

Scrutinizing Non-English Major Students' Perceptions of Informal Digital Learning of English

***¹Iis Sujarwati, ²Emilia Ninik Aydawati**

¹University of Bengkulu, Indonesia

²Soegijapranata Catholic University, Indonesia

***Correspondence:**

iissujarwati@unib.ac.id

Submission History:

Submitted: May 5, 2024

Revised: February 25, 2025

Accepted: March 01, 2025



This article is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

Abstract

The educational landscape has undergone a profound transformation with the rise of Informal Digital Learning of English (IDLE), reshaping language acquisition beyond traditional classroom settings. Although many studies have explored IDLE, research has primarily focused on English majors or highly motivated language learners, leaving a gap in understanding how non-English major students, who have varying levels of motivation and language exposure, engage with IDLE. This study investigates the perspectives of non-English major students on IDLE and its perceived effectiveness in their language learning journey. A total of 169 students from the nursing and accounting disciplines at the University of Bengkulu enrolled in a general English course and participated in the study. Data were collected through structured surveys and semi-structured interviews, with analysis conducted using both statistical and thematic approaches. The findings reveal that participants strongly agree that IDLE provides language support ($M = 4.55$), flexibility in use ($M = 4.25$), and contributes to increasing their language proficiency ($M = 4.58$). However, challenges such as the lack of structured feedback and inconsistent learning patterns were also noted. These insights underscore the potential of IDLE as a valuable supplement to formal instruction. Educators are encouraged to integrate IDLE into curricula through engaging, personalized digital learning strategies catering to non-English major students' distinct needs. Future research should explore the long-term impact of IDLE on language proficiency and best practices for its implementation.

Keywords: IDLE, non-English major, English language learning, digital learning.

INTRODUCTION

The rapid advancement of digital technology has significantly reshaped language learning, offering learners greater accessibility, flexibility, and autonomy in acquiring English beyond traditional classroom settings. The integration of digital tools such as language learning applications, online dictionaries, video-based platforms, and interactive forums enables students to engage with English in diverse and authentic contexts (Shadieff & Yang, 2020; Kanellopoulou & Giannakouloupoulos, 2021; Lee & Roger, 2023). In particular, digital resources such as podcasts, social media, and digital storytelling provide continuous

exposure to the language, fostering the development of essential skills, including listening, speaking, reading, and writing, in a more naturalistic manner (Kartal, 2022; Prayogo, 2022). These resources allow learners to move beyond the constraints of textbooks and classroom-based instruction, immersing themselves in real-world linguistic interactions that support comprehension and production (Bygstad et al., 2022; Karimah & Muslim, 2019). This shift has also redefined the traditional roles of instructors and students. Rather than serving as the primary source of knowledge, instructors now act as facilitators, guiding students in effectively utilizing digital tools to enhance their learning (Hidayat et al., 2022; Asratie et al., 2023). With access to a vast array of digital materials, students can independently explore, download relevant information, create and share content, and actively engage in their language development process. Digital learning strategies complement traditional instruction and introduce innovative approaches that enhance language acquisition, fostering learner autonomy and adaptability in an increasingly digitalized educational landscape (Du Plooy et al., 2024).

Within this evolving digital learning environment, a significant distinction has emerged between formal and informal learning approaches. While formal education integrates digital tools into structured curricula, many learners engage with English outside the classroom through self-directed digital experiences, a practice known as Informal Digital Learning of English (IDLE). Guo and Lee (2023), Rezai et al. (2024), and Lee (2021) emphasize that unlike traditional classroom instruction, where learning is structured and teacher-guided, IDLE is characterized by its informal, self-directed nature, allowing learners to engage with digital resources at their convenience. This includes watching English-language YouTube videos, participating in online discussions, using language-learning apps, gaming with international players, and interacting with social media content in English (Zhang & Liu, 2022; Hasumi & Chiu, 2024). IDLE has gained increasing recognition as an effective means of supplementing formal education, offering learners continuous exposure to the language in diverse contexts. As digital media consumption continues to rise, particularly among students, Soyoof et al. (2021) argue that IDLE presents a valuable opportunity for enhancing language acquisition in an engaging and personalized manner. For non-English major students, whose formal exposure to English may be restricted to general language courses, IDLE is a vital resource for enhancing their proficiency. By engaging with digital content that aligns with their interests—such as entertainment, social networking, or professional development—they develop language skills in a more meaningful and relatable way (Fauziah & Diana, 2023; Rezai et al., 2024).

While IDLE has been recognized as an effective supplement to traditional instruction, scholars have examined its various dimensions, including its role in fostering communicative competence, its impact on language skills, and its broader implications for both learners and educators. Soyoof et al. (2021) highlight that IDLE encompasses extramural and extracurricular learning, emphasizing the role of digital literacies and technocultural competence in language acquisition. Zhang and Liu (2022) further refine IDLE research by distinguishing between structured and unstructured practices, demonstrating that learning benefits depend more on cognitive engagement and available resources than mere exposure. Similarly, Lee (2017) finds that quality and diversity of IDLE engagement, rather than frequency, predict vocabulary gains, underscoring the importance of meaningful interaction with digital content. Supporting this, Dressman and Lee (2021) argue that IDLE does not

replace but rather complements formal learning by offering authentic input, fostering autonomy, and enhancing communicative competence, which can be strategically integrated into classrooms through activities like vlogging, YouTube-based tasks, and ethnographic studies. Beyond learners, [Rezai et al. \(2024\)](#) shift the focus to EFL teachers, demonstrating that IDLE positively influences job engagement, technological pedagogical content knowledge (TPACK), and digital competence, suggesting its potential for professional development.

Despite the growing recognition of Informal Digital Learning of English (IDLE) as a significant factor in language acquisition, existing research has predominantly focused on English majors and highly motivated language learners, often assuming they actively seek digital resources to enhance their language skills. However, this assumption may not apply to non-English major students, whose engagement with digital English content is often incidental rather than intentional. A key issue is whether these students perceive IDLE as a meaningful and structured approach to language learning. Unlike English majors, who may deliberately integrate IDLE into their study routines, non-English major students typically engage with digital content for entertainment, academic purposes, or professional development without primarily focusing on improving their English proficiency. Given this gap, the present study explores how non-English major students engage with and perceive IDLE in their language learning. Unlike previous research, which has primarily examined IDLE among motivated learners or within structured learning environments, this study investigates its role among students who may not consciously utilize digital tools for language acquisition, offering new insights into their learning behaviors and potential challenges.

METHOD

This study employed a case study design with a sequential explanatory mixed-methods approach ([Creswell & Plano Clark, 2018](#)) to gain a comprehensive understanding of non-English major students' engagement with Informal Digital Learning of English (IDLE). The research integrated quantitative and qualitative methods, with the quantitative phase serving as the primary data collection stage, followed by qualitative analysis to further contextualize and elaborate on the findings ([Ivankova et al., 2006](#)). In the first phase, a survey method was employed to gather quantitative data, as it effectively examines contemporary occurrences and establishes benchmarks ([Cohen et al., 2017](#)). As recommended by [Cohen et al. \(2017\)](#), the survey approach facilitates the collection of large-scale data, offering broad insights into participants' perceptions and experiences. The quantitative data were analyzed using descriptive statistics, a widely used method for identifying key patterns and trends in students' engagement with informal digital learning ([Field, 2018](#)).

To deepen the interpretation of the statistical findings, the second phase involved qualitative data collection through interviews, a method widely recognized for providing rich, explanatory insights into participant experiences ([Merriam & Tisdell, 2016](#)). These interviews helped clarify patterns observed in the survey responses and offered a more nuanced understanding of participants' experiences ([Maxwell, 2013](#)). The sequential explanatory methodology ensured that qualitative findings complemented and contextualized the quantitative results, enhancing the study's validity and depth. By integrating both methods, this research aimed to provide a well-rounded perspective on how

non-English major students perceive and interact with IDLE, aligning with the principles of mixed-methods research, which emphasize triangulation for a more comprehensive understanding (Tashakkori & Teddlie, 2010).

One hundred sixty-nine students from the Nursing and Accounting Study Programs at the University of Bengkulu, who were enrolled in general English courses, participated in this study. To collect data, the researchers employed two types of instruments: a survey and a semi-structured interview, aligning with best practices to gain the data (Cohen et al., 2017; Creswell & Plano Clark, 2018). The survey consisted of ten questions grouped into three key indicators: Supporting Language, Language Flexibility, and Enhancing Language Proficiency. The Supporting Language indicator assessed the extent to which IDLE activities contribute to vocabulary acquisition, grammatical improvement, and comprehension enhancement, as well as their role in supplementing classroom instruction and fostering autonomous learning. The Language Flexibility indicator evaluated students' ability to adapt their language use across different digital contexts, including formal and informal registers, audience-appropriate communication styles, and engagement in diverse online platforms such as social media, online forums, and digital content consumption. The Enhancing Language Proficiency indicator focused on the overall development of students' listening, speaking, reading, and writing skills, examining how IDLE contributes to fluency, pronunciation, comprehension, and confidence in English communication.

The survey employed a 5-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5), to assess students' perceptions of IDLE, a widely recognized method for measuring attitudes and opinions in educational research (Cohen et al., 2017). Before implementation, the questionnaire underwent pilot testing to ensure validity and reliability, with faculty members outside the study's participant pool reviewing the instrument—a standard procedure to enhance measurement accuracy (Dörnyei, 2010). In addition to the survey, the researchers conducted face-to-face semi-structured interviews with five students to complement the quantitative findings, following established best practices in mixed-methods research (Creswell & Creswell, 2018).

Table 1. Categorization of perceptions

Category	Average Range
Strongly agree	>4.20–5.00
Agree	>3.40–4.19
Undecided	>2.60–3.39
Disagree	>1.80–2.59
Strongly disagree	>1.00–1.79

The interview responses provided in-depth insights into students' experiences with IDLE, clarifying and contextualizing patterns observed in the survey results. Quantitative data from the survey were analyzed statistically using frequency and average scores, while the categorization of perceptions by Joshi et al. (2015) was applied to interpret the results. Meanwhile, qualitative data collected through the interviews were transcribed and subjected to thematic analysis, a rigorous method for identifying patterns and key themes in qualitative research (Braun & Clarke, 2006), allowing for a deeper understanding of students' engagement with IDLE.

FINDING AND DISCUSSION

This section presents the findings on non-English major students' engagement with and perceptions of Informal Digital Learning of English (IDLE). Analyzing quantitative survey data and qualitative interview responses, the results are structured around the three key indicators: Supporting Language, Language Flexibility, and Enhancing Language Proficiency.

Students' perceptions of IDLE: Survey findings

To understand non-English major students' perceptions of Informal Digital Learning of English (IDLE), a survey measured three key indicators: language support, flexibility, and language proficiency enhancement. Students were asked to express their level of agreement with statements related to these aspects, using a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). The survey aimed to capture students' attitudes toward IDLE as a complementary learning tool, its adaptability to their learning routines, and its effectiveness in improving language skills.

The findings reveal widespread recognition of IDLE's benefits, particularly in reinforcing classroom learning, providing flexible language practice opportunities, and enhancing overall proficiency. The results from the survey responses are presented in Table 2 below, summarizing students' levels of agreement with various statements regarding their engagement with IDLE.

Table 2. Student's Responses from the Survey

Indicator and statement		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Language Supports	Supporting language learning inside of classroom meetings	73.96%	12.4%	13.14%	0.5%	0%
	Supporting language learning outside of classroom meetings	76.9%	19.6%	3.5%	0%	0%
	Enhancing the independence of English learning	57.6%	28.6%	10.3%	3.5%	0%
	Helping the assignment completion	64.2%	22.8%	13%	0%	0%
Flexibility	It can be an alternative to practice language skills outside of class	39.2%	47%	13.8%	0%	0%
	Earning unlimited max language input	34.4%	52.2%	13.4%	0%	0%
	Customizing topic to be learned	46.84%	42.89%	10.27%	0%	0%
Increasing language	Assisting learning personally	67.2%	19%	8.91%	4.89%	0%
	Helping in understanding complex materials	74.2%	15.5%	6.8%	3.5%	0%

Enhancing English vocabulary	69.5%	30.5%	0%	0%	0%
------------------------------	-------	-------	----	----	----

In the language support category, most students acknowledged that IDLE helps them learn inside and outside the classroom. 76.9% strongly agreed that IDLE supports learning beyond formal instruction, while 73.96% strongly agreed that it enhances classroom learning. Additionally, 57.6% strongly agreed that IDLE fosters independent learning, and 64.2% strongly agreed that it helps them complete assignments. Students also highlighted the flexibility of IDLE, indicating that it allows them to engage with language learning beyond structured environments. A combined 86.2% of students either strongly agreed or agreed that IDLE is an alternative for practicing language skills outside the classroom, emphasizing its role in continuous exposure to English. Similarly, 86.6% of students acknowledged that IDLE provides access to unlimited language input, reinforcing that digital platforms offer rich and varied learning opportunities. Additionally, 89.73% of students agreed that IDLE enables them to customize their learning topics, reflecting the adaptability of digital learning tools to individual interests and needs. In terms of language proficiency, students overwhelmingly recognized IDLE's role in skill development. 67.2% strongly agreed that IDLE facilitates personalized learning, while 74.2% strongly agreed that it helps them understand difficult materials, highlighting its effectiveness in making complex topics more accessible. Moreover, 100% of students either strongly agreed or agreed that IDLE enhances their English vocabulary, making vocabulary acquisition the most widely acknowledged benefit.

Table 3. The mean score of the survey

No	Indicator	Mean	Category
1.	Language supports	4,55	Strongly Agree
2.	Flexibility	4,25	Strongly Agree
3.	Increasing language proficiency	4,58	Strongly Agree

The mean score for Language Support ($M = 4.55$) suggests that students highly acknowledge the role of IDLE in reinforcing their language learning, both inside and outside the classroom. This result aligns with previous findings where students recognized IDLE as a tool that aids vocabulary acquisition, comprehension enhancement, and independent learning. The Flexibility category received a mean score of 4.25, reflecting strong agreement that IDLE allows students to adapt their learning experiences based on their needs and preferences. This indicates that students appreciate the autonomy provided by digital learning, particularly in customizing topics, accessing unlimited language input, and engaging with various digital platforms for language practice. The slightly lower mean score compared to other indicators may suggest that while IDLE is perceived as flexible, some students may still experience challenges in structuring their digital learning experiences effectively. The highest mean score was recorded in Increasing Language Proficiency ($M = 4.58$), demonstrating that students strongly agree that IDLE significantly contributes to their overall language development. This finding highlights that students perceive IDLE as highly beneficial in improving their vocabulary, comprehension, and communication skills across different language components (listening, speaking, reading, and writing). The high level of agreement in this category reinforces the effectiveness of IDLE in enhancing practical language use and fluency.

Students' experiences with IDLE: Interview findings

The interview responses provide deeper insights into how non-English major students perceive and engage with Informal Digital Learning of English (IDLE). The findings highlight that students recognize IDLE as a valuable tool for improving their English proficiency, mainly due to its accessibility and flexibility. Many students reported that their lecturers encouraged them to use digital applications to supplement their learning, and they found these resources beneficial in understanding course materials more effectively. As Student 1 shared, *"My lecturer asked me to access some digital applications in my home to improve my English. I do that almost every day. It helps me to understand some materials easily."*

Several students emphasized the convenience of IDLE, as it allows them to learn anytime and anywhere, provided they have internet access. Student 3 expressed the necessity of digital tools due to difficulties in learning English: *"I need digital assistance to improve my English. Because my English is evil. My lecturer also suggested using some digital resources. I feel helpful of it."* This suggests that IDLE is a critical support system for students who struggle with language proficiency, enabling them to practice independently outside the classroom.

The flexibility of IDLE was another central theme in the responses, aligning with survey results where 87.51% of students strongly agreed that IDLE provides convenient and accessible learning opportunities. Many students reported using digital applications such as YouTube, Duolingo, Netflix, and Spotify, allowing them to practice English at their preferred time and place. Student 5 shared, *"I used many applications to help me in English subjects, such as YouTube, Duolingo, etc. I can use them everywhere I want. However, I must have an internet connection. However, it is okay since they can help me learn English easily."* Similarly, Student 2 described how IDLE fits into their daily routine: *"Since I have an internet connection, I can use quizzes, Netflix, and Spotify to sharpen my listening skills and enrich my English vocabulary. I usually use them in my bed before a night of sleep or when I have to wait for my lecturer in the next subject."* These responses illustrate how students integrate IDLE into their everyday lives, utilizing its on-demand accessibility and personalized learning experiences.

The survey results indicate that incorporating an Interactive Digital Learning Environment (IDLE) can significantly enhance students' language proficiency, with 91.97% expressing a positive attitude toward its benefits. The interview responses further support this finding, as students reported that IDLE's wide-ranging resources are valuable supplements to their classroom education, helping them improve their English proficiency in various aspects. Notably, Duolingo emerged as the preferred digital tool among students, as they found it effective for reinforcing grammar, vocabulary, and overall language skills. Several students acknowledged that IDLE tools help them overcome challenges in language learning, particularly boosting their confidence and reducing their fear of using English. Student 4 shared, *"My English proficiency is not good. Sometimes, I feel afraid about it. However, my lecturer told me about Duolingo, Grammarly, and U-Dictionary, which can help me improve my English. I try to use them, and I feel my English has improved."* This statement highlights that students perceive digital applications as supportive resources that enhance language proficiency and build confidence in their abilities.

The role of digital applications in improving academic performance was also emphasized in the interviews. Student 1 stated, *"I believe digital applications can help*

students get better English scores. For example, I often use Duolingo at my home to learn English. I think it can benefit me because it provides feedback and explanations when I choose a wrong answer." This response indicates that students value applications that offer corrective feedback and explanations, suggesting that interactive features in IDLE applications play a crucial role in facilitating learning. Moreover, Duolingo, in particular, was praised for its comprehensive language-learning features. Student 2 described its advantages: *"The best digital application, based on my opinion, is Duolingo. Since it provides many exercises on grammar, vocabulary, listening, speaking, and writing, more than that, this application serves as a score for our English proficiency. So, we can see our level of English."* This perspective underscores that students appreciate applications that track progress and offer structured exercises across multiple language skills, reinforcing their self-assessment and goal-setting in language learning.

DISCUSSION

The topic of Informal Digital Learning of English (IDLE) has gained increasing attention among researchers. Prior studies have primarily focused on the integration of IDLE into formal classroom environments (Alhaq et al., 2021; Liu & Wang, 2024) and its benefits for English majors (Lee, 2017; Lee & Lee, 2019; Maulida et al., 2022; Nugroho & Triana, 2021). However, this study shifts the focus to non-English major students, particularly those pursuing nursing and accounting, to examine the effectiveness of IDLE in supporting their language learning needs. The findings reveal that most students strongly agree that IDLE is a crucial resource for language support, particularly relevant since English is a foreign language for these learners. Notably, 64.9% of students reported regularly using IDLE platforms to complete assignments given by their lecturers. This highlights their dependence on digital tools to enhance comprehension and proficiency, emphasizing the increasing integration of technology into language learning practices (Hidayat et al., 2022; Bygstad et al., 2022). Such usage reflects a broader trend in which students seek additional resources beyond traditional classroom instruction to reinforce and expand their learning experiences. As Rahman et al. (2023) assert, digital technology provides essential support that significantly improves students' English learning outcomes.

Another key finding of this study is the perceived flexibility of IDLE, which significantly influences students' positive perceptions. Both survey and interview data indicate that students value the ability to access IDLE platforms anytime and anywhere, allowing them to align learning with their schedules and personal preferences. This finding is consistent with Riayuningsih et al. (2022) and Dressman and Lee (2021), who emphasized that integrating IDLE into language learning enhances engagement and practicality. Additionally, many IDLE platforms incorporate adaptive technologies that personalize the learning experience, enabling students to focus on specific language goals and address individual challenges. This personalized approach contributes to greater learning efficiency and encourages students to engage with English more frequently and meaningfully (Kanellopoulou & Giannakouloupoulos, 2021; Rezai et al., 2024; Zhang & Liu, 2022).

Furthermore, the study found that most students strongly believe in IDLE's role in enhancing language proficiency. A substantial 70.3% strongly agreed, and 21.67% agreed that IDLE is a valuable complement to formal English education. These findings align with prior research (Nugroho & Triana, 2021; Rahmawati et al., 2019), demonstrating that IDLE

significantly improves students' English skills. The alignment between these studies is evident in how IDLE is consistently recognized as a supplementary learning tool that reinforces language acquisition beyond the classroom. Students in this study widely acknowledged IDLE as an effective means of language improvement, leveraging diverse digital resources to practice and consolidate linguistic knowledge gained through formal instruction (Shadieff & Yang, 2020).

It is important to acknowledge that while many students reported positive experiences with Informal Digital Learning of English (IDLE), 9.2% expressed uncertainty about its effectiveness, as shown in Tables 2 and 3. This ambivalence may stem from difficulties articulating their perspectives, which could be influenced by the complexity of language learning environments (Lee, 2021). Research suggests that when students struggle to convey their experiences clearly, it may indicate a need for a more structured and emotionally supportive learning environment. Therefore, simplifying the learning process and fostering an encouraging atmosphere may help students better express their experiences with IDLE, leading to greater engagement and clearer self-assessment of their learning progress (Lee & Roger, 2023; Soyoof et al., 2021).

One significant finding from the qualitative data analysis is students' strong preference for Duolingo as a digital platform for language learning outside traditional classrooms. This preference aligns with a growing body of research emphasizing Duolingo's effectiveness among foreign language learners. For instance, Olimat (2024) found that students in Jordan not only appreciated Duolingo's engaging and accessible features but also recognized its practical benefits in improving English proficiency. Similarly, Ajisoko (2020) demonstrated that students using Duolingo as a structured learning intervention significantly improved vocabulary acquisition. These findings reinforce the platform's role as a valuable resource, providing students with interactive, self-paced, and engaging learning opportunities that complement formal education.

Although students generally expressed positive perceptions of IDLE, qualitative data revealed that internet availability remains a critical factor influencing the effectiveness of IDLE implementation. Students S5 and S2 highlighted that a stable and reliable internet connection is essential for fully engaging with IDLE platforms. This concern is supported by Gebremariam et al. (2025), whose research identified inadequate internet access as a primary obstacle in integrating technology-based learning into educational settings. Similarly, Glazkova et al. (2025) found that 79% of students in technology-enhanced learning programs reported that insufficient internet provision hindered their overall learning experience. These insights suggest that while IDLE has the potential to enhance language learning, its effectiveness depends heavily on addressing digital accessibility challenges.

CONCLUSION

This study examines the effectiveness of Informal Digital Learning of English (IDLE) from the perspective of non-English major students, a group less explored in previous research. The findings suggest that IDLE is a helpful complement to formal English education by providing students with additional opportunities to practice and reinforce their language skills through digital resources. Students reported that IDLE allows them to engage with English beyond the classroom, adapting their learning to their needs and schedules. The study also highlights the flexibility and accessibility of IDLE, which enables students to

integrate language learning into their daily routines. While most participants viewed IDLE positively, some expressed uncertainty, citing challenges like limited interaction and technological constraints. Addressing these issues may involve excellent instructor support in guiding students toward appropriate digital learning strategies and improving access to reliable technology. This study provides insights into informal language learning in diverse academic contexts by focusing on non-English majors. It also offers practical considerations for educators and curriculum developers when integrating IDLE into general English courses. Understanding students' perceptions and challenges can help improve the use of digital learning tools, making language learning more accessible and adaptable to different learner needs. Institutions may consider structured guidance, targeted support, and training programs to enhance the benefits of IDLE for a broader range of students.

REFERENCES

- Ajisoko, P. (2020). The use of Duolingo apps to improve English vocabulary learning. *International Journal of Emerging Technologies in Learning (IJET)*, 15(07), 149. <https://doi.org/10.3991/ijet.v15i07.13229>
- Alhaq, M. N. D., Drahati, N. A., & Wijayanto, A. (2021). IDLE challenges: Playing digital games? *AL-ISHLAH: Jurnal Pendidikan*, 13(1), 99–106. <https://doi.org/10.35445/alishlah.v13i1.440>
- Asratie, M. G., Wale, B. D., & Aylet, Y. T. (2023). Effects of using educational technology tools to enhance EFL students' speaking performance. *Education and Information Technologies*, 28(8), 10031–10051. <https://doi.org/10.1007/s10639-022-11562-y>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bygstad, B., Øvrelid, E., Ludvigsen, S., & Dæhlen, M. (2022). From dual digitalization to digital learning space: Exploring the digital transformation of higher education. *Computers & Education*, 182, 104463. <https://doi.org/10.1016/j.compedu.2022.104463>
- Cohen, L., Manion, L., & Morrison, K. (2017). Surveys, longitudinal, cross-sectional, and trend studies. In *Research Methods in Education* (8th ed., p. 27). Routledge. <https://doi.org/10.4324/9781315456539>
- Creswell, J.W. and Creswell, J.D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage, Los Angeles.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.
- Dornyei, Z. (2010). *Questionnaires in second language research: Construction, administration, and processing*. (2nd Edition), Routledge
- Dressman, M., & Lee, J. S. (2021). IDLE in the classroom: Learner-driven strategies for English language learning. *The Clearing House a Journal of Educational Strategies Issues and Ideas*, 94(4), 181–187. <https://doi.org/10.1080/00098655.2021.1929802>
- Du Plooy, E., Casteleijn, D., & Franzsen, D. (2024). Personalized adaptive learning in higher education: a scoping review of key characteristics and impact on academic performance and engagement. *Heliyon*, 10(21), e39630. <https://doi.org/10.1016/j.heliyon.2024.e39630>

- Fauziah, F., & Diana, N. (2023). Exploring students' informal digital learning of English (IDLE) and self-regulated language learning from a sociocultural perspective. *Indonesian TESOL Journal*, 5(2), 197–214. <https://doi.org/10.24256/itj.v5i2.4225>
- Field, A.P. (2018) *Discovering statistics using IBM SPSS statistics*. (5th Ed), SAGE.
- Gebremariam, H. T., & Mulugeta, Z. A. (2025). In-service language teachers' engagement with online learning platforms after the emergence of Covid-19. *Ampersand*, 14, 100215. <https://doi.org/10.1016/j.amper.2024.100215>
- Glazkova, I., Falko, N., Khomenko, O., Khatuntseva, S., Rula, N., Shulzhenko, A., & Tatarin, V. (2025). Barriers in online education for displaced universities: Insights from faculty and students. *Problems and Perspectives in Management*, 23(2), 136–150. [https://doi.org/10.21511/ppm.23\(2-si\).2025.10](https://doi.org/10.21511/ppm.23(2-si).2025.10)
- Guo, X., & Lee, J. S. (2023). A systematic review of informal digital learning of English: An ecological systems theory perspective. *System*, 117, 103097. <https://doi.org/10.1016/j.system.2023.103097>
- Hasumi, T., & Chiu, M. (2024). Technology-enhanced language learning in English language education: Performance analysis, core publications, and emerging trends. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186x.2024.2346044>
- Hidayat, D. N., Lee, J. Y., Mason, J., & Khaerudin, T. (2022). Digital technology supporting English learning among Indonesian university students. *Research and Practice in Technology Enhanced Learning*, 17(1). <https://doi.org/10.1186/s41039-022-00198-8>
- Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods*, 18(1), 3–20. <https://doi.org/10.1177/1525822X05282260>
- Joshi, A., Kale, S., Chandel, S. and Pal, D. (2015) Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7, 396-403. <https://doi.org/10.9734/BJAST/2015/14975>
- Kanellopoulou, C., & Giannakouloupoulos, A. (2021). Internet-assisted language teaching: The Internet as a tool for personalised language exploration. *Creative Education*, 12(03), 625–646. <https://doi.org/10.4236/ce.2021.123043>
- Karimah, A., & Muslim, A. B. (2019). Redefining EFL (English as a Foreign Language) teachers' roles in technology-integrated instruction. *ICETT '19*, 8–12. <https://doi.org/10.1145/3337682.3337686>
- Kartal, G. (2022). Evaluating a mobile instant messaging tool for efficient large-class speaking instruction. *Computer Assisted Language Learning*, 37(5–6), 1252–1280. <https://doi.org/10.1080/09588221.2022.2074463>
- Lee, J. S. (2017). Informal digital learning of English and second language vocabulary outcomes: Can quantity conquer quality? *British Journal of Educational Technology*, 50(2), 767–778. <https://doi.org/10.1111/bjet.12599>
- Lee, J. S. (2021). *Informal digital learning of English: Research to practice*. Routledge. <https://doi.org/10.4324/9781003043454>
- Lee, J. S., & Lee, K. (2019). Informal digital learning of English and English as an international language: The path less traveled. *British Journal of Educational Technology*, 50(3), 1447–1461. <https://doi.org/10.1111/bjet.12652>

- Lee, Y., & Roger, P. (2023). Cross-platform language learning: A spatial perspective on narratives of language learning across digital platforms. *System*, 118, 103145. <https://doi.org/10.1016/j.system.2023.103145>
- Liu, G. L., & Wang, Y. (2024). Modeling EFL teachers' intention to integrate informal digital learning of English (IDLE) into the classroom using the theory of planned behavior. *System*, 120, 103193. <https://doi.org/10.1016/j.system.2023.103193>
- Maulida, F. N., Mardiana, W., & Irfan, S. (2022). exploring tertiary students' experience of informal digital learning of English for boosting English receptive skills. *Indonesian Journal of English Language Studies (IJELS)*, 8(2), 41–51. <https://doi.org/10.24071/ijels.v8i2.5046>
- Maxwell, J.A. (2013) *Qualitative research design: An interactive approach*. Sage, Thousand Oaks.
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: Jossey Bass.
- Nugroho, A., & Triana, Y. (2021). EFL learners' beliefs and practices on informal digital learning of English beyond classroom. *IJEE (Indonesian Journal of English Education)*, 8(2), 198–212. <https://doi.org/10.15408/ijee.v8i2.19843>
- Olimat, K. N. (2024). The reality and effects of using Duolingo to develop English language skills for EFL learners in Jordan. *World Journal of English Language*, 14(5), 627. <https://doi.org/10.5430/wjel.v14n5p627>
- Prayogo, J. A. (2022). English language teaching in Indonesia in the 21st century: What needs reinforcing and enhancing for the teachers. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v7i7.10645>
- Rahman, L. T., Supraptiningsih, N., Pratiwi, S. K., & Nupus, A. M. (2023). Use of digital technology in informal English language learning: How the practices support learning outcomes? *ELLTER Journal*, 4(1). <https://doi.org/10.22236/ellter.v4i1.11420>
- Rahmawati, R., Drajiati, N. A., & Asib, A. (2019). Investigating informal digital learning of English (IDLE) speaking practices emerge the boundaries between countries. *English Language and Literature International Conference (ELLiC) Proceedings*, 3, 286–295.
- Riayuningsih, K., Lubis, A. A., & Sofyan, D. (2022). EFL students' beliefs and practices on informal digital english learning outside classrooms. *Journal of English Language Studies*, 7(2). <https://doi.org/10.30870/jels.v7i2.16536>
- Rezai, A., Soyoof, A., & Reynolds, B. L. (2024). Informal digital learning of English and EFL teachers' job engagement: Exploring the mediating role of technological pedagogical content knowledge and digital competence. *System*, 122, 103276. <https://doi.org/10.1016/j.system.2024.103276>
- Soyoof, A., Reynolds, B. L., Vazquez-Calvo, B., & McLay, K. (2021). Informal digital learning of English (IDLE): A scoping review of what has been done and a look towards what will come. *Computer Assisted Language Learning*, 36(4), 608–640. <https://doi.org/10.1080/09588221.2021.1936562>
- Shadiev, R., & Yang, M. (2020). Review of studies on technology-enhanced language learning and teaching. *Sustainability*, 12(2), 524. <https://doi.org/10.3390/su12020524>
- Tashakkori, A. and Teddlie, C. (2010) *SAGE handbook of mixed methods in social & behavioral research*. SAGE Publications, Inc., Thousand Oaks. <https://doi.org/10.4135/9781506335193>

Zhang, Y., & Liu, G. (2022). Revisiting informal digital learning of English (IDLE): A structural equation modeling approach in a university EFL context. *Computer Assisted Language Learning*, 37(7), 1904–1936. <https://doi.org/10.1080/09588221.2022.2134424>