Evaluating the Impact of Roblox-Based Interactive Media on English Learning Outcomes and Engagement at Chiang Rai Rajabhat University

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***Abstract*—In the global society, proficiency in English is essential for effective communication. However, English education in Thailand faces challenges, particularly in terms of students' self-confidence and the lack of interactive learning environments. This research explores how effective using interactive English learning media on the Roblox gaming platform is increased student engagement in higher education. The objectives are to 1) develop a comprehensive learning resource for Communicative English II using Roblox; 2) compare outcomes between students using game-based media and those using traditional websites; and 3) assess learners' satisfaction with the interactive media. This study was conducted using a quasi-experimental design with a pre-test/post-test research instrument, involving 40 students from Chiang Rai Rajabhat University. The participants were divided into two groups: an experimental group and a control group, each comprising 20 students. A t-test was employed for data analysis to accurately compare the differences in average scores between the two groups. Research findings reveal that the experimental group significantly outperformed the control group in average scores after the learning intervention, with a statistically significant difference (81.67% compared to 66.17%; t (19) = 5.45, p < 0.001, Cohen's d = 0.47). Additionally, the survey yielded positive outcomes, achieving an impressive average score of 4.52 out of 5.00, particularly in terms of media engagement and overall interest, with a high average score ($\bar{x}$ = 4.38, SD = 0.65), particularly highlighting the exceptional quality of the design. The findings of this study strongly indicate that the Roblox gaming platform serves as an effective supplementary medium for English language acquisition, not only significantly enhancing academic performance but also playing a crucial role in fostering learner motivation.**

***Keywords*—English learning, Roblox, interactive media, quasi-experimental design, learning outcomes, engagement**

I. Introduction

In today's global environment, proficiency in English is essential for effective communication in daily and professional contexts. In Thailand's higher education system, courses such as GEN2002: Communicative English II aim to enhance students' speaking and listening skills. However, challenges persist, including students' lack of confidence, an overreliance on theoretical knowledge, and limited engaging learning environments [1].

To address these challenges, educators are adopting experiential strategies, such as game-based learning, which offer interactive and learner-centered experiences [2, 3]. Platforms such as Roblox facilitate the creation of simulations that encourage collaboration and real-time engagement, enhancing communicative competence.

Additionally, integrating culturally relevant content into language instruction has proven beneficial. When students relate language to their cultural identity, their motivation and retention improve [4, 5]. For Thai learners, incorporating local philosophical frameworks, such as the Philosophy of Sufficiency Economy and initiatives by King Rama 9th, can heighten engagement. However, empirical evidence on the effectiveness of such integrations, particularly using platforms like Roblox, is limited.

This gap can be addressed by creating and assessing interactive learning media for the GEN2002 course, using Roblox, with an emphasis on the King Rama 9th Philosophy Hall. The study will evaluate how adding digital gamification and cultural Gamification for learning all elements affects learners' English skills, motivation, and satisfaction, ultimately suggesting a sustainable educational model that fits the local context. However, there remains a lack of empirical evidence demonstrating the effectiveness of integrating interactive virtual platforms with cultural content in the context of English language learning in Thailand. This research aims to design and evaluate the effectiveness of the English learning media for the course GEN2002 through the Roblox platform, using content related to the King Rama 9th Philosophy Hall to study how much this type of learning media can enhance language achievement, motivation, and learner satisfaction, while also proposing a new model of English learning that aligns sustainably with the local context.

II. Literature Review

The literature review has highlighted Roblox's potential in education across various aspects, presenting a diverse range of references on game-based learning and learning that utilizes Roblox as a medium. Therefore, this section lacks theoretical integration and critical synthesis, relying overly on descriptive summaries that fail to link the reviewed research to the focus of this research at the higher education level or the identified research gap.

Game-Based Learning (GBL) improves English language skills at both school and higher education levels, particularly in terms of vocabulary, engagement, and positive attitudes. Primary [6, 7]and university [8, 9] research confirms that GBL and gaming technologies (e.g., Roblox, Metaverse) enhance learning performance. Therefore, the English language learning in higher education should integrate GBL to improve learners' skills and motivation. Game-Based

Learning (GBL) contributes to English skills at both school and higher education levels, especially in vocabulary, engagement, and positive attitudes. Research at the primary level [6, 7] and at the university level [8, 9] confirms that GBL and game technologies (such as Roblox and Metaverse) enhance learning efficiency. Therefore, English learning at the higher education level should integrate GBL to enhance learners' skills and motivation.

Overall, research indicates that Roblox and the Metaverse can be an effective learning tool in higher education, especially in developing English language skills [10], cultural learning [11], and STEM [12] through the creation of participatory learning environments and gamification, which is consistent with the concept of Connectivism [13] that emphasizes the connection of knowledge in the digital world. The research also shows that the use of Roblox increases learner satisfaction [14] and academic achievement [15], which can be adapted in higher education to promote Active Learning and 21st-century skills.

Research has shown that games in the local Thai context can be an effective learning medium in higher education, both in terms of ecotourism [16] and Chinese language learning [17], with an emphasis on designing games that are consistent with the content and target audience to create interest and promote learner engagement.

However, a significant limitation is that specific cultural contexts and learning objectives must be profoundly considered consistently for games to precisely achieve their educational goals.

This content aligns with curriculum standards and learner needs, facilitating reproducible research. The instructional materials for the Roblox platform were developed based on the GEN2002: Communicative English II course syllabus, which adhered to CEFR (Common European Framework of Reference for Languages) standards and learner-centered principles. Activities focused on vocabulary development, situational dialogues, and problem-solving tasks related to the sufficiency economy. Three experts validated all materials to ensure relevance, linguistic appropriateness, and pedagogical soundness.

III. Materials and Methods

The research methodology was structured as follows:

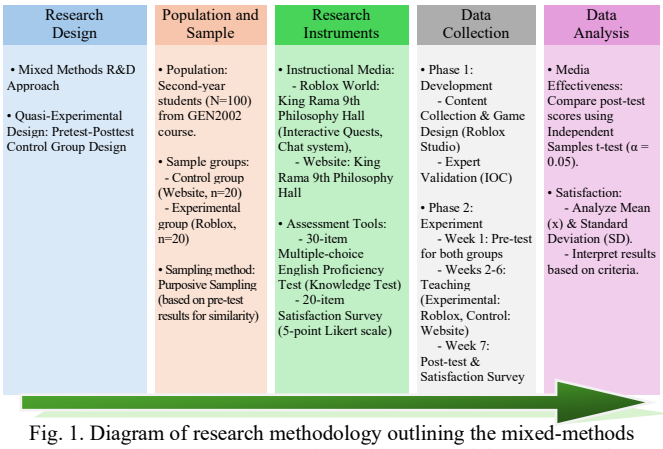

Fig. 1. Diagram of research methodology outlining the mixed-methods approach, population, instruments, data collection, and data analysis phases.

Before developing the media, the researcher conducted a survey of learners' needs using a questionnaire and a focus group discussion with 20 second-year students who had registered for the GEN2002 course. It was found that 87 percent of the students preferred learning media that focused on practical training rather than memorization, in the form of interactive games.

The Roblox game activities were designed to align with CEFR B1 (Intermediate) standards, aiming to develop communication skills in line with the objectives of the GEN2002 course. These activities are consistent with the content of the Sufficiency Economy Philosophy, presented in three parts: Contextual Vocabulary, Situational Dialogues, and Interactive Exercises.

In-game activities were designed to be consistent with the content of GEN2002's weekly lessons. For example, Week 1-2 activities include word searches that correspond to the Unit 1: Sustainable Living lesson. Weeks 3-4 feature in-game character conversation activities aligned with Unit 2: Community Engagement. Weeks 5-6 involve English problem-solving activities consistent with Unit 3: Ethical Decision Making. All activities are checked for compliance with learning objectives by an English teaching expert.

A. Research Design

This study used a mixed Research and Development (R&D) approach (Fig. 1), which consisted of two steps:

1) Development Phase: The design of teaching media on the Roblox platform was developed and validated by three experts.
2) Experimental Phase: A quasi-experimental design was employed to assess and evaluate the effectiveness of the teaching medium. This phase followed a pre-test control group design, characterized by the following elements:
   - Measurement was conducted both before and after the intervention (pre-test and post-test).
   - Participants were divided into a control group and an experimental group.
   - Randomization was not necessary when students were selected with similar skills only for the pretest.

B. Population and Sample

1) Population

- 100 second-year students of Chiang Rai Rajabhat University that registered for the course "Communicative English II".

2) Sample group

- Control Group: 20 students learning through the King Rama 9th Philosophy Hall's website.
- Experimental Group: 20 students learning through the Roblox platform.

3) Sampling

Purposive sampling was used to select students whose pre-test scores showed no significant differences, ensuring the initial groups were similar in terms of prior achievement. While this approach creates balanced groups, it can introduce selection bias and limit the generalizability of the findings. Therefore, the results should be interpreted with caution, and future studies should consider using a larger, systematically randomized sample to strengthen the reliability of the conclusions.

C. Research Instruments

1) Teaching media

The Roblox platform provides an engaging virtual exhibition of the King Rama 9th Philosophy Hall, featuring Interactive Quests and a text chat system to enhance interaction.

2) Assessment tools

- 30-question multiple-choice English proficiency test.
- The Satisfaction survey used 20 questions with responses measured on a 5-point Likert scale.

3) Ethical consideration

Before conducting the research, ethical approval was secured from the RDI Review Board at Chiang Rai Rajabhat University. All students were provided informed consent.

Additionally, the anonymity and confidentiality of participants' data were diligently preserved throughout the study to protect their personal information.

D. Data Collection

1) Development stage

Phase 1: Collect content from the King Rama 9th Philosophy Hall and design the game in Roblox Studio.

Phase 2: Validate content and activities with three experts using the Index of Item-Objective Congruence (IOC).

2) Trial stage

Week 1: Conduct a pre-test for two groups.

Weeks 2-6: Teach the experimental group Roblox, while the control group will use the website.

Week 7: Administer a post-test and assess satisfaction.

E. Data Analysis

1) Evaluate media efficiency: compare post-test scores using the Independent Samples t-test (set the level of statistical significance at $\alpha = 0.05$).
2) Satisfaction evaluation: analyze the average value ($\bar{x}$), Standard Deviation (SD), and interpret the results according to the criteria given.

IV. Results and Discussion

The research project titled "Evaluating the Impact of Roblox-Based Interactive Media on English Learning Outcomes and Engagement at Chiang Rai Rajabhat University" produced strong results:

1) Interactive Media Development was created a 3D model of the King Rama 9th Philosophy Hall using Roblox Studio, featuring five activity areas with twenty interactive points to enhance engagement (Fig. 2).
2) Learning Activities: These included text searches, Q&A games, conversations with Non-Player Characters (NPCs), and group tasks to encourage English communication. (Fig. 3)
3) Content Validation: Three experts validated the game content and activities using the Index of Item-Objective Congruence (IOC) method. These findings highlight the positive impact of interactive media on English learning outcomes and engagement.

The IOC review results, as shown in Table 1, clearly demonstrate that the content and activities within the Roblox game are not only highly accurate but also exceptionally aligned with the interactive English learning objectives.

- The system testing includes a stability test conducted by ten students and the resolution of technical issues before gameplay.
- The data analysis results are as follows:

Table 1. Validation of game content and activities

No	Roblox content/activity list	IOC value (ΣR/N)	Duration (height ≥ 0.67)
1	Simulated city map	1.00	Very Consistent
2	NPC dialogue	0.67	Consistent
3	Drag and drop vocabulary activities	1.00	Very Consistent
4	Fill in the blanks in sentences	1.00	Very Consistent
5	Arrange sentences into text boxes	1.00	Very Consistent
6	Progress and score recording function	1.00	Very Consistent

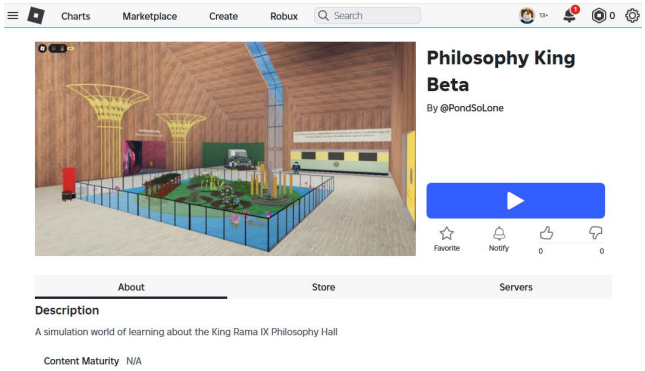

Fig. 2. Screenshot of the Roblox 'Philosophy King Beta' login page, demonstrating the user interface for accessing the learning environment.

The findings in Table 2 demonstrate that the experimental Group 1 (Roblox) significantly surpassed the control Group 2 (Website) in the mean post-test scores following the educational intervention, with a statistically significant difference at the .01 level (24.50 versus 19.85).

Table 2. Comparison of post-test scores between Group 1 and Group 2

Classroom	n	$\bar{x}$	SD	t-Test	df	Sig.**
Group 1 (Roblox)	20	24.50	6.05	5.45*	19.00	0.00
Group 2 (Website)	20	19.85	12.77			
Difference value	0	4.65	−6.71	-	-	-

* The t-test is statistically significant at the 0.05 level.
** Statistically significant at the 0.01 level.

This accounts for 81.67% of the total score for Group 1 and 66.17% for Group 2, respectively. The paired t-test statistic was 5.45, with $df = 19$, and $p < 0.01$. Moreover, the effect size, as measured by Cohen's d, was 0.47, indicating a small to medium practical significance of the intervention.

Additionally, the satisfaction survey produced highly favorable results, averaging 4.52 out of 5.00, notably in areas related to media engagement and overall interest.

Fig. 3. In-game screenshot illustrates the instructional system within the King Rama 9th Philosophy Hall Roblox environment, including navigation prompts.

Table 3. Quality assessment levels and questionnaire evaluation

No	Topic 1: Contents	$\bar{x}$	SD	Quality
1	Activities in the game enhance the understanding of the philosophy of the sufficiency economy.	4.60	0.63	Excellent
2	The game's content is interesting and unique.	4.53	0.52	Excellent
3	The game's content is accurate and complete.	4.27	0.70	Very good
4	The game's content is consistent with the learning objectives of GEN2002, Communicative English II.	4.13	0.74	Very good
5	English vocabulary and the sentences used are appropriate for the learner's level.	4.07	0.70	Very good
	Total average	**4.32**	**0.66**	**Very good**
	Topic 2: Designs			
1	The presentation of content through games is creative.	4.87	0.35	Excellent
2	The graphics and environment are beautiful and realistic.	4.80	0.41	Excellent
3	Sound and visual effects enhance students' learning experiences.	4.47	0.52	Very good
4	The in-game navigation system is easily applicable and understandable.	4.40	0.51	Very good
5	The characters and locations in the game are consistent with those in the real philosophy hall.	4.33	0.62	Very good
	Total average	**4.57**	**0.48**	**Very good**
	Topic 3: Learning outcome			
1	Games promote more engagement in learning than traditional teaching methods.	4.73	0.46	Excellent
2	Able to remember English vocabulary better from game activities.	4.27	0.59	Very good
3	The in-game activities help you gain a deeper understanding of King Rama 9th philosophy.	4.27	0.96	Very good
4	Application of knowledge from games to daily life.	4.20	0.77	Very good
5	The game helps improve the listening and speaking English skills of the player.	4.13	0.74	Very good
	Total average	**4.32**	**0.71**	**Very good**
	Topic 4: Technology			
1	The game is effective and worth spending time learning.	4.60	0.51	Excellent
2	The internet connection is stable when in use.	4.53	0.64	Excellent
3	The game's progress-saving system works efficiently.	4.27	0.80	Very good
4	The game is well supported on the device.	4.13	0.74	Very good
5	The game runs smoothly, without critical errors.	3.95	0.96	Very good
	Total average	**4.29**	**0.73**	**Very good**

Table 3 illustrates the game's effectiveness in promoting the Sufficiency Economy Philosophy. Key findings include significant improvements in comprehension ($\bar{x}$ = 4.60, *SD* = 0.63) and engagement with content ($\bar{x}$ = 4.53, *SD* = 0.52). Ratings for accuracy related to King Rama 9th Philosophy Hall were strong ($\bar{x}$ = 4.27, *SD* = 0.70), and the content aligned well with course objectives ($\bar{x}$ = 4.13, *SD* = 0.74).

In design, presentation creativity was rated highly ($\bar{x}$ = 4.87, *SD* = 0.35), with beautiful graphics ($\bar{x}$ = 4.80, *SD*= 0.41) and effective sound and visual effects ($\bar{x}$ = 4.47, *SD* = 0.52). User navigation was found to be friendly ($\bar{x}$ = 4.40, *SD* = 0.51), and characters effectively reflected real-world philosophy ($\bar{x}$ = 4.33, *SD* = 0.62).

The game enhanced active engagement ($\bar{x}$ = 4.73, *SD* = 0.46), vocabulary retention ($\bar{x}$ = 4.27, *SD* = 0.59), and understanding of the philosophy ($\bar{x}$ = 4.27, *SD* = 0.96). Students felt confident in applying their knowledge ($\bar{x}$ = 4.20, *SD* = 0.77) and reported improvements in their English skills ($\bar{x}$ = 4.13, *SD* = 0.74). Overall, the game was considered highly effective ($\bar{x}$ = 4.60, *SD* = 0.51), with stable internet ($\bar{x}$ = 4.53, *SD* = 0.64) and smooth operation ($\bar{x}$ = 3.95, *SD* = 0.96).

The evaluation results summarized in Table 4 indicate high efficiency for the learning game. The design aspect received the highest rating ($\bar{x}$ = 4.57, *SD* = 0.48), indicating an engaging experience. Content and learning outcomes were rated equally high ($\bar{x}$ = 4.32, *SD* = 0.66 and 0.71, respectively), emphasizing the game's effectiveness in delivering content and facilitating learning. The technology aspect also performed well ($\bar{x}$ = 4.29, *SD* = 0.73), reflecting a strong technological foundation. The overall average score was high ($\bar{x}$ = 4.38, *SD* = 0.65), particularly highlighting the exceptional quality of the design. This study evaluated short-term learning outcomes immediately after the intervention. Future research should include delayed post-tests or follow-ups to assess long-term retention of language skills.

Table 4. Quality assessment with four topics

No	Topics for Quality Assessment	$\bar{x}$	SD	Quality
1	Design	4.57	0.48	Excellent
2	Content	4.32	0.66	Very good
3	Learning outcome	4.32	0.71	Very good
4	Technology	4.29	0.73	Very good
	Total average	**4.38**	**0.65**	**Very good**

V. Conclusion

This research has three main objectives:

1) To design and develop educational media for the course GEN2002, Communicative English II, utilizing the Roblox platform, we will gather content data from the King Rama 9th Philosophy Hall and create games using Roblox Studio.
2) A comparison between two groups-20 participants using Roblox and 20 using a conventional website-showed that the Roblox group scored significantly higher (81.67% vs. 66.17%), with a statistically significant difference ($t^*(19) = 5.45$, $^*p < 0.001$, Cohen's $d = 0.47$). This indicates that Roblox-based learning is more effective in boosting test performance compared to traditional website-based methods.

The small to medium effect size ($d = 0.47$) demonstrates a practical difference between the two groups, supporting the idea that interactive, game-based learning environments (like Roblox) improve engagement and knowledge retention more than passive browsing. These findings align with earlier research on gamified learning [10, 18], which highlights the advantages of experiential and interactive learning grounded in Kolb's experiential learning theory.

3) The study revealed a high average satisfaction score ($\bar{x}$ = 4.38, *SD* = 0.65) among learners using the developed media. This agrees with [11], which shows Roblox effectively engages learners through its novelty and entertainment value. Satisfaction was highest in design ($\bar{x}$ = 4.57, *SD* = 0.48), followed by content ($\bar{x}$ = 4.32, *SD* = 0.66), learning experiences ($\bar{x}$ = 4.32, *SD* = 0.71), and technology ($\bar{x}$ = 4.29, *SD* = 0.73). Participants particularly appreciated the creative presentation of content ($\bar{x}$ = 4.87) and the visually appealing graphics and environment ($\bar{x}$ = 4.80). These results support Connectivism theory [19],

emphasizing learning through networks and interactions, with Roblox functioning within the Metaverse framework [10].

VI. Limitations and Suggestions

A. Limitations

1) The sample group is relatively small, comprising 20 individuals per group. It was selected using a specific sampling method (Purposive Sampling), which may restrict the generalizability of the findings to the broader population.
2) The trial duration is limited to a short term of six weeks, which hinders the ability to evaluate long-term outcomes.

B. Suggestions

1) A retention assessment should be conducted after the experiment to evaluate the effectiveness of the intervention.
2) The study should be expanded to include students with varying levels of English proficiency to assess the adaptability of the instructional media.

Although this study has only assessed short-term outcomes, understanding the sustainable impact of implementation requires future research to evaluate the long-term impact. Such investigations could include repeat assessments or student interviews to measure the sustainability of language skills and ongoing participation in the program.

While purposive sampling was used to ensure comparable baseline proficiency, the relatively small sample size (n = 20 per group) and the short duration of the intervention limit the generalizability of the findings. Therefore, caution is recommended when applying these results to larger student populations. Future research with larger and more diverse samples is suggested to confirm these findings further.

Despite these limitations, this research demonstrates the potential of integrating immersive platforms such as Roblox with culturally relevant content in English language teaching, particularly within higher education in Thailand. This approach not only fosters motivation and enhances short-term learning outcomes but also offers a novel method for developing learning resources that are deeply and meaningfully connected to learners' contexts.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Worapon A. Toopmongkol is the first author of this research article and is responsible for conducting the necessary research and experimentation with the tools employed in this study. Seatachai B. Jaihuek, the corresponding author, designed and developed research tools, and Natchanon C. Saiyee, a research assistant, provided support in both the design and development of the virtual environment. All authors have reviewed and approved the final version of the manuscript.

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