

Ubiquitous Language Learning with Duolingo: Effectiveness, User Perceptions, and Challenges

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Abstract

This study explores the effectiveness of Duolingo as a ubiquitous language learning tool by examining user perceptions, learning outcomes, and platform limitations. Based on survey data from 109 users, the findings show that Duolingo supports vocabulary acquisition and learner motivation, particularly for beginners and lower-intermediate users. However, its limited support for grammar depth, oral proficiency, and advanced-level learning restricts its broader pedagogical value. The study highlights the need for differentiated content, improved feedback systems, and AI-driven features to enhance user engagement and learning depth. Pedagogical implications suggest using Duolingo as a supplementary tool in formal education. Future research should adopt longitudinal or ethnographic methods to assess sustained learning outcomes in mobile-assisted contexts.

Keywords: Duolingo; mobile learning; gamification; language acquisition; user perception.

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1. INTRODUCTION

Ubiquitous language-learning media are no longer a novelty—they have become a central part of education, transforming how learners interact with languages. One such medium, Duolingo, has achieved widespread recognition due to its gamified structure, accessibility, and simple interface. However, questions remain about its depth and long-term effectiveness, particularly in developing advanced language skills. These concerns have inspired a growing body of research. For instance, Burston (2015) observed that mobile-assisted language learning, including platforms like Duolingo, often yields measurable gains, particularly in early-stage language acquisition. Similarly, Vesselinov & Grego (2012) reported notable progress among Duolingo users in vocabulary building and foundational language skills. The role of design in driving these outcomes cannot be overlooked. Studies by Dicheva, Dichev, Agre, & Angelova (2015) and Hamari, Koivisto, & Sarsa (2014) highlight how gamified features, such as rewards and challenges, enhance learner motivation in ways traditional methods might struggle to replicate. Adding to this conversation, Cózar-Gutiérrez & Sáez-López (2016) examined the behavioural reinforcements embedded in gamified platforms like Duolingo, which sustain user engagement. A specific example is Duolingo's streak system, analysed by Hanus & Fox (2015), which encourages daily use by leveraging consistent reinforcement. Collectively, these studies illustrate how platforms like Duolingo have reshaped language learning, making it a regular habit for millions of users.

However, the platform's limitations are also well-documented. Heil, Wu, Lee, & Schmidt (2016) questioned whether Duolingo's focus on vocabulary and grammar necessarily translates into broader language proficiency, particularly in productive skills such as speaking and writing. Furthermore, Demouy, Jones, Kan, Kukulska-Hulme, &

Eardley (2016) noted that while the gamified approach may be engaging, it might not adequately prepare learners for the cultural and practical demands of real-world language use. These perspectives highlight the need for a nuanced evaluation of Duolingo's strengths and weaknesses.

This study, therefore, builds on the existing body of research to deepen our understanding of Duolingo's educational outcomes. Specifically, it addresses the following research questions:

- What educational outcomes are associated with Duolingo use?
- How do users perceive Duolingo's effectiveness in enhancing language skills?
- What challenges do learners face when using the platform?

The rationale for this investigation lies in Duolingo's significant influence on language education and its potential to shape the future of ubiquitous learning. Through a survey-based approach, this research aims to contribute fresh insights into the capabilities and constraints of digital language learning tools, enriching the broader discourse on educational technology.

2. A Review of Related Literature

2.1 Theoretical Frameworks for Ubiquitous Learning

Ubiquitous learning, or u-learning, is reshaping the educational landscape by challenging traditional learning models. It breaks free from the usual limitations of time and place in education by leveraging wireless communication and mobile technology. Hwang et al. (2008) describe u-learning as a transformative method that allows learners to access educational content through digital platforms. This approach positions learning as a flexible, context-responsive process occurring "anytime, anywhere" (Dirin & Nieminen, 2015). U-learning builds on the foundations of e-learning and m-learning, but it goes

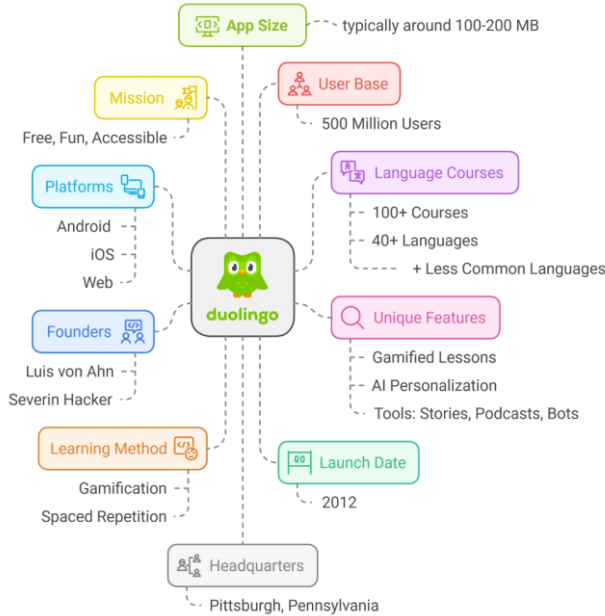
further by incorporating features like context-awareness and adaptability (Sampson & Zervas, 2013; Wong & Looi, 2011). These characteristics make u-learning particularly effective for language learning.

Yet, recent studies have introduced more critical viewpoints. Zhao & Lai (2023) highlight that while these platforms are effective for vocabulary acquisition and retention, they often fall short in developing more complex language skills, such as pragmatic fluency and cultural understanding. The adoption of gamification has also considerably transformed language learning methods. Apart from the above attributes, these games use the insertion of features like achievement streaks, leaderboards, and digital badges to help learners in sustaining their motivation and accessibility (Dichev & Dicheva, 2017; Loewen, 2020). Researchers (e.g., Ranalli et al., 2018) point out that gamified systems of learning may emphasize task completion instead of developing language proficiency. This gives emphasis on fast-paced results which hinder deeper learning such as precise grammar adoption and real-life conversational skills (Dicheva et al., 2015).

Although gamification helps in alleviating anxiety and motivating learners to engage freely, it also brings with it some significant cons. The familiarisation of these elements might make them less appealing with time (Zhao & Lai, 2023). Duolingo and other similar applications have to handle the complexity of balancing between the fun and motivating parts of the users' experience and at the same time, making sure that the users have gained the necessary thorough skills. Looking to the future, language learning technologies will require a new approach that includes more than just surface-level interaction ideas. The goal should be to create adaptive systems that genuinely support long-term language development, integrating features that promote deep, meaningful learning experiences rather than just gamified interactions.

2.2 Duolingo in the Context of Ubiquitous Learning Media

Fig.1. Duolingo Fact Sheet



Source: (produced by the author using [Napkin Ai](#))

Launched in 2012 by Luis von Ahn and Severin Hacker, Duolingo has established itself as a leading tool for language learning, boasting millions of users worldwide. Its design and interface incorporate a range of tools that align with the core tenets of ubiquitous learning media (ULM), including:

- **Gamification Elements:** Features such as streaks, skill trees, and virtual rewards (e.g., lingots) incentivise consistent use and goal-setting, encouraging learners to remain active on the platform.
- **Accessibility:** The application is available on multiple platforms, including Android, iOS, and web browsers, enabling users to engage with lessons anytime and anywhere.

- **Adaptability:** Algorithms adjust the difficulty and sequence of lessons based on user performance, ensuring that content remains relevant and appropriately challenging.
- **Immediate Feedback:** Corrective mechanisms provide real-time responses to user input, reinforcing learning through repetition and positive reinforcement.

Fig.2.: Duolingo App Interface



Source: (Behance, 2024)

Furthermore, the app's popularity stems from its ability to make language learning accessible and enjoyable. By gamifying the learning process and offering a cost-free basic version, the app democratises education, reaching a global audience. Research has demonstrated that consistent use of Duolingo can yield significant improvements in vocabulary acquisition and reading comprehension, comparable to outcomes achieved through traditional classroom instruction (Vesselinov & Grego, 2012). However, its reliance on repetitive, translation-based exercises has drawn criticism. Said & Ismail (2023) observed that:

Duolingo is suitable only for beginner and intermediate levels when it comes to teaching content aspects, where it concentrates on teaching the fundamentals of the language and may not include more advanced or nuanced aspects [

does not offer live feedback from actual educators, only automatic feedback on the activities that are currently accessible (p.06).

Although Duolingo has dominated the market through gamification and free accessibility, platforms like Rosetta Stone and Babbel offer contrasting pedagogical approaches that warrant deeper analysis. Rosetta Stone, established in the early 1990s, relies on an immersive, inductive method that eliminates translation and instead uses visual association and repeated exposure to teach language intuitively (Godwin-Jones, 2011). This aims to replicate first-language acquisition by integrating speech recognition tools and listening-focused drills. Babbel, on the other hand, incorporates structured grammar explanations and situational dialogues rooted in real-life communication scenarios. It offers lessons that are contextually adapted to users' native language and learning goals (Loewen et al., 2020; Vesselinov & Grego, 2016).

In terms of the future directions for Duolingo, recent advancements, such as the integration of generative AI through features like the AI-powered "Lily" assistant, demonstrate Duolingo's commitment to enhancing its educational offerings. These developments hold the potential to address some of the platform's current limitations, such as conversational practice and contextual language use, which pave the way for more comprehensive learning experiences. Recent research also suggests that personalised, adaptive content may offer a more effective learning experience, mainly for advanced skills. Cui and Sachan (2023) prove how AI-powered systems can dynamically adjust exercises based on learner performance, thereby increasing relevance and long-term retention. Such level of adaptation is currently underdeveloped in Duolingo especially in areas like speaking and contextualised grammar use. In addition, cultural immersion remains another major shortfall. As

Tafazoli (2024) argues, successful digital language learning tools must integrate culturally authentic content to promote intercultural competence and pragmatic fluency, both areas where Duolingo offers minimal support.

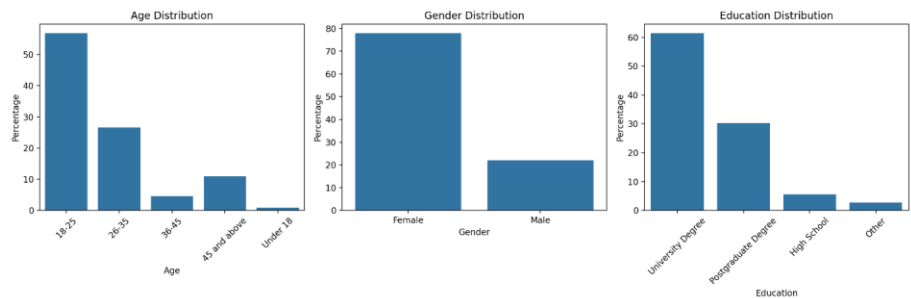
3. 3. Methodology

3.1 Participants

This study targeted active users of Duolingo to explore their experiences, perceptions, and learning outcomes. The sample consisted of 109 participants, recruited through purposive and convenience sampling techniques. Participants were drawn from online communities, including language learning-focused Facebook groups such as "1001 Languages" and "علاياك لغات | dz LANGUES". The selection criteria included individuals who had used Duolingo for at least three months to ensure familiarity with the platform.

The demographic profile of the participants reflected diversity in age, gender, and educational backgrounds. The participants were predominantly young adults (18-25 years old), with a significant female majority (approximately 3:1 ratio). Over 90% of the respondents had university or postgraduate degrees. While this sampling approach may introduce some biases, the diverse demographic profile of the participants helped to capture a range of perspectives.

Fig.3. Participants' profiles



Source: (Author's analysis of survey data)

3.2 Research Design and Instruments

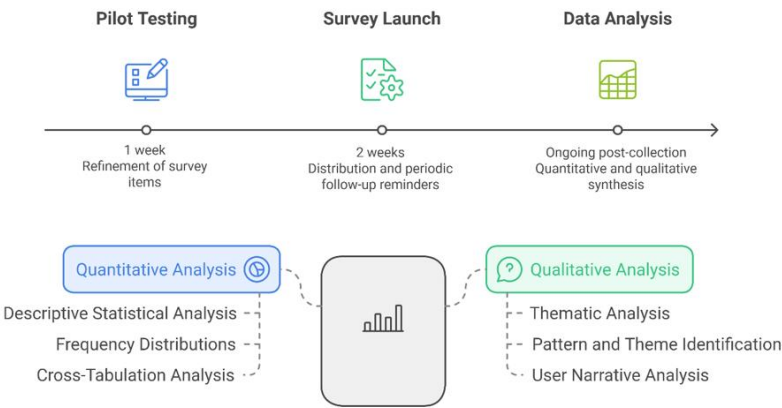
This research employed a cross-sectional survey research design to address its exploratory and descriptive objectives. The survey instrument consisted of a semi-structured online questionnaire that included both closed-ended and open-ended questions. To ensure accessibility and accommodate participant preferences, the questionnaire was available in both English ([here](#)) and Arabic ([here](#)). It comprised three sections:

- **Demographic Information:** Questions on age, educational background, and language-learning goals.
- **Usage Patterns and Perceptions:** Likert-scale items measuring frequency of use, satisfaction levels, and perceived skill improvement.
- **Open-Ended Questions:** Designed to capture nuanced insights into user experiences and the challenges encountered.

3.3 Research Procedures

The research was conducted in three phases, as demonstrated in the following figure:

Fig. 4. Survey Design, Launch, and Analysis Workflow



Source: (produced by the author using [Napkin Ai](#))

To meet its objectives, this study employed a cross-sectional survey design, integrating thematically analysed open-ended responses to capture qualitative insights into user experiences. Although limited in scope, these qualitative data enriched the quantitative findings by revealing patterns in motivation, perceived effectiveness, and challenges with the platform. The reliance on descriptive statistics aligns with the study’s exploratory aim; inferential techniques were deliberately excluded to avoid overextending conclusions beyond the data. Nonetheless, the absence of in-depth interviews and longitudinal tracking represents a methodological limitation. Future research should adopt a mixed-methods approach, combining large-scale surveys with semi-structured interviews and longitudinal data collection to enable deeper analysis of learner trajectories and a more robust understanding of how Duolingo supports or constrains different aspects of language development across user groups.

4. Results Analysis and Interpretation

4.1 Usage Patterns

Table 1. Distribution of Language Learning Choices

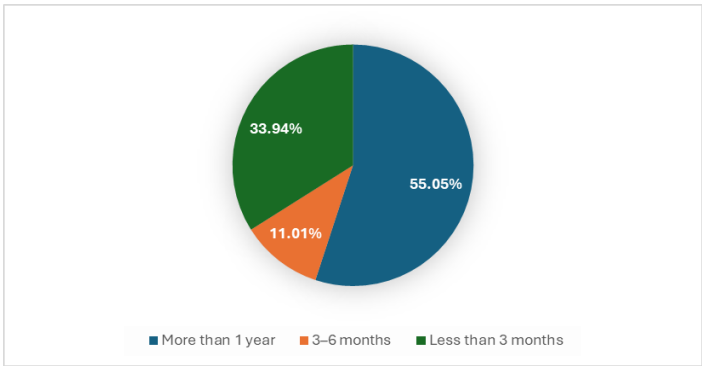
Language	Frequency	Percentage (%)
English	40	20.51
Spanish	22	11.28
German	14	7.18
French	13	6.67
Italian	12	6.15
Russian	3	1.54
Japanese	2	1.03
Other (Combined)*	11	5.64

*Includes lesser-studied languages (e.g., Arabic, Portuguese, Korean).

Source: (Author’s analysis of survey data)

The survey found that English (20.51%) and Spanish (11.28%) are the most frequently studied languages, followed by German (7.18%), French (6.67%), and Italian (6.15%). The prominence of English and Spanish reflects their global status as widely spoken languages in demand for academic, professional, and travel purposes. The popularity of German and French likely reflects regional and cultural interests. The lower uptake of less commonly studied languages, such as Russian (1.54%) and Japanese (1.03%), may suggest a perceived lack of utility or learning challenges within the sample population.

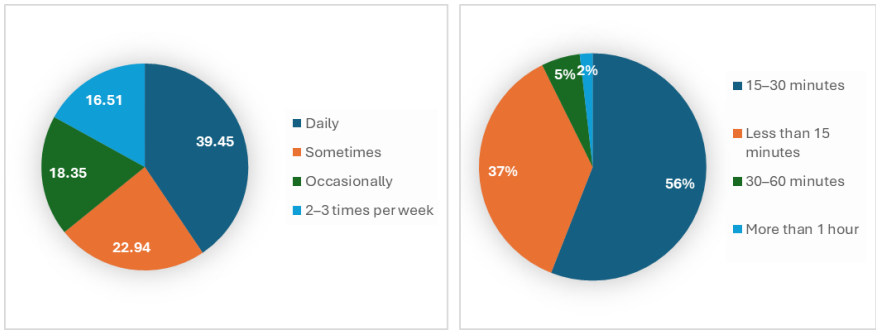
Fig. 5: Distribution of Time Periods



Source: (Author’s analysis of survey data)

The pie chart shows that 55% of respondents have used Duolingo for over a year, indicating a substantial base of long-term users. However, the 33.94% of users with less than three months of engagement may signal potential attrition among newer users, and this warrants further investigation.

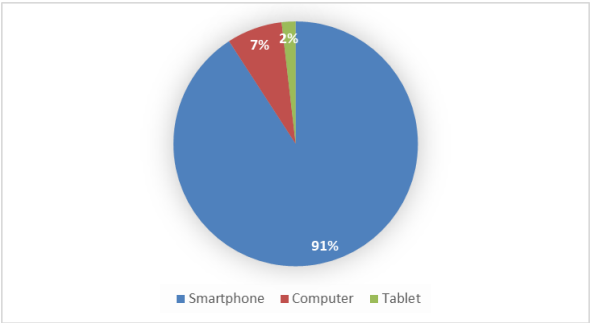
Fig. 6. User Duration and Session Length on Duolingo



Source: (Author’s analysis of survey data)

Fig. 6 shows that a significant portion of users engage with Duolingo daily, and session durations typically range from 15 to 30 minutes.

Fig. 7. Device Preference for Duolingo

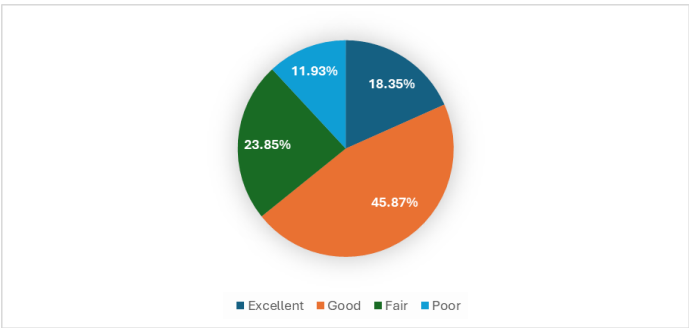


Source: (Author’s analysis of survey data)

With over 90% of respondents using smartphones as their primary access device, Duolingo's mobile optimization is clearly key. This likely reflects the accessibility and convenience of mobile learning, especially among younger, tech-savvy populations driving the global trend toward mobile educational applications.

4.2 User Experience and Perceived Effectiveness

Fig. 8. User Experience Summary

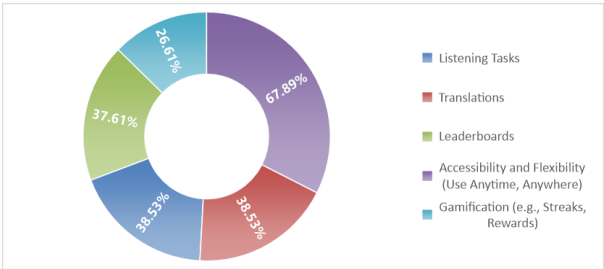


Source: (Author’s analysis of survey data)

Duolingo's user experience ratings present a mixed picture. While a substantial majority (64%) rated their experience as "Good" (46%) or "Excellent" (18%), a notable portion found it only "Fair" (24%) or "Poor" (12%).

(24%) or "Poor" (12%). Key challenges identified by users include insufficient in-depth explanations (33.03%), limited opportunities for speaking practice (21.10%), and repetitive content (19.27%).

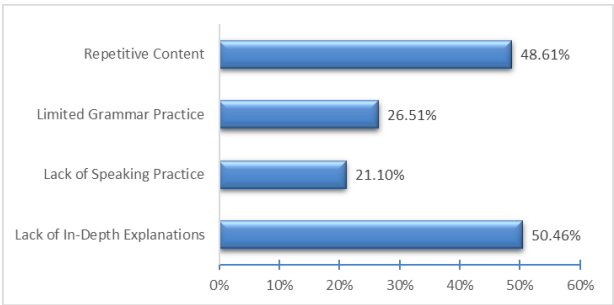
Fig. 9. Breakdown of Duolingo Users' Favourite Features



Source: (Author's analysis of survey data)

Figure 9 summarizes the most beneficial features for users. Listening tasks and translation exercises (38.53% each) are particularly appreciated for their practical application to language learning. Gamification elements, such as leaderboards (37.61%) and other motivational tools (26.61%), are also highly valued for promoting engagement and sustained interest. Duolingo's accessibility was also highlighted as a major advantage by 35.78% of respondents.

Fig. 10. Common Issues with Duolingo



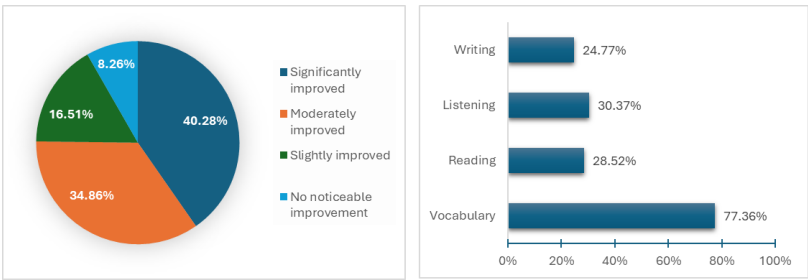
Source: (Author's analysis of survey data)

Respondents consistently identified challenges in grammar explanations (33.03%) and speaking practice (21.10%). These gaps

reflect Duolingo's reliance on automated feedback and repetitive exercises.

4.3 Perceived Effectiveness and Skill Development

Fig. 11. Perceived Effectiveness and Skill Improvement Through Duolingo

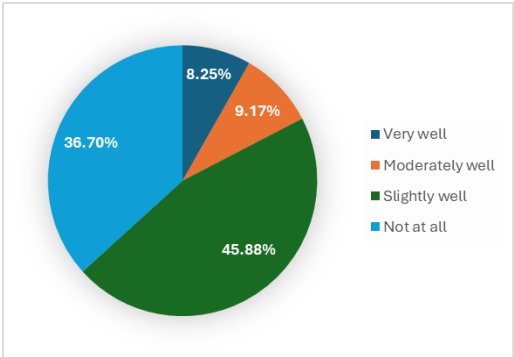


Source: (Author’s analysis of survey data)

The figure indicates that while 40% of users did not see significant improvement, 35% reported moderate progress, and 17% noted slight improvement. Only 8% experienced substantial gains. Thus, the platform is most effective for intermediate learners. As also shown in Fig. 11, users reported improvements primarily in vocabulary acquisition and basic comprehension. However, challenges in conversational fluency and grammar highlight gaps in Duolingo's ability to deliver a comprehensive language learning experience.

4.4 Preparation for Real-World Communication

Fig. 12. Perceived Real-World Application

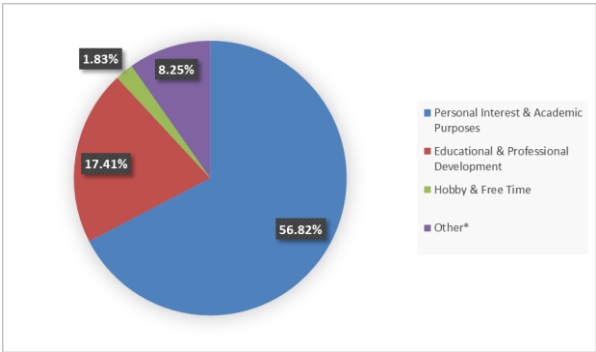


Source: (Author’s analysis of survey data)

As demonstrated in Fig. 12, users had mixed opinions on Duolingo’s real-world applicability. While Duolingo’s microlearning design is effective for casual contexts, users frequently reported its inability to address conversational complexity or cultural integration.

4.5 Motivational Factors

Fig. 13. Duolingo User Motivations



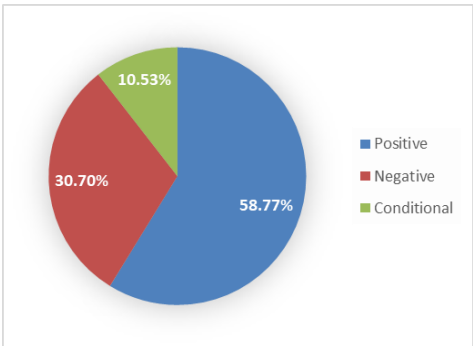
Source: (Author’s analysis of survey data)

Fig. 13 summarizes the primary user motivations. Personal interest and academic goals were the most common reasons (56.82%). Educational and professional development (17.41%) and other

motivations, such as travel preparation and language practice, also played significant roles.

4.6 User Recommendations

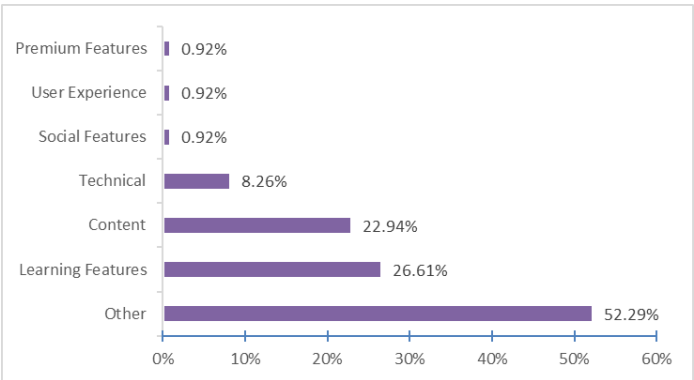
Fig. 14. Thematic Analysis of Recommendations



Source: (Author’s analysis of survey data)

Fig. 14 presents a categorization of user recommendations into positive, negative, and conditional sentiments. Positive feedback (58.77%) emphasized the app's engaging design, accessibility, and effectiveness in facilitating language learning. Negative feedback (30.7%) highlighted limitations, such as limited speaking practice and repetitive content. Conditional recommendations (10.53%) suggested using Duolingo as a supplementary tool to enhance language learning experiences.

Fig. 15. User Feedback Analysis



Source: (Author’s analysis of survey data)

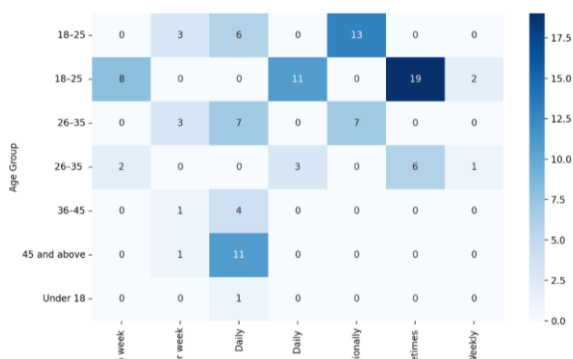
User feedback analysis revealed the following areas for enhancement:

- **Content Diversification:** 22.94% of users requested advanced lessons, cultural integration, and domain-specific vocabulary.
- **Enhanced Learning Features:** Suggestions included improved speaking exercises, comprehensive grammar explanations, and expanded writing tasks.
- **Technical Optimization:** While mentioned by 8.26% of respondents, app performance, bugs, and offline functionality require improvement.
- **Social Features:** Users recommended incorporating language exchange partnerships and community-based activities to foster collaboration.

4.7 Cross-Tab Analysis

- **Demographics and Usage Patterns**

Fig. 16.Age vs Frequency of Use



Source: (Author's analysis of survey data)

Younger adults (18–25) are the most active users, accessing Duolingo 2–3 times per week. Adults aged 26–35 use the app daily, while older age groups (36–45 and 45+) use it more occasionally. Analysis of session duration and skill improvement shows that 15–30 minute sessions yield the most significant progress. Shorter sessions (under 15 minutes) offer moderate benefits, while longer sessions (over 30 minutes) correlate with substantial improvement but are less common.

• Challenges, Features, and Effectiveness

Fig.17. Educational Level vs Challenges Faced

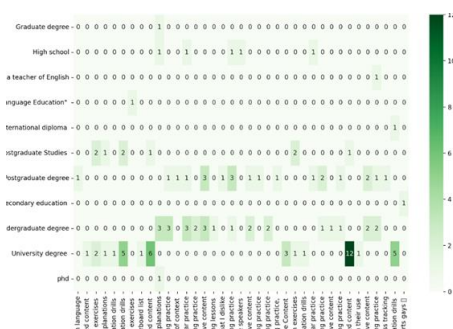
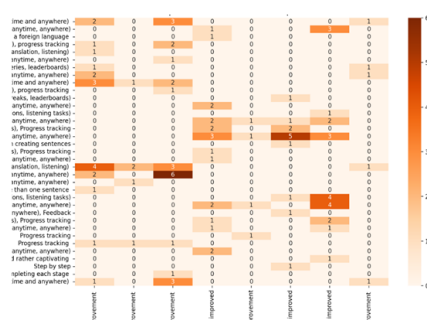


Fig. 18. Most Helpful Features vs Extent of Skill Improvement



Source: (Author’s analysis of survey data)

Users from diverse educational backgrounds faced similar challenges, primarily a lack of detailed explanations and limited opportunities for conversational practice. University graduates, however, specifically desired more advanced conversation drills and grammar exercises. Perceived skill improvement strongly correlated with engagement with specific features: users who actively used accessibility features, interactive tools, and daily practice reported greater progress.

• Motivation Patterns and Learning Outcomes

Fig. 19. Motivation Patterns and Learning Outcomes



Source: (Author’s analysis of survey data)

The analysis shows that different motivations correlate with varying learning outcomes. Learners motivated by personal growth and career advancement demonstrated the most significant skill improvement, while those driven by cultural curiosity and travel goals also showed consistent progress. Learners motivated primarily by academic requirements, however, experienced more varied results.

2. Discussion

This exploratory study provided substantial insights into user engagement with Duolingo, including perceived effectiveness and

areas for improvement. Gamification (through features like streaks, leaderboards, and virtual rewards) emerged as a key motivator (Dichev & Dicheva, 2017; Loewen, 2020). However, motivational structures alone do not guarantee linguistic progress, particularly if they prioritise task completion over genuine communicative competence (Ranalli et al., 2018).

Critically, user feedback and data analysis revealed a lack of differentiation across proficiency levels. Duolingo is particularly effective for beginners (A1–A2 levels), providing a structured and low-barrier introduction to vocabulary and basic grammar through short, engaging sessions (Vesselinov & Grego, 2012; Loewen et al., 2020). Intermediate users (B1 level), however, begin to encounter limitations. Repetitive content, lack of syntactic complexity, and minimal contextual variation reduce the platform’s ability to support deeper grammatical mastery or discourse-level comprehension. For advanced learners (B2–C1), the platform offers little in terms of pragmatic fluency, idiomatic usage, or spontaneous interaction. As Zhao & Lai (2023) and Tafazoli (2024) observe, the absence of real-world communication tasks or culturally embedded content hampers development at these levels.

This plateau effect is compounded by the platform’s over-reliance on translation exercises and decontextualised vocabulary drills. Furthermore, the system’s inability to adapt content based on CEFR-aligned proficiency stages restricts its effectiveness as a standalone solution for long-term language development. These findings align with Krashen’s (1982) affective filter hypothesis: although Duolingo may lower anxiety and sustain engagement, it cannot replace meaningful interaction and input-rich environments necessary for advanced acquisition.

To enhance the platform, users suggested improvements such as AI-powered conversational tools, culturally relevant materials, grammar-focused paths, and real-time interaction capabilities. These are essential if Duolingo aims to move beyond a gamified supplement and function as a serious pedagogical tool across the proficiency spectrum.

3. Conclusion

This study confirms that Duolingo is most effective as a supplementary language learning tool, precisely for beginners and lower-intermediate learners. Its gamified interface, mobile accessibility and short-session design bolster vocabulary retention and habit formation, which make it attractive for learners with limited time or formal instruction. However, the platform's pedagogical depth remains insufficient for intermediate and advanced users, who require more nuanced grammar explanations, pragmatic competence, and interactive speaking opportunities. Pedagogically, these findings suggest that Duolingo can be meaningfully integrated into formal education settings when used to reinforce foundational skills or to complement classroom instruction. Teachers can employ the app to support out-of-class learning, motivate practice through gamified engagement, or track student progress via usage analytics. But, its use must be framed critically: it cannot substitute structured instruction or rich communicative tasks essential for higher-order language development.

The study also points toward several concrete areas for platform enhancement. Greater AI integration could enable real-time speech feedback, dynamic error correction, and context-sensitive grammar support. Also, including oral proficiency modules (e.g. scenario-based speaking tasks or peer interaction simulations) could notably expand Duolingo's scope. In terms of research, future studies should adopt longitudinal or ethnographic approaches to capture how mobile-assisted tools like Duolingo shape learner trajectories over time.

particularly in non-Western or multilingual contexts. Exploring user behaviour, motivation, and dropout patterns over extended periods would provide deeper insights into the sustainability and educational value of such platforms.

Overall, Duolingo offers a compelling, accessible entry point into language learning. Yet to move from a popular app to a pedagogically sound learning environment, it must evolve—addressing gaps in speaking practice, linguistic complexity, and learner differentiation. Only then can it serve not just as a habit-forming tool, but as a robust partner in the language acquisition process.

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