

# Students' Perceptions of Duolingo for Arabic Vocabulary Acquisition: A Case Study of Arabic Literature Students at Hasanuddin University

Amelia Puteri Yuswandi<sup>1</sup>, Haeruddin<sup>2</sup>, Zuhriah<sup>3</sup>

<sup>1</sup> Universitas Hasanuddin, Makassar, Indonesia; [amelia01puteri@gmail.com](mailto:amelia01puteri@gmail.com)

<sup>2</sup> Universitas Hasanuddin, Makassar, Indonesia; [haeruddin@unhas.ac.id](mailto:haeruddin@unhas.ac.id)

<sup>3</sup> Universitas Hasanuddin, Makassar, Indonesia; [zuhriah@unhas.ac.id](mailto:zuhriah@unhas.ac.id)

---

## ARTICLE INFO

### *Keywords:*

Arabic literature;  
Duolingo;  
vocabulary acquisition

---

### *Article history:*

Received 2025-01-20

Revised 2025-03-05

Accepted 2025-08-22

## ABSTRACT

Technological innovations have significantly influenced language learning approaches, particularly among Arabic Literature students. Duolingo, a gamified language learning application, has gained popularity for vocabulary development. However, its effectiveness in academic contexts remains underexplored. This study employed a mixed-methods design to assess Duolingo's impact on vocabulary acquisition among 50 Arabic Literature students at Hasanuddin University. Participants completed pre- and post-tests over a two-week period of Duolingo use. Additionally, a questionnaire was administered to collect students' perceptions of the app's usability and educational value. Findings revealed that 74% of students improved their vocabulary scores, with an average increase of 4.8 points. Students reported that Duolingo's spaced repetition and gamification features enhanced motivation and vocabulary retention. However, 24% showed slight score declines, attributing this to the app's limited focus on grammar, writing, and speaking—skills essential for academic success. While Duolingo supports vocabulary development through engaging and interactive methods, it falls short in providing comprehensive language instruction. These limitations suggest the necessity of integrating supplementary learning tools to support grammar and productive language skills. Duolingo can serve as a valuable supplementary tool for vocabulary learning but should not replace holistic language instruction. Future research should investigate the incorporation of artificial intelligence to enhance its capabilities in grammar and speaking skill development.

*This is an open access article under the [CC BY-NC-SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license.*



---

### Corresponding Author:

Amelia Yuswandi

Universitas Hasanuddin, Makassar, Indonesia; [amelia01puteri@gmail.com](mailto:amelia01puteri@gmail.com)

---

## 1. INTRODUCTION

The discourse surrounding learning media in education has expanded significantly, encompassing various interpretations of its definition. Initially, learning media were often equated with technology, instructional aids, or educational resources (Jaelani & Sutari, n.d.). However, with the rapid advancement of technology, this concept has evolved to include a wide range of tools, such as social media, printed

materials, and digital platforms (Anton Adi Purwanto & Syafryadin, 2023). In the context of Arabic language education, vocabulary acquisition remains a significant challenge.

Effective vocabulary learning requires continuous exposure, memorization strategies, and engaging approaches. Traditional methods frequently fail to sustain student motivation and foster interactive learning environments, underscoring the necessity of integrating technology as a viable (Astarilla, 2018). Duolingo, a widely recognized language learning application, employs gamification and audiovisual techniques to enhance student engagement. Previous studies have demonstrated that Duolingo improves motivation by making vocabulary learning more enjoyable and dynamic. Specifically, in the context of Arabic vocabulary acquisition, Duolingo is regarded as a valuable educational technology that enriches students' learning experiences (Salsabila et al., 2024).

Furthermore, Duolingo features a structured and adaptive learning system, allowing students to personalize their goals and track progress through game-based assessments (Fanni & Maharani, 2024). Despite the extensive body of research on Duolingo, studies specifically addressing its effectiveness in Arabic vocabulary acquisition remain limited, particularly those focusing on Arabic literature students in higher education. One of the most relevant theoretical frameworks in the context of Arabic vocabulary learning through mobile-assisted platforms is Cognitive Load Theory (CLT), proposed by Sweller (1988). CLT emphasizes that learning becomes more effective when instructional materials are designed to reduce unnecessary cognitive burden and optimize mental resources. In Arabic as a foreign language, learners often face morphological complexities, such as root-based word structures and derived patterns, which can easily lead to cognitive overload when not presented in a segmented and structured manner.

Applications such as Duolingo have been shown to reduce extraneous cognitive load by providing a user-friendly interface, consistent repetition, and scaffolded vocabulary instruction. These features enable learners to focus their cognitive resources on germane load—the mental effort involved in processing, organizing, and integrating new information into long-term memory. From the perspective of Cognitive Load Theory (CLT), Duolingo's design supports early-stage vocabulary acquisition in a structured and manageable way. Kusumaningrum, Wibowo, and Anita (2020) found that mobile learning platforms incorporating CLT principles significantly improved learning outcomes by minimizing unnecessary mental strain and enhancing cognitive efficiency.

A growing body of research underscores the effectiveness of gamification and digital tools in language learning. For example, Purwanto and Syafryadin (2023) argue that gamified learning platforms increase student engagement and motivation. Salsabila et al. (2024) further support this claim, noting that Duolingo's interactive features positively impact vocabulary retention and comprehension. However, Astarilla (2018) highlights that while digital platforms are effective in promoting vocabulary acquisition, their success often depends on learners' individual backgrounds, preferences, and the linguistic complexities of the target language.

Given Arabic's unique grammatical and morphological structures, a more systematic approach to vocabulary instruction may be necessary. Fanni and Maharani (2024) argue that although Duolingo's gamified elements can enhance motivation, its effectiveness for advanced vocabulary learning remains questionable. They suggest the platform may be more suitable for beginners rather than learners who require nuanced semantic understanding and contextual application. This study addresses this gap by examining the perceptions of Arabic Literature students—a demographic that has received limited attention in existing research.

This study aims to explore the perceptions of Arabic Literature students at Hasanuddin University regarding Duolingo's usability, effectiveness, and impact on their learning motivation. The novelty of this research lies in its focus on Arabic Literature students, an academic group that has been largely overlooked in previous studies. Unlike prior research that broadly examines language learning with this application, this study specifically investigates how Arabic Literature students interact with Duolingo, addressing a critical gap in the literature.

The findings of this study are expected to provide valuable insights into the role of technology-based applications in Arabic language education and offer practical implications for educators, language

instructors, and developers of digital learning platforms. Additionally, this research aims to support the refinement of educational technologies to better accommodate the needs of university students, particularly those studying Arabic. By focusing on this underexplored demographic, the study will contribute to a deeper understanding of how technology-assisted learning tools such as Duolingo can enhance the learning experience of Arabic Literature students.

## 2. METHODS

This study employed a mixed-method approach, integrating both qualitative and quantitative methods to gain a comprehensive understanding of the effectiveness of Duolingo in enhancing vocabulary acquisition among Arabic Literature students. A case study method was used to explore students' perceptions, experiences, and insights, while the quantitative component measured vocabulary improvement through pre-test and post-test assessments. The participants of this study consisted of 50 Arabic Literature students at Hasanuddin University, selected using a purposive sampling technique. The inclusion criteria required participants to be actively enrolled in the program, have prior experience using Duolingo for Arabic vocabulary learning, and be willing to participate throughout the study. These criteria ensured that the selected students could provide meaningful insights regarding the application's effectiveness. The research employed three primary instruments: vocabulary tests (pre-test and post-test), questionnaires, and semi-structured interviews. The vocabulary test was designed to assess students' proficiency before and after using Duolingo. The pre-test was administered before students began using the application, while the post-test was conducted after six weeks of regular usage. The questionnaire consisted of 11 items, rated on a 5-point Likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree), designed to evaluate students' perceptions regarding effectiveness, ease of use, and the strengths and limitations of Duolingo in Arabic vocabulary learning. Following the completion of the questionnaire, semi-structured interviews were conducted with selected participants to explore their experiences, challenges, and factors influencing the effectiveness of the application.

The data collection process lasted for two weeks and followed several key stages. At the initial stage, participants completed the pre-test to assess their baseline vocabulary proficiency. Over the next two weeks, students were required to use Duolingo regularly, with a minimum frequency of four times per week. After the intervention period, a post-test was administered to measure vocabulary development. Subsequently, students completed the questionnaire, and follow-up interviews were conducted with selected participants to gain deeper insights into their experiences. To ensure accessibility, all interviews were conducted online via Zoom.

Although the duration of this study was limited to two weeks, this study timeframe remains valid for capturing initial responses in vocabulary acquisition particularly within the context of Arabic as a foreign language. Short-term exposure to mobile-assisted learning has been shown to enhance vocabulary gains, especially when learning is structured around repeated patterns and morphological roots, which are fundamental features of Arabic.

A study by (Permatasari, Lestari, & Fauziah, 2022) demonstrated that two weeks of mobile-based flashcard practice led to measurable vocabulary retention improvements among novice learners. Similarly, (Alharthi, 2023) emphasized that even short term interventions can produce meaningful lexical development, provided that the learning media is contextually adaptive and rooted in linguistic structure. Based on this evidence, the two week duration used in the present study is not only a practical decision but also one grounded in empirical precedent. This supports the study's goal of offering early stage insights into how applications like Duolingo can contribute to Arabic Vocabulary development within a focused and time-bound intervention.

Data analysis was conducted using descriptive statistical techniques for quantitative data obtained from the pre-test and post-test results. The mean scores, standard deviations, and percentage changes were calculated to evaluate students' vocabulary improvement. Questionnaire responses were analyzed statistically to identify general trends in students' perceptions of Duolingo's effectiveness. For qualitative

data, thematic analysis was applied to the interview transcripts to identify recurring themes regarding students' experiences with Duolingo. To enhance the validity and reliability of the findings, triangulation was employed by comparing questionnaire and interview data, ensuring consistency in the results. Furthermore, the research instruments underwent pre-testing on a separate group of students outside the main research sample to evaluate their clarity and reliability. The content validity of the instruments was confirmed through consultations with faculty members in the Arabic Literature program, ensuring that the instruments aligned with the research objectives.

Although this study provides valuable insights into the effectiveness of Duolingo for Arabic vocabulary acquisition, it has several limitations. First, the study sample was limited to Arabic Literature students at Hasanuddin University, which may affect the generalizability of the findings to a broader population. Second, students' perceptions of Duolingo's effectiveness may have been influenced by personal experiences, potentially introducing bias in the interpretation of interview data. These limitations should be considered when interpreting the results and can serve as a basis for further research that includes a larger sample and a more diverse range of language learning methodologies. To ensure that the data collected in this study is valid, reliable, and scientifically accountable, an evaluation of the validity and reliability of research instruments was conducted. The primary instruments used, namely questionnaires and interviews, underwent a series of validation tests to confirm that they accurately measure the research variables and produce consistent data. This evaluation is essential to ensure that the research findings provide an objective representation of Duolingo's effectiveness in Arabic vocabulary acquisition.

The validity of the research instruments was examined through two key approaches: content validity and construct validity. Content validity was assessed through expert consultation with scholars in Arabic language education, particularly faculty members with expertise in research methodology and language learning technologies. This assessment aimed to verify that each item in the questionnaire and interview guide appropriately reflects the concepts being measured and aligns with the research objectives. Additionally, construct validity was tested using Exploratory Factor Analysis (EFA) to examine the interrelation among questionnaire items and determine how well they measure predefined dimensions, such as Duolingo's effectiveness in vocabulary acquisition, students' learning motivation, and user experience in language skill development.

The reliability of the instruments was assessed to ensure that the results obtained remain stable and consistent across different testing conditions. Reliability testing was conducted using Cronbach's Alpha, a statistical method for measuring the internal consistency of questionnaire items. A Cronbach's Alpha value above 0.70 indicates a high level of reliability, confirming that the instrument is suitable for further research. To enhance the accuracy of qualitative data obtained from interviews, data triangulation was employed by comparing interview responses with questionnaire findings and pre-test/post-test scores. Furthermore, interview responses were analyzed using thematic analysis, allowing for the systematic identification of patterns and key themes within respondents' answers.

Based on the results of these evaluations, the research instruments used in this study have met rigorous academic standards, ensuring that the findings are credible for assessing Duolingo's effectiveness in Arabic language learning. Content and construct validity were confirmed through expert consultation and exploratory factor analysis, while instrument reliability was verified through Cronbach's Alpha and data triangulation, ensuring that the research results are accurate, consistent, and relevant within the context of technology-based language learning. Consequently, this study not only contributes to understanding how Duolingo can be utilized as a tool for vocabulary acquisition but also paves the way for developing more effective, adaptive, and sustainable technology-enhanced language learning methods.

### 3. FINDINGS AND DISCUSSION

This study aimed to identify students' perceptions of the use of the Duolingo application in the development of Arabic vocabulary, especially among Arabic Literature students at Hasanuddin University. The results from the questionnaire showed that most students found this application enabled them to increase their Arabic vocabulary independently and flexibly outside of formal lecture hours (Salsabila et al., 2024). Table 1 shows the effectiveness of using Duolingo in assisting students to gain new vocabulary, while table 2 indicates the benefits perceived by students in integrating the app into their study routines. On average, students agreed that the game-based learning approach offered by Duolingo creates an interactive learning environment and reduces burnout in language learning (Samad et al., 2024).

In this case, the findings of the research obtained from the questionnaire are presented based on two main indicators: first, students' perception of the effectiveness of using the Duolingo application, with the following details, namely: the effectiveness of the Duolingo application in improving Arabic vocabulary (E1); second, the ability of the Duolingo application to motivate students in advancing their vocabulary (E2); third, the ease of use in independent learning activities (E3). Second, the benefits of using the Duolingo application for Arabic literature students are as follows: the Duolingo application improves user vocabulary (M1); second, it enhances Arabic language skills after its use (M2). Based on the data collected, nearly 88% agreed that this application is a very effective learning tool in supporting vocabulary mastery. The majority of respondents stated that features such as word repetition and gradual learning allow them to remember new vocabulary more strongly. Additionally, the self-paced quiz and game features within the app provide opportunities for regular practice that doesn't rely on lecturer guidance, which in turn increases motivation to study independently. However, about 12% of students found that they felt Duolingo was less effective, citing that the limited content was considered not entirely relevant to their study needs in Arabic literature majors at the University level. Then, 85% of students confirmed that the Duolingo application is very useful for them, with features such as word repetition exercises and gradual recognition of new words, which enable students to strengthen their memory. On the other hand, 15% of students gave a negative response, that they perceived this application as less useful in meeting their needs. Some of the reasons conveyed include limited vocabulary variations and a lack of material that suits the needs of advanced Arabic literature students.

**Table 1.** Student perception of the effectiveness of using the Duolingo application

No	Positive	Negative
(E1)	88%	12%
(E2)	86%	14%
(E3)	90%	10%

This digram shows the results of students' perceptions of the three main aspects of using the Duolingo application: (E1) the effectiveness of the application in improving Arabic vocabulary, at 88% of students having positive perceptions and 12% negative; (E2) the ability of the Duolingo application to motivate students to expand their vocabulary, with 86% positive perception and 14% negative; as well as (E3) the ease of use of the application in independent learning activities, with 90% of students having positive perceptions and 10% negative. A breakdown of student assessments of the software effectiveness in enriching Arabic vocabulary, showed that 88% of respondents considered the application to be very effective, with various features to support independent learning.

To assess the benefits of using this app, the study also explored whether the Duolingo app supports the development of Arabic vocabulary and skills more broadly. 88% of students indicated positive responses to the benefits of this application, especially related to the role of word repetition features and the introduction of new vocabulary in helping to strengthen memory. In addition, game-based features and quizzes enable students to study independently, so they are more motivated to practice regularly outside of the lecture course. However, about 14% of students perceived that the app

is not able to meet their vocabulary needs, especially in terms of more specific or appropriate word variations for a higher level of learning.

**Table 2.** Significances of the Duolingo app for Arabic literature students

No	Positive	Negative
(M1)	86%	14%
(M2)	84%	16%

This diagram presents the results of students' perceptions regarding the two main aspects of the benefits of the Duolingo application: (M1) the benefits of using the Duolingo application for Arabic literature students, at 86% of students indicating a positive perception and 14% of negative perceptions; (M2) the benefits of the Duolingo app in improving Arabic language skills after its use, at 84% showing positive and 16% negative perceptions. Student assessment of the benefits of the Duolingo application in learning Arabic vocabulary, with 85% of respondents considering this application useful for strengthening vocabulary memory through quiz-based repetition and practice features.

Based on the analysis of pre-test and post-test data collected from 50 Arabic Literature students, it was found that the use of the Duolingo application had a measurable impact on their Arabic vocabulary acquisition. Prior to using the application, students' pre-test scores varied between 46 and 78, with an average score of 60.44. These results indicate that most students possessed a moderate level of Arabic vocabulary proficiency, while those scoring below 55 were classified as beginners who required more intensive vocabulary reinforcement.

After two weeks of regular Duolingo usage, students participated in a post-test to assess improvements in their Arabic vocabulary acquisition. The results revealed a significant increase in scores, with post-test scores ranging from 45 to 85 and an average score of 65.24. The average increase of 4.8 points suggests that the majority of students experienced notable progress in their vocabulary retention and comprehension following the use of Duolingo in their learning process.

A more detailed examination of the data showed that out of the 50 participating students, 37 demonstrated an improvement in their scores after actively using Duolingo. The extent of score improvement varied, with increases ranging between 1 and 15 points. This finding suggests that students who engaged more frequently with Duolingo's vocabulary training features experienced better retention and understanding of new Arabic words.

Conversely, one student exhibited no change in test scores between the pre-test and post-test, indicating a stagnant learning outcome. This lack of progress may be attributed to various factors, such as insufficient engagement with the application or learning strategies that did not align with the student's needs. Additionally, 12 students experienced a slight decline in their post-test scores, with decreases ranging from 1 to 5 points. Some students in this group reported that the material provided by Duolingo did not fully meet their academic requirements, particularly those who were at an advanced level in their Arabic studies.

Furthermore, this study also found that the frequency of Duolingo usage played a crucial role in learning outcomes. Students who used the application more than four times per week showed significantly higher score improvements compared to those who used it only once or twice a week. This finding underscores the importance of consistent engagement with the application to maximize vocabulary acquisition. Additionally, the type of exercises utilized within the app influenced learning effectiveness. Students who frequently engaged in writing and speaking exercises demonstrated greater progress than those who relied solely on multiple-choice exercises.

The results further indicate that students with lower initial vocabulary proficiency experienced more substantial improvements compared to those with higher baseline scores. This suggests that Duolingo is particularly effective for learners in the early stages of Arabic language acquisition, whereas more advanced students may require supplementary learning resources that provide more complex and contextually relevant content.

Overall, the use of Duolingo over a six-week period contributed to measurable gains in students' Arabic vocabulary proficiency. While not all students exhibited the same degree of improvement, the majority demonstrated positive learning outcomes after consistently engaging with the application. However, the effectiveness of Duolingo remains dependent on several factors, including frequency of usage, level of student engagement, and the relevance of the application's content to academic needs. Therefore, while Duolingo serves as a beneficial supplementary tool for language learning, it is recommended that students complement its use with additional learning resources to achieve a more comprehensive mastery of Arabic vocabulary.

**Table 3.** Pre-test and posttest results

Category	Number of Students	Average Pre-Test Score	Average Post-Test Score	Average Improvement
Score Improvement	37	60.89	68.00	+7.11
No Change	1	59.00	59.00	0.00
Score Decline	12	59.17	57.25	-1.92
Total	50	60.44	65.24	+4.80

This table indicates that the majority of students (37 out of 50) experienced an increase in their scores after using Duolingo, with an average improvement of 7.11 points. Additionally, 12 students showed a slight decline in their scores, with an average decrease of 1.92 points. Meanwhile, one student exhibited no change in their score.

### Discussion

The purpose of this study was to explore the effectiveness of the Duolingo application in enhancing Arabic vocabulary learning among Arabic literature students. The findings reveal that the majority of students (88%) confirmed the positive impact of Duolingo on their vocabulary acquisition (Asrina et al., 2024). Features such as word repetition and gradual exercises were highlighted by students as helpful in strengthening their memory retention. This supports previous findings suggesting that repetition and structured learning methods are essential for long-term vocabulary retention (Nurshiyam & Usman, n.d.).

The findings indicate that Duolingo meets student expectations in providing an effective tool for learning Arabic vocabulary outside of traditional classroom settings, making it a valuable addition to the learning process (Jaelani & Sutari, n.d.). Moreover, 85% of students reported that Duolingo provided significant benefits, particularly through its self-paced learning approach. The flexibility of the application. Allowing students to study at their own convenience is particularly advantageous for learners in higher education, who often face time constraints (Fanni & Maharani, 2024).

This finding corroborates previous studies that emphasize the importance of flexibility and accessibility in modern educational tools (Yazid et al., 2023). While the majority of students agreed on the benefits of Duolingo in vocabulary acquisition, it is important to note that 15% of students expressed a more neutral or negative view, suggesting that the application may not be as effective for all students, particularly those with different learning preferences or needs (Samad et al., 2024). In terms of motivation, 86% of students indicated that Duolingo increased their motivation to study independently (Salsabila et al., 2024). The integration of features like leaderboards, point systems, and gamified challenges plays a significant role in maintaining student interest in learning. These findings are consistent with broader educational technology research, which shows that gamified elements in language learning platforms can significantly enhance user engagement and motivation (Inayah et al., 2020).

Therefore, Duolingo's ability to foster motivation through its game-like elements presents a promising approach for language learners (Anton Adi Purwanto & Syafryadin, 2023). Despite these positive findings, the study also identified some limitations. Only 84% of students felt that Duolingo

helped improve their overall language skills, with 16% perceiving its impact as less significant. This discrepancy suggests that while Duolingo is highly effective for vocabulary acquisition, it does not sufficiently address other aspects of language learning, such as grammar or speaking skills (Basari et al., n.d.). Previous studies have also pointed out that language learning applications like Duolingo may be better suited for beginners, with limited capacity to cater to more advanced language learners. This limitation underscores the need for supplementary resources or a more comprehensive application that can address the full spectrum of language learning needs, particularly for students who are already at an intermediate or advanced level (Jurnal et al., 2022).

Additionally, the content of Duolingo was found to be limited in terms of academic or religious vocabulary, a crucial area for Arabic Literature students (Yazid et al., 2023). The application's focus on basic vocabulary, while beneficial for beginners, fails to meet the needs of advanced learners who require exposure to more complex linguistic structures and cultural nuances (Basari et al., n.d.). This finding aligns with research suggesting that Duolingo and similar apps tend to focus on more general language skills and may not fully support specialized fields of study, such as Arabic literature (Samad et al., 2024). Therefore, adding more specialized content, particularly in academic and religious contexts, would increase Duolingo's applicability for students in higher education.

The flexibility offered by Duolingo—enabling students to learn at their own pace and in various environments—was highly appreciated, with 90% of participants reporting satisfaction with its user-friendly interface and accessibility. This adaptability is particularly valuable, as it promotes continuous learning beyond the classroom, which is crucial in today's fast-paced academic landscape. The ability to revisit and reinforce challenging vocabulary at any time supports long-term retention and consistent learning progression. These benefits were affirmed by students in this study and are consistent with findings by Hardiyanto et al. (2023), who emphasize the importance of mobile learning tools in sustaining language acquisition outside traditional classroom settings.

The implications of this research are significant for the future development and application of language learning technologies (Winoto et al., 2024). First, Duolingo can serve as an effective tool for foundational Arabic vocabulary learning but should be complemented by other resources to address the broader language acquisition needs of advanced learners. Second, the application's content could be enhanced by including more academic, professional, and culturally relevant vocabulary, which would make it more applicable for university level students, particularly those specializing in Arabic literature. Furthermore, this study suggests that educational technology developers should consider integrating features that address speaking skills and cultural understanding, as these areas remain underdeveloped in Duolingo. Future research should explore the integration of these elements into existing platforms to create more comprehensive language learning tools (Jaelani & Sutari, n.d.).

Overall, this study highlights the potential of Duolingo as a valuable learning tool for Arabic literature students, particularly for vocabulary acquisition. However, to maximize its effectiveness, it is recommended that future versions of the application include more advanced content and interactive speaking exercises. Further research is also needed to explore other applications that might complement the limitations of Duolingo, offering a more holistic solution to the challenges faced by Arabic language learners in higher education.

### **Detailed Examination of Pre-Test and Post-Test Outcomes**

The pre-test results revealed that students' vocabulary scores ranged from 46 to 78, with a mean score of 60.44. These results indicate that most students possessed a moderate level of vocabulary proficiency. Students scoring below 55 were categorized as beginners, requiring additional reinforcement to improve vocabulary retention. The pre-test data also highlighted common challenges in memorizing and recalling new Arabic vocabulary, underscoring the need for structured and interactive instructional tools to support more effective acquisition.

Following two weeks of consistent use of Duolingo, the post-test scores ranged from 45 to 85, with an increased average of 65.24—reflecting a 4.8-point improvement. This gain suggests that Duolingo

played a meaningful role in reinforcing vocabulary retention and providing consistent exposure to new Arabic words through its systematic and scaffolded activities.

Although the descriptive data show clear improvement, inferential statistical methods such as paired t-tests or p-value analyses were not applied in this study. Therefore, the term *statistically significant* is intentionally omitted to maintain methodological integrity. Instead, this study relies on descriptive analysis to identify learning trends, which is a valid approach in early-stage educational research (Wang & Zhang, 2021). The following analysis presents central tendencies and score distributions, offering a nuanced view of the general trend following Duolingo engagement.

Individual-level performance data further strengthen these findings. Out of 50 students, 37 (74%) improved their scores by 1 to 15 points. These students actively engaged with Duolingo's vocabulary activities, which likely enhanced their retention and comprehension through the platform's gamification and spaced repetition features. Conversely, one student (2%) showed no change, possibly due to low engagement or ineffective study habits.

Twelve students (24%) experienced slight score declines ranging from 1 to 5 points. Many of these students reported that Duolingo's content did not align with their academic proficiency level, particularly those in advanced stages of Arabic study. This finding suggests that while Duolingo is effective for beginner and intermediate learners, it may not meet the more specialized vocabulary demands of advanced students.

One of the most significant findings is the impact of usage frequency. Students who used Duolingo more than four times per week demonstrated greater vocabulary gains than those who used it less frequently. This supports previous research emphasizing the role of consistent exposure and engagement in enhancing language acquisition and retention. Furthermore, the type of exercises students engaged with also influenced outcomes. Those who participated in speaking and writing tasks exhibited more substantial improvement than those relying solely on multiple-choice items. This aligns with prior studies indicating that output-based learning strategies contribute more significantly to vocabulary retention and overall language development.

Additionally, students with lower initial vocabulary proficiency experienced greater gains compared to their higher-scoring peers. This trend indicates that Duolingo is especially beneficial for novice and intermediate learners, while advanced students may require supplemental materials that incorporate complex grammatical structures, academic-specific vocabulary, and culturally embedded content to meet their learning objectives.

### **A Critical Assessment of Duolingo: Benefits and Challenges in Language Acquisition**

The advancement of technology has changed how students learn languages, including those studying Arabic Literature. Duolingo is one of the most popular language learning apps that uses gamified, interactive lessons to teach vocabulary and basic grammar. While it has proven useful for improving vocabulary retention (Vesselinov & Grego, 2012), its role in higher education, especially in Arabic Literature programs, still needs further exploration. Comparing Duolingo with traditional learning methods—like classroom instruction, textbooks, and immersion programs—can help determine its effectiveness in formal academic settings.

One of Duolingo's main advantages is its flexibility. Students can access lessons anytime and anywhere, making it easier to fit learning into busy university schedules. Unlike traditional classes with fixed times, Duolingo allows learners to study at their own pace (Godwin-Jones, 2011). This kind of self-directed learning is helpful for maintaining consistency in vocabulary practice, especially when students face time constraints.

Another benefit of Duolingo is its use of gamification. Features like point systems, daily streaks, and achievement badges make learning more enjoyable and motivate students to keep practicing. Studies show that game-based learning increases student engagement and reduces boredom in language learning (Salsabila et al., 2024). These elements encourage learners to develop regular study habits, which can lead to better long-term results.

Duolingo also uses a spaced repetition system to help users remember words by reviewing them over time. This method is known to improve long-term memory (Nation, 2001). Unlike passive methods like rote memorization or copying vocabulary lists, Duolingo provides instant feedback, helping learners correct mistakes immediately.

However, Duolingo also has several limitations. It mainly focuses on vocabulary and simple sentence patterns, with little explanation of Arabic grammar, morphology, or syntax. In contrast, classroom learning offers deeper instruction in these areas, which is important for Arabic Literature students who need to analyze texts and write academic papers (Bani-Khaled, 2020). Duolingo also lacks writing activities that help develop critical thinking, argumentation, and academic writing—skills needed for success in university-level Arabic programs.

Another major limitation is the lack of speaking practice. While Duolingo includes pronunciation exercises, it does not offer real-time conversation or interactive speaking tasks. This makes it less useful for improving fluency or adapting to real-life communication, which are key components of language learning (Peterson, 2010). Other methods, such as immersion programs or speaking clubs, provide better opportunities for active language use.

Furthermore, Duolingo's content is designed for general learners and does not include specialized vocabulary or classical texts that are common in Arabic Literature courses. These students must study classical poetry, prose, and rhetorical styles—materials not currently available on the platform. For this reason, Duolingo should be used as a supplementary tool rather than the main method of instruction.

To improve its educational value, developers should consider adding features that better support academic needs. This could include grammar explanations, writing tasks, and interactive speaking components. Future studies should also explore the use of artificial intelligence (AI) to personalize learning experiences and provide feedback on grammar, pronunciation, and academic writing (Lin & Warschauer, 2015). With these improvements, Duolingo and similar platforms could play a more significant role in Arabic language learning in higher education.

### Comparison with Similar Studies in Other Languages

The results of this study show that using Duolingo had a positive effect on Arabic vocabulary learning. About 74% of students improved their test scores, while 24% experienced slight declines. To see if these results were unique to Arabic or reflected a broader trend, the findings were compared with studies on Duolingo's use in other languages like English, Mandarin, and German.

In a study on English learners, Rifdinal (2021) found that Duolingo helped improve students' vocabulary in an Islamic senior high school. The study used both a control and an experimental group and showed better results for those who used Duolingo regularly. The current study found that Duolingo was more helpful for beginner learners than for advanced ones.

Widyastuti and Kusumadewi (2018) studied Mandarin language learning and also saw improvement in vocabulary skills. They noted that the app's gamified features helped students stay motivated and remember new words. However, they pointed out that Duolingo didn't fully meet the needs of advanced learners due to the complexity of Mandarin grammar—an issue that also appeared in the Arabic learning context of this study.

In another study, Nursyamsiah (2020) reported that Duolingo supported German vocabulary development over several learning cycles. Still, the study emphasized that Duolingo could not replace formal learning methods like classroom instruction or textbooks. This mirrors the findings here, where students felt Duolingo alone wasn't enough—especially for understanding classical Arabic, which requires deeper grammar and text analysis.

Comparing results across different languages, Duolingo appears consistently effective for vocabulary learning, particularly at the beginner and intermediate levels. However, its limitations are also consistent: it lacks strong support for grammar, speaking, and academic-level language skills. As with other languages, Duolingo should be seen as a helpful *supplement* rather than a main learning tool. To achieve full language proficiency, especially in academic settings, Duolingo should be used

alongside classroom instruction, writing practice, and real-life speaking opportunities with fluent speakers.

### **Implications for Curriculum Design and Independent Learning Strategies**

The findings of this study show that regular use of Duolingo can help university students improve their Arabic vocabulary. These results are useful for both improving Arabic language curricula in higher education and supporting students' independent learning. When integrated into formal and informal learning environments, Duolingo offers a flexible and engaging way to strengthen vocabulary acquisition. This suggests that digital tools like Duolingo can support student learning when used alongside more traditional classroom methods.

In terms of curriculum development, many students in this study showed noticeable improvement in vocabulary after using Duolingo. This suggests that the app can serve as a helpful supplement to classroom instruction. Within the curriculum, Duolingo can be used as a practice tool that provides students with fun, interactive vocabulary exercises that reinforce what they've learned in class. It can also help instructors track students' progress through its built-in monitoring features, offering insight into how well students are retaining vocabulary. Additionally, it can be included in a blended learning model, where students use Duolingo outside the classroom while in-person sessions focus on grammar, writing, and advanced language skills.

However, Duolingo has some limitations. The app mostly focuses on vocabulary and basic phrases, and does not provide detailed instruction on Arabic grammar, writing, or literary analysis. These skills are essential for Arabic Literature students, especially at the university level. As a result, Duolingo should not be used as a standalone learning tool. Instead, it should be combined with more comprehensive learning methods, such as classroom discussions, writing assignments, and instructor feedback. This ensures that students not only learn new words but also understand how to use them in academic and professional contexts.

Beyond its use in the classroom, Duolingo also supports independent learning by allowing students to study anytime and anywhere. This flexibility is especially valuable for university students with busy schedules. The study found that students who used Duolingo at least four times per week made more progress than those who used it less often. Therefore, consistency is important for seeing meaningful improvement. Students can benefit from setting specific learning goals—such as mastering a certain number of words each week—and combining Duolingo with other tools like Arabic-language podcasts, news articles, or textbooks. Active learning strategies, such as creating flashcards or writing short summaries, can further help students retain what they've learned. To improve their speaking and writing skills, students should also seek opportunities to use Arabic in real-life situations, such as conversations with peers or writing short essays.

Overall, this study shows that Duolingo is an effective tool for improving Arabic vocabulary, especially when used consistently and as part of a broader learning plan. However, it does not fully support more complex aspects of language learning, such as grammar, writing, and literary analysis. For this reason, it should be used to supplement, not replace, traditional learning methods. In classroom settings, it can help boost student motivation and engagement with vocabulary. Independent learning, it offers a flexible, user-friendly way to practice regularly.

To make language learning apps like Duolingo more useful for university students, future research should explore how technology can better support advanced language skills. For example, integrating artificial intelligence (AI) could allow apps to give personalized feedback on grammar, writing, and speaking. With these improvements, digital tools like Duolingo could become even more effective in helping students master Arabic at an academic level.

## Methodological Limitations and Implications for Future Research

Although this study was carefully designed using reliable tools, there are still some important limitations that need to be considered. Understanding these weaknesses is crucial for enhancing future research and maximizing the effective use of technology in language learning.

One major limitation is the small and specific sample. This study only included students from the Arabic Literature program at Hasanuddin University, which means the results might not apply to students from other programs, universities, or language backgrounds. To make future studies more widely applicable, researchers should involve a more diverse group of participants from different institutions and academic fields.

Another limitation is the focus on quantitative data. While the study did include some interviews to support the numbers, these were limited to a small number of students. As a result, the research may not fully reflect students' personal experiences or how they actually felt about using Duolingo. Future studies should use a mixed-methods approach, combining statistical data with more detailed interviews or observations. This would give a fuller picture of how students use Duolingo and what works best for them.

The short duration of the study is also a concern. The research only lasted two weeks, which is enough to measure short-term vocabulary improvement but not long-term language development. Longer studies would help researchers see whether students continue to remember new vocabulary over time and how Duolingo affects other skills like speaking, writing, and reading academic Arabic.

In addition, the study mainly used vocabulary tests to measure improvement. While this showed progress in one area, it didn't cover other important language skills, such as oral communication, grammar use, or academic writing. Future research should include more complete assessment tools, like speaking tests, writing assignments, and reading comprehension exercises with advanced Arabic texts.

There were also limitations in the Duolingo app itself. While Duolingo helps improve vocabulary, it doesn't offer much support for grammar learning, speaking practice, or understanding Arabic in academic and cultural contexts. Because of this, future studies could explore combining Duolingo with other learning tools, like apps that use artificial intelligence (AI) to give grammar feedback or support writing and speaking in Arabic.

In conclusion, while this study provides useful insights into how Duolingo can help with Arabic vocabulary learning, its limitations point to several areas for improvement. Future research should involve more diverse participants, use both quantitative and qualitative methods, run over longer periods, and use better tools to measure all language skills. Researchers should also look at how Duolingo can be paired with other learning technologies to create a more complete and effective language learning experience. These improvements would help educators and students get the most out of digital tools for learning Arabic.

## 4. CONCLUSION

This study found that most students improved their Arabic vocabulary retention after using Duolingo, with participants reporting that the app's daily practice and repeated exposure helped reinforce word recall. Students also responded positively to Duolingo's gamified features, which increased their motivation and engagement by offering a low-pressure, enjoyable learning environment. These results suggest that Duolingo can be a valuable supplementary tool in Arabic language courses, particularly for supporting independent vocabulary practice outside the classroom. However, the study faced several limitations. The sample was limited to students from a single academic program, reducing the generalizability of the findings. Additionally, the research focused only on vocabulary acquisition and did not evaluate the app's impact on other important language skills such as grammar, speaking, and academic writing. The short, two-week duration also limited the

ability to assess long-term learning outcomes. To build on these findings, future research should include a larger and more diverse student sample across different institutions and proficiency levels. Using a mixed-methods approach could provide richer insights into learners' experiences, while longer-term studies would help evaluate whether the benefits of Duolingo persist over time and extend to broader language competencies. Educators can integrate Duolingo into a blended learning curriculum by aligning its modules with textbook themes and monitoring students' app activity as part of formative assessment. Additionally, the app's repetition-based design can help reinforce Arabic's root-based and pattern-based vocabulary systems. For a more comprehensive learning experience, Duolingo should be combined with traditional teaching strategies, including structured writing tasks, academic text analysis, and speaking practice. Future studies could also explore how artificial intelligence (AI) technologies might improve the app's adaptability, offering personalized support for grammar, writing, and advanced language skills in Arabic.

**Acknowledgments:** This is a short text acknowledging the contributions of specific colleagues, institutions, or agencies that aided the authors' efforts. We would like to express our gratitude to the head of laboratory development of learning technology at the Faculty of Cultural Sciences, Hasanuddin University, who has facilitated our use of the laboratory during the course of this research.

## REFERENCES

- Alamudi, J. (2018). *Students' perception on the use of Duolingo as English learning media in Android* (Unpublished thesis). Faculty of Cultural Study, Universitas Brawijaya.
- Alharthi, M. (2023). Technology-assisted vocabulary learning: A review of recent trends and theoretical perspectives. *International Journal of Emerging Technologies in Learning (ijET)*, 18(7), 119–131. <https://doi.org/10.3991/ijet.v18i07.39235>
- Al Irsyadi, F. Y., Annas, R., & Kurniawan, Y. I. (2019). Game edukasi pembelajaran bahasa Inggris untuk pengenalan benda-benda di rumah bagi siswa kelas 4 sekolah dasar. *Jurnal Teknologi dan Informasi*, 9(2), 78–92.
- Amirudin, N. (2017). Problematika pembelajaran bahasa Arab. *Tamaddun: Jurnal Pendidikan dan Pemikiran Keagamaan*, 1–12.
- Apoko, T. W., Dunggio, A. A., & Chong, S. L. (2023). The students' perceptions on the use of mobile-assisted language learning through Duolingo in improving vocabulary mastery at the tertiary level. *English Review: Journal of English Education*, 11(1), 17–26. <https://doi.org/10.25134/erjee.v11i1.7927>
- Astarilla, L. (2018). University students' perception towards the use of Duolingo application in learning English. *Prosiding CELSciTech*, 3, 1–9.
- Azkiyah, S. N., & Anasy, Z. (n.d.). *Students' perception on using Duolingo application in increasing English learning motivation* (Bachelor's thesis, FITK UIN Syarif Hidayatullah Jakarta).
- Daniswara, L., Sahuddin, S., Putera, L. J., & Saputra, A. (2024). Students' perception of the use of Duolingo for learning English. *Jurnal Ilmiah Profesi Pendidikan*, 9(4), 2881–2890. <https://doi.org/10.29303/jipp.v9i4.517>
- Fanni, S. M., & Maharani, M. M. (2024). Students' perceptions regarding the use of Duolingo to enhance grammar learning. *Indonesian Journal of Education and Pedagogy*, 1(3), 185–193.
- Hardiyanto, M. R. P., Pahlevi, G., & Nugroho, M. F. (2023). Pengaruh fitur-fitur aplikasi Duolingo terhadap popularitasnya. *Jurnal Sains, Nalar, dan Aplikasi Teknologi Informasi*, 3(1), 23–28.
- Inayah, N., Yusuf, Q., & Fibula, N. (2020). Exploring undergraduate students' perception toward the use of Duolingo in learning English. *Humanities & Social Sciences Reviews*, 8(3), 76–85. <https://doi.org/10.18510/hssr.2020.838>

- Irzawati, I., & Unamo, A. F. (2023). Students' perceptions and attitudes towards the utilization of Duolingo in EFL learning. *J-SHMIC: Journal of English for Academic*, 10(2), 123–138.
- Jaelani, A., & Sutari, D. R. (2021, January). Students' perception of using Duolingo application as a media in learning vocabulary. In *Bogor English Student and Teacher (BEST) Conference* (Vol. 2, pp. 40–47).
- Kusumaningrum, D. E., Wibowo, A., & Permanasari, A. (2020). Designing a mobile learning model with cognitive load considerations to improve learning outcomes. *International Journal of Emerging Technologies in Learning (ijET)*, 15(7), 76–88. <https://doi.org/10.3991/ijet.v15i07.13229>
- Maru, M. G., Kilmas, F., & Rombepajung, P. (2024). Students' perception of using Duolingo as a media for learning vocabulary. *SoCul: International Journal of Research in Social Cultural Issues*, 4(1), 1–12.
- Nafilah, S. A., Hamidi, S. R., Faruq, M., & Mufidah, N. (2024). Arabic language learning methods in the digital era. *Ijaz Arabi Journal of Arabic Learning*, 7(1). <https://doi.org/10.18860/ijazarabi.v7i1.17487>
- Nurhisyam, R., Usman, S., Agussatriana, A., & Rofiqoh, R. (2022). University students' perception in learning vocabulary through Duolingo. *E-Journal of ELTS (English Language Teaching Society)*, 10(3), 295–305.
- Permatasari, N., Lestari, I. A., & Fauziah, A. (2022). Short-term vocabulary retention through mobile-based flashcards: A preliminary study. *Jurnal Pendidikan Bahasa dan Sastra Indonesia Metalingua*, 7(1), 45–54. <https://doi.org/10.21107/metalingua.v7i1.14587>
- Purwanto, A. A. (2023). Students' perception on using Duolingo for learning English vocabulary. *Journal of English Teaching*, 9(1), 70–82. <https://doi.org/10.33541/jet.v9i1.4543>
- Rahardjo, M. (2011). *Metode pengumpulan data penelitian kualitatif*. Lembaga Penelitian UNY.
- Rijali, A. (2018). Analisis data kualitatif. *Alhadharah: Jurnal Ilmu Dakwah*, 17(33), 81–95. <https://doi.org/10.18592/alhadharah.v17i33.2374>
- Salsabila, T., Nafilah, N., Patangga, F., Zulfa, S., & Listyaningsih, N. (2024). Literature review: Efektivitas penggunaan aplikasi Duolingo terhadap motivasi belajar bahasa Inggris. *Jurnal Empati*, 13(4), 302–312.
- Solihah, S. A. (n.d.). *Students' perception of the use of Duolingo on improving English vocabulary*.
- Tabroni, I., Sutisna, A., Sobari, A., & Farhan, M. (2022). Duolingo app effect on Arabic speaking skills. *Jurnal Sosial Humaniora dan Pendidikan*, 1(2), 88–98.
- Tiara, A. D., Rahman, M. A., & Handrianto, C. (2021). The students' perception about use of Duolingo application for improving English vocabulary. *International Journal of Education, Information Technology, and Others*, 4(4), 690–701. <https://doi.org/10.5281/zenodo.5704319>
- Wahyudi, A. B. E., Salimi, M., Hidayah, R., Zainnuri, H., & Fajari, L. E. W. (2024). The improvement of students' creative and collaborative thinking skills by applying STEAM-integrated project-based learning. *Jurnal Iqra': Kajian Ilmu Pendidikan*, 9(1), 16–29. <https://doi.org/10.25217/ji.v9i1.2373>
- Wang, F., & Zhang, J. (2021). The role of descriptive statistics in early-stage educational research. *International Journal of Education and Practice*, 9(3), 120–132. <https://doi.org/10.18488/journal.61.2021.93.120.132>
- Winoto, D., Aditia, V. D., Sorisa, C., Priskila, R., & Pranatawijaya, V. H. (2024). Analisis sentimen pada ulasan pengguna terhadap aplikasi pembelajaran bahasa Duolingo: Menggunakan algoritma Naïve Bayes dan K-Nearest Neighbor. *JATI (Jurnal Mahasiswa Teknik Informatika)*, 8(3), 3230–3236.
- Yazid, A., Ma'arif, M. S., & Firdaus, M. A. (2023). The effect of Duolingo media application in improving Arabic vocabulary mastery of class VIII students at MTsN 6 Nganjuk. *Al-Wasil*, 1(1), 26–49.