Mobile-Assisted Vocabulary Learning through Duolingo: Insights from Indonesian University Students across Disciplines

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Abstract

This study investigates how students from different academic disciplines experience vocabulary learning through Duolingo, a mobile-assisted language learning (MALL) application. Unlike previous research that predominantly focuses on quantitative outcomes, this study foregrounds individual learning experiences and disciplinary variations among Indonesian university students, a context rarely explored in international scholarship. Using a qualitative multiple case study design, data were collected from ten students at Universitas Muhammadiyah Jakarta across five disciplines: Automotive and Heavy Equipment Engineering, Social Welfare, Communication, Primary School Teacher Education, and two postgraduate programs (Hospital Administration and Educational Technology). Data sources included four-week usage observations, activity logs, in-depth interviews, and reflective journals, analyzed thematically and comparatively across cases. Findings indicate that disciplinary background shapes engagement patterns and learning strategies. Engineering students display instrumental and goal-oriented behaviors, social science students engage interactively with gamified features, teacher education students integrate pedagogical perspectives, and postgraduate learners employ metacognitive strategies. Shared challenges include sustaining motivation, contextual limitations of vocabulary, and technical constraints. Overall, Duolingo enhances learner autonomy and provides flexible, personalized support that complements formal instruction. This study contributes to applied linguistics and educational technology by highlighting the role of disciplinary contexts in shaping MALL experiences and offering insights for curriculum design and language policy.

INTRODUCTION

English has become one of the most essential academic competencies in the era of globalization and digitalization of higher education. In Indonesia, vocabulary mastery serves as a fundamental basis for students to comprehend academic texts, write scholarly works, and communicate within international contexts. However, in practice, many students continue to face challenges in expanding and retaining their English vocabulary effectively (Ferdinandus & Simantuak, 2024; Hendrikus et al., 2024). Vocabulary learning in classrooms tends to be conventional, emphasizing memorization while rarely providing opportunities for autonomy or contextualized learning experiences. In this regard, the emergence of Mobile-Assisted Language Learning (MALL) offers a promising alternative. One of the most popular applications in this domain is Duolingo, known for its gamified approach and its ability to

provide engaging and flexible learning experiences (Alek et al., 2022; Saddhono et al., 2023). Nevertheless, the extent to which Duolingo genuinely facilitates vocabulary acquisition among Indonesian university students across different disciplines remains an underexplored question.

The higher education context in Indonesia presents unique challenges. Students from various disciplines, engineering, social sciences, communication, and primary education, possess distinct needs, learning styles, and academic orientations (Kurniawan & Sabila, 2021; Selvi, 2025). In practice, English instruction at the tertiary level often follows a uniform pattern that overlooks these interdisciplinary differences. Yet, as noted by Fitayanti et al. (2024) and Karimah et al. (2025), vocabulary acquisition is strongly influenced by the context of use and learner motivation. Conversely, MALL allows for personalization and adaptation to individual needs. Mustaffa and Sailin (2022) and D. F. Pratiwi et al. (2024) emphasize that mobile-based learning enhances engagement, autonomy, and continuity of learning beyond the classroom. However, most MALL studies in Indonesia remain focused on quantitative measures such as test score improvements, while students' cross-disciplinary learning experiences and subjective reflections have received limited attention (Figueiredo, 2023; Sabani et al., 2025).

A growing body of international research highlights Duolingo's potential as a medium for vocabulary learning. For instance, Hadi (2023) and Vega et al. (2023a) demonstrated that regular use of Duolingo can lead to significant gains in vocabulary mastery among foreign language learners. Similarly, Dewi et al. (2025) and Kartika et al. (2024) noted that gamification features such as points, levels, and digital rewards sustain learner motivation. However, most of these studies were conducted in European and American contexts, where the target language is embedded in more authentic environments. In Indonesia, particularly among non-language majors, learning experiences with Duolingo may differ due to limited opportunities for authentic English use in daily life (S. A. Pratiwi & Firdaus, 2025; Suherman et al., 2025). Therefore, it is crucial to explore how Indonesian students from diverse academic backgrounds interpret, negotiate, and adapt to this digital learning system.

Previous literature has affirmed MALL's relevance in vocabulary learning while also noting its accompanying challenges. Studies by Katemba (2021) and Solihin (2021) indicate that while mobile applications expand learning opportunities, their effectiveness largely depends on learner autonomy and consistent study habits. Likewise, Mortazavi et al. (2021) and Vega et al. (2023b) underscore the importance of intrinsic motivation in sustaining long-term engagement with language learning apps. Mutiaraningrum and Nugroho (2021) further highlight that social factors, such as peer support and online communities, can enhance vocabulary retention through interaction and feedback. On the other hand, some studies reveal that gamified applications do not always yield significant learning outcomes if users lack appropriate learning strategies (Arsai & Arsai, 2024; Maspaitella & Afdhal, 2024). These findings suggest that individual and contextual factors, including academic background and technological perception, play a crucial role in determining MALL's effectiveness.

In the Indonesian context, studies by Malage and Watini (2024) and Saputra et al. (2023) indicate that students tend to use Duolingo sporadically, driven more by curiosity than by long-term learning commitment. Conversely, Andriani et al. (2022) and Hartono and Prima (2021) found that students in education and communication disciplines use Duolingo more reflectively, integrating its features for professional and pedagogical purposes. However, few studies have compared how students' academic backgrounds influence their strategies, motivation, and perceptions toward such applications. Most MALL research in Indonesia still treats university students as a homogeneous group, without accounting for epistemological and cognitive differences across disciplines.

Moreover, reflective and subjective perspectives in technology-mediated learning remain underrepresented in the literature. Many studies tend to assess MALL's effectiveness through score improvements or test outcomes, while students' learning experiences, how they negotiate motivation, habits, and technical barriers, often remain overlooked. Yet, as argued by Alhojailan (2021) and Faozi and Handayani (2023), individual experience and perceptions of technology shape long-term learning attitudes and determine the success of educational technology adoption. Thus, an in-depth exploration of students' subjective, cross-disciplinary experiences with Duolingo for vocabulary learning is essential, not merely to evaluate technological effectiveness, but to understand how such technologies are internalized in everyday learning practices.

Although interest in MALL continues to grow, a crucial gap persists in the literature. Most prior studies have yet to consider the cross-disciplinary and contextual dimensions of language learning app usage. Meanwhile, within Indonesian higher education, students from engineering, social sciences, communication, and education programs represent diverse learner profiles whose needs and motivations may not align with standardized language teaching approaches. This raises key questions regarding how academic background influences learning strategies, technological adaptation, and perceptions of MALL's effectiveness. The present study seeks to address these questions by focusing on the subjective experiences of students from multiple disciplines in using Duolingo for English vocabulary acquisition. This approach provides a fresh perspective that highlights cross-field experiences, personal reflections, and diverse motivational dynamics, moving beyond purely quantitative measurements.

Accordingly, this study not only contributes to enriching MALL and vocabulary learning theory but also offers a more human-centered understanding of language learning through technology. Within the context of Indonesian higher education, the findings are expected to inform the design of more adaptive mobile-based learning interventions that respond to cross-disciplinary needs and foster learner autonomy. Moreover, the results can guide language education policy, curriculum design, and the enhancement of students' digital literacy. More broadly, this study posits that technologies such as Duolingo are not merely learning tools, but reflective learning spaces where strategies, motivations, and academic identities converge.

RESEARCH METHOD

This study employed a qualitative approach using a multiple case study design, as its primary goal was not to statistically measure Duolingo's effectiveness but to understand students' learning experiences in depth, contextually, and subjectively. This approach allows the researcher to uncover the meanings behind learning behaviors and individual reflections across academic disciplines. As noted by Allan (2020) and Stanley (2023), qualitative case studies are effective for investigating complex phenomena within real-life contexts. This design aligns with the study's aim to highlight cross-disciplinary variation, where each field of study functions as a distinct "case" with its own learning characteristics, strategies, and motivational patterns.

The research was conducted at Universitas Muhammadiyah Jakarta (UMJ), chosen for its diverse academic programs that enable genuine cross-disciplinary exploration, ranging from engineering, social welfare, and communication to primary education and postgraduate studies. This diversity provided an ideal condition for examining how academic backgrounds influence students' engagement with language learning technologies. Furthermore, UMJ's institutional support for digital innovation and technology-based learning made it a relevant setting for MALL research.

The participants comprised ten active university students selected purposively based on academic discipline representation and experience using Duolingo for at least four weeks. They included two students from Automotive and Heavy Equipment Engineering, two from Social Welfare Studies, two from Communication Studies, two from Primary School Teacher Education (PGSD), one from the Master of Hospital Administration program, and one from the Master of Educational Technology program. Participant selection considered disciplinary diversity to capture comprehensive patterns and learning strategies across fields. All participants had prior experience with formal English education, enabling them to provide critical reflections on the differences between conventional and app-based learning.

Data collection consisted of three main stages: application-use observation, in-depth interviews, and analysis of activity logs and reflective journals. Observations were conducted over four weeks to monitor frequency, duration, and vocabulary-level progress achieved by participants within Duolingo. This stage was crucial for identifying user interaction patterns and consistency. In-depth interviews followed the observation phase to explore personal experiences, learning strategies, motivation, and perceptions of Duolingo's effectiveness as a learning medium. Each interview lasted between 45 and 60 minutes and was conducted online via Zoom to accommodate participants' schedules. Additionally, participants were asked to maintain daily reflective journals on their learning experiences. These reflections provided insights into the affective and cognitive dimensions of learning that might not emerge during interviews.

Data analysis followed the thematic analysis framework developed by Lim (2025) and Naeem et al. (2024), comprising six stages: data familiarization, initial coding, theme identification, theme review, theme definition and naming, and report generation. The analysis was conducted concurrently with data collection to allow iterative understanding of

each case. A cross-case analysis was subsequently performed to identify similarities and differences across disciplines, following Khan's (2019) comparative qualitative analysis framework.

To ensure data validity, the study employed source and method triangulation. Source triangulation involved comparing interview data, observations, and reflective notes to confirm consistency, while method triangulation combined observational and narrative approaches to capture not only "what" students did but also "why" and "how" they did it. Credibility was further strengthened through member checking, wherein preliminary interpretations were shared with participants for verification. This step adhered to the principles of credibility and trustworthiness in qualitative research as outlined by Coleman et al. (2024).

RESULTS AND DISCUSSION

Patterns of Duolingo Use and Student Engagement Dynamics

During four weeks of observation of ten students from five different disciplines at Universitas Muhammadiyah Jakarta, the patterns of Duolingo use and engagement dynamics showed significant variations, reflecting the cognitive characteristics and academic orientations of each field of study. In general, all students demonstrated enthusiasm during the first week, mainly due to the gamified nature of the application, which offers points, levels, and daily rankings. However, differences began to emerge from the second to the fourth week in terms of usage frequency, learning session duration, and students' interpretations of their learning processes.

Students from the Automotive and Heavy Equipment Engineering program exhibited relatively consistent and regular patterns of use. Based on activity logs downloaded from the application, both engineering informants used Duolingo for an average of 25 to 30 minutes per day, focusing on completing their daily goals. They tended to treat the application as a mechanical system, there is a target and a completion point. In an interview, one informant, RK, stated that he used Duolingo "like setting a machine; once the target points are reached, it's done." This pattern reflects an instrumental form of engagement, where learning is understood as a linear process with measurable outcomes. Field observations revealed that engineering students often accessed the application during breaks between workshop or lab sessions, typically in the afternoon after practical classes. They rarely opened discussion or leaderboard features, indicating that their engagement was more efficiency-oriented than socially interactive.

In contrast, students from the Social Welfare and Communication Studies programs showed more fluctuating but socially rich patterns. They used the application irregularly in terms of timing but spent longer durations per session, around 40 to 50 minutes on average. Based on digital observation, students in this group were more active in using the "Stories" and "Leaderboard" features and frequently commented on their peers' achievements in study groups. One informant, AN, described Duolingo as "a place to play and learn," adding that small competitions on the leaderboard motivated her to continue practicing. This pattern

reflects a high level of social and emotional engagement, where learning motivation stems not only from academic needs but also from social experiences shaped by the gamification features.

Students from the Elementary School Teacher Education (PGSD) program demonstrated the most reflective and structured form of engagement. They did not use the application daily but rather two to three times a week, with each session lasting about one hour. Reflective notes from one informant, MN, indicated that she often wrote down new vocabulary and linked it to how she could teach it to her future elementary students. Observations during the third week showed that PGSD students tended to use Duolingo alongside note-taking or consulting additional dictionaries. They frequently wrote down word meanings, grammatical categories, and example sentences in their notebooks. This demonstrates how they transformed digital learning experiences into contextualized pedagogical learning processes. In other words, Duolingo functioned not only as a learning aid but also as an inspiration for designing future teaching activities.

Graduate students from the Master of Hospital Administration and Educational Technology programs displayed more systematic and goal-oriented engagement. Based on observation data, both informants used the application at the same time each day, between 8:00 and 9:00 p.m. They applied strong self-regulated learning systems, set weekly goals, and monitored progress through the "Achievements" feature. One informant, NS, stated that she treated Duolingo "like a daily agenda, not entertainment," emphasizing that consistency was key to maintaining learning habits. Graduate students also exhibited higher metacognitive awareness; they did not merely pursue points but also reviewed the categories of mastered words and assessed their relevance to professional contexts. Researcher observation noted that these students frequently discussed their learning outcomes in academic WhatsApp groups, indicating the presence of social reflection processes supporting individual learning.

Comparatively, engineering students showed task-oriented engagement, social science students demonstrated interaction-oriented engagement, PGSD students exhibited reflection-oriented engagement, and graduate students displayed goal-oriented engagement. Although all used the same application, their engagement dynamics reflected how academic backgrounds shape their motivational structures and self-regulation strategies. Firdaus et al. (2021) explained that these differences can be understood across three main dimensions: cognitive, affective, and metacognitive. Engineering students focused on cognitive regulation (completing tasks and memorizing vocabulary), social students relied on affective regulation (maintaining interest and interaction), while PGSD and graduate students excelled in metacognitive regulation (strategizing and evaluating learning).

Interestingly, despite varying usage frequencies, not all students who studied daily demonstrated deeper engagement. This was evident among engineering students, who, despite their discipline, showed limited reflection on the meanings or contextual use of words. Conversely, PGSD students, who studied less frequently, displayed stronger contextual understanding. These findings reinforce Kurniawan and Haerunisa's (2023) argument that the success of technology-based learning is not solely determined by time or intensity of use but

by the quality of self-awareness in managing and evaluating the learning process. In other words, learning duration is not an absolute measure of success; what matters more is how students make sense of their learning process and adjust strategies to fit their academic goals.

Field observations also revealed that learning environments influenced engagement dynamics. Engineering and social students often accessed the application in open spaces such as cafeterias or parking areas, using earphones while waiting for class. Meanwhile, PGSD and graduate students tended to study in quieter environments, such as dorm rooms or libraries. These environmental conditions indirectly affected engagement depth. Those studying in calmer settings exhibited deeper reflection and greater emotional stability during learning. Malage and Watini (2024) explain that conducive learning contexts strengthen self-regulation because individuals have the mental space needed for reflection and evaluation.

Reflective data also indicated a shift in students' attitudes toward the application from the first to the fourth week. Initially, most viewed Duolingo as a fun game, but over time, they began perceiving it as a serious learning tool that could be integrated into academic activities. This demonstrates a process of internalization of learning goals, where external objectives such as earning points and ranks evolved into internal motivation to understand language and expand vocabulary. This phenomenon supports the idea that engagement in Mobile-Assisted Language Learning (MALL) is dynamic and developmental, depending on the interplay of individual, social, and academic factors.

Vocabulary Learning Strategies Across Disciplines

The findings reveal that the vocabulary learning strategies employed by students from various disciplines at Universitas Muhammadiyah Jakarta reflect fundamental differences in how they think and interact with foreign languages. Although all informants used Duolingo for four weeks, their ways of interpreting, selecting, and internalizing vocabulary were strongly shaped by their disciplinary identities. From the perspective of Disciplinary Learning Identity theory, these learning strategies are not merely individual variations but manifestations of epistemological cultures that shape how students conceptualize knowledge and learning within their academic contexts.

Engineering students demonstrated a functional recall strategy, characterized by memorizing and repeating words deemed to have direct functional value in their field. Based on digital observation notes, engineering students frequently highlighted words related to tools, work, or technology, such as engine, measure, and fix. They paid little attention to grammatical structures or social contexts but focused instead on technical relevance. One informant, RK, explained that he "did not want to memorize words that would not be used in the workplace." This statement indicates a strong pragmatic orientation, language is treated as a tool for work rather than a broad means of interpersonal communication. Field observations showed that engineering students often used Duolingo during workshop breaks, usually while waiting for equipment. They used earphones, opened the app for a few minutes, and focused on completing short, quick exercises. They often repeated the same sessions to ensure mastery of specific words, especially those related to mechanical or technical activities. This behavior indicates that their learning strategy was driven by efficiency and

outcome orientation. Within the epistemological framework of engineering, knowledge is considered valid when it can be applied directly, shaping how students internalize vocabulary. As Hidayati et al. (2023) explain, the engineering field has a "hard-applied" learning culture, where knowledge value lies in utility rather than conceptual or social elaboration.

In contrast, students from Communication and Social Welfare studies adopted a contextual association strategy, linking vocabulary to conversational or social experiences. Based on interviews, informants AN and DS explained that they found it easier to remember words when they could connect them to real-life situations such as conversations, social media, or everyday events. They often modified Duolingo example sentences to better suit personal experiences. For instance, when Duolingo presented "I am talking with my friend," they changed it to "I am talking with my classmate," then practiced saying it aloud. This shows that social science students construct meaning through contextual association rather than rote repetition. Field observations supported this: they often studied in open areas such as campus parks or cafeterias, sometimes engaging in discussions with peers. They compared scores or read sentences aloud, occasionally laughing at pronunciation mistakes, indicating that vocabulary learning for them was socially mediated rather than purely cognitive. Consistent with Salsinha and Lukman's (2024) view, students in social disciplines display a "soft-applied" epistemological orientation, where meaning is constructed through interaction and reflection rather than mechanical application. Thus, their vocabulary learning strategies are dialogical and contextual.

PGSD students exhibited a reflective and pedagogical approach. They used Duolingo not only for personal learning but also as a medium for exploring how language could later be taught in elementary classrooms. In an interview, informant MN mentioned that whenever she encountered a new word, she imagined how children might understand it. She even kept personal notes containing ideas for simple classroom games based on Duolingo words. "When the word apple appears, I think of how to introduce it with a real object in class," she said. During observations, PGSD students were often seen using the app in study rooms or libraries, with notebooks beside their phones. They wrote down new vocabulary and added small drawings or symbols beside each word. This indicates a learning strategy combining visual, reflective, and pedagogical elements. According to Afifi (2021), this aligns with the "soft-applied" epistemological character of education, where theory and practice intertwine, and learning is directed not only toward content mastery but also toward transforming knowledge for others. Therefore, PGSD students' vocabulary learning strategies reveal high pedagogical awareness, they learn language not just for themselves but also with an eye toward teaching it effectively.

Meanwhile, graduate students employed more complex and planned metacognitive strategies. Based on application data, both informants maintained consistent study schedules and systematically tracked their progress. They set daily targets (e.g., 30 points per day) and conducted weekly reflections on frequently mispronounced or forgotten words. In interviews, informant NS described a habit of evaluating her weekly learning outcomes by recording progress and challenges, then adjusting her next learning focus. She also used the "Mistakes

Review" feature to identify recurring errors. Field observations showed that graduate students studied in quiet, organized spaces such as study rooms or private bedrooms. They did not rush through lessons but instead focused on deep comprehension of meanings and their relevance to professional contexts. For example, informant MA, from Educational Technology, reflected that words like assessment and evaluation helped her understand terminology in language and education research. This strategy reflects strong metacognitive awareness, as described by Saputra et al. (2023), where advanced learners can plan, monitor, and evaluate their learning processes according to academic and professional goals.

Across disciplines, students' vocabulary learning strategies reflected the epistemological identities embedded in their fields. Engineering students relied on functional repetition; social students on contextual association; PGSD students on pedagogical reflection; and graduate students on metacognitive planning. Although they used the same digital platform, their interactions with language were guided by how they conceptualized knowledge within their disciplines. Within the Disciplinary Learning Identity framework, these differences affirm that "learning styles" are never neutral; they are shaped by epistemic values and academic cultures defining what counts as "good learning" in each discipline.

Moreover, students' interactions with Duolingo revealed the relationship between application structure and learning strategies. Features such as "streak count," "leaderboard," and "stories" were interpreted differently depending on disciplinary orientation. Engineering students viewed them as goal systems; social students as interactional media; PGSD students as pedagogical exploration tools; and graduate students as personal progress monitors. This demonstrates that digital learning environments are interpretive systems, each learner interprets and adapts them according to pre-existing values and learning habits.

Motivation and Perception toward Gamification

The study findings reveal that students' motivation in using Duolingo is not solely determined by the desire to expand their English vocabulary, but also by how they interpret the gamification features embedded within the platform. In this context, gamification is not merely an entertainment element but rather a medium that negotiates between students' intrinsic and extrinsic motivations across disciplines. Arsyad and Zainil (2023) note that the effects of gamification are strongly influenced by the users' social contexts and learning goals. This implies that features such as streaks, leaderboards, and reward systems do not carry uniform meanings for everyone; instead, they are interpreted differently depending on users' academic values and disciplinary orientations.

Students from Communication and Social Welfare programs appear to be the most affected by the social and competitive dynamics of gamified features. Observational data indicate that they often check daily rankings and compare their performance with peers. This activity occurs not only in digital spaces but also extends into physical campus environments. During one observation at the university cafeteria, two social science students, AN and DS, were seen spontaneously discussing their points and leaderboard positions. They laughed about their score differences and promised to "catch up" with each other before the end of the day. In an interview, DS explained, "I feel more motivated to study because I can see who's

more diligent than me." This statement illustrates how social competition within gamification functions as an effective extrinsic motivator for students from social backgrounds.

However, their motivation does not stop at the extrinsic level. The social interactions built through gamification generate affective forms of intrinsic motivation, where learning becomes enjoyable because it involves a sense of belonging and social support. This aligns with Saddhono et al. (2023), who found that gamification activating social dynamics, through competition, collaboration, or recognition, can evoke deep emotional engagement and enhance learning sustainability. In the case of social science and communication students, vocabulary learning becomes not just an individual effort but also a means to maintain social bonds and construct self-image as active learners in their academic environments.

In contrast, engineering students display a different motivational pattern. They pay little attention to leaderboards or competition, instead viewing features such as streaks and reward systems as indicators of learning efficiency. In an interview, informant RK described streaks as "a way to ensure discipline" and rewards as tangible markers of achievement. He remarked, "When I get a crown or level up, it feels like I've conquered a machine." This analogy reflects the mechanistic thinking typical of engineering fields, where motivation stems from measurable and systematic accomplishments.

Observations also show that engineering students prefer short but frequent learning sessions. They tend to use Duolingo during breaks or after working in the campus workshop. Their focus lies on visual progress, such as level increases or daily achievements, which provides a sense of control and productivity. According to Dardjito et al. (2023), this pattern reflects goal-oriented extrinsic motivation, in which digital reward systems serve as feedback loops that reinforce repetitive learning habits. However, in this case, such motivation is not superficial; for engineering students, gamification helps establish consistent learning routines aligned with their discipline's emphasis on precision and efficiency.

Students from the Primary School Teacher Education (PGSD) program demonstrate a more reflective relationship with gamification features. They acknowledge that streaks and rewards help maintain learning consistency, yet they also evaluate the pedagogical value behind these mechanisms. In an interview, MN stated that "the point system in Duolingo could be applied for elementary students to make them more enthusiastic about learning." This reflects the translation of learning experience into pedagogical reasoning. PGSD students are motivated not only as users but also as prospective educators who observe the potential of gamification in children's learning contexts.

During observations, PGSD students were frequently seen accessing Duolingo in shared study spaces or libraries, sometimes discussing teaching ideas with peers. They perceived that simple reward systems such as "lingots" could stimulate curiosity in young learners, while visual and animated sounds could enhance cognitive engagement. This indicates that their motivation is intrinsically rooted in the academic and professional relevance of digital learning experiences. As Lee (2023) explains, intrinsic motivation grounded in task relevance tends to be more enduring and results in more meaningful knowledge transfer than motivation based merely on external rewards.

Graduate students exhibit more complex, metacognitive forms of motivation. They are no longer driven by rewards or competition but interpret gamification as a tool for self-reflection and progress regulation. NS, a master's student in Educational Technology, stated that streaks are "not just numbers but reflections of personal consistency." She explained that losing a streak after several days "makes me realize that I've lost my learning momentum." This perspective indicates a strong metacognitive awareness, where gamified elements are internalized as mechanisms for self-regulation.

Graduate students also tend to ignore leaderboards and focus instead on progress trackers and the "Mistakes Review" feature. Observations revealed that they usually study in quiet spaces, using laptops or tablets to visually monitor their long-term performance. They are more interested in data showing long-term development rather than instant achievements. Thus, their motivation shifts from extrinsic to intrinsically academic-oriented. Subandowo and Sárdi (2023) refer to this phenomenon as intrinsic integration, where gamified elements merge with users' cognitive structures and reinforce self-directed learning orientations.

Interestingly, these motivational patterns illustrate a close relationship between academic discipline and perception of gamification. For social and communication students, leaderboards and competition nurture social enthusiasm; for engineering students, reward systems act as measures of efficiency; for PGSD students, gamification serves as a pedagogical reflection space; and for graduate students, it becomes a medium for self-regulation and long-term planning. In other words, Duolingo's gamification functions as a mediating mechanism that operates differently across academic contexts.

Within the framework of the Gamified Learning Framework, these distinctions indicate that learning motivation through mobile applications is not universal. Each student brings their goals, values, and academic habits into the digital space, interpreting gamified elements according to their academic identity. Field observations vividly demonstrate this dynamic: engineering students sitting alone in workshops with earphones focused on daily progress; social science students laughing together while comparing scores; PGSD students jotting down teaching ideas; and graduate students composing weekly reflections in their digital journals.

Challenges and Barriers in Mobile-Based Vocabulary Learning

The challenges of mobile-based vocabulary learning, particularly through platforms like Duolingo, present an intriguing picture of how technology introduces both opportunities and constraints in language learning processes. Among interdisciplinary students, the obstacles encountered are not only technical but also psychological, social, and structural. Field observations conducted in study areas and campus public spaces indicate that although many students enthusiastically download the app, their engagement significantly declines after several weeks. Students who initially used the app daily during breaks now more often open social media or entertainment platforms. This pattern reflects a consistent decline in motivation, consistent with what Hidayat et al. (2022) describe as digital fatigue, a form of

exhaustion arising from learning applications that lack social integration and clear academic purpose.

A major weakness often reported by students is difficulty maintaining learning consistency. Several informants admitted that while they initially completed daily targets diligently, they gradually felt monotonous due to the lack of varied activities or challenges relevant to their field of study. One engineering student, A.R., revealed that although the streak feature was motivating at first, it eventually felt like being trapped in a repetitive routine with little practical meaning. He commented, "Every day I just repeat the same exercise patterns, while the vocabulary rarely relates to the technical world I'm studying." This statement reinforces the notion that the sustainability of digital learning depends not merely on app design but on how deeply the content resonates with users' academic contexts.

The lack of authentic context emerges as another significant challenge. Many students, especially those from social and communication fields, feel that Duolingo's vocabulary is too generic and fails to represent real communicative situations. For instance, communication students note that many exercises focus on basic sentences rarely used in academic discussions or professional dialogues. In an interview, M.D., a fifth-semester communication student, expressed difficulty linking exercises to opinion writing or class presentations that require argumentative expression. He added, "Sentences like 'the apple is red' or 'the cat sleeps on the bed' may suit beginners, but they don't help me speak in debates or interviews." This highlights the gap between app-based learning and students' academic and professional needs.

Field observations in campus learning spaces reveal another interesting phenomenon: students typically use Duolingo in short sessions, averaging 5–10 minutes, often while waiting for class or during lunch breaks. This pattern resembles microlearning, a hallmark of mobile education. However, such brief engagement poses a dilemma. On one hand, time flexibility supports learner autonomy. On the other hand, the short duration limits cognitive engagement, resulting in shallow vocabulary retention. Direct observations showed that some students completed exercises quickly merely to maintain streaks or earn digital rewards, rather than to comprehend word meanings or applications.

Beyond motivational and contextual issues, technical barriers also serve as crucial limiting factors. Students from regions with unstable internet infrastructure often face connectivity disruptions, particularly when the app fails to load or save progress. In an interview, S.L., a PGSD student from a mountainous area, explained that her completed exercises sometimes failed to save due to connection drops. This caused frustration and decreased her motivation to continue. Such cases demonstrate that the success of Mobile-Assisted Language Learning (MALL) depends not only on user readiness but also on the supporting digital ecosystem.

Limitations in free features also emerged as a frequent complaint. The free version of Duolingo restricts the number of "hearts" per session, requiring users to wait or watch ads to continue. Several students stated that this disrupts their learning rhythm and diminishes

motivation. Graduate students, often with tight schedules, find it inefficient to wait between sessions. One informant, F.H., a graduate student in language education, remarked, "The freemium model makes learning feel fragmented and unprofessional." He added that the sustainability of digital learning should not be hindered by commercial mechanisms that disrupt learning flow.

This condition can be analyzed through the concept of Digital Learning Sustainability (Kapoor & Kapoor, 2021), which posits that technology-based learning can only be sustainable if supported by adequate structural, social, and motivational frameworks. In the Indonesian student context, social support, such as interaction with lecturers or peers, remains a fundamental need that gamification alone cannot fulfill. When students learn independently without strong social contexts, vocabulary internalization tends to be superficial. This phenomenon aligns with Jacquemet's (2019) findings within the Gamified Learning Framework, showing that the effectiveness of gamification heavily depends on social integration and goal meaningfulness.

From a psychological standpoint, the greatest challenge is not technological access but maintaining balance between autonomy and discipline. Some students reported high intentions to study daily, yet without social support or instructor supervision, their habits quickly faded. In an interview, R.N., a communication student, described that "no one reminds me, so the motivation gradually drops." This underscores that digital learning sustainability cannot be separated from the social relationships that sustain commitment.

Additional observations reveal that collaborative learning spaces tend to enhance students' participation in digital learning. In one campus discussion room, researchers found a small group of PGSD students using Duolingo together while discussing how to adapt its features for teaching elementary pupils. Such activities create a mutually reinforcing learning environment, where technology does not stand alone but becomes part of a living learning community.

Reflection on Autonomy and Cross-Context Learning

Reflection on learning autonomy in the context of Duolingo use among interdisciplinary students reveals that this application is not merely a digital medium for vocabulary expansion, but a learning space that enables the emergence of new forms of independence and academic reflexivity. Field observations show that many students use Duolingo in highly personal and contextual ways, as if the app mirrors their individual learning styles and life rhythms. In the corner of a faculty reading room, for example, a PGSD student was seen using Duolingo while waiting for a thesis consultation, while in the campus garden area, an engineering student played it during breaks between practical sessions. Beneath these seemingly random usage patterns lies a form of naturally developed learning autonomy, arising not from formal curricular pressure but from personal needs to master language in ways aligned with their daily lives.

Interviews with several informants revealed an awareness that learning a language through digital technology is no longer understood as an activity confined to classrooms, but as a reflective process intertwined with everyday routines. A communication student, R.N.,

stated that he uses Duolingo whenever he travels or waits for friends, not because of academic obligation but because he "wants to maintain a thinking rhythm in English." For R.N., learning a language is not merely about achieving linguistic competence but about developing a sense of closeness with the language as part of his future professional identity. This statement underscores how intrinsic motivation and self-reflection serve as primary drivers in technology-based autonomous learning.

The learning autonomy evident across disciplines is grounded in the concept of Learner Autonomy in Mobile Learning (Nedungadi et al., 2024). According to this theory, technology allows learners to set their own goals, schedules, and learning strategies based on their individual and social needs. In this study's context, students from different academic backgrounds demonstrate diverse forms of autonomy. Engineering students, for example, use Duolingo primarily to strengthen technical terminology and reading skills for English-language instructions. From an interview with A.R., an electrical engineering student, it was found that he viewed Duolingo as a "small assisting tool" to understand software manuals and documentation that are often written in English. He did not follow the learning path prescribed by the app entirely but selectively focused on topics relevant to his coursework. This pattern indicates the emergence of adaptive autonomy, where learners modify digital learning trajectories to align with the epistemological frameworks of their disciplines.

Conversely, students from social sciences and communication fields perceive Duolingo as a socially oriented space for linguistic experimentation. During observations in a faculty discussion room, several students were seen challenging each other's "leaderboard" scores while sharing experiences about new expressions or phrases they discovered. These interactions not only strengthened the competitive aspect but also created a reflective space where language was understood as a medium of social interaction and cultural identity. This aligns with findings by Sharabati et al. (2024) on disciplinary learning identity, which emphasize that each discipline constructs a unique relationship between language, meaning, and academic practice. Thus, the social use of Duolingo demonstrates that autonomy does not necessarily equate to isolation but can thrive within collaborative and reflective interactions.

PGSD students, on the other hand, exhibit a more pedagogical form of autonomy. They do not only learn for personal benefit but also reflect on how technologies like Duolingo can be used in children's learning contexts. In an interview, S.L., a final-year PGSD student, explained that she uses Duolingo to find inspiration for engaging classroom activities for elementary students, particularly for introducing basic English vocabulary. She mentioned that "the gamification feature helps me understand how children can become interested in learning a language without feeling forced." Such experiences demonstrate a more complex reflective dimension, where students are not merely learners but also future educators who contemplate learning practices to later apply in broader pedagogical contexts.

Meanwhile, graduate students display highly structured and metacognitively driven autonomy. Observations in the postgraduate workspace revealed that several students manually recorded their learning progress in digital journals, complete with daily targets and

weekly reflections. F.H., a master's student in language education, shared that he incorporates Duolingo as part of his "academic ritual" before reading international journals. He noted that 15 minutes of Duolingo practice helps activate his English thinking focus before engaging with academic texts. This illustrates that learning autonomy is not merely about the freedom to choose but about reflective awareness in integrating technology into one's intellectual rhythm.

Observations around campus also indicate that learning spaces and times have become increasingly fluid. Students can study anywhere, at campus cafés, bus stops, or even on the train to campus. What is most noteworthy, however, is not the flexibility itself, but the transformation in how students perceive the concept of a "learning place." One field note described an afternoon scene in a campus garden: two communication students sat side by side with open laptops and phones, taking turns completing Duolingo exercises while discussing the meanings of emerging idioms. The activity took place in a relaxed yet productive atmosphere, illustrating a form of reflective learning that bridges formal and informal boundaries. In this context, technology serves as a medium connecting the academic world with everyday life.

From a theoretical standpoint, these experiences reinforce Drobež et al.'s (2021) argument that learning autonomy in mobile contexts cannot be separated from self-reflection and the ability to negotiate learning meaning across social settings. Technologies such as Duolingo enable students to restructure their relationship with knowledge and learning time, fostering what can be termed self-directed yet socially grounded learning, autonomous learning that remains rooted in social realities. Students become active agents who adapt learning strategies to their academic and personal identities, constructing flexible and meaningful learning spaces.

However, reflection on the data also reveals that learning autonomy has its limits. Some students feel that excessive independence sometimes leaves them directionless without formal guidance. For instance, M.D., a communication student, admitted that "learning alone sometimes makes me unsure whether I'm doing it right or not." This admission highlights the paradox of autonomy: the more freedom one has in learning, the greater the need for critical reflection on direction and outcomes. It underscores that effective autonomy requires balance between freedom and structure, between personal motivation and social feedback.

CONCLUSION

Based on the overall findings and analyses, it can be concluded that mobile-based vocabulary learning through Duolingo functions not only as a technological means to expand lexical knowledge but also as an epistemological space where students from various disciplines construct distinctive forms of learning autonomy aligned with their academic orientations and learning identities. Disciplinary differences generate variations in strategies, motivations, and reflections, showing that language learning in digital environments is not universal but grounded in the values and epistemic practices of each field. Engineering

students demonstrate functional rationality focused on efficiency and technical relevance; social and communication students interpret gamification as a medium of interaction and social expression; PGSD students adapt Duolingo as a reflective pedagogical tool; while graduate students articulate their learning experiences within structured metacognitive frameworks. Amid this diversity, the study reaffirms that the success of Mobile-Assisted Language Learning (MALL) depends not only on app features or usage duration but on students' capacity to manage reflection, motivation, and their learning contexts. The novelty of this study lies in highlighting the relationship between academic discipline and digital autonomy practices, an area rarely explored in prior MALL research, while offering a new understanding that technologies such as Duolingo can serve as cross-context learning spaces that bring together flexibility, reflexivity, and learner autonomy within Indonesia's higher education ecosystem.

ETHICAL STATEMENT AND DISCLOSURE

This study was conducted in accordance with established ethical principles, including informed consent, protection of informants' confidentiality, and respect for local cultural values. Special consideration was given to participants from vulnerable groups to ensure their safety, comfort, and equal rights to participate. No external funding was received, and the authors declare no conflict of interest. All data and information presented were collected through valid research methods and have been verified to ensure their accuracy and reliability. The use of artificial intelligence (AI) was limited to technical assistance for writing and language editing, without influencing the scientific substance of the work. The authors express their gratitude to the informants for their valuable insights, and to the anonymous reviewers for their constructive feedback on an earlier version of this manuscript. The authors take full responsibility for the content and conclusions of this article.

REFERENCES

Afifi, N. (2021). Exploring the use of grammatical metaphor in Indonesian EFL learners' academic writing. *Indonesian Journal of Applied Linguistics*, *10*(3), 719–731. https://doi.org/10.17509/ijal.v10i3.31759

Alek, A., Marzuki, A. G., Hidayat, D. N., & Fauzji, F. (2022). The Discourse Structure and Linguistic Features of Research Articles and Thesis Abstracts in English by Indonesian Academics. *JELITA: Journal of Education, Language Innovation, and Applied Linguistics*, *1*(1), 37–44. https://doi.org/10.37058/jelita.v1i1.3940

Alhojailan, A. I. (2021). Developing an Understanding of The Sources of Some Graduate Students' Perceptions of Academic Writing. *Indonesian Journal of Applied Linguistics*, *11*(2), 281–291. https://doi.org/10.17509/ijal.v11i2.34265

Allan, G. (2020). Qualitative Research. In *Handbook for Research Students in the Social Sciences* (pp. 177–189). Routledge. https://doi.org/10.4324/9781003070993-18

Andriani, M., Udasmoro, W., Salsano, R., & Hardini, T. I. (2022). Stymie patterns: The case of French-language learning in Indonesian universities. *Indonesian Journal of Applied Linguistics*, *12*(1), 180–189. https://doi.org/10.17509/ijal.v12i1.46548

Arsai, A. N., & Arsai, A. F. W. (2024). Tracing Interlanguage through Grammatical Errors: An Analysis of Indonesian–English Translation by Junior High School Students. *Jurnal Tahuri*,

21(1), 69–83. https://doi.org/10.30598/tahurivol21issue1page69-83

Arsyad, S., & Zainil, Y. (2023). Research gap strategies in article introductions of different rank applied linguistics journals. *Studies in English Language and Education*, *10*(1), 216–234. https://doi.org/10.24815/siele.v10i1.25302

Coleman, M. L., Ragan, M., & Dari, T. (2024). Intercoder Reliability for Use in Qualitative Research and Evaluation. *Measurement and Evaluation in Counseling and Development*, *57*(2), 136–146. https://doi.org/10.1080/07481756.2024.2303715

Dardjito, H., Rolls, N., Setiawan, A., & Sumekto, D. R. (2023). Challenges in reading English academic texts for non-English major students of an Indonesian university. *Studies in English Language and Education*, *10*(3), 1290–1308. https://doi.org/10.24815/siele.v10i3.29067

Dewi, C. S., Widyantoro, A., & Qamaria, R. S. (2025). Undergraduate Students' Self-Regulated Learning in the Use of Mobile Assisted Language Learning (MALL). *Journal of Education and Teaching (JET)*, *6*(2), 463–481. https://doi.org/10.51454/jet.v6i2.526

Drobež, E., Rogelj, V., Bogataj, D., & Bogataj, M. (2021). Planning Digital Transformation of Care in Rural Areas. *IFAC-PapersOnLine*, *54*(13), 750–755. https://doi.org/10.1016/j.ifacol.2021.10.542

Faozi, F. H., & Handayani, P. W. (2023). The Antecedents of Mobile-Assisted Language Learning Applications Continuance Intention. *Electronic Journal of E-Learning*, *21*(4), 299–313. https://doi.org/10.34190/ejel.21.4.2744

Ferdinandus, M. S., & Simantuak, J. (2024). Interplay Between Reading Strategies and Comprehension Challenges in Academic Reading: Insights from Indonesian EFL Learners. *Jurnal Tahuri*, *21*(1), 1–19. https://doi.org/10.30598/tahurivol21issue1page1-19

Figueiredo, S. (2023). The effect of mobile-assisted learning in real language attainment: A systematic review. *Journal of Computer Assisted Learning*, *39*(4), 1083–1102. https://doi.org/10.1111/jcal.12811

Firdaus, S. F., Soemantri, Y. S., & Yuliawati, S. (2021). A corpus-based study of self-mention markers in English research articles. *International Journal of Language Teaching and Education*, *5*(2), 37–46. https://doi.org/10.22437/ijolte.v5i2.15695

Fitayanti, S., Husain, D., Alwolmabin, Z., & Nirigu, E. (2024). The Integration of Mobile-Assisted Language Learning (MALL) with Peer Tutoring Methods to Enhance Motivation and Engagement Among Management Students. *English Review: Journal of English Education*, *12*(3), 897–910. https://doi.org/10.25134/erjee.v12i3.10700

Hadi, F. (2023). Exploring the Potential of Mobile Assisted Language Learning in Rural Area of Indonesian. *International Conference on Computers in Education*, 977–982. https://doi.org/10.58459/icce.2023.1492

Hartono, D. A., & Prima, S. A. B. (2021). The correlation between Indonesian university students' receptive vocabulary knowledge and their reading comprehension level. *Indonesian Journal of Applied Linguistics*, *11*(1), 21–29. https://doi.org/10.17509/ijal.v11i1.34590

Hendrikus, L., Tuhulele, Y., & Kora, M. (2024). Code-Mixing in Multilingual Digital Spaces: Linguistic Patterns among Ambonese Social Media Users. *Jurnal Tahuri*, *21*(1), 20–35. https://doi.org/10.30598/tahurivol21issue1page20-35

Hidayat, F., Supangkat, S. H., & Hanafi, K. (2022). Digital Twin of Road and Bridge Construction Monitoring and Maintenance. *2022 IEEE International Smart Cities Conference (ISC2)*, 1–7. https://doi.org/10.1109/ISC255366.2022.9922473

Hidayati, D., Novianti, H., Khansa, M., Slamet, J., & Suryati, N. (2023). Effectiveness Project-

Based Learning in ESP Class: Viewed from Indonesian Students' Learning Outcomes. *International Journal of Information and Education Technology*, *13*(3), 558–565. https://doi.org/10.18178/ijiet.2023.13.3.1839

Jacquemet, M. (2019). Beyond the speech community: On belonging to a multilingual, diasporic, and digital social network. *Language & Communication*, *68*(12), 46–56. https://doi.org/10.1016/j.langcom.2018.10.010

Kapoor, R., & Kapoor, K. (2021). The transition from traditional to digital marketing: a study of the evolution of e-marketing in the Indian hotel industry. *Worldwide Hospitality and Tourism Themes*, *13*(2), 199–213. https://doi.org/10.1108/WHATT-10-2020-0124

Karimah, S. A., Zulianingrum, A., Zulha, H. F., Muhjaj, J. B., & Muzhaffar, D. N. (2025). Leveraging Mobile-Assisted Language Learning Technology to Boost English Listening Skills for Students at SMK Walisongo Jakarta. *Community Empowerment*, *10*(7), 1586–1594. https://doi.org/10.31603/ce.13421

Kartika, S., Jaya, A., Hermansyah, H., Pratiwi, E., & Kartikasari, D. (2024). The Use of Mobile-Assisted Language Learning (MALL) Technology in English Class. *Esteem Journal of English Education Study Programme*, *7*(1), 109–118. https://doi.org/10.31851/esteem.v7i1.12678

Katemba, C. V. (2021). Enhancing Vocabulary Performance Through Mobile Assisted Language Learning at a Rural School in Indonesia. *Acuity: Journal of English Language Pedagogy, Literature and Culture*, *6*(1), 1–11. https://doi.org/10.35974/acuity.v6i1.2457

Khan, N. I. (2019). Case Study as a Method of Qualitative Research. In *Qualitative techniques for workplace data analysis* (pp. 170–196). IGI Global Scientific Publishing. https://doi.org/10.4018/978-1-5225-5366-3.ch008

Kurniawan, E., & Haerunisa, Z. F. (2023). A comparative study of lexical bundles in accepted and rejected applied linguistic research article introductions. *Studies in English Language and Education*, *10*(2), 628–648. https://doi.org/10.24815/siele.v10i2.28119

Kurniawan, E., & Sabila, N. A. A. (2021). Another Look at the Rhetorical Moves and Linguistic Realizations in International and Indonesian Journal Articles: A Case of Tourism Research. *Indonesian Journal of Applied Linguistics*, *11*(2), 318–329. https://doi.org/10.17509/ijal.v11i2.32055

Lee, D. (2023). Bibliometric analysis of Asian 'language and linguistics' research: A case of 13 countries. *Humanities and Social Sciences Communications*, *10*(1), 379. https://doi.org/10.1057/s41599-023-01840-6

Lim, W. M. (2025). What Is Qualitative Research? An Overview and Guidelines. *Australasian Marketing Journal*, *33*(2), 199–229. https://doi.org/10.1177/14413582241264619

Malage, G., & Watini, S. (2024). Building Confidence through Intrinsic Rewards: The 'ASYIK' Model in Early English Education. *Jurnal Tahuri*, *21*(1), 54–68. https://doi.org/10.30598/tahurivol21issue1page54-68

Maspaitella, M., & Afdhal, A. (2024). Safeguarding Linguistic Heritage: Policy, Education, and Community-Based Strategies for the Development and Protection of Maluku's Local Languages. *Jurnal Tahuri*, *21*(1), 36–53. https://doi.org/10.30598/tahurivol21issue1page36-53

Mortazavi, M., Nasution, M. K. M., Abdolahzadeh, F., Behroozi, M., & Davarpanah, A. (2021). Sustainable Learning Environment by Mobile-Assisted Language Learning Methods on the Improvement of Productive and Receptive Foreign Language Skills: A Comparative Study for Asian Universities. *Sustainability*, *13*(11), 6328. https://doi.org/10.3390/su13116328

Mustaffa, N. U. C., & Sailin, S. N. (2022). A Systematic Review of Mobile-Assisted Language Learning Research Trends and Practices in Malaysia. *International Journal of Interactive Mobile Technologies (IJIM)*, *16*(05), 169–198. https://doi.org/10.3991/ijim.v16i05.28129

Mutiaraningrum, I., & Nugroho, A. (2021). Smartphone-based mobile assisted language learning application in higher vocational education in Indonesia. *JEES (Journal of English Educators Society)*, *6*(1), 793. https://doi.org/10.21070/jees.v6i1.793

Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2024). Demystification and Actualisation of Data Saturation in Qualitative Research Through Thematic Analysis. *International Journal of Qualitative Methods*, *23*(1), 1–13. https://doi.org/10.1177/16094069241229777

Nedungadi, P., Menon, R., Gutjahr, G., & Raman, R. (2024). Evaluating Holistic Education and Digital Learning model for advancing SDG4: a longitudinal mixed-effects modeling approach. *Cogent Social Sciences*, *10*(1), 2299134. https://doi.org/10.1080/23311886.2023.2299134

Pratiwi, D. F., Julianti, R., Dewi Anggung, S., Ima, N., & Halim, N. M. (2024). Mobile Assisted Language Learning (MALL) to Enhance Students Speaking. *ELS Journal on Interdisciplinary Studies in Humanities*, *7*(4), 545–555. https://doi.org/10.34050/els-jish.v7i4.41949

Pratiwi, S. A., & Firdaus, M. (2025). Effectiveness of Mobile-Assisted Language Learning on EFL Students' Reading Comprehension. *Global Expert: Jurnal Bahasa Dan Sastra*, *13*(1), 32–36. https://doi.org/10.36982/jge.v13i1.5426

Sabani, E., Sabilah, F., & Setyaningrum, R. W. (2025). Integrating mobile-assisted language learning (MALL) in teaching EFL: A study on senior high school teachers in Indonesia. *English Learning Innovation*, *6*(2), 533–554. https://doi.org/10.22219/englie.v6i2.41682

Saddhono, K., Rohmadi, M., Setiawan, B., Suhita, R., Rakhmawati, A., Hastuti, S., & Islahuddin, I. (2023). Corpus Linguistics Use in Vocabulary Teaching Principle and Technique Application: A Study of Indonesian Language for Foreign Speakers. *International Journal of Society, Culture & Language*, *11*(1), 231–245. https://doi.org/10.22034/ijscl.2022.1971972.2823

Salsinha, L. M. D. S., & Lukman, J. P. (2024). Library Digitalization and Modernization: Strategies for Utilizing E-Clipping to Enhance Services at The Digital Library of The Audit Board of The Republic of Indonesia (BPK RI) Bali Provincial Office. *Baileo: Jurnal Sosial Humaniora*, *2*(2), 176–188. https://doi.org/10.30598/baileofisipvol2iss2pp176-188

Saputra, Y., Widodo, P., Andriyanti, E., Silvani, D., & Abdullah, F. (2023). perspectives of educational linguistics and applied linguistics. *International Journal of Linguistics, Literature and Culture*, *9*(4), 182–190. https://doi.org/10.21744/ijllc.v9n4.2329

Selvi, A. F. (2025). The myopic focus on decoloniality in applied linguistics and English language education: citations and stolen subjectivities. *Applied Linguistics Review*, *16*(1), 137–161. https://doi.org/10.1515/applirev-2024-0011

Sharabati, A.-A. A., Ali, A. A. A., Allahham, M. I., Hussein, A. A., Alheet, A. F., & Mohammad, A. S. (2024). The Impact of Digital Marketing on the Performance of SMEs: An Analytical Study in Light of Modern Digital Transformations. *Sustainability*, *16*(19), 8667. https://doi.org/10.3390/su16198667

Solihin, S. (2021). Using Mobile-Assisted Language Learning (MALL) to Teach English in Indonesian Context: Opportunities and Challenges. *VELES Voices of English Language Education Society*, *5*(2), 95–106. https://doi.org/10.29408/veles.v5i2.3150

Stanley, M. (2023). Qualitative Descriptive. In *Qualitative Research Methodologies for Occupational Science and Occupational Therapy* (pp. 52–67). Routledge.

https://doi.org/10.4324/9781003456216-4

Subandowo, D., & Sárdi, C. (2023). Academic essay writing in an English medium instruction environment: Indonesian graduate students' experiences at Hungarian universities. *Ampersand*, *11*, 100158. https://doi.org/10.1016/j.amper.2023.100158

Suherman, L. O. A., Riniati, W. O., Akfan, S. S., Munirah, M., Utami, N. D., & Fitriani, F. (2025). Utilizing Mobile-Assisted Language Learning (Duolingo) to Foster Metacognitive Awareness and Self-Directed Learning in Non-English Major Students. *ELS Journal on Interdisciplinary Studies in Humanities*, *8*(1), 235–244. https://doi.org/10.34050/els-jish.v8i1.43453

Vega, N. De, Basri, M., & Nur, S. (2023a). Exploring the Psychological Dimensions of Mobile-Assisted Language Learning (MALL) in English Language Education. *Journal of Psychological Perspectives*, *5*(2), 97–106. https://doi.org/10.47679/jopp.526582023

Vega, N. De, Basri, M., & Nur, S. (2023b). Integrating mobile-assisted learning for a dynamic blended approach in higher education. *Indonesian Journal of Electrical Engineering and Computer Science*, *32*(2), 819–827. https://doi.org/10.11591/ijeecs.v32.i2.pp819-827