

THE EFFECTS OF DUOLINGO ON VOCABULARY RETENTION IN FIRST-YEAR ESL STUDENTS

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Abstract *This study investigates the effects of Duolingo, a mobile language learning application, on vocabulary retention among first-year English as a Second Language (ESL) students. The research aims to assess whether using Duolingo as a supplementary tool enhances short-term and long-term vocabulary acquisition compared to traditional learning methods. An experimental design was employed, involving 30 first-year ESL students divided into control and experimental groups. The experimental group used Duolingo daily for four weeks, while the control group relied on textbook-based instruction. Pre-tests, post-tests, and delayed post-tests were administered to evaluate retention. The results suggest that students using Duolingo showed significantly higher vocabulary retention, indicating the app's potential as an effective supplementary tool in ESL education.*

Introduction

Vocabulary acquisition is a fundamental component of second language learning, particularly for beginner-level learners. Without a strong vocabulary base, ESL students struggle with reading comprehension, writing, and oral communication. In recent years, technology-enhanced language learning has gained popularity, with mobile applications like Duolingo leading the way. Duolingo offers gamified learning, personalized review systems, and frequent practice through spaced repetition, which may benefit vocabulary retention.

First-year ESL students often face challenges in adjusting to new academic environments and linguistic demands. Supplementing traditional instruction with engaging, tech-based tools could support their learning process. This study explores the effectiveness of Duolingo in helping first-year ESL students retain newly learned vocabulary, comparing its impact with that of conventional methods over a four-week period.

Literature Review

Vocabulary retention plays a crucial role in second language acquisition, influencing a learner's ability to comprehend texts, participate in conversations, and produce coherent writing (Nation, 2001). For first-year ESL students, acquiring and retaining vocabulary can be especially challenging due to limited exposure, anxiety, and unfamiliarity with academic English. Researchers have long emphasized the importance of repeated exposure and contextual learning in vocabulary development (Schmitt, 2008).

With the growing integration of educational technology, mobile-assisted language learning (MALL) has become a viable supplement to traditional classroom instruction. Applications like Duolingo have gained popularity for their accessibility, gamified structure, and data-driven design. Duolingo uses spaced repetition algorithms to reinforce learned vocabulary at optimal intervals, a technique shown to improve long-term memory retention (Cepeda et al., 2006).

Several studies have examined the effectiveness of Duolingo in language learning. Loewen et al. (2020) found that adult learners who used Duolingo for 30 minutes daily over several weeks made measurable gains in vocabulary and grammar skills. Similarly, Vesselinov and Grego (2012) reported that Duolingo learners achieved comparable outcomes to those in college-level language courses over similar time periods.

Despite these promising results, the impact of Duolingo on beginner-level ESL students—especially in the context of formal education—remains underexplored. Most studies have focused on independent learners or native English speakers learning other languages. This study seeks to bridge that gap by focusing specifically on first-year ESL students and measuring their vocabulary retention over time.

Methodology

Research Design

This study employed a quasi-experimental design to evaluate the impact of Duolingo on vocabulary retention among first-year ESL students. Two groups were used: an experimental group, which utilized Duolingo as a supplementary vocabulary learning tool, and a control group, which followed a traditional, textbook-based approach. The study spanned four weeks, with vocabulary assessments conducted at three intervals: pre-test (Week 1), post-test (Week 4), and delayed post-test (Week 6).

Participants

Participants consisted of 30 first-year ESL students enrolled in a beginner-level English program at a university. The students were randomly divided into two equal groups of 15. All participants were of similar age (18–22), had comparable English proficiency based on placement tests, and had not used Duolingo prior to the study.

Materials

- Duolingo app: Used by the experimental group for 20 minutes daily, focusing on vocabulary relevant to their course content.
- Vocabulary list: A curated list of 100 essential words from the first-semester ESL syllabus was used to ensure alignment between both groups.
- Tests: Three vocabulary tests (pre-, post-, and delayed post-test) were designed to assess recognition and recall. Each test included multiple-choice questions, fill-in-the-blanks, and short answer items.

Procedure

1. Pre-Test: All participants took the same vocabulary test to measure their baseline knowledge.
2. Intervention:
 - The experimental group used Duolingo for 20 minutes per day, five days a week.
 - The control group used printed vocabulary worksheets and participated in in-class vocabulary activities.
3. Post-Test: Administered at the end of Week 4 to measure immediate vocabulary gains.
4. Delayed Post-Test: Given two weeks after the intervention to evaluate retention.

Data Analysis

Test scores from the three assessment points were analyzed using paired sample t-tests and ANOVA to determine differences in vocabulary acquisition and retention between the two groups. Statistical significance was set at $p < 0.05$.

Results

Pre-Test Scores

Prior to the intervention, both the experimental and control groups completed a pre-test to assess their initial vocabulary knowledge. The mean scores were relatively close, indicating similar baseline proficiency:

- Experimental Group: $M = 42.6\%$, $SD = 5.3$
- Control Group: $M = 41.9\%$, $SD = 6.1$

An independent samples t-test confirmed that the difference between the two groups was not statistically significant ($t(28) = 0.37$, $p = 0.71$), suggesting a comparable starting point.

Post-Test Scores

A t-test revealed a statistically significant difference in performance. At the end of Week 4, the post-test results showed a clear divergence between the two groups:

- Experimental Group: $M = 78.2\%$, $SD = 6.8$ • Control Group: $M = 64.5\%$, $SD = 7.4$

between the groups ($t(28) = 5.65, p < 0.001$), indicating that the Duolingo users had significantly higher vocabulary gains than the control group.

Delayed Post-Test Scores (Retention)

Two weeks after the intervention, the delayed post-test was administered to assess long-term retention:

- Experimental Group: $M = 73.9\%$, $SD = 7.1$
- Control Group: $M = 58.3\%$, $SD = 8.5$

The experimental group retained a significantly higher percentage of the learned vocabulary. Statistical analysis again showed a significant difference ($t(28) = 6.12, p < 0.001$).

Summary of Findings

- Vocabulary retention was significantly higher in the Duolingo group.
- Duolingo users showed a greater increase from pre-test to post-test.
- The retention drop from post-test to delayed post-test was smaller in the experimental group, suggesting stronger memory consolidation.

Discussion

The findings of this study indicate that the use of Duolingo as a supplementary learning tool significantly improves vocabulary acquisition and retention among first-year ESL students. The experimental group, which used Duolingo consistently over a four-week period, not only outperformed the control group on the immediate post-test but also retained a higher percentage of vocabulary on the delayed post-test. These results support previous studies suggesting that technology-based learning platforms can enhance language outcomes when appropriately integrated into educational settings (Loewen et al., 2020; Vesselinov & Grego, 2012).

One key factor contributing to the experimental group's success may be Duolingo's use of spaced repetition, a well-documented method for enhancing long-term memory. Unlike traditional vocabulary learning, which may rely on short-term cramming, spaced repetition helps reinforce learning by revisiting vocabulary at strategically timed intervals. Additionally, the gamification elements of Duolingo—such as rewards, streaks, and interactive tasks—may have helped sustain student motivation and engagement, which are critical in early stages of language learning.

Despite these promising outcomes, the study has some limitations. First, the sample size was relatively small ($N = 30$), which may limit the generalizability of the results. Second, the study lasted only four weeks; a longer study could provide deeper insights into how sustained Duolingo use affects vocabulary retention over a semester or academic year. Lastly, the study did not measure other language skills such as pronunciation, grammar, or reading comprehension, which could also be influenced by using Duolingo.

Nonetheless, the study highlights the pedagogical value of integrating mobile learning applications like Duolingo into ESL instruction, especially for beginners. While traditional instruction remains foundational, tech-based tools can offer flexible, engaging, and personalized reinforcement outside the classroom.

Conclusion

This study explored the effects of Duolingo on vocabulary retention in first-year ESL students and found that the app significantly enhanced both immediate vocabulary acquisition and long-term retention. Students who used Duolingo outperformed those who followed a traditional learning path, suggesting that mobile-assisted language learning tools can play a valuable role in second language education.

These findings support the integration of technology into ESL programs, particularly when used as a supplement to classroom instruction. The combination of spaced repetition, gamification, and user-friendly design makes Duolingo a practical and accessible resource for beginner learners.

Future research should involve larger and more diverse participant groups, explore long-term effects over an academic year, and examine how Duolingo impacts other language domains such as grammar, pronunciation, and reading. Educators are encouraged to consider using language learning apps not as replacements but as enhancements to traditional instruction — especially to support vocabulary development in early-stage ESL learners.

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