

*Original Research*

## Leveraging MALL in Higher Education: Duolingo's Efficacy in Enhancing Language Learning Motivation

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### Abstract

The increasing use of digital technologies in education has transformed language learning by offering flexible and interactive methods that address the diverse needs of students. This study explores the effectiveness of Duolingo, a Mobile-Assisted Language Learning (MALL) application, in enhancing English learning motivation among non-English major students in higher education. At Universitas Muhammadiyah Buton, students from the accounting and management programs typically receive only 48 hours of formal English instruction throughout their academic careers, resulting in challenges in developing adequate language proficiency. To address these limitations, a quasi-experimental study was conducted, using a mixed-methods approach involving 56 students who participated in a six-week Duolingo-based self-study program. Quantitative data were collected through pre- and post-test questionnaires, analyzed using the Wilcoxon Signed-Rank Test, revealing a significant increase in motivation for 85.7% of the participants ( $Z = -5.999, p < 0.001$ ). Qualitative data, gathered from in-depth interviews, offered further insights into how Duolingo's specific features such as levels, leaderboards, personalized feedback, and competition enhanced student motivation and engagement. The findings indicate that Duolingo provides a flexible, self-directed learning environment that effectively supplements limited formal instruction, helping students stay motivated despite their busy schedules. The study concludes that integrating MALL applications like Duolingo into university curricula can address time constraints in language learning while promoting greater student autonomy, motivation, and engagement, particularly for non-English majors in resource-limited educational settings. Further research is recommended to examine the long-term effects of such applications on language proficiency.

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## 1. Introduction

The rapid development of digital technologies has transformed education, particularly in language learning. Mobile-Assisted Language Learning (MALL) is increasingly recognized for its potential to enhance learning outcomes by providing flexibility, accessibility, and personalized learning experiences. By allowing learners to engage with authentic materials and contexts, MALL facilitates a more practical and relevant language acquisition process, which is often missing in traditional classroom environments (Walsh, 2021). Its multi-sensory and personalized approaches have been shown to reduce cognitive load, making language learning more enjoyable and effective (Alzieni, 2021; Chen et al., 2019; Tayan, 2017). This flexibility is especially valuable in today's fast-paced educational settings, enabling learners to study at their convenience, regardless of time or location, and to accommodate diverse learning styles (Wu, 2015; Yuan, 2023). MALL tools enable students to learn anytime and anywhere, making language learning more adaptable to individual schedules and needs, especially for students with limited formal learning hours.

Research has demonstrated that MALL applications not only support language acquisition but also boost student engagement and motivation by providing a more interactive and user-driven learning environment. (Lăpădat, 2023; Poláková & Klímová, 2022; Vega, 2023a).

Motivation is a critical factor in successful language learning, especially in self-directed environments like MALL. Studies show that learners are more likely to persist and succeed when they are motivated, whether intrinsically (driven by personal interest) or extrinsically (driven by external rewards) (Gonzales, 2010; Richards, 2015). Intrinsic motivation, where learners pursue language learning for personal satisfaction or the joy of communication, can result in deeper engagement and long-term success (Mahendra et al., 2022). On the other hand, extrinsic motivation, driven by external rewards such as academic achievement, career advancement, or social recognition, also plays a significant role in encouraging learners to meet specific learning goals (Azhimia, 2023; Hussain, 2023). MALL applications, including Duolingo, leverage motivational techniques such as gamification, rewards systems, and real-time feedback to foster both intrinsic and extrinsic motivation (Infante-Paredes, et. al., 2024; Xodabande & Babaii, 2021). For example, features like levels, leaderboards, and badges provide external incentives, motivating learners to compete and achieve higher rankings, while personalized feedback and adaptive learning paths cater to individual learner progress (Cigdem et al., 2024; Xodabande, 2018). Such features align with learners' personal interests and goals, making the learning process both engaging and effective (Chen, 2015).

Several studies have highlighted the substantial impact of MALL tools in enhancing language learning outcomes. A systematic review by Mustaffa and Sailin (2022) found that MALL significantly enhances motivation by providing opportunities for learners to practice language skills in real-world contexts. This is further supported by Wulandari (2023), who demonstrated that using MALL applications like Quizlet enhanced vocabulary acquisition by enabling students to practice both inside and outside the classroom. Additionally, Amalia (2020) found that mobile applications not only boosted learners' enthusiasm for language learning but also improved pronunciation skills, further illustrating how MALL tools can address specific language needs. The autonomy afforded by MALL tools promotes greater student responsibility for their learning, which is linked to increased motivation and engagement (Habib et al., 2022). Darsih and Asikin (2020) also found that learners appreciate the flexibility and accessibility of MALL, which allows them to engage with language learning at their own pace. Despite the growing body of research on MALL, there is still limited exploration of its effectiveness for non-English major students, particularly in contexts where formal language learning hours are restricted.

Duolingo is one of the most widely used language learning applications worldwide, known for its user-friendly interface and extensive use of gamification elements such as leaderboards, streaks, and XP points, which help sustain user engagement (Kamsik, 2023; Shortt et al., 2021). In comparison to other MALL tools such as Memrise, Babbel, and Busuu, Duolingo stands out due to its accessibility and free-to-use model, making it particularly suitable for students with limited resources, especially in higher education contexts in developing countries like Indonesia (Ajisoko, 2020; Sadaf, 2023). Additionally, Duolingo's adaptive learning algorithm customizes learning paths based on the user's progress, offering personalized feedback and allowing students to work at their own pace, which is particularly beneficial for learners balancing academic and personal commitments (Permatasari & Aryani, 2023). This individualized approach, combined with its gamification features, makes Duolingo especially effective in fostering motivation among learners who may struggle with traditional, more rigid learning environments (Savvani, 2019; Apoko, 2023).

For non-English major students, the flexibility offered by Duolingo is particularly important, as they often face significant time constraints due to the focus on their major-specific courses, leaving little time for language studies (Ikawati, 2023). The option to engage in short, frequent learning sessions with Duolingo fits well into their busy schedules and aligns with the concept of microlearning, which emphasizes short but consistent learning sessions (Febrianti, 2024). This makes Duolingo an ideal tool to overcome the challenges of limited formal language instruction in higher education, such as the 48 hours of English classes provided throughout the entire academic program for non-English majors at Universitas Muhammadiyah Buton. By combining flexibility with gamification, Duolingo creates a motivating and enjoyable learning experience, helping students stay engaged and improve their language skills in a time-constrained environment (Mustaffa & Sailin, 2022; Shortt et al., 2021).

While the research on MALL has grown significantly in recent years, most studies focus on English majors or general student populations, leaving a gap in the literature regarding the impact of MALL on non-English major students, particularly in Indonesia. Non-English major students often face unique challenges

in learning English due to limited formal instruction and the demands of their primary field of study, which makes it difficult for them to dedicate sufficient time to language learning. Previous studies have explored the benefits of MALL for language acquisition, but few have specifically examined how MALL can address the motivational needs of students who are not primarily focused on language studies (Vega, 2023b).

Moreover, the use of Duolingo in the context of non-English major students in Indonesian universities, where formal English instruction is severely limited, has not been extensively studied. While much of the existing research has concentrated on the cognitive benefits of MALL tools, there is a lack of empirical evidence on how these tools impact student motivation, particularly in higher education contexts where language learning is not the central focus of the curriculum (Jeong, 2023). This study aims to fill this gap by focusing on the motivational effects of Duolingo among non-English major students who face significant time constraints. By doing so, it contributes new insights into the effectiveness of MALL in improving language learning motivation in a specific, under-researched student population.

## 2. Methodology

### 2.1 Research Design

This study employed a quasi-experimental design with a mixed-methods approach to assess the effectiveness of Duolingo, a MALL tool, in enhancing language learning motivation among non-English major students at Universitas Muhammadiyah Buton. A quasi-experimental design was chosen because it allows for the evaluation of interventions in real-world educational settings where randomization is not feasible. The pre-test and post-test model was used to measure changes in motivation and language proficiency before and after the six-week intervention with Duolingo.

### 2.2 Participants and Sampling

The sample consisted of 56 non-English major students enrolled in accounting and management programs at Universitas Muhammadiyah Buton. These students were selected using convenience sampling, which was deemed appropriate given the study's focus on students with limited exposure to formal English instruction. The selection of accounting and management students was significant due to their minimal English instruction (48 hours throughout the entire academic program), which made them ideal candidates to evaluate the potential of Duolingo as a supplementary language learning tool. While convenience sampling limits the generalizability of the findings, it allowed for a targeted investigation of Duolingo's effectiveness within this specific group.

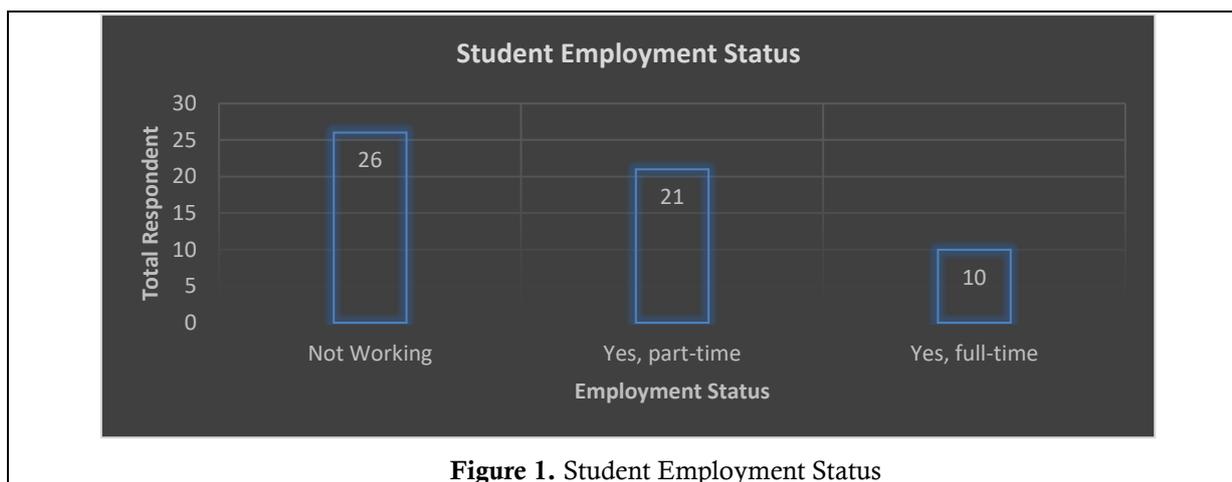


Figure 1. Student Employment Status

Based on the diagram above, it is shown that among the 56 respondents from the accounting and management programs at Universitas Muhammadiyah Buton, 26 students are unemployed, 21 are employed part-time, and 10 are employed full-time. The fact that most students have time constraints due to their work, particularly those who work part-time and full-time, highlights the importance of an intervention like Duolingo in this study. With the flexibility that Duolingo provides, students can remain engaged in English learning beyond the limited formal hours of instruction, which only cover 48 hours throughout their academic studies.

## **2.3 Data Collection Methods**

Data collection for this study utilized a mixed-methods approach, combining quantitative and qualitative data to provide a comprehensive evaluation of Duolingo's impact on language learning motivation and proficiency. Quantitative data were gathered through a pre-test and post-test questionnaire designed to measure changes in student motivation and language proficiency before and after the six-week intervention. The questionnaire included Likert-scale items adapted from established motivation and language learning instruments, ensuring both reliability and validity. To analyze these data, the Wilcoxon Signed-Rank Test was employed, chosen for its suitability in handling small sample sizes and non-parametric data distributions. In addition to the quantitative measures, qualitative data were collected through semi-structured interviews conducted with a subset of 15 students from the larger sample. These participants were selected to represent a range of experiences with Duolingo, ensuring diverse perspectives on its effectiveness as a language learning tool. The interview guide was carefully developed to explore students' perceptions of Duolingo's gamification features, their engagement levels, and how they integrated the app into their daily routines. To maintain consistency and reduce bias, a trained research assistant conducted all interviews following a standardized protocol, and the conversations were audio-recorded and transcribed verbatim for thematic analysis.

## **2.4 Instrument and Data Analysis**

The study utilized a combination of quantitative and qualitative instruments to gather comprehensive data on the effectiveness of Duolingo in enhancing language learning motivation and proficiency. Quantitative data were collected using a pre-test and post-test questionnaire, which included Likert-scale items adapted from validated instruments in language learning and motivation research to ensure reliability and validity. The questionnaires were designed to measure changes in student motivation and language proficiency before and after the six-week intervention with Duolingo. The Wilcoxon Signed-Rank Test was chosen for the analysis of quantitative data, as it is suitable for non-parametric data and small sample sizes, allowing for a robust comparison of pre-test and post-test scores.

For the qualitative component, in-depth semi-structured interviews were conducted with four students from the larger sample to gain deeper insights into their experiences with Duolingo's gamification features, motivation levels, and the integration of the app into their daily learning routines. The decision to interview only four students was made to enable a focused and detailed exploration of individual experiences while maintaining a manageable data set for in-depth analysis. This smaller sample size allowed for a more intensive examination of each participant's responses, ensuring that the nuanced perspectives on the impact of Duolingo were thoroughly captured. The students were selected to represent a range of language learning outcomes, from high to moderate and low levels of improvement, to provide a balanced view of how different users interacted with and benefited from the app. The interviews were audio-recorded, transcribed verbatim, and subjected to thematic analysis to identify recurring patterns and themes in the students' responses. NVivo software was used to facilitate the coding process, systematically organizing the data and enabling a detailed exploration of the students' engagement and perceptions of Duolingo as a language learning tool.

## **3. Results**

### **3.1 Duration and Frequency of Duolingo Use by Students**

Duolingo is one of the popular MALL applications among learners, offering a flexible and interactive learning method. Users can determine their own frequency and learning duration according to their available time. To understand the usage patterns of Duolingo among students, a survey was conducted with the respondents, covering their daily frequency and session duration. This survey provides a detailed description of how the respondents used Duolingo in their daily lives to learn English. Below is a detailed description of the survey results related to the frequency and duration of Duolingo use.

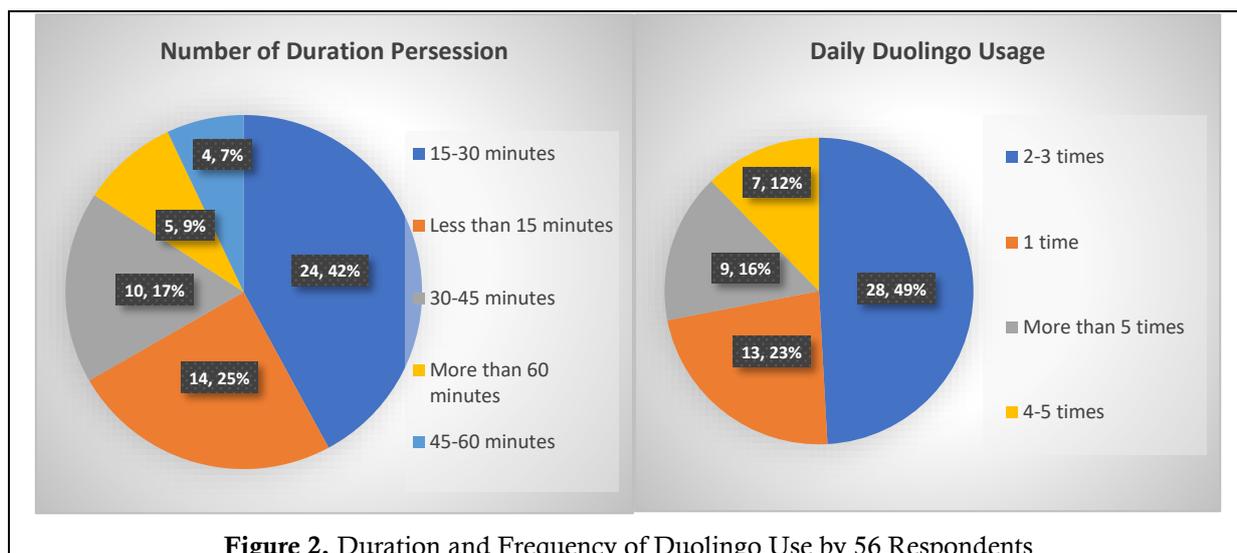


Figure 2. Duration and Frequency of Duolingo Use by 56 Respondents

According to the data collected, a significant portion of the respondents, specifically 50%, reported using Duolingo two to three times daily. The average duration of each session ranged from 15 to 30 minutes. When calculated, this results in an estimated total of approximately 0.94 hours, or roughly one hour, of Duolingo use per day. This segment constitutes the largest group in the dataset, clearly indicating a preference among the majority of respondents for multiple daily interactions with the app, even if each interaction is relatively brief.

This pattern of usage suggests a preference for a consistent yet fragmented learning strategy, where users engage in shorter but more frequent learning sessions. This method aligns well with the principles of microlearning, a pedagogical approach often promoted by language learning platforms like Duolingo. Microlearning emphasizes the benefits of brief, focused, and repeated learning interactions to enhance retention and overall learning effectiveness. In this context, the observed pattern indicates that users are likely leveraging the advantages of short yet regular study sessions to facilitate a more sustainable and effective language acquisition process over time.

### 3.2 The Impact of Duolingo on Student Motivation

One of the key aspects of technology-assisted learning is how applications affect student motivation, especially for those who are not majoring in language studies. Learning motivation plays a crucial role in the success of the learning process, particularly in the context of independent learning outside the classroom. Therefore, this study aimed to analyze the impact of using Duolingo on the learning motivation of non-English major students. By measuring changes in motivation before and after using the application, this study provides a clearer picture of the effectiveness of MALL in enhancing student motivation.

To understand the extent to which MALL through the Duolingo application affects the learning motivation of non-English major students, this study developed a hypothesis that was tested quantitatively. The hypothesis was as follows:

Hypotheses:

Ho: The use of MALL (Duolingo) does not have a significant impact on the learning motivation of non-English major students.

H1: The use of MALL (Duolingo) has a significant impact on the learning motivation of non-English major students.

Quantitative analysis using the Wilcoxon Signed-Rank Test below shows a significant difference in motivation after the use of Duolingo.

Table 1. Comparison of Motivation Ranks Before and After Using Duolingo

|                              |                | N               | Mean Rank | Sum of Ranks |
|------------------------------|----------------|-----------------|-----------|--------------|
| Motivasi_post - Motivasi_Pre | Negative Ranks | 4 <sup>a</sup>  | 7.75      | 31.00        |
|                              | Positive Ranks | 48 <sup>b</sup> | 28.06     | 1347.00      |
|                              | Ties           | 4 <sup>c</sup>  |           |              |
|                              | Total          | 56              |           |              |

a. Motivation\_post < Motivation\_Pre

b. Motivation\_post > Motivation\_Pre

c. Motivation\_post = Motivation\_Pre

According to the Wilcoxon Signed-Rank Test results shown in the “Ranks” table, 56 respondents were analyzed to assess differences in learning motivation before and after using the Duolingo application. The results showed that 48 respondents (85.7%) experienced an increase in motivation after using Duolingo, represented by the “Positive Ranks” category. The mean rank for this category was 28.06, with a total rank of 1347.00. This indicates that the majority of respondents experienced a significant increase in motivation, with not only a large number of respondents experiencing improvement but also higher-ranking scores compared to other categories.

On the contrary, only 4 respondents (7.1%) experienced a decrease in motivation after using Duolingo, as indicated by the “Negative Ranks” category. The mean rank for this category was 7.75, with a total rank of 31.00. This relatively low number and mean rank indicate that a decrease in motivation after using Duolingo was relatively rare and not statistically significant.

From this data, it can be concluded that using Duolingo generally contributed positively to increasing the learning motivation of non-English major students, with only a small fraction experiencing a decrease in motivation. These results support the hypothesis that Mobile Assisted Language Learning (MALL) through applications like Duolingo can be an effective tool for increasing learning motivation, particularly in the context of English language learning for non-English major students.

Table 2. Wilcoxon Signed-Rank Test Results for Changes in Motivation After Using Duolingo

| Test Statistic        | Value   |
|-----------------------|---------|
| Z-value               | -5.999  |
| p-value               | < 0.001 |
| Mean Rank (Increased) | 28.06   |
| Mean Rank (Decreased) | 7.75    |

The analysis using the Wilcoxon Signed-Rank Test (Table 2) indicates a significant difference in the motivation levels of non-English major students before and after using the Duolingo application. Based on the test statistics, the Z value obtained is -5.999, which signifies a notable difference between students' learning motivation before and after the intervention with Duolingo. This negative Z value highlights that a larger number of students experienced an increase in motivation (positive ranks) compared to those who experienced a decrease (negative ranks).

Additionally, the asymptotic significance (2-tailed) value of < 0.001 confirms that this result is statistically significant at the 0.05 significance level. With a p-value far below 0.05, we can confidently conclude that the observed increase in learning motivation after using Duolingo is not due to random chance but is indeed a real effect of the intervention. Therefore, these findings strongly support the hypothesis that using Duolingo significantly enhances the motivation to learn English among non-English major students.

### 3.3 Motivation and User Engagement

From the interviews with four students who participated in the Duolingo learning program, it was revealed that various aspects influenced their motivation and engagement in the learning process. These findings are organized into four main categories: user motivation, user engagement, learning settings, and competition. Students reported that gamification elements such as competition through leaderboards and the level-up feature significantly increased their motivation. User engagement was also evident from their active adjustment of learning settings according to individual needs, although some challenges, such as limited application features, posed obstacles. Overall, students' motivation and engagement in learning English through Duolingo showed improvement driven by various features provided by the application.

Figure 3 shows the results of thematic analysis using NVivo, which was conducted based on in-depth interviews with four students. From this analysis, four main themes emerged that are relevant to this study: user motivation, user engagement, learning regulation, and competition. Each of these themes reflects important aspects arising from the students' experiences with using the Duolingo app as a tool for learning English. This analysis provides a deeper insight into how each theme plays a role in enhancing the motivation of non-English major students using MALL technology. This figure visually depicts the relationship between these themes and the student interviews that have been coded in the qualitative data analysis process.

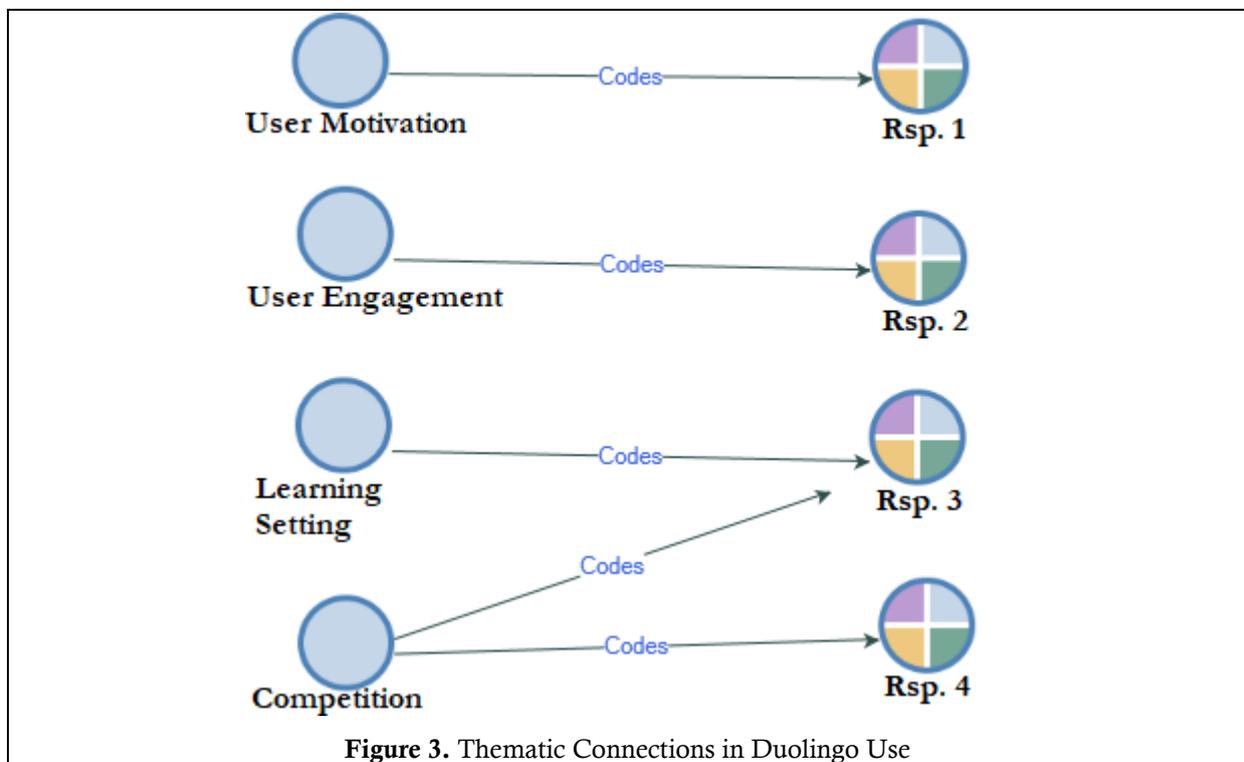


Figure 3. Thematic Connections in Duolingo Use

The visualization in Figure 3 illustrates the interconnection between the main themes of User Motivation, User Engagement, Learning Settings, and Competition with the interviews conducted with four students. User Motivation is represented by an interview with Respondent 1 (Rsp. 1), which reflects the key motivating factors in using Duolingo. User Engagement is depicted through an interview with Respondent 2 (Rsp. 2), showing how actively students engaged with the application. Learning Settings are linked with Respondent 3 (Rsp. 3), illustrating how students managed their time and strategies in using Duolingo. Meanwhile, Competition is related to an interview with Respondent 4 (Rsp. 4) and other interviews that highlight how competition elements in Duolingo enhance learning motivation. This visualization demonstrates how each theme is supported by interview data, providing a solid foundation for more in-depth qualitative analysis.

One of the aspects driving student motivation in using Duolingo is the variety of features offered by the application. One student stated:

*"My motivation in using Duolingo comes from its many features. For example, it has pronunciation training, and we are taught good English pronunciation. Duolingo also offers many new vocabulary words, and I gained a lot of new vocabulary from it."* [Respondent 1]

Features like pronunciation practice and the introduction of new vocabulary provide significant added value to their learning experience, ultimately enhancing overall learning motivation.

Students also indicated that Duolingo's structured learning approach, built through levels or stages, helped increase their motivation. One student described this experience by saying:

*"When studying on my own, it's usually not structured, kind of like studying haphazardly. But with Duolingo, there are levels, so every time we advance, the level also increases."* [Respondent 3]

Clear levels and progressively challenging tasks as users advance within the application make the learning process feel more structured and motivate students to continue learning and improving their English skills.

Some students noted that even though Duolingo contains many materials and units that could potentially cause boredom, they still managed to stay engaged by adjusting their study schedules. As one student revealed:

*"It gets boring sometimes because there are many parts, like six parts. Each part has up to 30 units or even up to 50 units. But I arranged it after work. I mean, I try to use it. I use my free time to play Duolingo."* [Respondent 2]

This demonstrates how users manage their time to stay engaged with the application, even when faced with the challenge of a large number of units. Flexible scheduling allows them to remain motivated and complete the course despite a busy daily routine.

Several students mentioned that competition elements in Duolingo, such as leagues and the XP system, were aspects they enjoyed:

*"What I liked was that Duolingo has leagues, so we can do exercises. If we get the highest XP, we can advance to the next levels. We can also compete with other people in Duolingo."* [Respondent 4]

This element not only made learning more enjoyable but also encouraged them to continue improving their skills to compete with other users. Moreover, students felt that the classroom feature, which allows them to see their classmates' rankings, increased their motivation to study harder:

*"The first thing is that we are put in one class, and there are XPs. We can see the rankings, which is also fun because we can track our classmates' progress. If one person is doing great and is at the top of the rankings, we don't want to be left behind, so we aim for the top ranking as well. It's exciting!"* [Respondent 4]

This competition sparks a desire to achieve higher rankings and strengthens their engagement in the learning process.

From the qualitative analysis, it is clear that Duolingo offers a range of features that significantly contribute to enhancing students' motivation to learn English. Among these, pronunciation training and the systematic introduction of new vocabulary are particularly noteworthy, as they provide students with the tools to improve both their speaking and comprehension skills in an engaging way. These features not only help in reinforcing the fundamental aspects of language learning but also add variety to the process, which is crucial in maintaining student interest. The platform's interactive approach appears to cater to diverse learning needs, enabling students to feel more confident and motivated as they progress. This is further supported by the tiered learning structure, which organizes content into levels of increasing difficulty. Such a structured pathway gives students a clear sense of direction while gradually presenting them with more challenging material as they advance, fostering a sense of achievement and motivating them to keep moving forward.

Further, the analysis also indicates that the extensive number of units and lessons can sometimes lead to feelings of monotony, as some students express boredom over the sheer volume of content they are required to complete. Despite this, many students remain engaged with the learning process by taking advantage of the flexibility that Duolingo offers. The ability to manage their own study time allows them to approach the lessons at their own pace, which seems to alleviate the potential for burnout. This flexibility

not only accommodates different schedules and learning styles but also empowers students to take ownership of their learning, ultimately contributing to sustained motivation and persistence in advancing through the language levels. Consequently, while the program's comprehensive nature might pose challenges in terms of volume, its user-friendly structure and flexible design appear to balance these issues, supporting students' language acquisition effectively.

Furthermore, competitive elements such as leagues and the XP points system add an appealing aspect, making learning more enjoyable and sparking competitive spirit among students. The classroom feature, which allows them to see their friends' rankings, also boosts motivation to study harder and strengthens their engagement in the learning process. Overall, Duolingo effectively combines learning and gamification elements to sustain and enhance the motivation of non-English major students

#### 4. Discussion

The findings of this study provide a comprehensive understanding of how Duolingo can effectively increase motivation among non-English major students through its unique features and learning design. The integration of quantitative and qualitative data revealed that Duolingo's impact on student motivation is both statistically significant and deeply rooted in its design elements. The quantitative analysis, using the Wilcoxon Signed-Rank Test, demonstrated a substantial increase in motivation levels, with 85.7% of participants reporting higher motivation and a Z-value of -5.999 indicating a significant shift in learning engagement. This statistical significance underscores the robustness of the test in handling small sample sizes and non-normal distributions, common challenges in educational research (Cvetković et al., 2020; Haidou & Sawilowsky, 2013; Kharkova & Grjibovski, 2014). These results align with previous studies highlighting the role of gamification and personalized feedback in fostering student engagement and creating a more interactive learning environment (Puspitasari, 2023; Sailer & Homner, 2019).

Qualitative data further reinforced these quantitative findings, revealing that students were particularly motivated by Duolingo's variety of features, such as pronunciation training, vocabulary expansion, and structured learning paths. One student expressed, "My motivation in using Duolingo comes from its many features. For example, it has pronunciation training, and we are taught good English pronunciation. Duolingo also offers many new vocabulary words, and I gained a lot of new vocabulary from it," [Respondent 1] which highlights the value these features add to the learning experience. This finding is consistent with research indicating that tools offering personalized learning opportunities significantly enhance student motivation by making learning more interactive and applicable to their language needs (Chen, 2015; Gardner & Yung, 2015). Additionally, Duolingo's structured approach to learning, which progresses through different levels and stages, provided further motivation for the students. One respondent shared, "When studying on my own, it's usually not structured, kind of like studying haphazardly. But with Duolingo, there are levels, so every time we advance, the level also increases" (Respondent 3). This feedback highlights the effectiveness of Duolingo's design in fostering a sense of progress and achievement. The clear progression through levels aligns with the gamification literature, which suggests that learners are more motivated when they can visualize their advancement and improvement over time (Xodabande & Babaii, 2021).

One of the most valuable aspects of Duolingo, as highlighted by students, was its flexibility, which allowed them to incorporate language learning into their busy schedules. Despite the potential monotony caused by the large number of units within the app, students managed to stay engaged by adjusting their study times. As one student explained, "It gets boring sometimes because there are many parts, like six parts. Each part has up to 30 units or even up to 50 units. But I arranged it after work. I mean, I try to use it. I use my free time to play Duolingo" (Respondent 2). This demonstrates how flexible scheduling enables students to maintain their motivation. Such findings are consistent with previous studies that emphasize the importance of flexibility in Mobile-Assisted Language Learning (MALL) tools, which allow learners to seamlessly fit their studies into their personal and professional routines (García Botero et al., 2021; Wu, 2015; Zeng & Fisher, 2024).

The competitive elements in Duolingo, such as leagues and the XP system, also emerged as significant motivators. One respondent mentioned, "What I liked was that Duolingo has leagues, so we can do exercises. If we get the highest XP, we can advance to the next levels. We can also compete with other people in Duolingo," [Respondent 4] reflecting how these features turned learning into a more engaging and enjoyable experience. Furthermore, students found the classroom feature, which allows them to track their classmates' progress, particularly motivating. As one student remarked, "We are put in one class, and there

are XPs. We can see the rankings, which is also fun because we can track our classmates' progress. If one person is doing great and is at the top of the rankings, we don't want to be left behind, so we aim for the top ranking as well," [Respondent 4]. This illustrates how competition and social interaction within the app create an environment where students are motivated not only by personal goals but also by a desire to perform well in relation to their peers, which is consistent with the literature on social learning and gamification (Karaaslan et al., 2018; Lister, 2015).

Moreover, the duration and frequency of Duolingo use by students played a critical role in sustaining motivation and improving language proficiency. The findings from this study indicated that students who engaged in short but frequent learning sessions showed higher levels of motivation compared to those who used the app less regularly. For instance, Respondent 2 mentioned how they tailored their learning around their work schedule, fitting in language practice during free time. This aligns with the concept of microlearning, which suggests that short, focused learning sessions are more effective for engagement and retention than longer, sporadic study periods (Xodabande & Babaii, 2021). Additionally, research supports that consistent interaction with learning tools is crucial for maintaining motivation and achieving long-term educational outcomes (García Botero et al., 2021; Wu, 2015). Despite the positive findings, some limitations need to be acknowledged. The study's qualitative aspect involved a small sample of four students, which may not reflect the broader student population. Additionally, focusing solely on Universitas Muhammadiyah Buton limits the generalizability of the results to other institutions. Future research should address these limitations by including a larger, more diverse sample and exploring different educational contexts to validate the findings.

The implications of these findings suggest that integrating tools like Duolingo into language curricula could significantly enhance student engagement and motivation, particularly in resource-limited educational contexts. By providing both educators and students with a scalable, gamified learning platform, Duolingo offers a practical solution to supplement traditional language instruction. It is crucial for educators to develop strategies that support self-directed learning and encourage consistent use of these digital tools to maximize their potential benefits in language education. Future studies should focus on conducting longitudinal research to assess the sustained impact of gamified learning tools like Duolingo on language proficiency and retention over time. Comparing Duolingo with other MALL tools such as Memrise or Babbel could also provide valuable insights into which features most effectively enhance motivation and learning outcomes. Further exploration into the integration of personalized learning paths and adaptive feedback mechanisms could reveal new approaches to optimizing student engagement and addressing individual learning needs in diverse educational settings.

## 5. Conclusion

This study provides clear evidence that Duolingo is an effective tool for increasing motivation among non-English major students, as demonstrated by both quantitative and qualitative data. The significant increase in motivation observed through the Wilcoxon Signed-Rank Test, with 85.7% of participants showing higher motivation levels, highlights the substantial impact of Duolingo's gamified features on student engagement. Qualitative insights further reinforced these findings, revealing that elements like pronunciation training, vocabulary expansion, structured learning paths, and competitive features such as leagues and XP points were key drivers of sustained motivation among students. These findings emphasize the dual benefit of combining intrinsic and extrinsic motivational strategies within digital language learning platforms, promoting both engagement and self-regulated learning.

The implications of these findings suggest that Duolingo can serve as a valuable resource for enhancing language learning, particularly in educational contexts with limited resources or time constraints. Integrating flexible and gamified learning platforms into traditional curricula can significantly support student motivation and engagement, creating more self-directed learning opportunities. While this study underscores the potential of Duolingo to supplement traditional language instruction and provide a scalable solution for diverse student groups, it also highlights some limitations. The small qualitative sample size and the specific educational context of Universitas Muhammadiyah Buton suggest that future research should explore these aspects more broadly. Comparative studies with other MALL tools like Memrise or Babbel, and further investigation into personalized learning paths and adaptive feedback mechanisms, could offer deeper insights into optimizing student engagement and motivation in varied educational settings. Ultimately, as digital education continues to evolve, leveraging innovative tools like Duolingo will be essential in shaping more accessible, personalized, and engaging language learning experiences across diverse learning contexts.

## 6. Acknowledgement

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