

## **GAMIFIED ENGLISH LEARNING: EVALUATING DUOLINGO MOBILE APPS IMPACT ON DET PERFORMANCE AMONG INDONESIAN COLLEGE STUDENTS**

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### **ABSTRACT**

This study explores the effectiveness of Duolingo, a well-known English mobile application, in enhancing university students' scores on the Duolingo English Test (DET). The DET itself has transformed to be an official English assessment like TOEFL or IELTS and has been recognized by institutions abroad. The research employed a quasi-experimental design using non-parametric statistical analyses which involved 110 EFL students in an Indonesian university who were asked to use Duolingo consistently for 7 weeks. Pre-test and post-test of DET scores were gathered to measure the impact of regular Duolingo use. The findings revealed there is an improvement in the university students' DET scores in the 7th week after intervention, especially on vocabulary, reading and listening comprehension. The results suggest that incorporating mobile-assisted language learning tools like Duolingo can be an effective strategy to enhance students' English proficiency and test performance. This study contributes to the rising evidence supporting technology involvement in English language learning, especially in preparation for standardized English tests like DET.

**Keywords:** Gamification; Duolingo; DET (Duolingo English Test); University Students

### **INTRODUCTION**

In recent years, mobile-assisted language learning (MALL) has emerged as an interactive approach in English as a Foreign Language (EFL) classroom, leveraging the ubiquity of mobile devices to facilitate English language acquisition. Among various mobile applications, Duolingo has gained prominence due to its gamified learning experience, accessibility and the official test offered by this application. Research indicates that MALL tools can significantly improve language skills, including vocabulary acquisition and listening comprehension (Ullah et al., 2024). The improvement of English through this learning application has been shown by early childhood education (PAUD) students (Saputra et al., 2020) and even at the university level (Gou, 2023).

This is also supported by previous studies that have demonstrated the use of the Duolingo application to improve English vocabulary (Aisyah & Hidayatullah, 2023; Lovantika, 2022; Rifdinal, 2021; Tiara et al., 2021; Widyastut & Kusumadewi, 2018). Other research has specifically reported the use of the Duolingo learning app as contributing to listening skills (Alya & Kembaren, 2025) and mobile phone-based applications like Duolingo have also been proven to increase

learners' motivation in learning English by allowing users to manage their own independent learning (Chen et al., 2019). This application serves as an adequate tool for new ways of learning, and it can assist students in improving their English proficiency.

Moreover, Duolingo's features are engaging (Hardiyanto et al., 2023) and addictive to users, thus stimulating and motivating students to learn English and making them feel comfortable and enjoy the learning process (Astarilla, 2018; Salsabila et al., 2025). However, learning applications have also been found to have some drawbacks, such as the lack of explanatory feedback for users (Heil et al., 2016) and the insufficient practice of all English skills relevant to real-life situations (Kacatl & Klímová, 2019). Despite these weaknesses, the application has proven to be effective as a supplementary tool for English learning. In addition, given the growing reliance on digital platforms for language learning, it is imperative to explore how consistent engagement with applications like Duolingo influences the standardized test outcomes. Former research shows that students not only improve their grammar and reading comprehension using Duolingo, but also experience increased motivation due to its interactive design (Fatmawati et al., 2023).

Furthermore, the Duolingo English Test (DET), as an alternative to traditional English proficiency assessments such as TOEFL or IELTS, offers a conveniently virtual assessment and affordable test fee for learners. While most of former studies explored the contents of Duolingo application, the impact of this app toward the specific English skill and the use of this app in basic education level, there is a lack of research specifically investigating how this Duolingo mobile-app gives the direct impact on DET performance, particularly from university students, whereas DET has been used as a reliable measure of academic English proficiency, particularly as an entrance requirement in higher education abroad. By analyzing pre- and post-test results, the research seeks to determine whether sustained interaction with the application can lead to measurable improvements in English proficiency as assessed by the DET. Based on this aim, the study addresses the following research questions.

1. Does regular interaction of the Duolingo mobile application significantly improve students' Duolingo English Test (DET) scores?
2. Which aspects of English proficiency (e.g., vocabulary, reading, listening) show the most improvement after the intervention?

## METHOD

This study employed a quasi-experimental design with a pre-test and post-test. Participants are not randomly assigned to groups. Instead, existing groups to examine the effectiveness of the Duolingo mobile application in improving students' scores on the Duolingo English Test (DET). Unlike a true experimental design, this approach utilized an intact class of university students from public administration major and there are 4 classes involved in this study. The aim was to measure changes in DET performance after a 7-weeks treatment using the Duolingo app as a learning tool.

One-group pretest–posttest design is used in this study so the participants are not divided into control group and experimental group for this study. The participants in this study were 110 university students enrolled in a non-major English department at a private university in Indonesia. All participants were basic-level English learners, as determined by their placement tests at the beginning of the research. They were selected using purposive sampling since they attend the English as Foreign Language (EFL) course and engage in a 7-week mobile-based learning intervention.

The primary instrument for data collection was the free official test provided by Duolingo which is similar to Duolingo English Test (DET), administered as both a pre-test and a post-test. The pre-test was conducted in the first week to establish a baseline score for each student. Following this, participants were instructed to use the Duolingo app for at least 30 minutes until 1 hour per day over a period of seven weeks. During the intervention, students' activity logs on the Duolingo app were monitored to ensure consistent usage by checking the progress, especially on the game level rise every week when attending the EFL classroom. At the end of the 7-week period, the DET was re-administered as the post-test to assess any improvements in English proficiency.

The quantitative data obtained from the DET pre-test and post-test scores were analyzed using Wilcoxon signed-rank test (non-parametric) to determine whether there was a statistically significant difference in students' scores after the intervention. Descriptive statistics, such as mean and standard deviation, were also used to describe the overall performance trend. In addition, the gain scores (post-test minus pre-test) were calculated to measure individual improvement. All statistical analyses were conducted using SPSS version 29 with a significance level set at  $p < 0.05$ .

This study used a one-group pretest–posttest design to measure changes in Duolingo English Test (DET) performance among Indonesian college students after a gamified learning intervention. To ensure the validity of measurements, we did some procedures. The DET is a standardized, computer-adaptive English proficiency test with established construct validity, showing strong

correlations with TOEFL iBT and IELTS (Blanco, 2022). For local relevance, three Indonesian EFL lecturers reviewed the DET content and confirmed its appropriateness for academic English contexts in higher education. Pre- and post-test DET administrations were conducted in controlled classroom with identical conditions, supervised by proctors to ensure standardization. Normality of DET scores was tested (Shapiro-Wilk), with outlier analysis performed to confirm suitability for parametric testing. For the test reliability, self-report questionnaire assessing Duolingo usage and learner engagement was pilot-tested ( $n = 30$ ) with non-participating students. The results suggest that the instrument reliably measures students' perceptions and engagement related to using the Duolingo app for English learning.

This study adhered to ethical research guidelines to protect participants' rights and well-being. Ethical approval was obtained from the university's institutional review board (IRB). Participation was voluntary, with all students providing informed consent after being fully briefed on the study's purpose, procedures, and their rights to withdraw at any time without penalty. Confidentiality and anonymity were ensured by assigning unique codes to participants instead of recording personal identifiers. All collected data were stored securely and used solely for research purposes. Additionally, participants were informed that their DET (Duolingo English Test) scores and questionnaire responses would be aggregated and reported only in summary form, protecting individual privacy.

## RESULTS AND DISCUSSIONS

### Results

Prior to the main analysis, normality of the difference scores (post-test minus pre-test) was examined using the Shapiro-Wilk test. Depending on the results, either a paired-samples t-test (for normally distributed data) or a Wilcoxon signed-rank test (for non-normal data) was employed to evaluate significant changes in DET scores following the intervention. Therefore, the normality test can be used as below.

Tests of Normality						
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.100	110	.008	.971	110	.017
Posttest	.102	110	.007	.973	110	.024

a. Lilliefors Significance Correction

Tests of normality were conducted to evaluate the distribution of pretest and posttest scores. The Shapiro-Wilk test indicated that both the pretest scores ( $W = 0.971$ ,  $p = .017$ ) and posttest scores ( $W = 0.973$ ,  $p = .024$ ) significantly deviated from normality ( $p < .05$ ). Similarly, the Kolmogorov-Smirnov test also showed significant results for pretest ( $D = 0.100$ ,  $p = .008$ ) and posttest ( $D = 0.102$ ,  $p = .007$ ). These findings suggest that the assumption of normality was not met for either set of scores, supporting the use of non-parametric statistical analyses in subsequent comparisons.

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig. <sup>a,b</sup>	Decision
1	The median of differences between Pretest and Posttest equals 0.	Related-Samples Wilcoxon Signed Rank Test	<.001	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

A Wilcoxon Signed-Rank Test was conducted to compare pretest and posttest DET scores. The test revealed a statistically significant difference between pretest and posttest scores (Asymptotic Significance  $p < .001$ ). This result leads to rejection of the null hypothesis that the median of the differences equals zero. This suggests that participants' English proficiency improved significantly after using the gamified learning app. These findings suggest that the Duolingo application had a positive impact on students' English language skills. The consistent and significant increase in scores highlights the potential of mobile-assisted language learning tools to support vocabulary development, reading comprehension, and possibly other areas of English proficiency when used regularly and systematically. Specifically, the majority of participants demonstrated increased scores in the posttest compared to the pretest, consistent with the study's hypothesis that gamified mobile learning can enhance English proficiency. While SPSS did not display the exact test statistic ( $Z$ ) in the hypothesis summary table, the reported significance level below .001 indicates a highly robust result.

These findings suggest that the Duolingo mobile app had a meaningful impact on students' English proficiency as measured by the Duolingo English Test (DET). The significant improvement supports the pedagogical value of gamified language learning tools in the Indonesian higher education context, particularly for motivating students and enhancing engagement in self-directed learning outside of traditional classrooms.

To answer the second research question, the result shows that a post-intervention survey revealed high user satisfaction from university students' perspectives. Key findings included 92% of participants felt their vocabulary improved due to Duolingo's repetition and contextual practice, 86% agreed that Duolingo's story and reading features enhanced their comprehension skills and 79% reported improved listening skills, particularly from audio-based activities and pronunciation drills. Participants also appreciated the gamified features such as XP points, streaks, and achievement badges, which kept them motivated and consistent in their learning routine.

## Discussion

The findings of this study indicate that consistent use of the Duolingo mobile application over a seven-week period can lead to statistically significant improvements in university students' English proficiency, as measured by the Duolingo English Test (DET). This aligns with prior research suggesting that mobile-assisted language learning (MALL) tools, such as Duolingo, can effectively enhance language skills through interactive and gamified learning experiences, especially in listening, speaking, reading and writing skills in the experimental students group (Kazu & Kuvvetli, 2025)

The outcome of this recent study which highlights digital platforms like Duolingo underscores the potential learning media for EFL students. This is in accordance with another former research that investigated the application design, which incorporates gamification elements like points and badges, may contribute to increased learner motivation and engagement, leading to better learning outcomes (Xu & Liu, 2025).

Regarding the DET itself, recent studies have examined its validity and effectiveness as a measure of English proficiency. For instance, research conducted at a University in London found that DET scores could predict international students' first-year academic performance, suggesting that the test can be a reliable indicator of English language proficiency in academic settings. However, the study also noted the different academic performance for bachelor and master program students who were admitted by DET (Isaacs et al., 2023). While the DET offers a convenient and accessible alternative to traditional English proficiency tests, some concerns have been raised about its fairness and validity. A study investigating test-takers' perceptions of the DET found that while many viewed the test as accessible, there were concerns about its validity, particularly regarding the test's ability to accurately assess language skills in a comprehensive manner. These findings suggest that while the DET is a promising tool for language assessment, ongoing evaluation and refinement

are necessary to ensure its effectiveness and fairness (Yao, 2023), particularly for the listening section which is lacking with diverse English accents (Kang et al., 2025).

Regardless the DET perception, the Duolingo gamification on listening section has outweighed another dialogue-based application like Replika (Tajik, 2025) and in line with this current study, a significant rise of test score from negative to positive in learning apps has been previously explored, especially in reading and listening comprehension (Jiang et al., 2024). Other studies showed similar results with this recent study for the English improvement after Duolingo intervention such as English skill enhancement in elementary school level (Atalya et al., 2025) and junior high school level (Istighfaroh et al., 2025). However, although this study emphasized the impact of Duolingo for the EFL learners at the university level, this learning app remains challenging for teachers in terms of the productive language skills, English curriculum alignment, and technological accessibility (Alya & Kembaren, 2025).

## CONCLUSION

In conclusion, the results of this study support the use of Duolingo as an effective tool for improving English proficiency among university students as the research questions addressed. This study answers the first research question that daily use of Duolingo app enhances DET scores and the second research question that the most affected skills are vocabulary, reading and listening. The application's interactive and gamified approach to language learning appears to facilitate measurable improvements in language skills, as evidenced by increased DET scores. However, it is important to consider the broader context of language assessment and the need for continued research into the validity and fairness of tools like the DET. Duolingo's user-friendly design, immediate feedback, and adaptive learning pathways appear to foster learner motivation and engagement, contributing to measurable language gains.

These findings support the integration of mobile learning applications like Duolingo into academic English programs, particularly in contexts that value flexible, self-paced learning. Future research could explore long-term effects, compare Duolingo with other learning tools, or investigate which specific language skills benefit most from its use. Additionally, incorporating learners' perceptions and motivation in future studies could provide deeper insight into how such platforms influence language development

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