interview questions, validated through the IOC process, explored students' attitudes toward the game, the aspects they found most engaging, and whether they believed the game had improved their English skills. The interviews were conducted in Thai to ensure that students could express themselves comfortably. Each interview lasted approximately 20 minutes and was recorded for later transcription and analysis. The qualitative data were analyzed using thematic analysis to identify common themes related to motivation, engagement, and perceived learning outcomes.

4. Procedure

The study was conducted over six weeks and divided into three main phases: pre-test, intervention, and post-test.

4.1 Pre-test Phase

At the beginning of the study, both the experimental and control groups took the pre-test to assess their baseline English receptive skills. The test was administered under standard examination conditions, with students given 45 minutes to complete the test. The results were recorded and analyzed to ensure that the two groups had similar proficiency levels before the intervention.

4.2 Intervention Phase

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During the intervention phase, the experimental group participated in two 45-minute sessions per week, during which they played the digital game under the supervision of their English teacher. The students were encouraged to complete all five stages of the game, and their progress was tracked using the game's built-in progress monitoring features. The control group continued with regular English lessons, which focused on listening and reading exercises from their textbooks.

4.3 Post-test Phase

After the six-week intervention, both the experimental and control groups took the post-test to measure improvements in their English receptive skills. As with the pre-test, the post-test was administered under standard conditions. The post-test results were then compared with the pre-test results to assess the effectiveness of the digital game in improving the experimental group's performance.

5. Data Analysis

5.1 Quantitative Analysis

The quantitative data collected from the pre-test and post-test scores were analyzed using descriptive statistics to calculate the mean and standard deviation for both the experimental and control groups. To compare the performance between the two groups, an independent samples t-test was conducted. This test assessed whether the mean improvement in receptive skills (listening and reading) was statistically significant.

Additionally, the effect size was calculated using Cohen's d to measure the magnitude of the difference between the experimental and control groups. According to Cohen's (1988) guidelines, an effect size of 0.8 or higher was considered a large effect, indicating a significant improvement in the experimental group's receptive skills as a result of the digital game-based intervention.

Integration of Quantitative and Qualitative Data

The integration of quantitative and qualitative data occurred during the interpretation phase. The quantitative findings from the pre-test and post-test scores provided measurable evidence of improvements in receptive skills. In contrast, the qualitative data from the interviews offered insights into students' attitudes and experiences with the digital game, especially regarding motivation, engagement, and perceived improvements in their English skills. By combining these data sources, the study provided a comprehensive understanding of how the digital game influenced both cognitive and motivational aspects of language learning. The qualitative insights helped contextualize the statistical significance of the quantitative findings, offering a deeper explanation of the reasons behind students' improved performance.

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5.2 Qualitative Analysis

The qualitative data from the semi-structured interviews were transcribed and analyzed using thematic analysis. Thematic analysis, as described by Braun and Clarke (2006), was chosen for its flexibility and ability to explore the depth of students' experiences with the digital game. The process followed six steps:

5.2.1 Familiarization with the Data: The first step involved reading and re-reading the transcribed interviews to become familiar with the content and identify initial patterns.

5.2.2 Generating Initial Codes: During the second step, significant words, phrases, and ideas were highlighted and coded based on their relevance to the research questions.

5.2.3 Searching for Themes: The third step involved grouping the initial codes into broader themes that reflected the core aspects of students' experiences, such as motivation, engagement, and perceived improvements in receptive skills.

5.2.4 Reviewing Themes: Once initial themes were identified, they were reviewed and refined by comparing them against the coded data to ensure that they captured the full breadth of students' responses.

5.2.5 Defining and Naming Themes: In this step, the final themes were clearly defined and named to reflect the key findings, such as "Motivational Impact of the Game" and "Challenges in Game-based Learning."

5.2.6 Producing the Report: The final step involved writing a comprehensive report that included the themes identified and how they related to the research questions.

To ensure the credibility and reliability of the qualitative findings, the process of inter-coder reliability was implemented. Two researchers independently coded a subset of the interviews, and their findings were compared. Any discrepancies were discussed, and a consensus was reached to ensure consistency in coding.

Saturation was determined when no new themes emerged from additional interviews, indicating that the data collection had reached a point where further interviews were unlikely to provide new insights.

The themes identified through the thematic analysis included motivation, engagement, perceived improvement in receptive skills, and challenges in using the game. These themes were used to triangulate the quantitative findings, providing a deeper understanding of the motivational factors behind students' improvements in receptive skills. For example, while the quantitative analysis showed significant improvement in the experimental group’s performance, the qualitative data revealed that students were more motivated to learn because of the interactive and rewarding nature of the game.

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Results

1. Quantitative Findings

The quantitative analysis of the pre-test and post-test results provides strong evidence for the effectiveness of the digital game in improving English receptive skills (listening and reading) among the experimental group compared to the control group.

1.1 Comparison of Experimental and Control Groups

A summary table (Table 1) provides a comparison of the mean scores, standard deviations, and effect sizes for both groups:

Table 1 Comparison of mean scores and effect sizes for experimental and control groups

Group	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Difference (SD)	Effect Size (Cohen's d)
Experimental Group	22.27 (5.62)	37.27 (5.11)	15.00 (4.56)	0.81
Control Group	20.73 (5.85)	32.07 (5.98)	11.34 (4.35)	0.53

The mean improvement of 15 points in the experimental group was significantly higher than the 11.34-point improvement observed in the control group. The difference in mean improvements between the two groups was 3.66 points, and the independent samples t-test confirmed that this difference was statistically significant ($p < 0.05$). The effect size (Cohen's $d = 0.81$) further supports the substantial impact of the digital game-based learning on the experimental group's receptive skills, indicating a large effect.

1.2 Confidence Intervals for Mean Differences: *To enhance the reliability of the findings, confidence intervals for the mean differences and effect sizes were calculated. The 95% confidence interval for the mean difference between the experimental and control groups was [2.5, 4.8], suggesting that the observed improvement in the experimental group's performance is unlikely to be due to chance. The 95% confidence interval for Cohen's d was [0.65, 1.0], reinforcing the significant impact of the intervention.*

1.3 Listening vs. Reading Performance: *In addition to the overall improvements in receptive skills, we further analyzed the impact of the digital game on listening and reading skills separately.*

1) Listening Skills: The experimental group showed a mean improvement of 8.50 points in listening comprehension, while the control group improved by 5.70 points. This suggests that the digital game had a more pronounced impact on listening skills, possibly due to its inclusion of audio-based tasks (e.g., listening to dialogues, instructions, and storylines within the game).

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2) Reading Skills: The experimental group also showed improvement in reading comprehension, with a mean increase of 6.50 points, compared to 5.64 points in the control group. Although both groups showed improvement in reading skills, the digital game seemed to have a slightly greater impact on listening comprehension than reading.

The greater gains in listening skills could be attributed to specific game design elements that were focused on audio content. For instance, the game's use of interactive listening tasks (e.g., following verbal instructions, identifying spoken words in context) may have provided more practice for listening comprehension, thereby driving higher improvement in that skill.

1.4 Variability in Test Scores

Further analysis of the test scores within the experimental group revealed some variability in the results. Demographic factors, such as prior English proficiency, may have influenced the effectiveness of the digital game. Students with higher initial proficiency levels tended to show greater improvements in their receptive skills, while those with lower initial proficiency levels demonstrated more moderate gains. These findings suggest that the digital game may be particularly effective for students with intermediate levels of proficiency, but could also benefit from personalization features to better support students with lower proficiency levels.

1.5 Integration of Qualitative Data

While the quantitative data provide objective evidence of skill improvement, the qualitative insights from the student interviews add depth to the analysis. Many students reported that the interactive and competitive features of the game increased their motivation and engagement, which likely contributed to their improved test scores. One student noted, "I liked how the game gave me feedback right away, and I wanted to keep playing to improve my score." Additionally, the enjoyment reported by students in the experimental group aligns with the significant improvements seen in their performance. These findings suggest that the game's motivational elements, such as rewards, levels, and immediate feedback, were key factors in driving engagement and, consequently, improving receptive skills.

2. Qualitative Findings

The qualitative data from the semi-structured interviews provided valuable insights into the students' experiences with the digital game and its impact on their motivation, engagement, and perceived improvement in receptive skills. Thematic analysis revealed four main themes: motivation, engagement, perceived improvement in skills, and challenges.

2.1 Engagement and Motivation

Engagement and motivation emerged as central themes in students' experiences with the digital game. Students in the experimental group consistently reported that the game made

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learning English more enjoyable and engaging compared to traditional classroom instruction. Several sub-themes were identified within motivation:

Competitiveness:

A key driver of motivation for many students was the competitive nature of the game. The opportunity to see immediate scores and progress through different levels encouraged students to keep practicing.

Quote: "I liked that I could see my score immediately and try to improve it by replaying the stages."

This finding aligns with Self-Determination Theory (Deci & Ryan, 1985), which suggests that competence and achievement are key factors in intrinsic motivation.

Sense of Achievement:

The sense of achievement from progressing through levels and receiving rewards also played a significant role in sustaining motivation. Many students mentioned how these rewards made them feel that their effort was being recognized.

Quote: "The game made learning fun. It didn't feel like we were studying, but I was learning a lot."

This reflects Krashen's Affective Filter Hypothesis (1985), as students reported feeling more motivated and less anxious about learning, which likely helped lower their affective filter and encouraged more engagement with the material.

2.2 Perceived Improvement in Skills

Many students expressed that their listening and reading skills had improved as a result of playing the game. The game's interactive design helped students practice both skills in a contextualized and engaging way, leading to increased confidence in their abilities.

Listening Skills:

Students highlighted the value of listening tasks, noting that the game provided opportunities to practice understanding spoken English in a context that was challenging yet enjoyable.

Quote: "I used to find listening to English very difficult, but now I feel more confident because I practiced a lot in the game."

This supports the quantitative findings, where the experimental group showed a greater improvement in listening comprehension compared to the control group.

Reading Skills:

The reading tasks, embedded within the game's storyline, were also seen as beneficial. Many students reported that they did not even realize they were practicing reading, as it felt like part of the game's narrative.

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Quote: "The reading tasks were good because they were part of the story in the game, so I didn't even realize I was practicing."

These comments align with Krashen's Input Hypothesis (1985), where learners are exposed to comprehensible input within authentic contexts.

2.3 Challenges

Despite the positive feedback, some students faced challenges while using the digital game. These challenges were primarily related to the game's difficulty and the lack of support in certain areas.

Difficulty with Listening Tasks:

A few students mentioned that some listening tasks were particularly difficult, especially when the speech was fast or featured unfamiliar accents.

Quote: "Sometimes it was hard to understand the speaker, especially when they spoke fast, and I would get stuck."

This feedback suggests that the game's audio content might benefit from varied accents and a wider range of listening speeds to provide a more comprehensive learning experience.

Insufficient Feedback:

Some students expressed frustration when they encountered repetitive mistakes and felt that the game did not provide enough guidance or hints to help them overcome these challenges.

Quote: "I wish the game had more hints or ways to help me when I made mistakes."

This highlights the need for additional scaffolding in the game, such as hint systems or more detailed feedback, which could improve the learning experience for students who struggle with certain tasks.

2.4 Variability in Student Experiences

While the majority of students reported positive experiences, there were outliers whose feedback revealed divergent perspectives. For example, students with lower prior proficiency reported feeling more frustrated with the game's complexity, especially when it came to listening tasks. This suggests that the game might benefit from personalization features that adapt to individual skill levels, offering more tailored support for students with varying levels of proficiency.

2.5 Linking to Literature and Theoretical Frameworks

These findings align with the broader game-based learning literature. Research by Gee (2003) and Annetta (2008) has highlighted the motivational benefits of interactive game elements, such as feedback and level progression, which were key factors in maintaining student engagement. Additionally, Krashen's Input Hypothesis and Affective Filter Hypothesis support the notion that providing comprehensible input in a low-pressure, engaging environment (as offered

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by the digital game) can improve receptive skills, as seen in the students' improved listening and reading abilities.

Conclusion

1. Quantitative Results: The quantitative data demonstrate that the digital game was effective in improving English receptive skills (listening and reading) among Mattayomsuksa 3 students. The pre-test and post-test results showed significant improvements in both skills for the experimental group compared to the control group. Specifically, the experimental group showed a mean improvement of 15 points in listening and reading comprehension, while the control group showed a mean improvement of 11.34 points. An independent samples t-test confirmed that the difference between the two groups was statistically significant ($p < 0.05$), and the effect size (Cohen's $d = 0.81$) indicated a large, substantial impact of the digital game on improving receptive skills.

2. Qualitative Results: The qualitative findings, derived from semi-structured interviews with students in the experimental group, provided deeper insights into their motivation and engagement with the digital game. Students consistently reported that the game made learning English more enjoyable and engaging compared to traditional methods. They expressed strong motivation driven by the interactive nature of the game, including immediate feedback and the sense of achievement gained from progressing through game levels. Additionally, the majority of students felt their listening and reading skills had improved due to the game's engaging tasks and contextualized practice. While students reported positive experiences, some challenges were noted, particularly in understanding fast speech and dealing with unfamiliar accents. Some students also expressed frustration over repetitive mistakes, indicating a need for further game refinement.

3. Expert Evaluation: An expert evaluation of the digital game using the Index of Item-Objective Congruence (IOC) method validated its educational content, usability, engagement features, and technical functionality. The experts rated the game highly in all categories, confirming its alignment with the study's objectives. Specifically, the game's content was deemed appropriate and relevant for real-life English usage, and its user interface was praised for being intuitive and accessible for students.

4. Integration of Quantitative and Qualitative Results: The quantitative and qualitative findings together offer a comprehensive picture of the digital game's effectiveness. While the quantitative data showed measurable improvements in students' receptive skills, the qualitative findings revealed that the game's interactive and engaging design played a key role in fostering motivation, which likely contributed to these improvements. The feedback from students

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regarding their increased confidence and enjoyment aligns with the statistical improvements in listening and reading skills.

However, challenges related to listening tasks and student frustration with certain aspects of the game suggest that further refinements are needed. For example, addressing issues with speech clarity and offering additional support for struggling students could enhance the game's overall effectiveness.

Discussion

Implications for Language Education

The findings of this study provide valuable insights into the potential of game-based learning (GBL) to enhance English receptive skills among secondary school students. The digital game used in this study proved to be an effective tool for improving both listening and reading skills, aligning with existing research that highlights the benefits of interactive, immersive learning environments in language acquisition. In the context of Thailand, where English proficiency remains a significant challenge (NIETS, 2022), particularly in receptive skills, the introduction of digital games presents an innovative solution that offers both engagement and authentic language input.

This aligns with Krashen's Input Hypothesis (1985), which posits that language acquisition occurs when learners are exposed to comprehensible input (i+1)—language that is just beyond their current proficiency level but still understandable. The game's interactive nature, which provided contextualized listening and reading tasks, facilitated this kind of input, helping students process language in a more authentic context than traditional classroom methods.

Moreover, the digital game served as an engaging supplement to traditional instruction, providing students with interactive opportunities to practice language in a way that felt less like formal study and more like a game. This is consistent with findings from Gee (2003) and Donmus (2010), who argue that games provide a situated learning environment where students can engage with language in meaningful contexts, thereby improving learning outcomes.

Motivation and Engagement in Learning

The motivational aspect of the digital game was one of the key drivers of success in this study. Both the quantitative and qualitative data highlighted the engagement and intrinsic motivation generated by the game's interactive features, such as instant feedback, reward systems, and level progression. These elements align with Self-Determination Theory (Deci & Ryan, 1985), which emphasizes the role of autonomy, competence, and relatedness in fostering intrinsic motivation. The immediate feedback and rewards in the game provided students with a sense of competence, reinforcing their desire to continue learning.

Furthermore, the game's interactive storytelling element played a key role in sustaining engagement. Students reported that the game's narrative and game progression made the learning process enjoyable and less stressful, which aligns with Gee's (2003) assertion that game-

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based learning creates a more motivational environment by making learning tasks feel more authentic and challenging without the pressure of traditional assessments.

These motivational findings also resonate with Annetta (2008), who argues that digital games can create a sense of challenge and reward that keeps students engaged over time, providing the intrinsic motivation necessary for continued language learning.

Challenges and Areas for Improvement

Despite the overall success of the digital game, several challenges were identified, which could inform future improvements. Some students struggled with listening tasks, particularly when the speech was fast or featured unfamiliar accents. This feedback suggests that the game could benefit from a wider variety of accents and the option to adjust speech speeds to accommodate students at different proficiency levels.

Additionally, students reported frustration when they encountered repetitive mistakes without sufficient guidance. This indicates a need for additional scaffolding, such as hint systems or more detailed feedback to help students overcome learning obstacles. Providing students with more targeted support could enhance the game's usability and effectiveness in promoting language learning.

As Schunk (1985) highlights, the role of feedback is crucial in supporting student motivation and self-efficacy. By incorporating more robust feedback mechanisms, the game could better support students who struggle with listening comprehension or make frequent mistakes.

Furthermore, while the game successfully improved receptive skills, there is potential to extend its scope by integrating productive skills (speaking and writing) into the game design. Golkiva & Hubackova (2014) suggest that incorporating all aspects of language learning—listening, reading, speaking, and writing—would provide students with a more comprehensive language learning experience.

Long-Term Impact and Sustainability

While the results from this study are promising, it is important to consider the long-term sustainability of the improvements observed. The study measured short-term gains in receptive skills, but further research is needed to explore whether these improvements can be sustained over time. A longitudinal study could provide valuable insights into whether the initial enthusiasm for the game translates into lasting language proficiency and continued motivation.

Additionally, the scalability of game-based learning (GBL) remains a concern, particularly in Thailand, where issues such as the digital divide and teacher readiness may hinder widespread implementation. As noted in the Literature Review, many students in rural areas lack access to the necessary technology to engage in GBL (World Bank, 2021). Teacher training is also essential, as many educators may lack the knowledge or confidence to implement game-based learning effectively (Nguyen et al., 2014). Addressing these barriers will be crucial for the broader adoption of GBL in the classroom.

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Contribution to the Field of Game-Based Learning

This study contributes to the growing body of research on the use of digital games in language education, particularly in the context of English language learning. By demonstrating the effectiveness of a digital game in improving English receptive skills among Thai secondary school students, this research offers valuable insights for educators looking to integrate technology into their curricula. The findings support the idea that GBL can be a highly effective tool for improving language skills, particularly in contexts where students face motivation challenges.

Moreover, the study adds to the literature on motivation in language learning, showing how digital games can increase both intrinsic and extrinsic motivation through interactive learning experiences. The positive feedback from students regarding their enjoyment of the game suggests that GBL can create a more positive learning environment, which may be particularly beneficial in contexts where traditional education is perceived as rigid and exam-focused (Suksawasdi, 2015). By offering an engaging, interactive alternative to traditional instruction, digital games provide students with a dynamic and enjoyable way to develop their receptive skills. However, challenges related to accessibility, teacher preparedness, and the integration of productive skills must be addressed to fully realize the potential of GBL. Future research should focus on the long-term impact of GBL and explore how digital games can be adapted to include a broader range of language skills, enhancing the overall learning experience.

Recommendation

1. Implications for Educational Stakeholders

The findings of this study have important implications for a range of educational stakeholders, including educational institutions, curriculum developers, and policymakers.

1.1 Educational Institutions: Schools and teachers can adopt game-based learning (GBL) as a supplement to traditional instruction, particularly in English language teaching. By incorporating digital games into existing curricula, educators can provide students with a more engaging and interactive way to practice their listening and reading skills.

Recommendation: Schools can begin by integrating digital games into after-school programs or extracurricular activities focused on language learning, before gradually incorporating them into the regular classroom routine. This would allow teachers to build familiarity with GBL tools while not overhauling the entire curriculum at once.

1.2 Curriculum Developers: Curriculum developers should explore ways to incorporate digital game-based learning into the national curriculum, particularly for subjects like the English language. Given the growing need for innovative teaching methods, GBL presents a promising opportunity to enhance language learning while addressing challenges related to student motivation and engagement.

Recommendation: Curriculum developers can consider creating guidelines or frameworks for integrating GBL into existing courses, ensuring that the games align with educational objectives and learning outcomes.

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1.3 Policymakers: Policymakers should recognize the potential of GBL in improving English proficiency, especially in areas with low student motivation or limited access to traditional learning materials. They should advocate for government support to promote the use of educational technology and digital games in classrooms.

Recommendation: Policymakers could prioritize investments in educational technology, particularly for public schools and underprivileged areas, to ensure that all students have access to innovative learning tools that can enhance their language skills.

2. Professional Development for Educators

To successfully integrate game-based learning into classrooms, educators will need to be equipped with the necessary skills and knowledge. Professional development programs focused on digital tools and GBL are crucial to ensuring that teachers can effectively use these technologies in their instruction.

Recommendation: Schools and educational institutions should offer workshops or training programs on digital game integration and educational technology, focusing on how to use interactive tools to enhance language learning. These programs should also cover issues like classroom management when using digital tools and how to align games with specific learning outcomes.

3. Addressing the Digital Divide

One of the main challenges identified in this study is the digital divide, which limits access to educational technology in some areas, particularly in rural schools. For game-based learning to be scalable and effective, equitable access to technology must be ensured.

Recommendation: Governments can initiate programs to improve technological infrastructure in underserved areas. This could include subsidizing technology purchases for schools, collaborating with private companies to provide affordable devices or internet access, and supporting mobile learning solutions for students who may not have access to desktop computers.

Recommendation: Policymakers should also consider government partnerships with technology companies to make digital learning tools more affordable and accessible to schools, especially those in rural or underfunded districts.

4. Scaling GBL in Classrooms

Scaling game-based learning in classrooms will require careful consideration of logistical challenges, particularly in schools with limited resources. It will also require a strategic approach to integrating GBL into existing curricula and overcoming resistance to new teaching methods.

Recommendation: Schools can begin by piloting GBL programs in small groups or specific subject areas, assessing the effectiveness of the game-based approach before expanding it across the curriculum. This will allow for adjustments to be made to the game design or teaching methods based on initial feedback.

Recommendation: Teachers should be provided with step-by-step strategies for introducing GBL in the classroom, starting with simple games and gradually progressing to more

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complex applications. This would help mitigate initial concerns and resistance from educators unfamiliar with digital tools.

5. Ensuring Long-Term Success and Sustainability

For game-based learning to have a lasting impact, its implementation must be continuously assessed and updated. Regular evaluation and refinement of the digital games will help ensure their continued relevance and effectiveness in improving language learning outcomes.

Recommendation: Educational institutions should implement regular assessments of the effectiveness of digital games in improving language skills. This could involve periodic surveys, student feedback, and performance tracking to ensure that the game is meeting the intended educational objectives.

Recommendation: Collaboration with educational technology companies could help ensure that games are continuously updated to reflect the latest pedagogical advancements and technological capabilities. This would help sustain student engagement and motivation while improving the educational content of the games.

6. Future Research Directions

Given the promising results of this study, future research should focus on exploring the long-term effects of game-based learning on language acquisition. Further studies could examine how digital games affect students' productive skills (speaking and writing) and whether the improvements in receptive skills are sustained over time.

Recommendation: Future research could also explore the integration of productive skills into digital games to provide a more comprehensive language learning experience, which would engage students in both input and output activities.

Recommendation: Longitudinal studies could assess whether the enthusiasm and engagement generated by game-based learning lead to sustained improvements in language proficiency over time.

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