

# Digital Extramural English, Motivation, and Vocabulary Acquisition in English as a Foreign Language Contexts

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## Article Info

### Keywords:

*Extramural English; Informal Digital Learning of English; Learning Styles; Motivation; Vocabulary Acquisition*

## ABSTRACT

This study investigates how Extramural English (EE) and Informal Digital Learning of English (IDLE) contribute to vocabulary acquisition among EFL students, with emphasis on motivation and learning styles. Using a qualitative phenomenological design, this study involved eleven English Education students from IAIN Langsa selected through purposive sampling based on their active engagement in digital extramural English activities. Data were collected through semi-structured interviews and non-participant observations and analyzed using thematic analysis. The findings revealed that audiovisual input from videos, films, songs, and social media supported contextual vocabulary acquisition. Students' engagement was sustained by the interaction between intrinsic motivation and the Ideal L2 Self, while learning styles influenced their choice of platforms and vocabulary strategies. These findings indicate that EE and IDLE function as meaningful informal learning spaces that promote authentic exposure, learner autonomy, and personalized vocabulary development. The study implies that guided IDLE-based activities should be integrated into formal EFL instruction to connect classroom learning with students' everyday digital practices.

## Informasi Artikel

### Kata Kunci:

*Extramural English; Gaya Belajar; Informal Digital Learning of English; Motivasi; Pemerolehan Kosakata*

## ABSTRAK

Penelitian ini bertujuan untuk menganalisis bagaimana *Extramural English* (EE) dan *Informal Digital Learning of English* (IDLE) berkontribusi terhadap pemerolehan kosakata mahasiswa EFL, dengan menekankan peran motivasi dan gaya belajar. Penelitian ini menggunakan desain kualitatif fenomenologis dengan melibatkan sebelas mahasiswa Pendidikan Bahasa Inggris IAIN Langsa yang dipilih melalui teknik *purposive sampling* berdasarkan keterlibatan aktif mereka dalam aktivitas digital ektramural berbahasa Inggris. Data dikumpulkan melalui wawancara semi-terstruktur dan observasi non-partisipan, kemudian dianalisis menggunakan analisis tematik. Temuan menunjukkan bahwa input audiovisual dari video, film, lagu, dan media sosial mendukung pemerolehan kosakata secara kontekstual. Keterlibatan mahasiswa dipertahankan melalui interaksi antara motivasi intrinsik dan *Ideal L2 Self*, sementara gaya belajar memengaruhi pilihan platform dan strategi kosakata. Temuan ini menunjukkan bahwa EE dan IDLE berfungsi sebagai ruang pembelajaran informal yang bermakna untuk mendorong paparan autentik, otonomi belajar, dan pengembangan kosakata yang dipersonalisasi. Implikasi penelitian ini menegaskan perlunya integrasi aktivitas IDLE terbimbing dalam pembelajaran EFL formal untuk menghubungkan pembelajaran kelas dengan praktik digital sehari-hari mahasiswa.

## Article History

Received : 04 15, 2026  
Revised : 05 26, 2026  
Accepted : 07 21, 2026

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## 1. Introduction

In recent decades, the paradigm of second language acquisition (SLA) has undergone a substantial transformation, shifting from predominantly formal, classroom-based instruction toward more dynamic and technology-mediated learning environments. Traditionally, language learning has been characterized by structured curricula, teacher-centered approaches, and reliance on textbooks as primary sources of linguistic input. However, the rapid development of digital technologies has significantly expanded the boundaries of language learning, enabling learners to engage with authentic linguistic input beyond institutional settings [1], [2], [3]. This transformation has redefined the learning ecosystem, positioning learners as active agents who autonomously construct knowledge through diverse digital interactions.

One of the most prominent manifestations of this shift is Informal Digital Learning of English (IDLE), which refers to self-directed, voluntary engagement with English through digital platforms such as social media, online videos, gaming environments, and virtual communities [1], [4], [5]. IDLE is closely related to the concept of Extramural English (EE), which emphasizes learning activities conducted outside formal educational contexts driven by personal interest and intrinsic motivation. These forms of learning provide learners with abundant exposure to authentic, contextualized language input, which is often absent in traditional classroom settings [6], [7], [8]. The increasing accessibility of digital resources, coupled with the global dominance of English as a lingua franca, has further amplified the role of informal learning environments in shaping language proficiency [9], [10], [11].

A growing body of empirical research has demonstrated that IDLE significantly contributes to vocabulary acquisition, which is widely recognized as a foundational component of language proficiency. Studies indicate that learners who frequently engage in informal digital activities tend to exhibit higher levels of vocabulary knowledge due to repeated exposure to meaningful language use in authentic contexts [6], [12], [13]. Moreover, the multimodal nature of digital input combining visual, auditory, and textual elements enhances cognitive processing and retention, thereby facilitating deeper lexical acquisition [14], [15], [16]. These findings align with incidental learning theories, which suggest that vocabulary is more effectively acquired when learners are exposed to language in meaningful and engaging contexts rather than through rote memorization [17], [18], [19].

Beyond cognitive factors, affective variables have been identified as critical determinants of successful language learning in informal digital environments. Motivation, in particular, plays

a central role in shaping learners' engagement and persistence in IDLE activities. Previous studies have consistently shown that intrinsic motivation such as enjoyment, curiosity, and personal interest strongly predicts the frequency and intensity of learners' participation in digital language learning [20], [21], [22]. In addition, the concept of the Ideal L2 Self, which reflects learners' aspirations to become proficient language users in the future, has been found to significantly influence engagement in extramural activities [20], [23], [24]. These motivational constructs interact dynamically, transforming informal digital experiences into meaningful learning opportunities that extend beyond entertainment purposes.

Despite the substantial progress in understanding the cognitive and affective dimensions of IDLE, existing research has largely focused on quantitative and correlational approaches, emphasizing measurable outcomes such as vocabulary gains, frequency of engagement, and proficiency levels [14], [16], [23]. While these studies provide valuable insights into the effectiveness of informal digital learning, they often overlook the complexity of learners' lived experiences, particularly the subjective processes through which learners construct meaning, negotiate motivation, and adapt learning strategies in real-world contexts. Qualitative and phenomenological investigations remain relatively limited, especially in developing countries such as Indonesia, where the integration of digital learning into formal education systems is still evolving [2], [15], [20].

Furthermore, individual differences particularly learning styles have received comparatively little attention in IDLE research, despite their potential influence on how learners interact with digital resources and process linguistic input. Learning styles, which encompass individual preferences for visual, auditory, or kinesthetic modes of learning, are known to affect the selection of learning strategies and the effectiveness of language acquisition [13], [17], [22]. In digital environments characterized by diverse multimodal inputs, understanding the role of learning styles becomes increasingly important for optimizing learning outcomes. However, the interplay between learning styles, motivation, and vocabulary acquisition in IDLE contexts remains underexplored in the existing literature.

In addition, previous studies conducted in the Indonesian context have primarily examined IDLE from the perspectives of self-regulated learning, digital engagement, and language proficiency, with limited focus on the phenomenological aspects of vocabulary acquisition [11], [14], [25]. These studies have highlighted the positive impact of IDLE on learner autonomy and engagement but have not sufficiently captured the depth and richness of learners' experiences in navigating digital learning environments. Consequently, there is a need for more in-depth qualitative research that explores how learners perceive,

experience, and internalize vocabulary learning through extramural digital activities.

Based on these considerations, a significant research gap can be identified in the lack of phenomenological studies that comprehensively examine the interaction between IDLE, motivation, and learning styles in shaping vocabulary acquisition among EFL learners, particularly within the Indonesian higher education context. Existing studies have predominantly addressed these variables in isolation or through quantitative frameworks, thereby limiting the understanding of their dynamic and interrelated nature.

Therefore, this study aims to fill this gap by adopting a qualitative phenomenological approach to explore the lived experiences of English Education students in acquiring vocabulary through Extramural English (EE) and Informal Digital Learning of English (IDLE). Specifically, this study seeks to (1) investigate how students acquire vocabulary through digital extramural activities, (2) examine how motivation influences their engagement and learning processes, and (3) analyze how individual learning styles mediate their interaction with digital learning resources. By providing an in-depth understanding of these processes, this study contributes to the development of more integrative and learner-centered pedagogical approaches that bridge the gap between formal instruction and informal digital learning environments.

## 2. Method

This study employed a qualitative phenomenological design to explore the lived experiences of English as a Foreign Language (EFL) students in acquiring vocabulary through Extramural English (EE) and Informal Digital Learning of English (IDLE). The phenomenological approach was selected due to its capacity to capture the essence of individuals' subjective experiences and meaning-making processes, particularly in understanding how learners perceive and engage with informal digital learning environments [26], [27]. This methodological orientation aligns with qualitative inquiry traditions that emphasize the exploration of complex cognitive and affective dimensions of learning, which are often not fully accessible through quantitative approaches. By focusing on participants' lived experiences, this study aims to uncover the underlying structures of vocabulary acquisition within naturally occurring digital contexts.

The research was conducted at the English Education Department of IAIN Langsa, Indonesia, where students frequently interact with English through digital platforms outside formal classroom settings. Participants were selected using purposive sampling, a strategy that enables the identification of information-rich cases capable of providing in-depth insights

into the phenomenon under investigation [26]. A preliminary screening questionnaire was administered to ensure that selected participants were actively engaged in extramural English activities such as watching videos, playing online games, or interacting on social media in English. Based on this criterion, eleven undergraduate students from the fifth and seventh semesters were recruited, as they were considered to have sufficient academic experience and exposure to both formal and informal learning environments.

Data were collected through semi-structured interviews and non-participant observations to ensure methodological triangulation and enhance the credibility of the findings [28], [26]. The interview protocol was designed to elicit rich, detailed narratives concerning participants' vocabulary learning experiences, motivational orientations, and learning strategies in digital environments. Each interview lasted approximately 30–45 minutes, was audio-recorded with participants' consent, and transcribed verbatim to preserve data accuracy. In addition, non-participant observations were conducted to complement the interview data by documenting participants' actual learning behaviors, including interaction with audiovisual materials, note-taking practices, repetition strategies, and engagement with digital content. This combination of data sources allowed for a more comprehensive understanding of the phenomenon and reduced reliance on self-reported data alone.

The data analysis followed a systematic thematic analysis procedure, which included stages of data familiarization, initial coding, theme generation, refinement, and interpretation. This analytical approach enabled the identification of recurring patterns and meaningful themes across participants' experiences, leading to a deeper understanding of how vocabulary acquisition occurs in informal digital contexts. In accordance with phenomenological principles, the researcher applied bracketing techniques to minimize personal bias and maintain analytical neutrality throughout the research process. Reflexivity was continuously practiced to ensure that interpretations remained grounded in participants' perspectives rather than the researcher's assumptions.

To ensure the trustworthiness of the findings, this study adhered to established qualitative research criteria, including credibility, dependability, and confirmability [28]. Credibility was achieved through data triangulation and member checking, allowing participants to verify the accuracy of the interpretations. Dependability was ensured by maintaining a detailed audit trail documenting all stages of data collection and analysis. Confirmability was established through systematic documentation and transparency in analytical procedures, enabling the findings to be traced back to the original data sources. Ethical considerations were strictly observed, including obtaining informed consent from all participants, ensuring

anonymity through the use of pseudonyms, and maintaining the confidentiality and security of all collected data throughout the research process.

### 3. Result and Discussion

#### 3.1 Result

The thematic analysis of interview and observational data revealed that students’ vocabulary acquisition through Extramural English (EE) and Informal Digital Learning of English (IDLE) was shaped by three interrelated themes: audiovisual input, motivational dynamics, and learning-style preferences. These themes indicate that vocabulary learning in informal digital environments is not merely incidental, but also involves conscious engagement, strategic behavior, and personal meaning-making. The integration of interview excerpts and observational notes further demonstrates that students actively transformed everyday digital activities, such as watching videos, listening to songs, using social media, and playing online games, into meaningful vocabulary learning opportunities.

**Table 1.** Summary of Themes and Supporting Evidence

Theme	Description	Supporting Evidence
Primacy of audiovisual input	Students relied heavily on YouTube videos, films, vlogs, songs, and other multimodal digital content to understand new vocabulary through contextual cues.	“I do not just hear the word; I see the expression and the situation. That is why I never forget the word <i>awkward</i> .”
Intrinsic and Ideal L2 Self-motivation	Students’ engagement was driven by enjoyment, social interaction, and future aspirations to become competent English users or teachers.	“I play online games for fun, but now I try to speak more English because I want to be a fluent teacher later.”
Learning style as a mediator	Students’ learning preferences influenced their choice of digital platforms and vocabulary learning strategies.	“I save vocabulary images on Pinterest. I learn pronunciation from English songs by writing the lyrics.”

As shown in Table 1, audiovisual input emerged as the most dominant source of vocabulary learning. Most participants reported that they frequently acquired new words from YouTube videos, films, vlogs, songs, and short-form social media content. These platforms provided simultaneous auditory, visual, and contextual information, enabling students to infer word meanings

more effectively. Rather than memorizing vocabulary in isolation, participants learned words through expressions, gestures, subtitles, pronunciation, and situational context. Observational data also indicated that students often paused videos, replayed specific segments, checked subtitles, and searched for unfamiliar words, suggesting that their engagement with digital content involved active meaning-making rather than passive consumption.

The second theme shows that motivation played an important role in sustaining students’ engagement with informal digital English activities. Participants initially engaged with English digital content for enjoyment, entertainment, and social connection. However, these activities gradually developed into purposeful learning practices. For example, students who played online games with international users reported becoming more aware of their English use because they wanted to communicate more effectively. Similarly, those who watched English-language videos or followed English-speaking influencers stated that such activities helped them imagine themselves as more fluent English users in the future. This indicates that intrinsic motivation and future-oriented self-images worked together to strengthen students’ commitment to vocabulary learning.

The findings also reveal that learning styles mediated how students selected digital resources and applied vocabulary learning strategies. Visual-oriented learners preferred image-based platforms such as Instagram and Pinterest because these platforms allowed them to associate words with pictures, colors, and visual contexts. Auditory-oriented learners, on the other hand, preferred songs, podcasts, films, and spoken content because these resources supported pronunciation, intonation, and listening-based vocabulary acquisition. Some students combined visual and auditory strategies by watching videos with subtitles, writing down unfamiliar words, and repeating phrases aloud. These patterns suggest that vocabulary acquisition through IDLE is highly individualized, as students adapt their learning strategies according to their personal preferences and digital habits.

Overall, the results indicate that EE and IDLE provide meaningful opportunities for vocabulary development by connecting language learning with students’ everyday digital practices. Audiovisual input facilitates contextual understanding, motivation sustains engagement, and learning-style preferences shape the selection of platforms and strategies. These findings demonstrate that informal digital environments function as flexible and learner-centered spaces where vocabulary acquisition occurs through authentic exposure, self-directed engagement, and personalized learning strategies.

### 3.2 Discussion

The findings of this study demonstrate that Extramural English (EE) and Informal Digital Learning of English (IDLE) provide meaningful opportunities for vocabulary development among EFL students through authentic, multimodal, and self-directed digital engagement. The dominance of audiovisual input, particularly through YouTube videos, films, vlogs, songs, and social media content, indicates that students acquire vocabulary not merely through intentional memorization but through contextualized exposure embedded in daily digital practices. This finding is consistent with Lee's study, which showed that informal digital learning contributes positively to second language vocabulary outcomes, particularly when learners are exposed to diverse and meaningful digital input [10]. Similarly, Rezai et al. found that IDLE practices significantly support EFL learners' vocabulary knowledge by providing repeated exposure to authentic language use in digital contexts [12]. The present study extends these findings by showing that audiovisual input supports vocabulary acquisition not only through frequency of exposure but also through the simultaneous interaction of sound, image, gesture, subtitle, and situational context. This suggests that multimodal input allows learners to infer meaning, retain lexical items, and connect vocabulary with real communicative situations more effectively than isolated word learning. Lee's work on IDLE and vocabulary outcomes and Rezai et al.'s mixed-methods study both support this vocabulary-learning relationship, while the current study adds a phenomenological account of how students experience such learning in everyday digital environments.

The finding that students actively pause videos, replay segments, check subtitles, and search for unfamiliar words indicates that vocabulary learning through IDLE is not entirely passive or accidental. Instead, students transform entertainment-oriented activities into strategic learning experiences. This aligns with Guo's systematic review of IDLE, which emphasized that informal digital English learning involves complex learner agency, digital engagement, and self-directed meaning-making rather than simple exposure to English content [8]. It also supports Fang's recent findings that IDLE can enhance learner engagement in digital contexts by encouraging students to interact more actively with English materials [5]. However, the present study differs from previous studies by highlighting the micro-processes of learner behavior, such as pausing, replaying, note-taking, and contextual guessing, which are often underreported in quantitative investigations. Therefore, this study contributes to the literature by demonstrating that vocabulary acquisition through IDLE is shaped by both incidental exposure and deliberate learner strategies.

Another important finding is that students' engagement with EE and IDLE is strongly influenced by the dynamic interaction between intrinsic motivation and the Ideal L2 Self. Participants initially engaged with English digital content for enjoyment, entertainment, and social interaction; however, these activities gradually became connected to their future aspirations as fluent English users and prospective English teachers. This finding is in line with Lee and Sylvén, who found that IDLE plays an important role in shaping EFL learners' communication behavior and willingness to use English in authentic contexts [7]. It also supports Lee and Lee's argument that motivational variables, including foreign language enjoyment and the L2 motivational self-system, are closely related to informal digital English engagement [29]. The present study strengthens these previous findings by showing that motivation in IDLE is not static but develops progressively from leisure-based engagement into career-oriented language investment. In this sense, students' digital activities function not only as sources of language input but also as spaces for identity construction, where learners imagine themselves as more competent English users in the future. Lee and Sylvén specifically examined IDLE's role in communication behavior, providing a useful basis for interpreting the motivational dimension of this study.

The motivational findings also correspond with recent studies on EE and affective variables. Imsa-ard's study on Thai EFL undergraduates found that extramural English engagement significantly predicted vocabulary knowledge and affective variables such as self-perceived ability, confidence, motivation, and grit [30]. Similarly, Leona et al. showed that extramural English exposure and motivation help explain individual differences in young learners' vocabulary knowledge [31]. The present study confirms these findings in the Indonesian higher education context, but it further demonstrates that motivation operates through the blending of personal enjoyment and professional identity. For example, students who played online games or consumed English videos did not perceive these activities as formal study; nevertheless, they gradually recognized their value for improving communicative competence and supporting their future role as English teachers. This finding suggests that informal digital learning may become pedagogically powerful when learners are able to connect their personal interests with long-term academic and professional goals. Recent EE studies, including Imsa-ard's work, support the relationship among extramural engagement, vocabulary, and motivation.

The role of learning styles as mediating factors also represents a significant finding of this study. Participants selected platforms and strategies according to their preferred modes of learning. Visual-oriented learners tended to use Instagram,

Pinterest, subtitles, and image-based vocabulary notes, whereas auditory-oriented learners preferred songs, podcasts, films, and repeated listening practices. This finding is consistent with Zhang and Liu, who reported that learners' backgrounds, proficiency levels, and digital device use influence how students engage in IDLE activities. It also aligns with Indrayani et al., who identified the diverse nature of self-directed IDLE activities and emphasized that learners engage with digital English resources in different ways depending on their preferences and learning goals [32]. However, this study adds a more specific contribution by showing that learning styles do not merely influence preference but also mediate the relationship between digital input and vocabulary strategy use. In other words, learning style functions as a cognitive filter through which learners select platforms, process input, and determine how vocabulary is retained.

The novelty of this study lies in its phenomenological explanation of how EE and IDLE contribute to vocabulary acquisition through the interaction of audiovisual input, motivation, and learning styles among Indonesian EFL pre-service teachers. Previous studies have generally examined IDLE through quantitative or mixed-method designs by focusing on frequency, vocabulary outcomes, proficiency, or motivation. In contrast, this study provides an in-depth qualitative account of students' lived experiences, showing how digital habits become meaningful vocabulary-learning practices. The study also contributes novelty by positioning learning styles as mediating factors in IDLE-based vocabulary acquisition, an aspect that remains relatively underexplored in existing IDLE and EE research. Thus, the contribution of this research is not only empirical but also conceptual, as it proposes that informal digital vocabulary learning should be understood as a multidimensional process involving multimodal exposure, affective investment, and personalized learning pathways.

The pedagogical implications of this study are significant for English language teaching, particularly in EFL teacher education contexts. Since students already engage extensively with English through digital media, lecturers should not treat informal digital activities as separate from formal instruction. Instead, formal classrooms can strategically integrate IDLE-based tasks such as guided video analysis, vocabulary logs from social media content, reflective digital learning journals, subtitle-based vocabulary exercises, podcast listening tasks, and game-based communicative reflections. Such integration may help bridge the gap between students' everyday digital practices and academic language learning objectives. Furthermore, teachers should guide students to become more reflective users of digital English content by helping them evaluate reliable sources, identify useful vocabulary, record contextual meanings, and connect new lexical

knowledge with communicative use. These strategies can strengthen learner autonomy while maintaining pedagogical direction.

This study also has implications for curriculum development. In the context of Merdeka Belajar and learner-centered education, EE and IDLE can be positioned as complementary learning resources that support independent and lifelong language learning. Curriculum designers may consider incorporating structured informal learning components into English education programs, especially for vocabulary development, listening comprehension, pronunciation practice, and intercultural communication. Since motivation and learning styles influence how students benefit from digital resources, curriculum design should allow flexibility, personalization, and learner choice. This approach can make English learning more relevant to students' real-life digital environments and professional aspirations as future teachers.

Despite its contributions, this study has several limitations. First, the study involved only eleven participants from one English Education Department, which limits the transferability of the findings to broader EFL populations. Second, the data were primarily based on interviews and observations, meaning that the study did not measure vocabulary gains through standardized pre- and post-tests. Third, the study relied on participants' self-reported learning styles, which may not fully represent their actual cognitive processing patterns. Fourth, the research focused mainly on vocabulary acquisition and did not examine other language skills such as grammar development, speaking fluency, pronunciation accuracy, or pragmatic competence. Future studies should involve larger and more diverse participants, employ longitudinal designs, and combine qualitative inquiry with vocabulary assessment to examine the long-term effects of EE and IDLE. Further research may also explore how guided IDLE interventions can be integrated into formal classroom instruction and how different digital platforms contribute to specific dimensions of language proficiency.

#### **4. Conclusion**

This study concludes that Extramural English (EE) and Informal Digital Learning of English (IDLE) play a significant role in supporting vocabulary acquisition among EFL students by providing authentic, multimodal, and self-directed exposure to English beyond the formal classroom. The findings show that audiovisual input from platforms such as YouTube, films, songs, vlogs, and social media helps students understand and retain vocabulary through contextual cues, subtitles, pronunciation,

gestures, and real-life communicative situations. Motivation also emerged as a central factor, as students' engagement was driven not only by enjoyment and entertainment but also by their Ideal L2 Self and professional aspirations as future English teachers. In addition, learning styles mediated students' selection of digital platforms and vocabulary strategies, indicating that informal digital vocabulary learning is a personalized and learner-centered process. These findings contribute to the literature by demonstrating that EE and IDLE should not be viewed merely as incidental or recreational activities, but as meaningful learning spaces that integrate cognitive engagement, affective investment, and autonomous strategy use. Pedagogically, the study implies that English lecturers should strategically connect students' informal digital practices with formal classroom instruction through guided vocabulary logs, reflective digital learning tasks, subtitle-based activities, and platform-based vocabulary exploration. However, the study is limited by its small sample size, single institutional context, and absence of standardized vocabulary measurement. Future research should involve larger and more diverse participants, employ longitudinal or mixed-method designs, and examine the measurable impact of guided IDLE practices on vocabulary development and broader language proficiency.

## References

- [1] J. S. Lee, "Informal digital learning of English and strategic competence for cross-cultural communication: Perception of varieties of English as a mediator," *ReCALL*, vol. 32, no. 1, pp. 47–62, Jan. 2020, doi: 10.1017/S0958344019000181.
- [2] R. Shadiev and X. Wang, "A Review of Research on Technology-Supported Language Learning and 21st Century Skills," *Front. Psychol.*, vol. 13, Jul. 2022, doi: 10.3389/fpsyg.2022.897689.
- [3] R. Shadiev and M. Yang, "Review of Studies on Technology-Enhanced Language Learning and Teaching," *Sustainability*, vol. 12, no. 2, 2020, doi: 10.3390/su12020524.
- [4] J. S. Lee and N. A. Drajadi, "Affective variables and informal digital learning of English: Keys to willingness to communicate in a second language," *Australas. J. Educ. Technol.*, Apr. 2019, doi: 10.14742/ajet.5177.
- [5] J. S. Lee and L. K. Sylvén, "The role of Informal Digital Learning of English in Korean and Swedish EFL learners' communication behaviour," *Br. J. Educ. Technol.*, vol. 52, no. 3, pp. 1279–1296, May 2021, doi: 10.1111/bjet.13082.
- [6] P. Sundqvist, "Extramural English as an individual difference variable in L2 research: Methodology matters," *Annu. Rev. Appl. Linguist.*, vol. 44, pp. 79–91, Mar. 2024, doi: 10.1017/S0267190524000072.
- [7] J. S. Lee and K. Lee, "The role of informal digital learning of English and L2 motivational self system in foreign language enjoyment," *Br. J. Educ. Technol.*, vol. 52, no. 1, pp. 358–373, Jan. 2021, doi: 10.1111/bjet.12955.
- [8] X. Guo and J. S. Lee, "A systematic review of Informal Digital Learning of English: An ecological systems theory perspective," *System*, vol. 117, p. 103097, Oct. 2023, doi: 10.1016/j.system.2023.103097.
- [9] G. L. Liu, A. Soyooof, J. S. Lee, and L. J. Zhang, "Informal Digital Learning of English in Asian English as a Foreign Language Contexts: A Thematic Review," *REL C J.*, Apr. 2025, doi: 10.1177/00336882251332309.
- [10] J. S. Lee, "Quantity and diversity of informal digital learning of English," *Lang. Learn. Technol.*, vol. 23, no. 1, pp. 114–126, Feb. 2019, doi: 10.64152/10125/44675.
- [11] J. S. Lee and K. Lee, "Informal digital learning of English and English as an international language: The path less traveled," *Br. J. Educ. Technol.*, vol. 50, no. 3, pp. 1447–1461, May 2019, doi: 10.1111/bjet.12652.
- [12] A. Rezai, A. Soyooof, and B. L. Reynolds, "Effectiveness of informal digital learning of English on EFL learners' vocabulary knowledge: a mixed-methods investigation," *Comput. Assist. Lang. Learn.*, vol. 39, no. 1–2, pp. 1–26, Jan. 2026, doi: 10.1080/09588221.2024.2350419.
- [13] R. Zhang, D. Zou, G. Cheng, H. Xie, F. L. Wang, and O. T. S. Au, "Target languages, types of activities, engagement, and effectiveness of extramural language learning," *PLoS One*, vol. 16, no. 6, p. e0253431, Jun. 2021, doi: 10.1371/journal.pone.0253431.
- [14] A. Fathoni, L. S. Agung, and S. Sumaryati, "The Utilization of Interactive Multimedia in Improving Vocabulary Knowledge of High School Students," *JTP - J. Teknol. Pendidik.*, vol. 26, no. 2, Oct. 2024, doi: 10.21009/jtp.v26i2.46279.
- [15] L. Kodriyah, N. Islamiah, and H. Hengki, "The Impact of Interactive Digital Storytelling Apps on English Vocabulary Acquisition for Young English Learners in South Kalimantan, Indonesia," *Intensive J.*, vol. 8, no. 1, p. 26, Apr. 2025, doi: 10.31602/intensive.v8i1.17973.
- [16] A. F. R. Najib, A. C. Setiyadi, I. Mahmudi, and L. Muhyiddin, "Wordwall Game as an Interactive Medium in Arabic Vocabulary Acquisition for Novice Learners," *J. Al Bayan J. Jur. Pendidik. Bhs. Arab*, vol. 17, no. 2, pp. 483–501, Dec. 2025, doi: 10.24042/ewqxn123.
- [17] T. Taherian, M. E. Shirvan, E. Yazdanmehr, M. Kruk, and M. Pawlak, "A Longitudinal Analysis of Informal Digital Learning of English, Willingness to Communicate and Foreign Language Boredom: A Latent Change Score Mediation Model," *Asia-Pacific Educ. Res.*, vol. 33, no. 4, pp. 997–1010, Aug. 2024, doi: 10.1007/s40299-023-00751-z.
- [18] S. Webb, T. Uchihara, and A. Yanagisawa, "How effective is second language incidental vocabulary learning? A meta-analysis," *Lang. Teach.*, vol. 56, no. 2, pp. 161–180, Apr. 2023, doi: 10.1017/S0261444822000507.
- [19] T. H. Saputro, A. N. Hima, and S. Prastiyowati, "Exploring the perception of English lecturers about incidental vocabulary learning and involvement load hypothesis in their classrooms," *J. English as a Foreign Lang.*, vol. 14, no. 2, pp. 476–500, Sep. 2024, doi: 10.23971/jeft.v14i2.8020.

- [20] G. L. Liu, R. Darvin, and C. Ma, "Unpacking the role of motivation and enjoyment in AI-mediated informal digital learning of English (AI-IDLE): A mixed-method investigation in the Chinese context," *Comput. Human Behav.*, vol. 160, p. 108362, Nov. 2024, doi: 10.1016/j.chb.2024.108362.
- [21] A. Zadorozhnyy and J. S. Lee, "Informal Digital Learning of English and willingness to communicate in a second language: self-efficacy beliefs as a mediator," *Comput. Assist. Lang. Learn.*, vol. 38, no. 4, pp. 669–689, May 2025, doi: 10.1080/09588221.2023.2215279.
- [22] A. Soyooof, B. L. Reynolds, B. Vazquez-Calvo, and K. McLay, "Informal digital learning of English (IDLE): a scoping review of what has been done and a look towards what is to come," *Comput. Assist. Lang. Learn.*, vol. 36, no. 4, pp. 608–640, May 2023, doi: 10.1080/09588221.2021.1936562.
- [23] G. L. Liu, Y. Zhang, and R. Zhang, "Examining the relationships among motivation, informal digital learning of English, and foreign language enjoyment: An explanatory mixed-method study," *ReCALL*, vol. 36, no. 1, pp. 72–88, Jan. 2024, doi: 10.1017/S0958344023000204.
- [24] J. S. Lee and Y. Lu, "L2 motivational self system and willingness to communicate in the classroom and extramural digital contexts," *Comput. Assist. Lang. Learn.*, vol. 36, no. 1–2, pp. 126–148, Jan. 2023, doi: 10.1080/09588221.2021.1901746.
- [25] Y. Zhang and G. Liu, "Revisiting informal digital learning of English (IDLE): a structural equation modeling approach in a university EFL context," *Comput. Assist. Lang. Learn.*, vol. 37, no. 7, pp. 1904–1936, Sep. 2024, doi: 10.1080/09588221.2022.2134424.
- [26] J. W. Creswell and J. D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications, 2022. [Online]. Available: <https://books.google.co.id/books?id=Pr2VEAAAQBAJ>
- [27] J. W. Creswell and J. D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications, 2017. [Online]. Available: <https://books.google.co.id/books?id=335ZDwAAQBAJ>
- [28] V. Braun and V. Clarke, "Reflecting on reflexive thematic analysis," *Qual. Res. Sport. Exerc. Heal.*, vol. 11, no. 4, pp. 589–597, Aug. 2019, doi: 10.1080/2159676X.2019.1628806.
- [29] P. Imsa-ard, "Extramural English (EE): Its effects on EFL undergraduates' L2 vocabulary knowledge and affective variables," *Soc. Sci. Humanit. Open*, vol. 12, p. 102286, 2025, doi: 10.1016/j.ssaho.2025.102286.
- [30] N. L. Leona, M. J. H. van Koert, M. W. van der Molen, J. E. Rispens, J. Tijms, and P. Snellings, "Explaining individual differences in young English language learners' vocabulary knowledge: The role of Extramural English Exposure and motivation," *System*, vol. 96, p. 102402, Feb. 2021, doi: 10.1016/j.system.2020.102402.
- [31] Y. Zhang and G. L. Liu, "Examining the impacts of learner backgrounds, proficiency level, and the use of digital devices on informal digital learning of English: an explanatory mixed-method study," *Comput. Assist. Lang. Learn.*, vol. 38, no. 5–6, pp. 1113–1140, Jul. 2025, doi: 10.1080/09588221.2023.2267627.
- [32] N. Indrayani, B. Y. Cahyono, N. Mukminatien, and F. Maria, "Self-Directed Informal Digital Learning of English: Identifying Its Nature and Activities for English Proficiency," *rEFLECTIONS*, vol. 31, no. 2, pp. 791–814, 2024, doi: 10.61508/refl.v31i2.275261.

