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Vocabulary Growth Through Immersive App-Based Learning: A Study of Duolingo and Quizlet

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ABSTRACT

Vocabulary mastery is a fundamental component of English proficiency, yet many EFL learners continue to struggle with vocabulary retention and contextual use despite traditional instruction. The integration of mobile-assisted learning applications offers new opportunities to enhance engagement and autonomy; however, a gap remains between theoretical expectations of mobile learning effectiveness and its actual implementation in classroom contexts. Therefore, it aims to explore how immersive app-based learning through Duolingo and Quizlet supports vocabulary growth among higher education students. Employing a qualitative descriptive design, the study involved first semester students of English Study Program. Data were collected through semi-structured interviews and document analysis. The data analyzed using thematic analysis supported by triangulation for validity. The findings revealed four dominant themes: (1) students' learning profile using Duolingo and Quizlet (2) improved vocabulary retention and contextual application facilitated by spaced repetition and retrieval practice; (3) heightened motivation and engagement through gamified features; (4) development of self-regulated learning behaviors such as goal-setting and progress monitoring; and (5) the crucial role of lecturer mediation and contextual factors in enhancing app effectiveness. The study concludes that immersive app-based learning significantly enhances vocabulary acquisition when technological features are supported by motivational design, learner autonomy, and instructional integration. These results bridge the gap between mobile-assisted language learning theory and classroom practice, offering both theoretical contributions to the understanding of Mobile-Assisted Language Learning (MALL) and pedagogical implications for integrating digital tools into EFL instruction. Duolingo and Quizlet, when appropriately guided, can transform vocabulary learning into an engaging, autonomous, and sustainable process for EFL learners.

Keywords: Vocabulary mastery, mobile-assisted language learning, Duolingo, Quizlet, self-regulated learning, gamification

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INTRODUCTION

The rapid advancement of mobile technologies has transformed educational landscapes, particularly in language learning. Today's learners are increasingly turning to mobile-assisted platforms that allow them to study anytime and anywhere, breaking traditional classroom boundaries. The social phenomenon of "learning-on-the-go" has emerged as a result of the widespread use of smartphones and affordable internet access, which promote informal and autonomous learning among students worldwide (Lin & Lin, 2019). This shift has made Mobile-Assisted Language Learning (MALL) one of the most significant trends in education, fostering flexibility and accessibility for vocabulary development in both English as a Foreign Language (EFL) and English as a Second Language (ESL) contexts (Okumuş Dağdeler, 2023).

Vocabulary mastery plays a fundamental role in achieving language proficiency since it provides the building blocks for communication and comprehension. Research on MALL has consistently shown that mobile-based tools have the potential to enhance vocabulary acquisition through multimodal and gamified exposure (Loewen et al., 2019). However, while numerous studies have documented positive learning outcomes from app-based vocabulary instruction, these results vary depending on app design, learner engagement, and contextual factors (Kessler et al., 2025). Thus, there remains a pressing need to explore how vocabulary learning occurs through immersive app use, rather than simply measuring pre- and post-test vocabulary gains.

Among the many mobile learning platforms available, Duolingo and Quizlet have gained particular prominence in vocabulary learning due to their accessible and interactive features. Duolingo promotes adaptive, gamified learning experiences through repetition, feedback, and point-based motivation, while Quizlet supports retrieval-based learning using flashcards and spaced repetition (Loewen et al., 2019; Ningsih et al., 2024). Previous studies indicate that both applications can improve vocabulary outcomes; however, their effectiveness may differ depending on learners' proficiency levels, study habits, and cultural contexts (Kessler et al., 2025; Pramesti et al., 2025). This comparative dynamic provides an important foundation for examining how each app contributes to vocabulary growth.

Despite these positive findings, existing research tends to rely heavily on quantitative methods and short-term experimental designs that overlook learners' lived experiences and cognitive processes (Okumuş Dağdeler, 2023). In Indonesia, for example, recent studies have investigated student attitudes toward Duolingo and Quizlet in EFL classrooms but often focus on test scores rather than how learners interact with and internalize vocabulary through immersive app engagement (Kessler et al., 2025; Pramesti et al., 2025). Consequently, the qualitative dimension—how learners experience, interpret, and sustain vocabulary learning through app-based environments—remains underexplored.

Furthermore, the pedagogical affordances of these two platforms differ significantly, yet little is known about how such differences influence vocabulary development. Duolingo's gamified and adaptive interface may encourage motivation and sustained engagement, while Quizlet's retrieval-practice model may strengthen long-term retention through repetition and testing (Lin & Lin, 2019; Loewen et al., 2019). Comparative qualitative insights into these mechanisms could provide a more nuanced understanding of how each app supports the vocabulary learning process, addressing the gap left by previous outcome-focused studies (Kessler et al., 2025; Okumuş Dağdeler, 2023).

To address these issues, the present study adopts a qualitative deductive approach, grounded in MALL and cognitive learning theories, to examine how immersive app-based learning contributes to vocabulary growth. By focusing on the specific experiences of learners who engage deeply with Duolingo and Quizlet, this research seeks to reveal underlying cognitive, behavioral, and motivational processes associated with vocabulary development (Pramesti et al., 2025). The use of in-depth interviews, learning logs, and participant observation allows for a comprehensive analysis of learners' engagement patterns and perceived challenges during app-based learning (Kessler et al., 2025).

The objectives of this research are threefold: (1) to describe students' vocabulary improvement using immersive app, Duolingo and Quizlet; and (2) to analyze how immersive app learning influence students' motivation in learning. By comparing learners' experiences with both applications, this study aims to provide valuable insights for educators, app developers, and policymakers seeking to integrate mobile technologies into formal and informal learning environments.

Ultimately, this study contributes to the growing body of knowledge in MALL by bridging the gap between quantitative results and qualitative understanding. It expands the discussion on vocabulary acquisition from context-driven learning experiences. The findings are expected to provide practical implications for EFL educators in Indonesia and beyond, suggesting strategies for optimizing mobile vocabulary learning through immersive, sustained engagement with Duolingo and Quizlet (Lin & Lin, 2019; Okumuş Dağdeler, 2023). Thus, the research not only strengthens

theoretical perspectives on app-based learning but also advances real-world educational practices toward more autonomous and technology-integrated vocabulary development.

Mobile-Assisted Language Learning (MALL) and Vocabulary Growth

The rapid development of mobile technologies has led to a substantial increase in studies on mobile-assisted language learning (MALL), particularly for vocabulary acquisition. A systematic review by A systematic review of Mobile-Assisted Vocabulary Learning research (Okumuş Dağdeler, 2023) found that across 687 publications, mobile tools significantly aid vocabulary acquisition but highlight methodological heterogeneity and short intervention periods. The review suggests that mobile tools provide flexible, on-the-go exposure to lexical items, which is especially important in EFL contexts where classroom time is limited.

In parallel, studies emphasise that vocabulary knowledge is more than simple word-lists; it involves breadth, depth, retention, and transfer to usage. MALL platforms add affordances such as spaced repetition, instant feedback, gamified incentives, and learner autonomy—mechanisms hypothesised to enhance vocabulary growth beyond traditional instruction. However, the literature also cautions that exposure alone is insufficient: meaningful engagement, contextualization, and opportunities for use determine learning gains.

App-Based Environments: Duolingo and Quizlet

Turning to specific apps, the software Duolingo has been widely studied. For example, a qualitative study at a high school in Bali found that the teacher integrated Duolingo tasks into group work and warm-up activities; students responded positively but the study noted limited evidence on how vocabulary transfer occurred beyond the app (Pramesti et al., 2025). Another study found significant gains in vocabulary mastery among younger learners after five months of Duolingo use (pre-test mean = 54.10, post = 85.77) and reported increased motivation and engagement. (Ramdhani & Subiyantoro, 2025). Nonetheless, many studies highlight gaps: typically short-term interventions, mostly receptive vocabulary measured, and little exploration of how features like gamification, adaptive sequencing, and learner control contribute to outcomes.

The medium of Quizlet, a learner-generated flashcard and practice platform, offers a different architecture. A classroom action research study with 13 high school students found that Quizlet increased engagement when used with B2-level vocabulary materials (Prayogi & Wulandari, 2021). A systematic literature review on Quizlet usage in vocabulary expansion concluded that while many studies show positive outcomes, the research is concentrated on engagement and motivation, less often on lexical transfer or long-term retention (Yunita Ayu Riski & Wahyuni, 2024). These findings underscore the differing app affordances: Duolingo offers a structured, scaffolded curriculum with gamification, while Quizlet emphasizes learner-driven flashcard practice and flexibility.

Self-Regulated Learning (SRL) Theory

Complementing MALL, Self-Regulated Learning (SRL) theory highlights the learner's active role in managing their own learning processes. Zimmerman (2002) defines SRL as the ability to plan, monitor, and evaluate one's learning activities to achieve academic goals. According to (Pintrich, 2000), successful self-regulated learners employ metacognitive strategies to control motivation and behavior throughout the learning process. In the context of mobile learning, SRL manifests when students use apps like Duolingo or Quizlet to set study goals, monitor progress through app analytics, and reflect on their vocabulary mastery. These applications incorporate SRL mechanisms by providing visual progress trackers, personalized reminders, and adaptive review systems. Studies by (Lai & Gu, 2011) and (Godwin-Jones, 2017) show that such tools foster learner autonomy and discipline, essential qualities for sustainable vocabulary development. Therefore, SRL theory supports the interpretation of how learners manage their motivation, persistence, and reflection while using immersive learning apps.

Gaps and the Need for Qualitative Process Exploration

Although the evidence supports that both Duolingo and Quizlet can positively influence vocabulary growth, several research gaps remain relevant to your study. First, there is a scarcity of qualitative process-oriented research that examines *how* learners engage with these apps in context,

why certain features foster or hinder vocabulary uptake, and *under what conditions* transfer to classroom tasks occurs. Second, comparative studies between different app types, with different affordances, are limited. Few studies juxtapose structured gamified apps like Duolingo with more learner-controlled tools like Quizlet in the same research design. Third, many studies focus on short-term outcomes (pre/post-test over weeks) and receptive vocabulary; fewer investigate longer-term retention, productive vocabulary use, and immersion within learners' daily routines. In the Indonesian/EFL context, implementing app brings positive student perceptions at MTs in Kepahiang (Anton Adi Purwanto & Syafryadin, 2023). However, these local studies seldom adopt comparative qualitative methods, nor deeply explore the immersive app. This study therefore offers a new perspective by focusing on immersion, process, and comparative affordances of these two platforms for vocabulary growth, bridging a gap in both international and local literature.

METHOD

This study adopts a qualitative deductive approach, grounded in established theory on vocabulary acquisition and MALL, and proceeds from general theoretical propositions to specific empirical observation of learner experiences and practices. The design will compare two immersive app-based learning environments—Duolingo and Quizlet—to explore how each influences vocabulary growth among EFL learners. The deductive frame allows the researcher to begin with theory and examine how these constructs manifest in practice.

The participants were 5 higher education students at Rokania University enrolled in English vocabulary courses, who use the apps (Duolingo or Quizlet) as part of their out-of-class or blended vocabulary program. Data collected through multiple qualitative sources to capture immersion, interaction, and meaning-making. Semi-structured interviews with learners to explore perceptions, routines of app use, contextual integration, and vocabulary transfer to classroom tasks.

The data will be analysed using thematic analysis, guided by deductive codes derived from theory (e.g., "gamification effect", "spaced retrieval", "learner autonomy", "vocabulary transfer", "routine integration") as well as inductively generated themes emerging from the field. Comparative cross-case analysis applied to examine similarities and differences between the two groups (Duolingo vs Quizlet) with respect to immersion patterns, vocabulary uptake, and reported transfer. Trustworthiness addressed through triangulation of data sources (observations, document analysis, interviews), member checking of preliminary themes with participants. Ethical considerations include informed consent for all participants, anonymization of data, and secure storage of app-usage logs.

FINDINGS AND DISCUSSION

Findings

The qualitative data collected from 5 students through semi-structured interviews and document analysis revealed five main themes: (1) Students' learning profile using Duolingo and Quizlet, (2) improvement in vocabulary retention and application, (3) heightened motivation and engagement through gamification, (4) development of self-regulated learning strategies, and (5) the influence of lecturer mediation and contextual factors.

1. Students' Learning profile using Duolingo and Quizlet

This section presents the results of the document analysis and interview conducted to support and validate the findings of the study on vocabulary growth through the use of Duolingo and Quizlet. The tables below provide a structured summary of various aspects of student engagement and vocabulary performance during the intervention period. The table highlights key indicators that show how frequently students interacted with the applications as below:

Table 1. Summary of Duolingo activity logs

Category	Indicators	Results Observed
Engagement Frequency	Daily streak length	10–29 days (students maintained streaks ≥10 days)
Learning Intensity	XP gained across 6 weeks	Ranged from 300–2000 XP per student
Skill Unit Completion	Vocabulary-related units	Highest completion in: Food, Verb, Daily Activities, Adjectives
Practice Behavior	Repeated review attempts	Majority engaged in daily review prompts and correction cycles
Usage Duration	Estimated session time	5–15 minutes per session (self-reported)

Activity records showed that students had streaks ranging from 10 to 29 days, indicating sustained use across the learning period. XP (experience point) accumulation ranged widely, with several students exceeding 1,000 XP, reflecting high-intensity practice. The logs also showed completion of multiple skill units, with vocabulary categories such as *Food*, *School*, *Daily Activities*, and *Adjectives* showing the highest completion rates. The data indicate that most students maintained consistent app usage, as shown by streak lengths and cumulative XP points. These indicators reflect not only frequency of engagement but also learners' commitment to practicing vocabulary through repeated exposure. High completion rates in units such as *Daily Activities*, *Adjectives*, and *Food* suggest that learners engaged with vocabulary topics relevant to classroom instruction, reinforcing the connection between app-based and school-based learning.

Table 2. Summary of Quizlet activity logs

Category	Indicators	Results Observed
Study Mode Utilization	Modes used	High usage of *Match, Learn, Test*; moderate usage of *Flashcards*
Learner-Generated Content	Student-created sets	students created sets containing 10–25 words
Practice Frequency	Number of practice cycles	Most students practiced each set 2–5 times per week
Collaboration/ Competition	Group learning activities	Students used *Quizlet Live* during lecturer-guided sessions
Vocabulary Mastery Indicators	Score trends	Increased accuracy over repeated practice cycles observed in logs

Quizlet usage data also signalled strong engagement. Students interacted with multiple study modes, particularly *Match*, *Learn*, and *Test*. Students created their own sets containing 10–25 vocabulary words, demonstrating initiative in selecting and organizing learned items. The presence of custom sets indicates that learners internalized the process of building and reviewing vocabulary autonomously.

From the document analysis is found that Duolingo logs revealed that most learners engaged with the app on a frequent, if not daily, basis. The activity logs confirm that students used the apps regularly and deliberately, which complements interview evidence showing increased motivation and self-regulation. Consistent streaks, XP gains, and study modes demonstrate that app-based learning became an integrated part of students' daily routines. The presence of self-created Quizlet sets is especially significant because it shows that learners did not simply consume content but actively constructed it—an essential indicator of deeper vocabulary processing.

Table 3. Summary of Quizlet Usage Patterns and Learner Behaviors

Category	Indicators	Findings
Study Mode Utilization	Modes used	High usage of *Match, Learn, Test*; moderate usage of *Flashcards*
Learner-Generated Content	Student-created sets	12 students created sets containing 15–40 words

Practice Frequency	Number of practice cycles	Most students practiced each set 2–5 times per week
Collaboration/ Competition	Group learning activities	Students used *Quizlet Live* during lecturer-guided sessions
Vocabulary Mastery Indicators	Score trends	Increased accuracy over repeated practice cycles observed in logs

Table 3 compares the quality of vocabulary used in students' written assignments before and after using the apps. The results show marked improvement in vocabulary variety, accuracy, sentence complexity, and lexical density. After the intervention, students used more descriptive adjectives, action verbs, and topic-specific words introduced in the apps. The table also illustrates clearer evidence of transfer, as students incorporated app-learned vocabulary into authentic writing tasks. This demonstrates that learning outcomes extended beyond recognition to productive language use, a central indicator of vocabulary mastery.

2. Improvement in Vocabulary Retention and Application

Participants consistently reported that their ability to remember and apply English vocabulary improved significantly after using Duolingo and Quizlet for six weeks. Students highlighted that the *spaced repetition* and *retrieval practice* features helped them recall and use new words in both oral and written tasks. For example,

"Before I used Quizlet, I usually forgot new words quickly, but now I can remember them when I write or speak in class." (S1)
"Duolingo reminds me to review words every day, so I don't easily forget them anymore." (S4)
"I learned to use new words in sentences after repeating the practice in both apps." (S3)
"When I see a word again in Quizlet after some days, it helps me remember the meaning better." (S2)
"The test and match games make me think actively about the meaning, so I really understand it." (S5)

The excerpts indicate that students perceived a clear progression in vocabulary retention, mainly due to repeated exposure and active recall. The participants emphasized that vocabulary became easier to use in productive tasks, such as speaking and writing. This suggests growth not only in recognition (receptive knowledge) but also in application (productive knowledge). The findings show that repetition, immediate practice, and consistent exposure enable students to build stronger mental associations with vocabulary items. The students' ability to recall and apply words outside the app environment also reflects transfer of learning, indicating that the apps facilitated meaningful vocabulary acquisition rather than rote memorization.

Moreover, students' written tasks, particularly short paragraphs and descriptive texts, were examined to identify patterns of vocabulary use. Early assignments revealed limited use of varied vocabulary, with most students relying on basic, high-frequency words. However, assignments submitted after the six-week implementation showed clear improvement. A notable increase was observed in:

1. Use of newly learned adjectives (e.g., "delicious," "comfortable," "confident")
2. More accurate use of verbs introduced through app units
3. Occasional attempts at more complex vocabulary (e.g., "motivate," "improve," "experience")
4. Visible reduction in repetitive vocabulary choices

In several samples, students integrated words that matched the content of their Duolingo units or their Quizlet sets. For example, in a descriptive writing task about "My Daily Routine," multiple students included vocabulary learned in the *Activities* and *Time* units from Duolingo. It is supported by the results of document analysis, as in the table:

Table 4. Vocabulary Use in Written Assignments Before and After the Intervention

Aspect of Vocabulary Use	Before Using Apps	After Using Apps
Vocabulary Variety	Limited to high-frequency/basic words	Increased variety including adjectives, verbs, and topic-specific nouns
Accuracy of Word Use	Frequent misuse or incomplete meaning	Higher correctness and contextual accuracy

Sentence Complexity	Simple patterns, repetitive structures	More variation in structure and descriptive detail
Lexical Density	Low — many function words, few content words	Higher — more content words used appropriately
Evidence of Transfer	Minimal use of newly learned words	Clear incorporation of vocabulary from Duolingo/Quizlet topics

This table compares the quality of vocabulary used in students' written assignments before and after using the apps. The results show marked improvement in vocabulary variety, accuracy, sentence complexity, and lexical density. After the intervention, students used more descriptive adjectives, action verbs, and topic-specific words introduced in the apps. The table also illustrates clearer evidence of transfer, as students incorporated app-learned vocabulary into authentic writing tasks. This demonstrates that learning outcomes extended beyond recognition to productive language use, a central indicator of vocabulary mastery.

3. Heightened Motivation and Engagement through Gamification

A strong motivational factor emerged from the gamified design of both applications. Features such as streak counts, levels, badges, and leaderboards created a sense of achievement and enjoyment that encouraged consistent use. Many students described the learning experience as "fun," noting that gamification reduced anxiety and made vocabulary learning feel like a game rather than a formal task.

"I like learning with Duolingo because it feels like playing a game, not studying." (S3)

"When I get a badge or reach a higher level, I feel proud and want to learn more." (S5)

"Quizlet is fun because I can compete with my friends using flashcard games." (S1)

"Sometimes I just open Duolingo to maintain my streak—it makes me excited to continue." (S2)

"The sound effects and colourful design make me feel relaxed while learning." (S4)

The interview data show that motivation was driven by both intrinsic and extrinsic factors. Students felt enjoyment from the interactive design and reward system, which reduced stress and increased willingness to revisit the app. Gamification created a sense of achievement and progress, fostering consistent engagement over time. The competitive and reward-based environment also enhanced learners' emotional investment, transforming vocabulary learning into an activity they voluntarily pursued. This indicates that motivation is not merely a supplementary factor but a central mechanism that sustains learning behavior, especially in digital environments.

4. Development of Self-Regulated Learning Strategies

The data also showed that the use of Duolingo and Quizlet encouraged learners to manage their study routines more independently. Students set daily learning goals, tracked their progress, and reflected on their performance based on app feedback. One participant explained,

"I can see how much I study every day and how many words I've learned. It makes me want to do more.I always set my daily goal on Duolingo and try to complete it before sleeping." (S2)

"I check my progress chart to see how many words I've learned; it motivates me." (S3)

"If I make mistakes, I review them again in Quizlet until I get it right." (S4)

"Sometimes I make my own word sets in Quizlet to review before exams." (S5)

"These apps help me control my learning; I don't need the teacher to remind me." (S1)

Self-regulated learning emerged naturally through the design of the applications. Students became more aware of their learning progress and took active steps to plan and monitor their study routines. The apps provided instant feedback, which encouraged reflection and correction. Several respondents described creating personalized lists, which suggests ownership over their learning. This demonstrates how mobile learning environments can foster autonomy, accountability, and strategic learning behaviors—core elements of SRL. Such findings highlight the capacity of digital tools to transform learners from passive recipients into active managers of their own vocabulary development.

5. Influence of Lecturer Mediation and Contextual Factors

Although the apps supported independent learning, the role of the lecturer remained central in integrating app-based activities with classroom instruction. It showed that when lecturers linked vocabulary lessons with app exercises, students demonstrated better comprehension and active participation.

"When my lecturer asked us to use Quizlet in class, I understood the topic faster." (S5)
"The lecturer helped us choose which vocabulary lists to practice, so it matched the lesson." (S3)
"If the lecturer discussed the words from Duolingo, it was easier to remember them." (S4)
"Sometimes my internet connection is bad, but the lecturer allows us to use it offline, which helps." (S2)
"I learn more when the lecturer gives feedback about my app results." (S1)

The findings reveal that lecturer mediation significantly strengthened the learning outcomes from Duolingo and Quizlet. Students benefited from guided vocabulary selection, integration of app content into class discussions, and feedback on their performance. These forms of scaffolding helped students connect digital practice with classroom contexts, leading to deeper understanding and long-term retention. However, infrastructural limitations such as unstable internet access also influenced students' ability to engage consistently. This highlights the importance of institutional support when implementing mobile-assisted learning. Overall, lecturer involvement acted as a bridge between digital learning and academic application, ensuring that vocabulary learned through the apps was meaningfully reinforced.

Table 4. Alignment Between Lecturer Lesson Plans and App-Based Vocabulary Learning

Lesson Component	Corresponding App Feature	Alignment Observed
Vocabulary Topic Selection	Duolingo units, Quizlet sets	Lecturer selected topics identical to app units
In-Class Activities	Quizlet Live, flashcard review	Used to reinforce app vocabulary
Writing Tasks	Application of learned words	Tasks required students to use app vocabulary
Speaking Tasks	Topic-based descriptions	Activities matched vocabulary lists from apps
Feedback Mechanisms	App progress data	Lecturer reviewed student app results during class

The lesson plans integrated vocabulary themes from the apps and incorporated activities such as Quizlet Live, flashcard reviews, and writing tasks requiring the application of newly learned words. This alignment is significant because it shows that app-based learning was not isolated but rather supported through instructional scaffolding. The table highlights how lecturer mediation strengthened students' ability to contextualize vocabulary, contributing to deeper understanding and retention. It illustrates how the lecturer intentionally aligned classroom instruction with vocabulary practiced on Duolingo and Quizlet.

Furthermore, lesson plans collected during the study showed clear attempts by the lecturer to integrate mobile learning with classroom instruction. The lecturer selected vocabulary topics that matched the themes offered in Duolingo and Quizlet, such as *Descriptive Words*, *Healthy Living*, and *Daily Activities*. In some lessons, the lecturer designed reinforcement tasks requiring students to apply vocabulary they practiced on the apps.

Examples include:

1. A speaking activity titled "Describe Your Daily Activities" using vocabulary from Duolingo units
2. A writing task "Write 10 Sentences Using the Words from Your Quizlet Set"
3. A classroom review session using a projector to display Quizlet flashcards
4. A group activity requiring students to compete in Quizlet Live

The lecturer's alignment of classroom activities with app-based learning demonstrates an intentional effort to connect digital practice with academic objectives. This alignment helped ensure that vocabulary encountered in the apps was reinforced and contextualized through communicative

classroom tasks. The integration also validated students' app-based learning experiences, making them feel relevant and academically meaningful.

DISCUSSION

The findings demonstrate that immersive app-based learning through Duolingo and Quizlet effectively supports vocabulary growth by combining technological innovation with learner motivation and self-regulation. Students' improved recall and application of vocabulary confirm the effectiveness of cognitive features such as *retrieval practice* and *spaced repetition*, as previously highlighted by Cao et al. (2023). These findings align with the cognitive learning perspective that repeated and distributed practice leads to long-term vocabulary retention (Ebbinghaus, 1964; Karpicke & Roediger, 2008).

Motivation and engagement emerged as powerful mediating variables in the success of vocabulary learning. Gamification elements, as emphasized in the studies by Fithriani (2021) and Irzawati (2024), play a crucial role in sustaining learner interest, enhancing autonomy, and creating enjoyable learning experiences. These motivational factors not only foster continuous app use but also transform vocabulary learning into a more meaningful process—bridging the gap between extrinsic reward systems and intrinsic motivation (Deci & Ryan, 1985).

Furthermore, this study reinforces the role of self-regulated learning (SRL) as an integral process in app-based vocabulary development. Learners demonstrated the ability to plan, monitor, and evaluate their progress, reflecting key SRL principles (Zimmerman, 2002). This finding echoes the research of Ho and Kawaguchi (2024), who identified that students using Quizlet effectively manage their own learning pace and strategies. Through consistent practice, learners cultivated autonomy, which is essential in sustaining vocabulary retention beyond formal instruction.

Finally, lecturer mediation and contextual support were found to significantly shape the effectiveness of app-based learning. As suggested by Irzawati (2024), teacher—or in this case, lecturer—guidance ensures that mobile learning is pedagogically relevant and connected to curriculum goals. Without such integration, app-based learning risks becoming an isolated activity rather than a complement to classroom instruction. Meanwhile, infrastructural challenges highlighted in Al-Jarf (2022) remind educators and policymakers of the necessity of technological accessibility in achieving equitable language learning outcomes.

In summary, this study supports the conclusion that immersive app-based learning fosters vocabulary growth through a synergistic combination of gamification, self-regulation, and instructional support. Duolingo and Quizlet, when properly guided and contextually implemented, can serve as powerful extensions of EFL classrooms—enhancing learner motivation, promoting independent study, and strengthening vocabulary retention.

CONCLUSIONS

Based on the findings and discussion, this study concludes that immersive app-based learning using Duolingo and Quizlet effectively enhances vocabulary growth among senior high school EFL learners. The integration of mobile learning applications provided meaningful and interactive experiences that encouraged continuous vocabulary practice and long-term retention. Students showed noticeable improvement in both receptive and productive vocabulary skills, confirming that features such as *spaced repetition*, *retrieval practice*, and *immediate feedback* effectively strengthened lexical memory and application.

The study further concludes that gamification plays a vital role in sustaining learners' motivation and engagement. Duolingo's badges, levels, and progress streaks, as well as Quizlet's interactive review modes, transformed vocabulary learning from a routine task into an enjoyable experience. In addition, that self-regulated learning (SRL) behaviors significantly mediated vocabulary improvement. Learners who consistently used the apps demonstrated enhanced abilities to plan study schedules, monitor progress, and reflect on outcomes. The self-tracking and goal-setting features in both apps encouraged autonomy and self-discipline, supporting Zimmerman's (2002) SRL framework. The evidence suggests that app-based environments not only enhance

vocabulary mastery but also foster independent learning habits essential for long-term success in EFL learning.

Lastly, the study highlights the critical role of lecturer mediation and contextual factors in maximizing the effectiveness of app-based learning. Students benefited most when lecturers guided them in integrating app activities with classroom lessons, facilitating contextual vocabulary use in authentic communication.

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REFERENSI

Al-Jarf, R. (2022). Learning vocabulary in the app store by EFL college students. *International Journal of Social Science and Human Research, 5*(1), 216–225. https://doi.org/10.47191/ijsshr/v5-i1-30

Anton Adi Purwanto, & Syafryadin. (2023). Students' Perception on Using Duolingo for Learning English Vocabulary. *JET (Journal of English Teaching)*, *9*(1), 70–82. https://doi.org/10.33541/jet.v9i1.4506

Cao, D., Ismail, L., & Razali, A. B. (2023). Effects of mobile app on memory retention of vocabulary knowledge among low proficiency EFL learners. *English Language Teaching, 17*(10), 1–11. https://doi.org/10.5539/elt.v17n10p1

Fithriani, Rahmah. (2021). The utilization of mobile-assisted gamification for vocabulary learning: Its efficacy and perceived benefits. *Computer-Assisted Language Learning Electronic Journal, 22*(3).

Godwin-Jones, R. (2017). Smartphones and language learning. *Language Learning and Technology*, *21*(2), 3–17. https://doi.org/10.64152/10125/44607

Ho, T. T. H., & Kawaguchi, S. (2024). The effectiveness of Quizlet in improving EFL learners' receptive vocabulary acquisition. *[Research output – Western Sydney University]*.

Irzawati, I. (2024). The integration of Duolingo into EFL learning. *Esteem Journal of English Education Study Programme, 6*(2). https://doi.org/10.31851/esteem.v6i2.12317

Kessler, M., Loewen, S., & Gönülal, T. (2025). Mobile-assisted language learning with Babbel and Duolingo: comparing L2 learning gains and user experience. *Computer Assisted Language Learning*, *38*(4), 690–714. https://doi.org/10.1080/09588221.2023.2215294

Lai, C., & Gu, M. (2011). Self-regulated out-of-class language learning with technology. *Computer Assisted Language Learning*, *24*(4), 317–335. https://doi.org/10.1080/09588221.2011.568417

Lin, J. J., & Lin, H. (2019). Mobile-assisted ESL/EFL vocabulary learning: a systematic review and meta-analysis. *Computer Assisted Language Learning*, *32*(8), 878–919. https://doi.org/10.1080/09588221.2018.1541359

Loewen, S., Crowther, D., Isbell, D. R., Kim, K. M., Maloney, J., Miller, Z. F., & Rawal, H. (2019). Mobile-assisted language learning: A Duolingo case study. *ReCALL*, *31*(3), 293–311.

https://doi.org/10.1017/S0958344019000065

Ningsih, K. W. D., Padmadewi, N. N., & Dewi, K. S. (2024). Implementing Quizlet in Teaching Vocabulary Achievement for 5th Grade Students. *International Journal of Language and Literature*, *8*(4), 192–200. https://doi.org/10.23887/ijll.v8i4.94035

Okumuş Dağdeler, K. (2023). A systematic review of Mobile-Assisted Vocabulary Learning research. *Smart Learning Environments*, *10*(1). https://doi.org/10.1186/s40561-023-00235-z

Pintrich, P. R. (2000). the Role of Goal Orientation in Self-Regulated Learning [El Papel De La Orientación a Objetivos En El Aprendizaje Autorregulado]. *Boekaerts & Niemivirta*, 451–502. https://doi.org/10.1016/B978-012109890-2/50043-3

Pramesti, R. D., Padmadewi, N. N., & Wahyuni, L. G. E. (2025). Duolingo: A Qualitative Study on Vocabulary Acquisition. *The Art of Teaching English as a Foreign Language (TATEFL)*, *6*(1), 41–52. https://doi.org/10.36663/tatefl.v6i1.942

Prayogi, A. W., & Wulandari, M. (2021). Implementing a mobile application Quizlet to help Senior High School students learn vocabulary. *ELT Forum: Journal of English Language Teaching*, *10*(1), 87–99. https://doi.org/10.15294/elt.v10i1.42775

Ramdhani, I., & Subiyantoro, H. (2025). The Effect of the Duolingo App to Improve Vocabulary Mastery Among Gen-Z In an English Course Program. *Journal of General Education and Humanities*, *4*(4), 1635–1646. https://doi.org/10.58421/gehu.v4i4.720

Yunita Ayu Riski, & Wahyuni, S. (2024). Quizlet as Teaching Media in Navigating Vocabulary Expansion: Systematic Literature Review. *English Education:Journal of English Teaching and Research*, *9*(2), 148–157. https://doi.org/10.29407/jetar.v9i2.21928