

Gamifying English Vocabulary Learning: The Role of Duolingo in Enhancing EFL Students' Vocabulary Mastery in UPT SMPN 2 Pangsid

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ABSTRACT

Vocabulary mastery is a fundamental component of English as a Foreign Language (EFL) learning, as it supports students' ability to comprehend and communicate effectively in English. However, many students encounter difficulties in acquiring, memorizing, and using English vocabulary due to limited exposure to the target language and conventional teaching methods. This study aims to investigate the role of Duolingo as a digital game-based learning platform in enhancing students' English vocabulary mastery at UPT SMPN 2 Pangsid, Sidenreng Rappang, Indonesia. The proposed study employs a quantitative approach using a pre-experimental design involving pre-test and post-test assessments. Duolingo is integrated into vocabulary learning activities through interactive exercises, word recognition, sentence construction, and gamified tasks designed to encourage active participation and independent learning. Data are collected through vocabulary achievement tests administered before and after the instructional intervention, supported by questionnaires to explore students' learning interests. The quantitative data are analyzed using descriptive and inferential statistics to examine changes in students' vocabulary achievement. Drawing on the instructional framework presented in the original research, the study examines the potential of mobile-assisted language learning and gamification to create engaging and interactive vocabulary learning experiences. The anticipated contribution of this research is to provide pedagogical insights into the integration of Duolingo in secondary school English instruction and its potential to support students' vocabulary development. The study also highlights the importance of incorporating accessible digital learning applications into EFL classrooms to promote student engagement and technology-enhanced language learning.

Keywords: Duolingo, EFL Students, Gamification, Mobile-Assisted Language Learning, Vocabulary Mastery

INTRODUCTION

English has become an essential means of international communication, providing opportunities for individuals to participate in education, technology, business, and intercultural interactions. In Indonesia, English is taught as a foreign language at various educational levels, including junior secondary schools. English language instruction aims to develop students' communicative competence through the integration of listening, speaking, reading, and writing skills. However, the successful development of these language skills depends significantly on students' mastery of vocabulary. Vocabulary serves as a fundamental component of language proficiency because it enables learners to recognize meanings, construct sentences, comprehend information, and express ideas effectively. Without sufficient vocabulary knowledge, students may encounter difficulties in understanding instructional materials and participating actively in English learning activities.

Vocabulary mastery involves more than memorizing individual words and their meanings. It encompasses understanding pronunciation, spelling, grammatical functions, contextual meanings, and appropriate word usage. Nation (2001) emphasizes that vocabulary knowledge includes both receptive and productive dimensions, which contribute to language comprehension and communication. Similarly, Thornbury (2002) argues that vocabulary is central to language learning because learners require lexical knowledge to communicate meaningfully. Students with limited vocabulary frequently struggle to comprehend reading passages, formulate spoken responses, and produce written expressions. Consequently, vocabulary instruction should be considered an essential component of English language teaching, particularly for learners at the junior secondary school level.

Despite its importance, vocabulary learning remains a challenging aspect of English as a Foreign Language (EFL) education. Students may experience difficulties remembering unfamiliar words, distinguishing word meanings, recognizing pronunciation patterns, and applying vocabulary in meaningful communication. These challenges can become more pronounced when vocabulary instruction relies primarily on conventional approaches, such as memorization, translation, textbook exercises, and teacher-centered explanations. Although traditional approaches can provide useful foundations, their exclusive use may limit opportunities for interactive practice and independent learning. Therefore, English teachers need instructional strategies that encourage active participation, repeated vocabulary exposure, and meaningful language practice.

The development of digital technology has created opportunities to transform vocabulary instruction into a more interactive and engaging learning experience. Digital learning platforms provide access to multimedia materials, interactive exercises, immediate feedback, and flexible learning activities. These features

allow students to practice vocabulary beyond classroom boundaries and develop greater independence in their learning processes. Technology-enhanced language learning also supports differentiated learning experiences because students can complete exercises according to their abilities and learning progress. Integrating digital applications into English instruction may therefore provide an alternative approach to addressing vocabulary learning difficulties.

One increasingly relevant approach is Mobile-Assisted Language Learning (MALL), which involves using mobile devices to support language acquisition. Mobile learning enables students to access instructional materials through smartphones and other portable devices. Unlike traditional classroom instruction, mobile-assisted learning provides opportunities for flexible practice, repeated exposure, and personalized learning experiences. Students can review vocabulary, complete language exercises, and monitor their progress at different times and locations. Kukulska-Hulme and Shield (2008) explain that mobile-assisted language learning offers opportunities for language learning beyond conventional classroom environments. Such flexibility may be particularly beneficial for students who require additional vocabulary practice.

Another approach receiving attention in educational technology is gamification. Gamification refers to incorporating game-design elements into non-game contexts to encourage participation, motivation, and engagement. Deterding et al. (2011) describe gamification as the application of game-design elements outside traditional gaming environments. In educational settings, gamification may include points, rewards, achievement levels, progress indicators, challenges, and immediate feedback. These elements can create learning experiences that encourage students to complete activities and monitor their achievements. However, the educational value of gamification depends on how effectively game elements are connected to instructional objectives rather than merely providing entertainment.

Within English vocabulary instruction, gamification can facilitate repeated exposure to lexical items through structured and interactive activities. Students may encounter vocabulary through matching exercises, translation tasks, sentence completion, listening activities, and contextual practice. Repetition combined with feedback may help learners recognize unfamiliar words and strengthen their understanding of vocabulary. Moreover, gamified learning environments can provide a sense of achievement when students complete tasks or advance through learning levels. Such experiences may support engagement, although improved motivation does not automatically guarantee measurable vocabulary development. Duolingo is one digital language learning application that incorporates gamification into language instruction. The application provides interactive lessons designed to support vocabulary recognition, sentence construction, listening comprehension, and other language-related activities. Its learning environment includes features such as experience points, learning streaks, achievement indicators, and structured exercises. Through these features, Duolingo encourages learners to engage in repeated language practice and monitor their progress. The application also offers

immediate feedback that enables students to identify incorrect responses and attempt similar tasks. These characteristics make Duolingo a potentially useful supplementary learning tool for EFL instruction.

The educational potential of Duolingo can be understood through its combination of mobile learning, gamification, and repeated vocabulary practice. Students are introduced to lexical items through various exercise formats that require recognition, comprehension, and application. Repeated interaction with vocabulary may strengthen word familiarity and facilitate retrieval. Furthermore, the availability of short learning activities allows teachers to incorporate Duolingo into classroom instruction without necessarily replacing existing teaching methods. In this context, Duolingo can function as supplementary instructional media that supports teacher-guided vocabulary development.

Previous research has examined the application of game-based activities in vocabulary learning. Sulistyowati (2012), as discussed in the source thesis, investigated vocabulary instruction through puzzles, while Purba (2013) compared crossword games with conventional teaching methods. Jauhari (2015) explored bingo games for vocabulary development, and Rosada (2016) examined anagram games. These studies, as summarized in the original thesis, suggest that game-based activities may support vocabulary learning through increased participation and repeated practice. However, findings from traditional vocabulary games cannot automatically establish the effectiveness of digital applications such as Duolingo, since the instructional features, learning environments, and student interactions may differ.

The original thesis by Rudiansyah (2021) focused on using Duolingo to improve vocabulary mastery among second-semester university students at *Universitas Muhammadiyah Sidenreng Rappang*. Its research framework incorporated vocabulary testing before and after instructional treatment, together with questionnaires concerning students' learning interests. Although this framework provides a useful foundation for investigating Duolingo-based vocabulary instruction, the characteristics of university learners differ from those of junior secondary school students. Younger learners may require different instructional guidance, vocabulary content, learning duration, and classroom management strategies. Therefore, the original framework requires adaptation before being applied to a secondary school setting.

UPT SMPN 2 Pangsid, located in Sidenreng Rappang, South Sulawesi, Indonesia, provides the proposed educational context for investigating the integration of Duolingo into English vocabulary instruction. At the junior secondary level, students are expected to develop foundational vocabulary that supports everyday communication and classroom learning. Exploring digital game-based vocabulary instruction in this setting is relevant because it may provide teachers with additional strategies for integrating technology into English lessons. Nevertheless, the actual vocabulary difficulties, technological access, and learning characteristics of

students at this school must be established through preliminary observation and research data rather than assumed.

A research gap can therefore be identified in the need to examine how Duolingo-based gamification functions within the specific context of junior secondary EFL vocabulary instruction. While existing literature provides theoretical support for vocabulary learning, digital media, and educational games, the effectiveness of a particular application must be evaluated using evidence from the target learners. The present study is designed to investigate changes in students' vocabulary mastery following Duolingo-assisted instruction and to explore students' responses to the learning activities. Its contribution lies in contextualizing a mobile-assisted vocabulary learning framework within an Indonesian junior secondary school environment.

Accordingly, this study aims to investigate the role of Duolingo in enhancing EFL students' vocabulary mastery at UPT SMPN 2 Pangsidi. Specifically, it seeks to examine students' vocabulary achievement before and after Duolingo-based instruction and explore their engagement with gamified vocabulary learning activities. The findings are expected to provide empirical evidence regarding the potential benefits and limitations of integrating Duolingo into secondary school English instruction. Furthermore, the study may offer practical insights for teachers seeking to combine conventional teaching strategies with accessible digital learning tools to create more interactive, meaningful, and student-centered vocabulary learning experiences.

LITERATURE REVIEW

Vocabulary mastery is a fundamental element of English language proficiency because it supports learners' ability to comprehend and produce meaningful communication. Vocabulary knowledge involves recognizing word forms, understanding meanings, identifying grammatical functions, and using words appropriately in different contexts. Nation (2001) distinguishes between receptive vocabulary, which involves recognizing words during listening and reading, and productive vocabulary, which involves using words in speaking and writing. These dimensions are interconnected and contribute to overall language competence. Thornbury (2002) emphasizes that vocabulary learning requires continuous exposure, meaningful practice, and opportunities to retrieve previously learned words. Students cannot develop vocabulary mastery simply by memorizing isolated word lists. Instead, they need opportunities to encounter words repeatedly and apply them in communicative situations. Cameron (2001) similarly explains that vocabulary development involves recognizing word forms, understanding meanings, and strengthening connections between vocabulary and language use. In junior secondary EFL classrooms, vocabulary instruction should therefore incorporate activities that promote word recognition, comprehension, retention, and application. Interactive exercises, contextual examples, and repeated practice can

provide opportunities for students to develop both receptive and productive vocabulary knowledge.

Gamification is an instructional approach that integrates game-design elements into educational activities to encourage engagement and participation. Deterding et al. (2011) define gamification through the use of game-design elements in non-game contexts. Within language learning, gamification may include points, rewards, achievement levels, progress indicators, challenges, and feedback mechanisms. These features can encourage students to participate in learning activities by providing visible indicators of achievement. For example, completing vocabulary exercises may allow learners to earn points or advance to higher learning levels. Such activities can create a structured learning environment in which students receive feedback about their performance.

However, gamification should not be understood as a guarantee of successful learning. Its effectiveness depends on the relevance of learning tasks, the quality of instructional content, and the extent to which game elements support educational objectives. In vocabulary instruction, gamification is most meaningful when it encourages repeated encounters with words, accurate word recognition, and appropriate vocabulary use. Mobile-Assisted Language Learning (MALL) refers to the use of portable digital devices to facilitate language learning activities. Kukulska-Hulme and Shield (2008) explain that mobile technologies create opportunities for language practice beyond traditional classroom settings. Through mobile applications, students can access instructional materials, complete exercises, and review previously learned content. MALL provides flexibility in learning because students can engage with language materials according to their available time and learning needs. Mobile applications may also incorporate audio, visual materials, and interactive exercises that support different aspects of language acquisition.

In vocabulary learning, mobile applications can facilitate repeated practice and immediate feedback. Nevertheless, successful implementation depends on device availability, internet connectivity, students' digital literacy, and teacher guidance. Consequently, mobile learning should be integrated into instructional planning rather than treated as a replacement for classroom teaching. Duolingo is a digital language learning platform that combines interactive language exercises with gamification features. Its instructional activities include word recognition, translation, sentence construction, listening tasks, and other language practice exercises. Learners complete structured lessons and receive feedback about their responses.

One characteristic of Duolingo is its use of gamified learning elements, including experience points, progress indicators, learning streaks, and achievement-based activities. These features are designed to encourage learners to participate regularly and complete language exercises. For vocabulary instruction, Duolingo provides opportunities for repeated exposure to lexical items through different exercise

formats. Students may recognize word meanings, connect words with appropriate expressions, and practice vocabulary in short sentences. Such activities can support vocabulary familiarity and reinforce previously learned material. Nevertheless, Duolingo exercises should be aligned with classroom learning objectives. Teachers need to select relevant vocabulary topics, provide explanations when necessary, and evaluate whether students can transfer vocabulary knowledge from application-based exercises to meaningful communication.

Previous studies discussed in Rudiansyah's (2021) thesis provide a foundation for understanding the potential contribution of educational games to vocabulary instruction. Sulistyowati (2012) examined puzzle-based vocabulary learning, while Purba (2013) investigated the effectiveness of crossword games compared with conventional instruction. Jauhari (2015) explored bingo games, and Rosada (2016) investigated anagram activities for vocabulary development. According to the summaries presented in the original thesis, these studies reported improvements in vocabulary learning through game-based instructional activities. Their findings suggest that interactive exercises may encourage student participation and provide opportunities for vocabulary practice. However, these studies primarily concerned particular game-based instructional techniques. Their findings should not be generalized directly to Duolingo without further empirical investigation. Digital learning platforms introduce additional features, including automated feedback, individual progress tracking, and mobile accessibility, which may influence students' learning experiences differently.

Rudiansyah (2021) subsequently examined Duolingo-based vocabulary instruction among university students. The study provides a relevant methodological foundation through its use of vocabulary assessments and student questionnaires. Nevertheless, further investigation is necessary to establish how this approach operates among junior secondary school learners. The conceptual framework of the present study is based on the relationship between Duolingo-assisted instruction and students' vocabulary mastery. Duolingo-based gamification serves as the instructional intervention, while vocabulary mastery represents the principal learning outcome. The proposed learning process involves three stages: assessing students' initial vocabulary knowledge, implementing Duolingo-based vocabulary activities, and evaluating vocabulary achievement following the intervention. Student questionnaires may provide additional information concerning engagement and perceptions of the learning experience. The research gap concerns the contextual application of Duolingo-assisted vocabulary instruction among junior secondary EFL students at UPT SMPN 2 Pangsid. Existing theoretical literature supports the potential of interactive and mobile-assisted vocabulary learning, but school-specific effectiveness remains to be established through empirical investigation. Therefore, this study seeks to contribute to the literature by examining vocabulary achievement in a secondary school setting and providing context-specific evidence regarding the integration of gamified digital learning into English instruction.

METHOD

Design and Sample

This study is designed to employ a quantitative approach using a pre-experimental research design, specifically a one-group pre-test and post-test design, to investigate the role of Duolingo in enhancing English vocabulary mastery among EFL students at UPT SMPN 2 Pangsid, Sidenreng Rappang, South Sulawesi, Indonesia. The research design involves measuring students' vocabulary knowledge before and after implementing Duolingo-assisted learning activities. The pre-test is intended to identify students' initial vocabulary mastery, while the post-test evaluates changes in vocabulary achievement following the instructional intervention. This design allows the researcher to examine differences in students' vocabulary performance, although it cannot establish causality as strongly as a controlled experimental design.

The research is planned to be conducted at UPT SMPN 2 Pangsid, a junior secondary school in Sidenreng Rappang Regency, Indonesia. The target population consists of students studying English as a foreign language. Participants will be selected using a purposive sampling technique based on their enrollment in the selected English class, availability during the research period, and participation in vocabulary learning activities. The final sample size and grade level will be determined based on the actual research participants. Before implementing the intervention, the researcher will coordinate with the school administration and English teacher to establish an appropriate learning schedule. Student participation, privacy, and relevant school research permissions will be considered throughout the study.

Instruments and Procedure

The study will employ two primary research instruments: a vocabulary mastery test and a student questionnaire. The vocabulary test will be administered before and after the intervention to assess students' knowledge of English vocabulary. The test will consist of 25 items, including 10 multiple-choice questions, 10 sentence-arrangement questions, and five picture-based vocabulary questions, adapted from the assessment framework presented in the original thesis. The questions will assess vocabulary recognition, word meanings, and vocabulary use in simple contexts. A questionnaire consisting of 20 statements will also be administered to investigate students' perceptions and engagement during Duolingo-assisted vocabulary learning. The questionnaire will include 10 positively worded and 10 negatively worded statements using a five-point Likert scale ranging from strongly disagree to strongly agree. The instruments will be reviewed for content suitability and clarity before implementation.

The research procedures will consist of three main stages: pre-test, treatment, and post-test. During the initial stage, students will complete a vocabulary pre-test to

determine their existing vocabulary knowledge. The researcher will then introduce Duolingo and explain its learning features, including interactive exercises, points, progress indicators, and vocabulary practice activities. The treatment will be conducted over four instructional meetings, following the general intervention structure described in the original thesis. During these meetings, students will participate in Duolingo-assisted vocabulary activities involving word recognition, translation, sentence construction, and repeated vocabulary practice. The English teacher or researcher will provide guidance, monitor participation, and facilitate classroom discussions to reinforce vocabulary understanding. Following the intervention, students will complete a post-test assessing the targeted vocabulary knowledge. They will also respond to the questionnaire concerning their experiences and engagement with Duolingo-based instruction.

Data Analysis

The collected data will be analyzed using descriptive and inferential statistics. Descriptive analysis will include mean scores, standard deviations, and score distributions for the pre-test and post-test. Students' vocabulary achievement will be classified into five categories: very good (86–100), good (71–85), fair (56–70), poor (41–55), and very poor (40 or below). A paired-samples t-test will be used to examine whether the difference between pre-test and post-test scores is statistically significant, provided the assumptions are satisfied. If the normality assumption for paired differences is not met, the Wilcoxon signed-rank test will be considered. The significance level will be set at 0.05. Questionnaire responses will be summarized using frequencies, percentages, and descriptive statistics to describe students' perceptions of Duolingo-assisted vocabulary learning.

RESULTS AND DISCUSSION

Students' Vocabulary Mastery Before and After Duolingo-Assisted Learning

The results section focuses on changes in students' English vocabulary mastery following the implementation of Duolingo-assisted learning activities at UPT SMPN 2 Pangsid. Vocabulary achievement is assessed through pre-test and post-test instruments designed to measure students' ability to recognize word meanings, identify vocabulary in context, and construct simple English expressions. The pre-test is intended to establish students' initial vocabulary knowledge, while the post-test measures their performance following the instructional intervention. A comparison of these assessments provides the basis for evaluating changes in vocabulary mastery. The results should be interpreted in relation to the learning objectives and the characteristics of the participating students.

Table 1

Descriptive Statistics of Students' Vocabulary Mastery

Statistical indicator	Pre-test	Post-test
Number of students (N)	—	—
Mean score	—	—

Statistical indicator	Pre-test	Post-test
Median	—	—
Minimum score	—	—
Maximum score	—	—
Standard deviation	—	—
Mean score improvement	—	—

The mean score difference can be calculated by subtracting the pre-test mean from the post-test mean. A positive difference would indicate an increase in average vocabulary achievement following the intervention. However, descriptive improvements alone would not establish whether the difference is statistically significant or attributable specifically to Duolingo.

Classification of Students' Vocabulary Achievement

To provide a clearer understanding of students' vocabulary performance, the test scores are classified into five achievement categories. These classifications follow the scoring framework presented in the original thesis.

Table 2
Distribution of Students' Vocabulary Achievement

Score interval	Classification
86–100	Very Good
71–85	Good
56–70	Fair
41–55	Poor
0–40	Very Poor
Total	

The classification of students' scores is intended to illustrate the distribution of vocabulary achievement before and after Duolingo-assisted instruction. Changes in the number of students within each category can provide additional information about the overall pattern of vocabulary development. A shift from lower achievement categories to higher categories would suggest improvement in vocabulary performance. Nevertheless, the magnitude and consistency of these changes must be established through the actual data.

Statistical Findings

The original study provides descriptive and inferential statistical results for 28 university students. These findings are useful as a methodological reference for the proposed research at UPT SMPN 2 Pangsid, but they must not be presented as results obtained from the school.

Table 3
Descriptive Statistics Reported in the Original University Study

Statistical indicator	Pre-test	Post-test
Number of participants	28	28
Mean score	50.18	81.61
Median	50.00	80.00
Minimum	35.00	70.00
Maximum	65.00	95.00
Standard deviation	7.51	6.95
Mean difference	—	+31.43

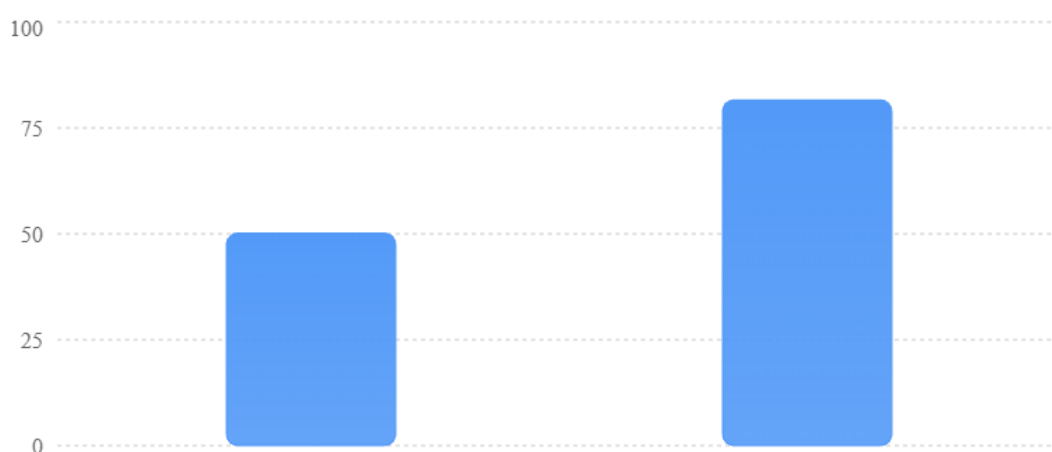


Figure 1. Comparison of mean vocabulary scores reported in Rudiansyah's original university study.

The original research reported a mean pre-test score of 50.18 and a mean post-test score of 81.61, representing an increase of approximately 31.43 points. This suggests that participants demonstrated higher vocabulary achievement following the instructional period. The thesis also reported a statistical significance value of 0.000, conventionally interpreted as $p < 0.001$ rather than an exact probability of zero. However, these results require careful interpretation because the thesis contains inconsistencies in its descriptions of the instructional treatment, including references to Duolingo, four-card games, and other instructional media. Therefore, the findings should not be treated as conclusive evidence of Duolingo's isolated effect without verifying the intervention records.

Distribution of Vocabulary Achievement

Table 4
Vocabulary Achievement Categories

Classification	Pre-test (n)	Post-test (n)
Very Good	0	5
Good	0	20

Classification	Pre-test (n)	Post-test (n)
Fair	6	3
Poor	17	0
Very Poor	5	0
Total	28	28

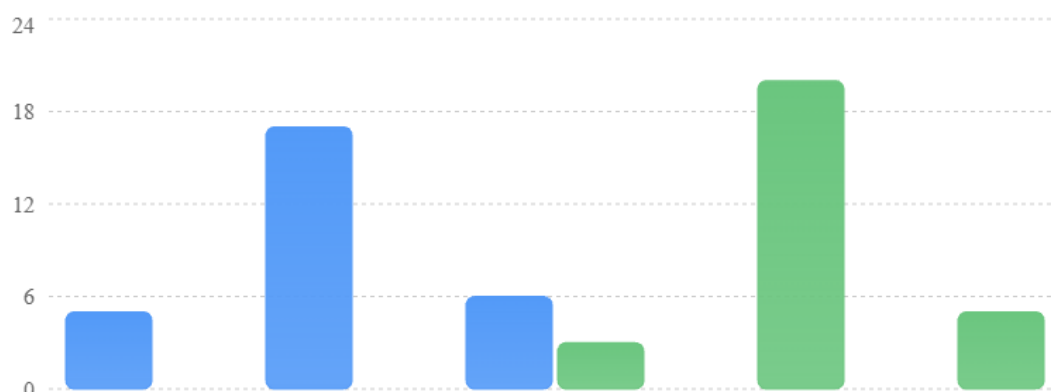


Figure 2. Vocabulary Achievement Distribution

The narrative accompanying those tables gives different frequencies, so the distribution requires verification against individual scores.

Hypothesis Testing

The proposed study at UPT SMPN 2 Pangsid will test whether students' vocabulary mastery differs significantly before and after Duolingo-assisted instruction.

Table 5

Proposed Statistical Hypothesis Testing

Indicator	Result
Statistical test	Paired-samples t-test
Significance level	0.05
Mean difference	Pending school data
t-value	Pending school data
Degrees of freedom	Pending school data
p-value	Pending school data
Statistical decision	Pending analysis

The null hypothesis states that there is no significant difference between students' pre-test and post-test vocabulary scores. The alternative hypothesis states that a significant difference exists. A p-value below 0.05 would support rejecting the null hypothesis. Nevertheless, statistical significance should be interpreted together with the magnitude of the score difference, effect size, and research design.

Students' Perceptions of Duolingo-Assisted Learning

Students' perceptions are an additional component of the proposed investigation. A questionnaire can be used to examine whether learners consider Duolingo accessible, engaging, motivating, and helpful for vocabulary practice.

Table 6
Indicators of Students' Perceptions

Dimension	Assessment focus	Result
Learning motivation	Interest in completing vocabulary tasks	Pending
Engagement	Active participation in exercises	Pending
Ease of use	Accessibility and clarity of the application	Pending
Perceived usefulness	Students' views of vocabulary improvement	Pending
Learning independence	Willingness to practice independently	Pending

The questionnaire results should be presented as frequencies, percentages, or mean Likert-scale responses after the school data have been collected. They should not be interpreted as objective proof of vocabulary improvement because self-reported perceptions and achievement tests measure different outcomes.

The integration of Duolingo into EFL vocabulary instruction can be understood through theories of vocabulary acquisition, repeated exposure, and technology-enhanced language learning. Nation (2001) emphasizes that vocabulary knowledge involves recognizing word forms, understanding meanings, and using words appropriately in communication. Consequently, effective vocabulary instruction should provide learners with opportunities to encounter lexical items repeatedly and apply them in meaningful contexts. Duolingo offers several activities that can support these learning processes, including vocabulary recognition, sentence completion, translation, and listening exercises. These activities may reinforce connections between written word forms and their meanings. Immediate feedback also allows students to identify incorrect responses and repeat exercises when necessary. The original university study reported an increase in mean vocabulary scores from 50.18 to 81.61. Although this finding is consistent with the possibility that interactive learning activities can support vocabulary development, it cannot establish the effectiveness of Duolingo among junior secondary students at UPT SMPN 2 Pangsidi. The school-based investigation is therefore necessary to determine whether comparable improvements occur in a different educational setting.

Gamification provides a theoretical explanation for how digital applications may encourage student participation in vocabulary learning. Deterding et al. (2011) explain that gamification involves incorporating game-design elements into activities outside conventional gaming environments. Duolingo incorporates elements such as experience points, progress indicators, achievement levels, and learning streaks. These features can provide students with visible evidence of task completion and encourage repeated participation.

In junior secondary English classrooms, such activities may help create a more interactive learning environment. Students can engage with vocabulary exercises individually while teachers provide additional explanations and feedback. Nevertheless, gamification should be evaluated according to its contribution to learning outcomes rather than entertainment alone. Students may enjoy completing exercises without necessarily demonstrating improved vocabulary retention or contextual word usage. For this reason, the proposed study combines vocabulary achievement testing with a questionnaire concerning students' learning experiences.

The application of Duolingo is also connected to Mobile-Assisted Language Learning. Kukulska-Hulme and Shield (2008) explain that mobile technologies can extend language learning beyond traditional classroom environments. Mobile applications allow students to access vocabulary exercises through portable devices and practice language skills at different times. This flexibility may encourage repeated learning activities, particularly when students need additional exposure to unfamiliar vocabulary. However, implementation at UPT SMPN 2 Pangsid requires consideration of students' access to smartphones, internet connectivity, school policies, and digital literacy. Teachers should also ensure that application-based activities correspond to students' language proficiency and the objectives of the English curriculum. Accordingly, Duolingo is best conceptualized as a supplementary learning platform rather than a complete replacement for teacher-guided instruction.

The relationship between educational games and vocabulary mastery has been discussed in previous research. The studies summarized in Rudiansyah's thesis examined puzzle games, crossword activities, bingo games, and anagram exercises. These approaches suggest that structured language games can provide opportunities for vocabulary practice and student participation. Duolingo differs from traditional classroom games because it combines interactive exercises with automated feedback and digital progress tracking. Such features may allow students to receive responses immediately and continue practicing vocabulary according to their learning needs. Nevertheless, the mechanisms responsible for vocabulary improvement require empirical examination. Improvements may be influenced by repeated exposure, teacher explanations, additional practice time, student motivation, or combinations of these factors. Therefore, any positive difference between pre-test and post-test scores in the proposed school-based study should be interpreted as an observed change associated with the instructional period, not definitive proof that gamification alone caused the improvement.

The proposed research has several implications for English vocabulary instruction at the junior secondary level. First, Duolingo-assisted learning may provide teachers with an additional strategy for presenting vocabulary through interactive digital exercises. Second, the integration of game elements may encourage students to participate more consistently in vocabulary practice. Third, digital learning activities can complement classroom explanations, textbook materials, and communicative exercises.

Teachers should select vocabulary activities appropriate to students' proficiency levels and provide opportunities to use newly learned words in speaking and writing. Vocabulary achievement should also be evaluated through independent assessments rather than relying exclusively on application-generated scores.

The proposed one-group pre-test and post-test design has limitations. Without a control group, improvements in vocabulary scores cannot be attributed exclusively to Duolingo because other factors may contribute to student learning. Furthermore, a short instructional intervention may capture immediate vocabulary achievement without establishing long-term retention. Questionnaire responses may also be influenced by students' preferences for digital activities. Future research could employ quasi-experimental designs involving experimental and control groups, delayed post-tests, and additional measures of productive vocabulary knowledge. Such approaches would provide stronger evidence concerning the effectiveness and sustainability of Duolingo-assisted vocabulary instruction.

CONCLUSION

This study highlights the potential of gamified digital learning through Duolingo to support English vocabulary mastery among EFL students at UPT SMPN 2 Pangsid, Sidenreng Rappang, Indonesia. Integrating Duolingo into vocabulary instruction offers an alternative approach to conventional teaching methods by providing interactive exercises, repeated vocabulary exposure, immediate feedback, and game-based learning activities. These features may help students develop their ability to recognize word meanings, understand vocabulary in context, and construct simple English expressions. From a pedagogical perspective, Duolingo has the potential to create a more engaging and student-centered learning environment that encourages active participation and independent vocabulary practice.

The theoretical discussion suggests that gamification and mobile-assisted language learning can complement traditional classroom instruction by providing flexible opportunities for vocabulary development. Features such as experience points, achievement levels, progress indicators, and interactive challenges may encourage students to participate consistently in learning activities. However, improvements in vocabulary mastery must be established through empirical evidence. Although the original university-based research reported higher post-test than pre-test scores, these findings cannot be generalized directly to students at UPT SMPN 2 Pangsid. Therefore, the effectiveness of Duolingo in the proposed school setting requires confirmation through actual vocabulary assessments and statistical analysis. Duolingo represents a promising supplementary learning platform for integrating technology and gamification into English vocabulary instruction at the junior secondary school level. Its educational value depends on appropriate instructional planning, teacher guidance, students' access to digital devices, and the alignment of learning activities with curriculum objectives. The proposed research is expected to contribute to technology-enhanced English language teaching by examining the

relationship between Duolingo-assisted learning and students' vocabulary development. Future studies are recommended to employ larger samples, experimental and control groups, and delayed post-tests to investigate the effectiveness of gamified vocabulary learning and its contribution to long-term vocabulary retention

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