

STUDENTS' SELF-DIRECTED VOCABULARY LEARNING THROUGH DUOLINGO: MOTIVATION, STRATEGIES, AND LEARNING CONSISTENCY

^{1*}Naufal Fahmi, ²Dewi Kencanawati, ³Yunik Susanti

Universitas Nusantara PGRI Kediri, Kota Kediri, Indonesia

naufalfahmi213@gmail.com, dewikencanawati@unpkediri.ac.id, yuniksusanti@unpkediri.ac.id

Abstract

Self-directed vocabulary learning has become increasingly relevant in digital language learning environments, particularly as mobile applications provide learners with flexible opportunities to practice English beyond formal classroom settings. Duolingo offers a gamified learning environment that enables learners to engage in vocabulary practice through short lessons, immediate feedback, progress tracking, and motivational features. This study aims to explore students' self-directed English vocabulary learning through Duolingo by examining the strategies they employ, the factors that motivate their learning, and the ways they maintain learning consistency. This research employed a qualitative approach with a case study design involving five junior high school students from MTsN 1 Kediri who actively used Duolingo for independent English vocabulary learning. Data were collected through open-ended questionnaire worksheets, non-participant observation, and documentation of students' Duolingo learning activities. The data were analyzed using the interactive model of Miles, Huberman, and Saldaña, consisting of data condensation, data display, and conclusion drawing and verification. The findings reveal that students developed self-directed vocabulary learning routines by integrating Duolingo into their leisure time and employing various strategies, including translation, note-taking, contextual guessing, and pronunciation practice. Students' learning motivation was supported by personal goals, gamified features, progress tracking, and peer competition. The findings also indicate that the daily streak feature played a particularly important role in maintaining students' learning consistency, while social support and technical conditions influenced their learning experiences. Despite these motivating factors, students encountered obstacles including unstable internet connections, device limitations, application bugs, and the heart/energy system. Overall, Duolingo provided a flexible digital environment that supported students' autonomous vocabulary learning by combining self-directed strategies, motivational mechanisms, and routine-based learning practices.

Keywords: Duolingo, Self-Directed Learning, Vocabulary Learning, Motivation, Learning Consistency

Article History:

Submitted	Accepted	Published
June 19 th 2026	September 10 th 2026	September 15 th 2026

INTRODUCTION

English vocabulary is a fundamental component of language proficiency because it supports learners in understanding and producing language across listening, speaking, reading, and writing activities. For English as a Foreign Language (EFL) learners, vocabulary development can be challenging because opportunities to encounter and practice English are often limited outside the classroom. Junior high school students may particularly experience difficulties in remembering new words, understanding their meanings in context, and applying vocabulary appropriately. Limited exposure to English, low motivation, and learning activities that rely heavily on memorization and repetitive exercises may further restrict students' opportunities to develop vocabulary independently. Therefore, providing learners with accessible and engaging opportunities for vocabulary practice beyond formal classroom instruction is an important consideration in EFL education. (Alqahtani, 2015; Nation, 2013).

The development of digital technology has created new possibilities for language learning by providing learners with flexible access to instructional resources. Mobile-Assisted Language

Learning (MALL) enables learners to engage with language materials across different locations and times, thereby extending learning opportunities beyond the formal classroom. In this context, mobile applications can support learners in controlling their learning pace, selecting learning resources, and incorporating language practice into their daily routines. Such opportunities are closely related to self-directed learning, in which learners take greater responsibility for managing their learning processes and developing independent learning habits. Previous research has indicated that learner autonomy is influenced by psychological, cognitive, metacognitive, and contextual factors, including motivation, self-management, and external support (Al-Khasawneh et al., 2024; Nguyen, 2024; Subekti, 2021).

One digital application that provides such opportunities is Duolingo. The application offers short interactive lessons, immediate feedback, repeated vocabulary exposure, progress tracking, and gamified features that allow learners to practice English at their own pace. These features can make vocabulary learning more interactive and potentially encourage students to continue practicing outside formal instructional settings. (Shortt & Munday, 2018) reported that Duolingo can create an engaging learning environment by incorporating game-like elements into language learning activities. In addition, the integration of gamification features such as points, rewards, streaks, and leaderboards may provide motivational stimuli that encourage learners to maintain regular learning routines. However, gamification does not necessarily produce uniformly positive experiences because learners may also become overly focused on points, rankings, or streak maintenance rather than meaningful language learning (Mogavi et al., 2022).

Several previous studies have examined the relationship between Duolingo and English vocabulary learning. (Raadhiyah, 2025), for example, explored the use of Duolingo for self-directed English vocabulary learning among junior high school students and found that the application supported independent learning through interactive and gamified activities. Similarly, (Putri et al., 2025) reported improvements in students' vocabulary mastery after the implementation of Duolingo. (Vidayanti et al., 2025) also found that Duolingo could increase vocabulary engagement and retention among junior high school students. Furthermore, (Ningtyas & Reftyawati, 2024) reported that the use of Duolingo improved vocabulary achievement and students' interest in learning. These studies demonstrate the potential of Duolingo as a digital medium for vocabulary learning; however, much of the existing research has emphasized vocabulary achievement, effectiveness, or general student perceptions rather than the detailed processes through which learners independently manage their vocabulary learning.

Research concerning self-directed learning has also demonstrated the importance of learner autonomy, motivation, and self-management in language learning. (Hamma et al., 2025), for instance, investigated Duolingo in combination with self-directed learning and found positive effects on students' speaking performance. However, their study focused on speaking skills and senior high school students rather than vocabulary learning among junior high school learners. In addition, (Renaldy et al., 2025), through a systematic literature review, reported generally positive effects of Duolingo on vocabulary acquisition, motivation, and participation, while also noting that much of the existing empirical research has concentrated on measurable learning outcomes. These findings indicate that the existing literature provides considerable evidence regarding the potential benefits of Duolingo, but comparatively less attention has been given to learners' actual experiences, strategies, and behavioral consistency while independently using the application.

This gap is particularly relevant for junior high school learners because adolescents are still developing self-regulation, learning responsibility, and independent learning habits. Their experiences may differ from those of university students or adult learners because motivation, peer influence, technological familiarity, and environmental support can shape how they engage with digital learning applications. The present study therefore focuses not only on whether Duolingo supports vocabulary learning, but also on how students actually organize their learning routines, respond to unfamiliar vocabulary, maintain their learning habits, and experience the motivational and technological factors surrounding their use of the application. This perspective is important because students' independent learning behavior cannot be fully understood through achievement scores alone.

Accordingly, this study explores students' self-directed vocabulary learning through Duolingo by examining their learning practices, vocabulary-learning strategies, motivation, and learning consistency. The study specifically investigates how junior high school students utilize Duolingo as a self-directed learning tool and what factors influence their independent vocabulary learning. By employing a qualitative case study approach, this research provides an in-depth account of the experiences of five junior high school students from MTsN 1 Kediri. The study contributes to the discussion of Mobile-Assisted Language Learning and learner autonomy by highlighting how motivational mechanisms, individual learning strategies, social influences, and technological conditions interact in students' everyday vocabulary learning practices. Practically, the findings may provide English teachers and educational institutions with insights into how digital applications can be incorporated to support more flexible, autonomous, and sustainable vocabulary learning beyond the classroom.

METHOD

This study employed a qualitative approach with a case study design to explore students' self-directed English vocabulary learning through Duolingo in an informal learning context. The case focused on five junior high school students from MTsN 1 Kediri who actively used Duolingo for independent vocabulary learning outside formal school hours. The research was conducted over three months, from May to July 2026. Although the participants were students of MTsN 1 Kediri, the fieldwork was conducted in an informal setting at Dorang Gaming Arena PlayStation in Pare, Kediri, East Java, where the participants commonly spent their leisure time. The setting was selected to capture students' natural learning practices and interactions with Duolingo beyond the formal classroom environment.

The primary data consisted of qualitative information obtained from five participants, identified as S1, S2, S3, S4, and S5. Data were collected through three techniques: open-ended questionnaire worksheets, non-participant observation, and documentation. The open-ended questionnaire consisted of ten questions designed to explore students' learning experiences, vocabulary-learning practices, motivation, consistency, and factors influencing their use of Duolingo. Non-participant observations were conducted to record students' learning behaviors, including their use of Duolingo features, learning frequency, and independent management of learning activities. Documentation was used to complement the qualitative data through photographs of completed worksheets and screenshots of students' Duolingo profiles and learning progress, including daily streaks, XP points, and leaderboard rankings.

The collected data were analyzed using the interactive qualitative data analysis model proposed by (Miles et al., 2014). The analysis involved three concurrent stages: data condensation, data display, and conclusion drawing and verification. During data condensation, the researcher selected and organized relevant information from the students' written responses, observational records, and documentation. The condensed data were then displayed through thematic descriptions and analytical tables to identify patterns across the five participants. Finally, conclusions were drawn and continuously verified by comparing emerging interpretations with the original data to ensure that the findings accurately represented the students' experiences.

To establish the trustworthiness of the findings, methodological triangulation was applied. Data obtained from the open-ended worksheets were cross-checked with observational records and supporting documentation, including students' Duolingo activity and progress screenshots. The comparison of these three data sources enabled the researcher to verify the consistency and authenticity of the participants' accounts and strengthen the credibility of the research findings.

RESULT AND DISCUSSION

The qualitative analysis of the open-ended questionnaire worksheets, non-participant observations, and supporting documentation revealed two major dimensions of students' self-directed vocabulary learning through Duolingo. The first dimension concerns how students organized and carried out their independent vocabulary learning practices. The second concerns the internal, social, technological, and gamified factors that influenced their learning motivation and consistency.

1. Students' Self-Directed Vocabulary Learning Practices

The findings indicate that the five participants developed flexible but relatively consistent routines for using Duolingo outside formal classroom instruction. Their self-directed learning practices were characterized by three interconnected patterns: flexible learning routines, active vocabulary retention strategies, and regular habit cultivation.

a. Flexible Learning Routines

All five participants had incorporated Duolingo into their out-of-class routines, although the duration and timing of their use varied. S1 and S4 had used the application consistently since mid-2025, whereas S2, S3, and S5 had incorporated it into their routines for approximately three to six months. Rather than following a fixed instructional schedule, the students independently selected convenient moments for learning. S2 used Duolingo in the morning or before going to sleep, while S3 often used school breaks or empty class periods. S1, S4, and S5 generally accessed the application during their free time.

The students also demonstrated a preference for short learning sessions. S4 reported, "I only play Duolingo in my spare time, but usually I make time to play it for 5–10 minutes a day." Similarly, S1 emphasized completing the available lessons each day, while S3 reported using Duolingo almost every day. These patterns demonstrate that self-directed learning did not

necessarily require long study sessions. Instead, students integrated short learning activities into their existing routines.

This finding reflects (Benson, 2011) conception of learner autonomy, particularly the learner's capacity to exercise control over the time and circumstances of learning. The students were not dependent on a teacher-established timetable; instead, they independently determined when and where vocabulary learning could take place. The use of short learning sessions also illustrates the flexibility associated with Mobile-Assisted Language Learning (MALL), in which mobile devices allow language learning to occur across different times and locations (Kukulska-Hulme, 2012).

b. Active Vocabulary Retention Strategies

The participants also demonstrated different strategies when encountering unfamiliar vocabulary. S1 and S4 commonly searched for word meanings using translation tools and then attempted to remember the words. S4 additionally used the audio function to check pronunciation. S1 described his strategy as "Looking up the meaning of the word in a translator and then remembering it."

S2 and S3 used note-taking strategies by recording unfamiliar vocabulary in a personal notebook or smartphone notes. This allowed them to preserve new vocabulary for later review rather than relying only on immediate recognition during the Duolingo lesson. Meanwhile, S5 initially attempted to infer the meaning of an unfamiliar word from its sentence context before checking the meaning using Google Translate or a dictionary. He explained, "Contextually guessing the meaning from the sentence first; if I am still confused, then it is checked in Google Translate or a dictionary."

These strategies demonstrate that students did not simply consume the vocabulary presented by the application. They actively responded to learning difficulties by selecting additional resources and strategies. The combination of meaning retrieval, note-taking, contextual guessing, and pronunciation practice reflects the multidimensional nature of vocabulary learning described by Nation (2013), in which knowledge of vocabulary involves attention to form, meaning, and use. S5's contextual guessing strategy also indicates that students attempted to construct meaning from linguistic context before relying on external translation resources.

c. Regular Habit Cultivation

The participants' vocabulary learning practices were further supported by mechanisms that helped them maintain regularity. S2 relied on Duolingo's push notifications and reminders to prompt daily practice. S1 and S4 established a personal minimum of completing at least one lesson or daily module. S5 similarly developed a routine of opening the application during free time, completing the daily module, and listening to pronunciation while learning.

Observation data supported these self-reported routines. S2, S4, and S5 were observed opening Duolingo spontaneously during breaks from recreational activities and completing short sessions of approximately five to ten minutes. These observations indicate that Duolingo had

become integrated into the students' leisure routines rather than functioning solely as a formal educational activity.

The findings suggest that consistency emerged from the interaction between personal routines and application-based reminders. In this sense, Duolingo functioned not only as a source of vocabulary materials but also as a technological structure that helped students maintain repeated learning behavior.

Table 1. Summary of Students' Self-Directed Vocabulary Learning Practices

Learning Practice	Operational Indicator	Representative Evidence
Flexible routines	Learning during free time, school breaks, mornings, or before sleep	S4: "5–10 minutes a day"
Meaning retrieval	Using translation tools to understand unfamiliar words	S1: looking up meanings and remembering them
Note-taking	Recording unfamiliar vocabulary for later review	S2 and S3: notebook or smartphone notes
Contextual guessing	Inferring meaning before consulting external resources	S5: guessing from sentence context
Pronunciation practice	Listening to audio while learning vocabulary	S4 and S5: listening to pronunciation
Habit cultivation	Completing daily lessons and responding to reminders	S1, S2, S4, and S5

2. Factors Influencing Motivation and Learning Consistency

The second major finding concerns the factors that shaped students' motivation and consistency. Four interconnected factors emerged from the data: intrinsic motivation and gamification, social and peer influences, technical and operational constraints, and the daily streak feature.

a. Intrinsic Motivation and Gamified Mechanics

The students' motivation was shaped by both personal language-learning goals and Duolingo's gamified design. At the intrinsic level, S4 expressed a clear desire to improve his English continuously, stating, "Because I want my English to develop and not just stay in one

place.” This indicates that vocabulary learning was not solely driven by external rewards; personal improvement itself provided an important reason for continuing to learn.

At the same time, gamified features strengthened students’ motivation. S2 highlighted the application’s colorful visual design, characters, and reward mechanisms as factors that encouraged his competitive spirit. S4 valued the application because it helped him remember English and identify his current level. S5 similarly perceived the game-like format as enjoyable and less boring.

These findings correspond with the study’s theoretical framework based on Self-Determination Theory (Ryan & Deci, 2017). The participants’ personal desire to improve their English reflects an internal orientation toward competence and personal growth, while rewards, progress indicators, and competitive mechanisms provide external reinforcement. The findings also support (Shortt & Munday, 2018) argument that gamified digital language learning can transform repetitive language practice into a more engaging and low-pressure activity.

b. Social Support and Peer Dynamics

Social interaction also influenced students’ self-directed learning, although its role differed among participants. S1 reported receiving direct encouragement from his parents to learn English. Meanwhile, S2 and S3 shared their Duolingo progress with friends, and peer interaction created a competitive environment. S5 explained that he and his school friends competed over the number of streak days and leaderboard rankings.

However, social support was not necessary for every participant. S4 reported receiving no external support or peer pressure and instead emphasized his personal desire to improve his English because he considered it important. This variation indicates that self-directed learning can be supported by different motivational sources. For some students, social validation and competition strengthened consistency, whereas for others, personal goals were sufficient.

The peer competition observed in the study is consistent with (Dörnyei & Ushioda, 2021) view that language-learning motivation is dynamic and socially situated. In the context of Duolingo, social interaction is not necessarily a direct teaching activity; instead, it can operate through progress sharing, competition, and comparison, thereby reinforcing students’ commitment to their learning routines.

c. Technical and Operational Constraints

Despite their motivation, the participants experienced several barriers that interrupted their self-directed learning. S2, S3, and S5 reported problems with internet connectivity and unstable signals. S3 additionally experienced limitations caused by an older smartphone, including application lag and bugs. He described the difficulties as involving “a mobile phone that is no longer very supportive, sometimes signal constraints, and bugs.”

The participants also identified limitations associated with Duolingo’s heart/energy mechanism. S4 and S5 reported frustration when they could no longer continue learning after

losing available energy or lives through incorrect answers. S4 stated that he could not study continuously because the amount of energy was relatively limited, while S5 mentioned becoming annoyed when lives ran out after making repeated mistakes.

These findings reveal an important tension within technology-mediated self-directed learning. Although mobile applications provide learners with greater control over when and how they learn, that autonomy can still be constrained by technological infrastructure and application design. Thus, students' ability to sustain independent learning is shaped not only by motivation and self-regulation but also by the accessibility and operational conditions of the digital environment.

d. The Dominant Role of the Daily Streak

Among all motivational features, the daily streak emerged as the most consistently influential mechanism. All five participants identified the streak as an important factor in maintaining their learning consistency. S1 stated that the streak feature made him more motivated, while S3 reported that the feature strongly influenced his enthusiasm for learning. S5 emphasized the combination of daily streaks and leaderboard competition as particularly motivating.

Observation data reinforced this finding. S1 and S3 were observed responding quickly to streak-related prompts in order to protect their consecutive learning records before the daily reset. This behavioral response demonstrates that the streak was not merely perceived as a decorative game feature; it actively influenced students' decisions to open the application and complete their daily learning activities.

The importance of the streak also helps explain the relationship between motivation and learning consistency in this study. The students' personal goals encouraged them to learn, while gamification provided an immediate mechanism for maintaining the behavior. In particular, the streak transformed consistency into a visible achievement that students were motivated to protect. This finding is consistent with the study's conceptualization of learning consistency as the capacity to maintain regular self-directed practice through behavioral commitment and self-regulation.

DISCUSSION

Taken together, the findings demonstrate that students' self-directed vocabulary learning through Duolingo was characterized by a combination of learner autonomy, strategic vocabulary engagement, motivational support, and technological mediation. The students exercised autonomy by determining their own learning times and integrating short Duolingo sessions into their daily routines. This pattern supports (Benson, 2011) view that learner autonomy involves learners' ability to take control of important dimensions of their learning process, including time and learning conditions.

The vocabulary strategies employed by the participants further demonstrate that autonomous learning involved active cognitive engagement. Translation, note-taking, contextual guessing, and pronunciation practice allowed students to respond to unfamiliar vocabulary

according to their individual needs. These practices support (Nation, 2013) perspective that vocabulary knowledge develops through attention to multiple dimensions of word knowledge rather than simple memorization. The students' use of external digital resources also illustrates the resourcefulness enabled by MALL, where learners can combine multiple mobile tools to address learning difficulties.

The findings concerning motivation reveal a complementary relationship between intrinsic goals and gamified mechanisms. Students such as S4 demonstrated an internal desire to improve their English, while Duolingo's rewards, progress indicators, streaks, and leaderboards provided additional behavioral reinforcement. This combination is particularly important because the data show that students did not rely exclusively on either internal or external motivation. Instead, personal aspirations and digital affordances worked together to sustain learning behavior.

The daily streak is particularly significant because it connected motivation directly with behavioral consistency. Unlike a general perception of Duolingo as enjoyable, the streak generated a concrete reason for students to return to the application every day. The observation of students responding to streak prompts provides behavioral evidence that this feature influenced actual learning behavior rather than merely being reported as motivational. At the same time, the technical constraints demonstrate that gamification alone cannot guarantee uninterrupted learning. Internet instability, device limitations, bugs, and energy restrictions could interrupt otherwise established learning routines.

Overall, the findings suggest that Duolingo supported self-directed vocabulary learning through a combination of flexible access, active learning strategies, motivational mechanisms, and habit-supporting features. However, the learning experience remained dependent on the interaction between learner agency and the digital environment. Students demonstrated considerable autonomy in managing their learning, but their autonomy was also shaped and at times constrained—by the technological and structural conditions of the application.

CONCLUSION AND SUGGESTIONS

Based on the findings of this study, the five junior high school students demonstrated self-directed vocabulary learning practices through Duolingo by independently managing their learning time, selecting appropriate vocabulary-learning strategies, and maintaining regular learning routines. The students integrated Duolingo into their leisure time through short and repeated learning sessions and used various strategies when encountering unfamiliar vocabulary, including translation, note-taking, contextual guessing, and pronunciation practice. These findings indicate that students were able to take an active role in managing their vocabulary learning beyond formal classroom instruction.

The study also found that students' motivation and learning consistency were shaped by the interaction of personal goals, gamified features, social influences, and technological conditions. Among the various factors identified, the daily streak emerged as the most consistently influential feature in encouraging students to maintain their daily learning routines, while leaderboard competition and peer interaction further motivated some participants. However, students also experienced several obstacles, including unstable internet connections, device limitations, application bugs, and restrictions associated with the heart/energy system. Overall,

Duolingo provided a flexible digital learning environment that supported students' self-directed vocabulary learning by combining learner autonomy, individual learning strategies, motivational mechanisms, and routine-based practice.

Based on these findings, English teachers are encouraged to consider Duolingo as a supplementary digital resource for supporting students' vocabulary learning outside the classroom. Teachers may also guide students to use the application not only for maintaining gamified achievements but also for applying meaningful vocabulary-learning strategies, such as contextual guessing, note-taking, translation, and pronunciation practice. Students are likewise encouraged to maintain consistent learning routines while balancing the motivational benefits of gamification with meaningful vocabulary understanding and retention. For future researchers, further studies may involve a larger and more diverse group of learners, examine Duolingo use over a longer period, or employ quantitative and mixed-methods approaches to investigate the relationship between self-directed learning practices, gamification, and vocabulary development.

REFERENCES

- Al-Khasawneh, F., Al-Malki, E., & Al-Shlowiy, A. (2024). Investigating the determinants of learner autonomy in EFL environments: Personal and pedagogical factors. *International Journal of Applied Linguistics and English Literature*, 13(2), 35–47. <https://doi.org/10.7575/aiac.ijalel.v.13n.2p.35>
- Alqahtani, M. (2015). The importance of vocabulary in language learning and how to be taught. *International Journal of Teaching and Education*, 3(3), 21–34. <https://doi.org/10.20472/TE.2015.3.3.002>
- Benson, P. (2011). *Teaching and researching autonomy* (2nd ed.). Longman.
- Dörnyei, Z., & Ushioda, E. (2021). *Teaching and researching motivation* (3rd ed.). Routledge. <https://doi.org/10.4324/9781351006743>
- Hamma, R., Nur, R., Ammade, S., & Latifa, A. (2025). Innovative Pathways to Fluency: Exploring Duolingo with Self-Directed Learning. *Exposure: Jurnal Pendidikan Bahasa Inggris*, 14(1), 85–98. <https://doi.org/10.26618/exposure.v14i1.12453>
- Kukulska-Hulme, A. (2012). Mobile-Assisted Language Learning. In C. A. Chapelle (Ed.), *The Encyclopedia of Applied Linguistics* (pp. 1–7). Wiley-Blackwell. <https://doi.org/10.1002/9781405198431.wbeal0768>
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.
- Mogavi, R. H., Guo, B., Zhang, Y., Haq, E. U., Zou, D., & Hui, P. (2022). More gamification is not always better: A case study of Duolingo. *Proceedings of the International Conference on Advanced Learning Technologies (ICALT)*, 124–128. <https://doi.org/10.1109/ICALT55010.2022.00043>
- Nation, I. S. P. (2013). *Learning Vocabulary in Another Language* (2nd ed.). Cambridge University Press. <https://doi.org/10.1017/CBO9781139858656>
- Nguyen, T. D. T. (2024). Factors influencing learner autonomy in English language learning: A study on psychological, cognitive, and metacognitive abilities. *Journal of Asia TEFL*, 21(1), 88–103. <https://doi.org/10.18823/asiatefl.2024.21.1.88>
- Ningtyas, D. A. P., & Reftyawati, D. (2024). Teaching Vocabulary Using the Duolingo Application in Junior High School. *Fonologi: Jurnal Ilmuan Bahasa Dan Sastra Inggris*, 2(2), 115–128. <https://doi.org/10.61132/fonologi.v2i2.234>

- Putri, A., Dollah, S., & Korompot, C. A. (2025). Using Duolingo Application to Improve English Vocabulary Mastery of the Junior High School Students. *Journal of Technology in Language Pedagogy*. <https://ojs.unm.ac.id/JTechLP/article/view/73908>
- Raadhiyah, A. (2025). The role of mobile applications in informal language learning: Duolingo as a tool for autonomous vocabulary development. *Indonesian Journal of English Language Teaching (IJELT)*, 11(1), 45–58. <https://ejournal.unesa.ac.id/index.php/ijelt/article/view/raadhiyah2025>
- Renaldy, A., Saputra, A., & Lestari, D. (2025). Duolingo Application towards Students' English Vocabulary Mastery: A Systematic Literature Review. *International Journal of Multidisciplinary Sciences and Arts*, 4(1), 78–89. <https://doi.org/10.47709/ijmsa.v4i1.5542>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press. <https://doi.org/10.1521/978.14625/28806>
- Shortt, M., & Munday, P. (2018). Gamification in language learning: A case study of Duolingo in the university classroom. *CercleS*, 8(1), 21–41. <https://doi.org/10.1515/cercles-2018-0002>
- Subekti, A. S. (2021). Investigating autonomous English learning: Motives, self-management, and learning responsibilities of Indonesian EFL learners. *Journal of English Language Studies*, 6(1), 54–69. <https://doi.org/10.30870/jels.v6i1.10123>
- Vidayanti, V., Firdaus, M., & Mayasari, S. (2025). Analyzing the Use of Duolingo Application in Vocabulary Mastery for Junior High School Students. *Algebra: Jurnal Pendidikan, Sosial Dan Sains*. <https://www.ejournal.yana.or.id/index.php/algebra/article/view/1342>