

THE EFFECTIVENESS OF DUOLINGO IN ENHANCING ENGLISH VOCABULARY THROUGH READING AMONG PRATHOMSUKSA 6 STUDENTS AT WAT RONG-OR SCHOOL, CHIANG MAI PROVINCE

Kyi Naing Htwe (Vilakanta), Thippanakorn Laolee, Wisuttichai Chaiyasit
Mahachulalongkornrajavidyalaya University, Chiang Mai Campus

Corresponding Author E-mail: vilakanpang@gmail.com

Received April 21, 2026

Revised September 4, 2026

Accepted September 9, 2026

Abstract

The objectives of this study were (1) to compare Prathomsuksa 6 students' English vocabulary knowledge before and after learning through Duolingo-based reading activities and (2) to examine students' perceptions and attitudes toward learning English vocabulary through the Duolingo application. An explanatory sequential mixed-methods design was employed. The quantitative phase utilized a one-group pretest-posttest design involving 35 Prathomsuksa 6 students at Wat Rong-Or School, Chiang Mai Province. The qualitative phase involved 12 purposively selected student informants representing different achievement levels and gender groups. Research instruments included a 50-item English vocabulary test, the Duolingo application as the intervention tool, and semi-structured interview questions. The vocabulary test demonstrated acceptable content validity (IOC = 0.60–1.00) and reliability (Cronbach's $\alpha = .723$). Quantitative data were analyzed using mean, standard deviation, paired-samples t-test, and Cohen's d_z effect size analysis, while qualitative data were analyzed using thematic analysis.

The findings revealed that students' English vocabulary knowledge improved after participating in the Duolingo-based reading activities. The mean pre-test score was 40.97 (SD = 11.19), whereas the mean post-test score increased to 54.74 (SD = 12.40). The paired-samples t-test indicated a statistically significant difference between the pre-test and post-test scores ($t = -23.81$, $p < .05$). The effect size analysis revealed a very large effect (Cohen's $d_z = 4.02$). The qualitative findings further indicated that students held positive perceptions toward the Duolingo application. Students reported increased motivation through gamification features, improved vocabulary understanding through reading contexts, and greater confidence in learning English. The findings suggest that Duolingo-based reading activities may support English vocabulary development among primary-level learners in rural educational contexts.

Keywords: Duolingo, English Vocabulary, Reading-Based Learning, Prathomsuksa 6 Students, Educational Technology

Introduction

English has become an essential international language for communication in education, business, science, tourism, and digital technology. In Thailand, English is a core subject in the Basic Education Core Curriculum, which aims to develop students' communicative competence in listening, speaking, reading, and writing (Ministry of Education, 2008). As globalization increases the demand for English proficiency, the development of students' English language skills has become an important educational priority. Among the various components of language proficiency, vocabulary knowledge plays a crucial role in supporting reading comprehension and effective communication. Learners with limited vocabulary often encounter difficulties in understanding texts, expressing ideas, and participating confidently in language learning activities (Nation, 2022; Schmitt & Schmitt, 2020).

Despite continuous efforts to improve English language education, vocabulary learning remains a challenge for many primary school students. Traditional classroom practices often emphasize memorization of isolated vocabulary items, which may limit students' ability to understand and apply vocabulary in meaningful contexts. These challenges are particularly evident in rural educational settings where students have limited opportunities to interact with English outside the classroom. At Wat Rong-Or School, Chiang Mai Province, many Prathomsuksa 6 students experience difficulties in remembering vocabulary and using vocabulary knowledge when reading English texts. As a result, students often demonstrate low confidence and limited motivation toward English learning.

To address these challenges, educational technology has increasingly been integrated into language learning environments. One widely used mobile-assisted language learning application is Duolingo, which incorporates gamification, immediate feedback, repeated practice, and contextualized language-learning activities. The present study is informed by several theoretical perspectives. Multimedia Learning Theory proposes that learners process information more effectively when verbal and visual information are presented together (Mayer, 2002; Mayer & Fiorella, 2022). According to the input hypothesis, language acquisition occurs when learners receive comprehensible input in meaningful contexts (Krashen, 1985) suggests that language acquisition occurs when learners receive comprehensible input in meaningful contexts. In addition, Vygotsky (1978)'s Sociocultural Theory emphasizes the role of learning tools and mediated interaction in cognitive development. These theoretical perspectives suggest that technology-supported learning environments may facilitate vocabulary development by providing meaningful input, contextualized practice, and continuous feedback.

Previous studies have reported positive effects of Duolingo on vocabulary learning and learner engagement among English language learners (Ajisoko, 2020; Kusumadewi & Widyastuti, 2018; Aulia et al., 2020). However, most existing studies have focused on secondary school students, university students, or learners in urban educational contexts.

Relatively limited research has investigated the effectiveness of Duolingo-based reading activities in enhancing English vocabulary knowledge among primary school students in rural Thai schools. Furthermore, previous studies have primarily examined vocabulary learning outcomes, while comparatively less attention has been given to students' perceptions and attitudes toward learning English vocabulary through reading-based activities in Duolingo. Consequently, there remains limited understanding of how Duolingo-based reading activities may support both vocabulary development and learner engagement among young learners in rural educational settings. This research gap highlights the need for further investigation in the context of Prathomsuksa 6 students at Wat Rong-Or School, Chiang Mai Province. Therefore, this study aims to compare students' English vocabulary knowledge before and after learning through Duolingo-based reading activities and to examine their perceptions and attitudes toward learning English vocabulary through the Duolingo application.

Research Objectives

1. To examine the baseline level of English vocabulary knowledge of Prathomsuksa 6 students before the Duolingo intervention at Wat Rong-Or School, Chiang Mai Province.
2. To compare the English vocabulary knowledge scores of Prathomsuksa 6 students at Wat Rong-Or School between the pre-test and post-test after using the Duolingo application.
3. To explore the perceptions and attitudes of Prathomsuksa 6 students towards learning English vocabulary through the Duolingo application.

Methodology

This study employed an explanatory sequential mixed-methods design, consisting of a quantitative phase followed by a qualitative phase. In the first phase, a quasi-experimental one-group pretest-posttest design was used to examine changes in students' English vocabulary knowledge after participating in Duolingo-based reading activities. In the second phase, qualitative data were collected through semi-structured interviews to provide deeper explanations of the quantitative findings, particularly regarding students' perceptions, attitudes, motivation, and learning experiences while using the Duolingo application. The integration of both quantitative and qualitative findings enabled a more comprehensive understanding of vocabulary development in a technology-supported learning environment.

Population, Sample, and Key Informants

The participants consisted of 35 Prathomsuksa 6 students enrolled at Wat Rong-Or School, Chiang Mai Province, during the 2025 academic year. Purposive sampling was employed because the students represented an intact classroom in a rural educational context where English language exposure was relatively limited. All students in the classroom participated in the quantitative phase of the study. For the qualitative phase, 12 students

were purposively selected as key informants. The selection included six male and six female students representing high-, medium-, and low-achievement groups based on their vocabulary learning performance. This selection strategy was employed to obtain diverse perspectives and ensure comprehensive representation of students' learning experiences.

Research Instruments

Three research instruments were employed in this study.

1. Duolingo Application

The Duolingo application served as the intervention tool for vocabulary learning through reading activities. The intervention was conducted over a seven-week period. During the intervention, students completed reading-based vocabulary activities, including sentence-completion exercises, vocabulary-matching tasks, short reading passages, contextual vocabulary practice, and story-based activities. These activities provided repeated exposure to target vocabulary in meaningful contexts while incorporating gamified features such as XP points, streaks, rewards, and leaderboards. Teachers monitored students' participation through Duolingo for Schools to ensure consistent engagement throughout the intervention period.

2. Vocabulary Pre-test and Post-test

A 50-item English vocabulary test was developed to assess students' vocabulary knowledge related to the Prathomsuksa 6 English curriculum. The test consisted of vocabulary items representing nouns, verbs, and adjectives. Content validity was evaluated by three experts in English language teaching, and the Item-Objective Congruence (IOC) values ranged from 0.60 to 1.00, indicating acceptable content validity.

The reliability of the vocabulary test was examined using Cronbach's alpha coefficient. The analysis yielded a reliability coefficient of $\alpha = .723$, indicating acceptable internal consistency and suitability for use in the present study.

3. Semi-Structured Interviews

Semi-structured interviews were conducted with 12 selected key informants after completion of the intervention. The interview questions focused on students' perceptions, attitudes, motivation, engagement, vocabulary learning experiences, and challenges encountered while using the Duolingo application. The interview protocol was reviewed by five experts, and all interview questions achieved IOC values above 0.50.

Data Collection

The data collection process consisted of three phases.

First, students completed the vocabulary pre-test to establish baseline vocabulary knowledge before the intervention. Second, students participated in Duolingo-based reading activities over a seven-week period under teacher supervision. Third, the vocabulary post-test was administered, followed by semi-structured interviews with the selected key informants.

Prior to participation, informed consent was obtained from parents or legal guardians. Participation was voluntary, and all collected data were anonymized to ensure confidentiality and protect participants' privacy.

Data Analysis

Quantitative data were analyzed using descriptive statistics, including mean and standard deviation, to summarize students' vocabulary scores. A paired-samples t-test was employed to compare pre-test and post-test scores because the same group of students was measured at two different time points. In addition, Cohen's d_z was calculated to determine the practical significance of the intervention.

Qualitative data obtained from the semi-structured interviews were analyzed using thematic analysis. Interview responses were reviewed, coded, and grouped into categories according to recurring patterns. These categories were subsequently synthesized into major themes, including motivation through gamification, contextual vocabulary understanding, and confidence in English learning. The qualitative findings were then used to explain and support the quantitative results.

Results

Vocabulary Learning Outcomes

The findings are presented according to the research objectives.

Objective 1: To examine the baseline level of English vocabulary knowledge of Prathomsuksa 6 students before the Duolingo intervention at Wat Rong-Or School, Chiang Mai Province.

The pre-test results were analyzed to determine students' baseline English vocabulary knowledge before participating in the Duolingo intervention. The findings showed that the mean pre-test score was 40.97 ($SD = 11.19$), indicating that students demonstrated a moderate level of English vocabulary knowledge before the intervention.

Objective 2: To compare the English vocabulary knowledge scores of Prathomsuksa 6 students at Wat Rong-Or School between the pre-test and post-test after using the Duolingo application.

The results revealed that the baseline level of students' English vocabulary knowledge before the intervention was moderate. The mean pre-test score was 40.97 ($SD = 11.19$). After participating in the Duolingo-based reading activities, the mean post-test score increased to 54.74 ($SD = 12.40$). The paired-samples t-test was conducted to compare students' vocabulary scores before and after the intervention. The results indicated a statistically significant difference between the pre-test and post-test scores, ($t = -23.81$, $p < .05$). The effect size analysis using Cohen's d_z revealed a very large effect size ($d_z = 4.02$), suggesting substantial practical significance. Although the study employed a one-group pretest-posttest design without a control group, the findings suggest that participation in

Duolingo-based reading activities may have contributed to improvements in students' English vocabulary knowledge.

Table 1 Comparison of Pre-test and Post-test Vocabulary Scores

Test	N	Mean	SD	t	df	p	dz
Pre-test	35	40.97	11.19				
Post-test	35	54.74	12.40	-23.81	34	.000	4.02

Table 1 shows that students achieved higher vocabulary scores after participating in the Duolingo-based reading activities. The difference between pre-test and post-test scores was statistically significant and demonstrated a very large practical effect.

Objective 3: Students' Perceptions and Attitudes Toward Learning English Vocabulary Through the Duolingo Application

To complement the quantitative findings, semi-structured interviews were conducted with 12 student informants following the intervention. The thematic analysis revealed three major themes: (1) motivation through gamification, (2) contextual vocabulary understanding, and (3) increased confidence in English learning.

1. Motivation Through Gamification

Students reported that gamification features such as XP points, streaks, rewards, and leaderboards increased their motivation to participate in vocabulary learning activities regularly. Many students described the learning experience as enjoyable and less stressful than traditional vocabulary memorization.

2. Contextual Vocabulary Understanding

Students indicated that reading passages, stories, and sentence-based activities helped them understand vocabulary in meaningful contexts. Rather than memorizing isolated words, students reported learning vocabulary through contextualized reading experiences, which supported comprehension and vocabulary retention.

3. Increased Confidence in Vocabulary Learning

Students also reported increased confidence in learning English vocabulary. Immediate corrective feedback enabled students to recognize and correct mistakes without fear of embarrassment. Repeated practice through the application further enhanced students' confidence in using English vocabulary.

Overall, the qualitative findings suggest that students perceived the Duolingo application positively and viewed it as a supportive tool for vocabulary learning through reading activities.

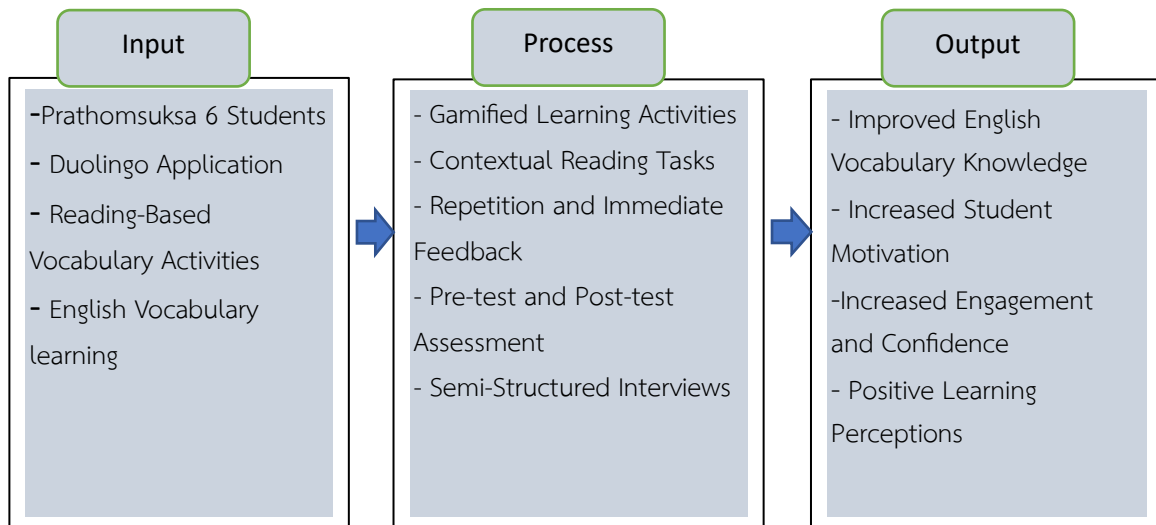


Figure 1: Conceptual Framework of the Study

Source: Developed by the author

Figure 1 illustrates the conceptual framework guiding the present study. The framework demonstrates the relationship between the Duolingo intervention and students' vocabulary development through reading activities.

Discussion

The discussion is presented according to the research objectives. Development of Students' English Vocabulary Knowledge After Learning Through Duolingo-Based Reading Activities.

The findings revealed that students' English vocabulary knowledge improved after participating in the Duolingo-based reading activities. The post-test scores were significantly higher than the pre-test scores, suggesting that the intervention may have supported vocabulary development among the participating students. However, because the study employed a one-group pretest-posttest design without a control group, the findings should be interpreted cautiously within the context of the study. The improvement in vocabulary knowledge may be explained by Multimedia Learning Theory (Mayer, 2002) which proposes that learners process information more effectively when verbal and visual information are presented together. During the intervention, students encountered vocabulary through written text, images, audio pronunciation, and interactive exercises. The integration of multiple forms of input may have facilitated vocabulary comprehension and retention.

The findings may also be interpreted through Krashen's Input Hypothesis. Duolingo-based reading activities exposed students to comprehensible language input through sentence-based exercises, short reading passages, and contextualized vocabulary tasks.

These activities may have supported vocabulary acquisition by allowing students to encounter new vocabulary in meaningful and understandable contexts.

In addition, Vygotsky (1978)'s Sociocultural Theory provides another explanation for the findings. Duolingo functioned as a learning tool that mediated students' interaction with language and provided immediate feedback during the learning process. Such support may have helped students gradually develop vocabulary knowledge while actively engaging with learning tasks.

The findings are consistent with previous studies reporting positive outcomes from the use of Duolingo in vocabulary learning. Ajisoko (2020) found that Duolingo supported vocabulary improvement through interactive learning activities and immediate feedback. Similarly, Kusumadewi & Widyastuti (2018) reported that students who learned through Duolingo demonstrated higher vocabulary achievement than those receiving traditional instruction. While previous studies primarily focused on secondary school or university learners, the present study extends existing evidence by examining Duolingo-based reading activities among Prathomsuksa 6 students in a rural Thai educational context. Students' Perceptions and Attitudes Toward Learning English Vocabulary Through the Duolingo Application

The qualitative findings revealed that students held positive perceptions and attitudes toward learning English vocabulary through the Duolingo application. Three major themes emerged from the interviews: motivation through gamification, contextual vocabulary understanding, and increased confidence in English learning. The motivational effects of Duolingo appeared to be associated with gamification features such as XP points, streaks, rewards, and leaderboards. These features encouraged students to participate regularly in learning activities and made vocabulary learning more enjoyable. The qualitative findings may help explain the quantitative improvement in vocabulary scores by suggesting that increased motivation contributed to sustained engagement with learning tasks.

Students also reported that reading-based activities helped them understand vocabulary in meaningful contexts rather than relying solely on memorization. This finding supports the view that contextualized vocabulary learning may promote deeper comprehension and retention. The ability to infer word meanings from reading passages, stories, and sentence-based exercises may have contributed to the vocabulary gains observed in the quantitative phase.

Furthermore, students reported increased confidence in learning English vocabulary. Immediate feedback enabled students to identify and correct errors without embarrassment, while repeated exposure to vocabulary across different activities reinforced learning. These findings suggest that both cognitive factors (contextual learning and repetition) and affective factors (motivation and confidence) may have contributed to students' vocabulary development.

The qualitative findings are consistent with previous studies emphasizing the importance of learner engagement and motivation in technology-assisted language learning. However, because the study was conducted in one rural school and did not include a control group, the findings should not be generalized beyond the specific context of the study. Instead, the findings suggest that Duolingo-based reading activities may be a useful supplementary approach for supporting vocabulary learning among similar groups of primary-level learners.

Body of knowledge

Duolingo Vocabulary Engagement Development Model (DVEDM)

The body of knowledge derived from this study is the Duolingo Vocabulary Engagement Development Model (DVEDM). The model was synthesized from the integration of quantitative and qualitative findings and explains how Duolingo-based reading activities may support English vocabulary development among primary-level learners.

The model consists of four interconnected components that emerged from the research findings.

1. Digital Motivation Activation

This component was derived from the qualitative findings related to motivation through gamification. Students reported that features such as XP points, streaks, rewards, and leaderboards encouraged regular participation in vocabulary learning activities. These motivational mechanisms appeared to increase students' willingness to engage with reading-based vocabulary tasks.

2. Contextual Vocabulary Construction

This component was synthesized from students' reports that vocabulary was easier to understand when presented through reading passages, stories, and sentence-based activities. Rather than memorizing isolated words, students learned vocabulary in meaningful contexts, enabling them to construct vocabulary knowledge through contextual understanding.

3. Repetition and Reinforcement Loop

This component emerged from both the qualitative and quantitative findings. Students repeatedly encountered target vocabulary through multiple activity formats and received immediate corrective feedback. Repeated exposure and reinforcement appeared to support vocabulary retention and strengthen vocabulary learning over time.

4. Vocabulary Confidence and Achievement

This component was derived from two sources of evidence. First, the quantitative findings indicated higher post-test scores following participation in the intervention. Second, the qualitative findings revealed increased confidence in learning and using English vocabulary. Together, these findings suggest that motivation, contextual learning, and

repeated reinforcement may contribute to vocabulary achievement and confidence development.



Figure 2: Duolingo Vocabulary Engagement Development Model (DVEDM)

Source: Developed by the author

As illustrated in Figure 2, the DVEDM represents a sequential and integrated learning process in which motivation, contextual learning, and repeated practice interact to enhance vocabulary acquisition. The model suggests that motivation encourages engagement in learning activities, contextualized reading supports vocabulary construction, repeated practice reinforces vocabulary retention, and these processes collectively contribute to vocabulary achievement and learner confidence. It should be emphasized that the DVEDM is a conceptual model proposed from the findings of the present study. Because the study was conducted with a relatively small sample from a single rural school and did not include a control group, further research is required to validate and refine the model in different educational contexts and with larger participant groups.

Conclusion and Recommendations

This study examined the effectiveness of Duolingo-based reading activities in enhancing English vocabulary knowledge among Prathomsuksa 6 students at Wat Rong-Or School, Chiang Mai Province. The findings indicated that students' English vocabulary knowledge improved after participating in the intervention. The quantitative results revealed significantly higher post-test scores than pre-test scores, while the qualitative findings demonstrated positive student perceptions toward learning English vocabulary through the Duolingo application.

The qualitative findings further suggested that students were motivated by gamification features, developed vocabulary understanding through contextualized reading activities, and gained greater confidence in learning English. The integration of quantitative and qualitative findings suggests that Duolingo-based reading activities may support both the cognitive and affective dimensions of vocabulary learning among primary-level learners.

However, because the study was conducted in a single rural school and employed a one-group pretest-posttest design without a control group, the findings should be interpreted within the context of the study and should not be generalized beyond similar educational settings.

Policy Recommendations

School administrators, local educational agencies, and curriculum planners should consider supporting the integration of technology-assisted language learning applications into English language instruction, particularly in rural schools where access to authentic English learning resources may be limited. Educational institutions should also promote the development of digital learning environments that encourage learner engagement, contextualized vocabulary learning, and self-directed learning through educational technology.

Operational Recommendations

English teachers are encouraged to use Duolingo as a supplementary tool for vocabulary learning through reading activities, vocabulary review, and independent learning practice. The application may be particularly useful for increasing learner motivation through gamification features and providing additional opportunities for contextualized vocabulary exposure.

Schools should improve internet accessibility and increase the availability of digital devices to ensure equitable participation in technology-assisted language learning activities. Teachers may also use Duolingo for Schools to monitor student progress and provide individualized learning support.

Recommendations for Next Research

Future studies should employ experimental or quasi-experimental research designs that include control groups in order to provide stronger evidence regarding the effectiveness of Duolingo-based reading activities.

Future research should also investigate long-term vocabulary retention through delayed post-tests to determine whether vocabulary gains are sustained over time. In addition, future studies may examine the applicability of the Duolingo Vocabulary Engagement Development Model (DVEDM) in different educational contexts and with larger participant groups. Further research may also explore how the model can support the development of other English language skills, including reading comprehension, listening, speaking, writing, and pronunciation.

References

- Ajisoko, P. (2020). The use of Duolingo apps to improve English vocabulary learning. *International Journal of Emerging Technologies in Learning (IJET)*, 15(7), 149-155.

- Aulia, H. R., Wahjuningsih, E., & Andayani, R. (2020). The effect of Duolingo application on students' English vocabulary mastery. *ELTR Journal*, 4(2), 131–139.
- Krashen, S. D. (1985). *The input hypothesis: Issues and implications*. New York: Longman.
- Kusumadewi, H. & Widyastuti, M. (2018). The effects of using Duolingo towards students' vocabulary mastery (An experiment of junior high school students at Omega Sains Institute). *Indonesian Journal of English Teaching*, 7(2), 172–186.
- Mayer, R. E. (2002). Multimedia learning. In B. H. Ross (Eds.), *The psychology of learning and motivation* (pp. 85–139). Academic Press.
- Mayer, R. E. & Fiorella, L. (2022). *The Cambridge handbook of multimedia learning* (3rd ed.). New York, NY: Cambridge University Press.
- Ministry of Education. (2008). *The Basic Education Core Curriculum B.E. 2551 (A.D. 2008)*. Bangkok: Ministry of Education.
- Nation, I. S. P. (2022). *Learning vocabulary in another language* (3rd ed.). Cambridge: Cambridge University Press.
- Schmitt, N. & Schmitt, D. (2020). *Vocabulary in language teaching* (2nd ed.). Cambridge: Cambridge University Press.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.