Understanding Foreign Language Enjoyment in AI-Mediated Informal Learning of English: Insights from the Vietnamese EFL Context

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ABSTRACT

The advent of artificial intelligence (AI) and its widespread adoption in language education have altered the way English is learned. Despite abundant research on the classroom-based implementation of educational technologies, learners' affective responses to the digital transformation outside classrooms have been relatively overlooked. This study examines the association between informal digital learning of English mediated by AI (AI-IDLE) and university students' enjoyment in this learning practice. A structured, paper-based survey focusing on the nexus of AI-IDLE and L2 enjoyment was conducted with 304 Vietnamese EFL students, aged between 19 and 23, from two different universities. They enrolled in three different disciplines, including Business Administration (n = 87), Finance and Accounting (n = 104), and Tourism (n = 113). Results show a positively strong correlation between these two variables, an indication of students' enjoyment in informal digital learning activities through the mediation of AI. They could benefit from the rich exposure to L2 and culture that are partially conducive to their enhancement in speaking and writing skills. This study makes contributions to the burgeoning body of research on the importance of AI and digital resources in supporting beyond-class language education and fostering positive emotional nuances.

Introduction

The diverse language resources and learning opportunities within and beyond classroom settings have necessitated the shifts in learners' perceptions of learning spaces and out-of-class practices (Choi & Nunan, 2018). The emergence of new educational technologies, digital resources and platforms, and social media has also contributed to the richness of access to the

target language, facilitating and fostering learners' autonomous and self-directed learning (Indrayani et al., 2024; Lai et al., 2024). Language learning has extended beyond the confines of traditional classrooms as learners can draw on a wide variety of resources, especially digital ones, in different informal or less formal learning environments. This trend has escalated the importance of informal digital learning of English (IDLE) in supporting and sustaining learners' cognitive, conative, and affective development (Lee & Lee, 2019; Rezai et al., 2024a; Zhang & Liu, 2024). This practice lies at the intersection between digitally mediated language learning and language learning in multiple spaces, thus tapping into learners' agentive practices in appraising the learning values of digital resources in non-classroom settings and amount of effort they are ready to expend (Indrayani et al., 2024; Liu & Ma, 2024). Zhang and Liu (2024, p. 2) expound that "IDLE has become an indispensable element of L2 education in a world where language learners can negotiate more extensive and convenient access to digital technologies and benefit from self-directed autonomous English learning with technology." As such, learners can employ various digital tools and resources to improve their language learning outcomes like mobile apps, speech-to-text software, online communities, podcasts, social networking sites, and online role-playing games, through which they can further expand their exposure to authentic language.

The advent of artificial intelligence (AI) has augmented IDLE. It provides learners with more versatile tools for language practice and independence from formal classroom teachers (Yuan & Liu, 2025; Zhou & Hou, 2024). It may be crucial to draw learners' attention to the potential of AI-IDLE. As such, it may develop learners' positive emotions and resilience in embarking on this relatively novel learning route, in the absence of scaffolding and mentoring of teachers (Lee et al., 2024a; Lee & Lee, 2021). Learners' proactive engagement in this digitally empowered learning setting indicates its high contingency on their perceptions of this emerging language modality and the emotional nuances provoked from their engagement in informal incidental learning (Liu & Fan, 2025; Rezai et al., 2024a; Zong & Yang, 2025). To the researchers' knowledge, there is a dearth of investigations into the underlying mechanisms in the link between AI-IDLE and L2 enjoyment (Wang et al., 2024). As Li et al. (2018, p. 184) put it, learners' L2 enjoyment can "broaden individual's momentary repertoires of thoughts and actions and build their psychological resiliency and personal resources." This emotional construct proposes itself to be especially essential in informal beyond-class language learning contexts, where learners exercise a much higher degree of control and accountability for their learning (Duong & Pham, 2022; Lai et al., 2024). Given its significance, the current study investigates the association between AI-IDLE and L2 enjoyment. The results contribute to informing teachers in devising approaches to supporting L2 learners in exploring, evaluating, and utilizing the diverse digital resources in informal learning spaces.

Literature review

Informal digital learning of English

To begin with, IDLE is broadly defined as to any forms of beyond-class self-directed learning of English, on digital platforms, motivated by learners' own interests, with or without their

deliberate intentions (Lee & Lee, 2021). It is close to some other concepts, such as extramural English (Sundqvist Sylvén, 2016) and online informal learning (Toffoli et al., 2023). Despite their common ground, IDLE seems to be the most popular one in the literature.

According to Lee (2022) and Dressman (2022), IDLE is usually categorized into extracurricular IDLE and extramural IDLE. While the former indicates tasks conducted outside the classroom as an extension of classroom-based activities, with the supervision and evaluation of teachers, the latter is done without teachers' supervision and evaluation. It is the latter—extramural IDLE—that is referred to in the present paper.

Alternatively, IDLE is also divided into receptive and productive tasks (Lee, 2018, 2022). Receptive IDLE includes informal activities concerning reading or listening skills, such as watching English news on YouTube, watching English-speaking movies on Netflix, or listening to English podcasts on smartphones, etc. On the other hand, productive IDLE is concerned with writing or speaking skills, such as writing English comments on Threads, discussing news with peers in English on X, or making video calls with international friends on Messenger. According Zhang et al. (2021), receptive IDLE is more popular with language learners because it is less cognitively demanding and easier to use.

Previous research unanimously reveals that IDLE brings about significant benefits to language learners, especially by increasing their language proficiency (Lee, 2018). It also raises their global awareness and positively transforms their attitudes towards English as an international language (Lee & Lee, 2019; Rezai, 2023; Rezai et al., 2024b). In addition, IDLE also has empowering effects on learners' emotions, such as raising their motivation (Rezai et al., 2025; Zadorozhnyy & Lee, 2024), willingness to communicate (WTC) (Lee & Sylvén, 2021; Rezai, 2023), and levels of enjoyment (Liu et al., 2024a; Toffoli et al., 2023). Meanwhile, negative emotions like L2 anxiety and boredom may be significantly reduced (Taherian et al., 2024).

Despite these positive outcomes, previous studies on IDLE did not cover all skills and aspects of English, but concentrated primarily on English vocabulary (Lee, 2019; Lee et al., 2024a, 2024b). Additionally, these studies were largely set in Chinese or Persian contexts (Zhang et al., 2024), leaving other linguistic and cultural contexts, Vietnam included, underrepresented in the literature. These gaps justify the present study, which examines the link between AI-IDLE and L2 enjoyment (FLE) in Vietnamese higher education. The two concepts of AI-IDLE and FLE are reviewed below.

AI-mediated informal digital learning of English

Integrated into generative AI, IDLE has turned into AI-IDLE (Guan et al., 2024; Liang & Tse, 2024). Instead of relying on regular digital platforms like Facebook, YouTube, Netflix, or Instagram, language learners have begun to make use of AI platforms, such as ChatGPT, Gemini, and DeepSeek, for language learning. The construct of AI may refer to a wide range of generative AI platforms, but in the literature on language education, it often implies ChatGPT. In formal settings, ChatGPT has been proven to be associated with higher language proficiency (Ma et al., 2024; Tafazoli, 2024), cognitive growth, and emotional development (Wei, 2023; Yuan & Liu, 2025). However, the utilization of ChatGPT for AI-IDLE is a relatively new phenomenon. Therefore, evidence for its benefits among language learners remains scarce.

Despite this, Guan et al. (2024) pointed out positive associations among AI-IDLE, learners' English proficiency and self-regulation. As Liang and Tse (2024) put it, AI tools might have beneficial impacts on learners' WTC in informal settings. There is, nevertheless, limited scholarship on the interplay between AI-IDLE and learner emotions.

Foreign language enjoyment

Together with the affect turn in language education research (Dewaele, 2015), FLE has recently attracted much attention from scholars. To begin with, it is necessary to distinguish pleasure from enjoyment. According to recent research (e.g. Dewaele & MacIntyre, 2014; Boudreau et al., 2018), pleasure indicates a simple hedonic feeling, while enjoyment implies the pleasure derived from an intellectual challenge, a heightened attention, and a deep engagement. In language education, FLE refers to a mental state in which language learners derive pleasure from engaging whole-heartedly with English L2, overcoming the optimal challenges, and achieving their learning goals. Dewaele and MacIntyre (2014) added that FLE might fluctuate or remain static, depending on environmental and situational conditions.

Previous scholarship on FLE revolves around the factors that shape language learners' FLE. First, the level of FLE is determined by the learners themselves - their dispositions, attitudes, and socio-economic backgrounds. Dewaele et al. (2023), Li (2022), Zhang and Liu (2023) found that learners who were by nature more emotionally stable, more open-minded, and had a more positive attitude toward the target language tended to enjoy language learning more. Their family backgrounds also matter. According to Dewaele et al. (2016) and Dewaele and Li (2022), learners from more privileged family backgrounds tended to have a higher level of FLE. This is quite obvious, because these learners have easier access to learning opportunities - and with more options, which affects the extent to which they enjoy English learning. Second, language learners' FLE also depends on their instructors' personality and pedagogical skills (Dewaele & Dewaele, 2017; Hejazi & Sadoughi, 2023). Unsurprisingly, warm-hearted, friendly, approachable English teachers were found to make their students enjoy learning English more. Their pedagogical skills also play a role, but surprisingly, they are not emphasized in the literature. Finally, previous studies also confirm the roles of learning environments. According to Lee and Lee, (2021) and Chen (2023), learners who experienced positive classroom dynamics, especially within digital environments, tended to enjoy their language learning more. The roles of digital learning environments, however, need further verification through more rigorous empirical research.

Methodologically, most previous studies on FLE employed the cross-sectional design and were conducted in Chinese or Persian contexts. Zhang et al. (2024) problematized this bias and called for more diverse research methods, such as correlation or qualitative designs. They also emphasized the need to explore FLE in more linguistically and culturally diverse settings. These two changes are hoped to help scholars gain more neutral but nuanced insights into the matter.

Informal digital learning of English, AI-mediated informal digital learning of English, and foreign language enjoyment

FLE is found by some scholars as a mediator for learning motivation and WTC (Lee et al., 2024a; Rezai et al., 2025). This means that a strong learning motivation may increase learners'

FLE, which may in turn affect their WTC. FLE's mediating role is usually framed in formal settings, while its role in informal, digital settings (IDLE), and especially with the integration of AI (AI-IDLE), is rare. For instance, Fan and Zhang (2024) and Liu et al. (2024c, 2025) examined the correlation between AI-IDLE and FLE, pointing out FLE as an emotional mediator. Given the accelerating popularity of AI-IDLE, further studies on the emotional landscape of language learners within this new mode of learning are needed.

In short, as Zhang et al. (2024) has justifiably pointed out, research into FLE, especially in relation to AI-IDLE, is limited and biased, characterized by a disproportionate employment of cross-sectional design and an overreliance on the Chinese and Persian contexts. The present research responds to the gaps, investigating the link between AI-IDLE and FLE among Vietnamese university students. It is hoped that this study will greatly contribute to the literature on both AI-IDLE and FLE.

Methods

Participants

304 Vietnamese university students participated in this study. They were selected from two universities in Ho Chi Minh City, 49.7% from one and 50.3% from the other (see Table 1). These participants enrolled in three different disciplines: Business Administration (n = 87), Finance and Accounting (n = 104), and Tourism (n = 113). Though they were studying different academic majors, they learned English as required in their undergraduate programs. Of these, 51.3% were male and 48.7% were female. Their ages were between 19 and 23 years.

Table 1.

Description of participants

Specialization	N	Gender (%)		Age (M)	University (%)	
		Male	Female		1	2
Business Administration	87	52.9	47.1	20.14	54.0	46.0
Tourism	113	53.1	46.9	20.12	52.2	47.8
Finance & Accounting	104	48.1	51.9	19.82	43.3	56.7
TOTAL	304	51.3	48.7	20.02	49.7	50.3

The current study employed a purposive convenience sampling technique to recruit the participants. Eligible participants included the students of English courses at the university who had prior experience with AI-powered learning tools for language learning, including chatbots, speech recognition applications, and vocabulary-based AI games. In line with the study criteria, we directly approached the target population of students signaling their interest through the assistance of instructors that guided us in identifying those students. Although this recruitment strategy allowed for ease of implementation and alignment of target populations, we do note that this may have introduced some biases in the generalizability of the findings.

All students completed the survey voluntarily, so informed consent was obtained. This study targeted students of multiple disciplines participating AI-IDLE. The researchers applied the ethical guidelines of the institution in which students' participation was voluntary, and data were kept confidential.

Survey

This study was conducted using a structured, paper-based survey developed from two validated scales: AI-IDLE Scale by Liu and Ma (2024 and L2 Enjoyment Scale by Liu et al. (2024c). The AI-IDLE Scale consisted of 8 items about students' engagement in AI-IDLE. The L2 Enjoyment Scale had five items about the enjoyment of L2 English learning. The questionnaire was designed on a 5-point Likert format (1 = strongly disagree; 5 = strongly agree). It could take the participants around 15 minutes to complete.

In the pilot phase, ten students were invited to test the instruments. We used the results to adapt a few items based on comments regarding clarity and language use to enhance the comprehensibility of the items. Results showed that both scales indicated a high internal consistency (Cronbach's alpha >.8) and given the nature of our research focus on the relationship between the variables, such reliability evidence was considered satisfactory for the purposes of this study. However, as the participants (N=10) in this pilot testing were limited in number, we did not conduct confirmatory factor analysis.

Data analysis

We projected data into SPSS 28 for analysis. Various techniques were used to investigate the association between AI-IDLE and L2 enjoyment. After data cleaning, skewness and kurtosis tests were employed to ensure the appropriateness of the data for further statistical tests (see Table 2). As the sample size in this study was greater than 300, we used skewness and kurtosis tests with critical ratios (z-value) within ±1.96 and absolute skewness and kurtosis values ≤2 and ≤4 respectively. In this study, such values satisfy the statistical standards (see Table 2). In other words, the data were symmetric (Misha et al., 2019).

Table 2.
Data distribution

N=304	Minimum	Maximum	Mean	SD	Skewness		Kurtosis	
					Statistic	SD Error	Statistic	SD Error
ENJOY1	3.00	5.00	4.33	.58	-.18	.14	-.65	.28
ENJOY2	3.00	5.00	4.45	.62	-.67	.14	-.51	.28
ENJOY3	3.00	5.00	4.43	.56	-.34	.14	-.84	.28
ENJOY4	3.00	5.00	4.55	.59	-.96	.14	-.07	.28
ENJOY5	3.00	5.00	4.49	.60	-.74	.14	-.42	.28
IDLE1	3.00	5.00	4.47	.60	-.65	.14	-.52	.28
IDLE2	3.00	5.00	4.46	.58	-.51	.14	-.68	.28
IDLE3	3.00	5.00	4.43	.61	-.58	.14	-.58	.28
IDLE4	3.00	5.00	4.44	.59	-.54	.14	-.62	.28
IDLE5	3.00	5.00	4.48	.59	-.64	.14	-.55	.28

IDLE6	3.00	5.00	4.47	.57	-.51	.14	-.71	.28
IDLE7	3.00	5.00	4.44	.60	-.57	.14	-.60	.28
IDLE8	3.00	5.00	4.43	.59	-.48	.14	-.67	.28

Reliability was then examined by using the internal coefficient consistency value (Cronbach's alpha). Results show that the scale of L2 Enjoyment had a high value of reliability (see Table 3). Cronbach's alpha value was greater than .894 ($\alpha > .8$). Corrected item-total correlation was greater than .5. The mean ratings varied within the range of .224 (Min. = 4.329; Max. = 4.553).

Table 3.
Scale of L2 enjoyment

N=304	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	squared multiple correlation	Cronbach's alpha if item deleted
ENJOY1	17.92	4.07	.753	.59	.868
ENJOY2	17.80	3.86	.786	.63	.860
ENJOY3	17.82	4.12	.754	.58	.868
ENJOY4	17.70	4.18	.670	.46	.886
ENJOY5	17.76	4.02	.737	.56	.871

Also, the scale of AI-IDLE met the statistical standard (see Table 4). Accordingly, Cronbach's alpha value was .873 ($\alpha > .8$). The data fluctuated around the value of .043 (Min. = 4.434; Max. = 4.477. The corrected item-total correlation was greater than .6. According to Everitt (2002) and Field (2005), the values show that the scales of L2 enjoyment and AI-IDLE were highly reliable.

Table 4.
Scale of AI-IDLE

N=304	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
IDLE1	31.16	9.33	.600	.39	.861
IDLE2	31.17	9.30	.642	.55	.857
IDLE3	31.19	9.21	.625	.59	.858
IDLE4	31.18	9.23	.640	.51	.857
IDLE5	31.15	9.26	.637	.43	.857
IDLE6	31.16	9.29	.652	.55	.856
IDLE7	31.18	9.31	.608	.57	.860
IDLE8	31.19	9.26	.641	.51	.857

A further examination into the results of regression analysis shows that AI-IDLE (independent variable) could in general predict L2 enjoyment (dependent variable), with r=.730, r^2=.534,

adjusted r^2=.521), with Durbin-Watson value of 2.201 (see Table 5). The significance value (*p*-value) was lower than .001 (*F* = 42.177). According to Yoko and Rafi (2022), the acceptable value of Durbin-Watson is within the range of 1.5 and 2.5. Also, the r value shows a potential relationship between AI-IDLE and L2-enjoyment.

Table 5.

Regression analysis (L2 Enjoyment)

Model (N=304)	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.730[a]	.534	.521	.344	.534	42.18	8	295	<.001	2.20

a. Predictors: (Constant), IDLE8, IDLE3, IDLE2, IDLE1, IDLE5, IDLE4, IDLE6, IDLE7

b. Dependent Variable: ENJOY

Results of preliminary data analysis show that the statistics were satisfactory. Therefore, the data were analyzed further to answer the two research questions. To answer Research Question 1, we employed descriptive statistics. To answer Research Question 2, we used Pearson Correlation test to investigate the relationship between AI-IDLE and L2 enjoyment.

Results

Vietnamese university L2 English students' use of artificial intelligence to learn English informally

The analysis of data collected from AI-IDLE questionnaire (n=304) shows that the Vietnamese university L2 English students employed AI in learning English most frequently (see Table 6). In particular, they aimed to increase their exposure to English beyond the classroom (AI-IDLE 1, M=4.47), access resources (AI-IDLE 5, M=4.48) and broaden their knowledge of English language culture (AI-IDLE, M=4.47). They utilized AI to practice interaction and productive skills (items 2, 4, and 7) less often, with M=4.46, M=4.44, M=4.44 respectively. The standard deviations varied marginally, from slightly over .57 to around .6, and variance values were smaller than .4, which could in part explain the great Cronbach's alpha value (α = .873), as in the aforesaid.

Table 6.

AI-IDLE activities used by Vietnamese students

Observed variable (N=304)	Min.	Max.	Range	M	SD	Variance
AI-IDLE 1	3.00	5.00	2.00	4.47	.60	.36
AI-IDLE2	3.00	5.00	2.00	4.46	.58	.34
AI-IDLE3	3.00	5.00	2.00	4.43	.61	.37
AI-IDLE4	3.00	5.00	2.00	4.44	.59	.35
AI-IDLE5	3.00	5.00	2.00	4.48	.59	.35
AI-IDLE6	3.00	5.00	2.00	4.47	.57	.33

AI-IDLE7	3.00	5.00	2.00	4.44	.60	.36
AI-IDLE8	3.00	5.00	2.00	4.43	.59	.35

Results of simple random bootstrapping show that the bias of data for each item was very limited (see Table 7). For the mean scores, the figure was smaller than .002. For the standard deviation, it was within the range of ±.002. The bias for variance was also very small, within ±.001. According to Davison and Hinkley (2006), the data indicated high reliability or consistency of the AI-IDLE measure.

Table 7.

Simple random bootstrapping results

Item (N=304)	Statistic	Bias	SD error	95% confidence interval	
				Lower	Upper
AI-IDLE 1	M	.0006	.03	4.40	4.53
	SD	-.00158	.02	.56	.64
	Variance	-.001	.03	.31	.41
AI-IDLE 2	M	-.0001	.03	4.39	4.53
	SD	-.00084	.02	.54	.62
	Variance	-.001	.02	.29	.38
AI-IDLE 3	M	-.0004	.04	4.37	4.50
	SD	-.00043	.02	.57	.65
	Variance	.001	.03	.32	.42
AI-IDLE 4	M	-.0013	.03	4.38	4.51
	SD	-.00143	.02	.55	.63
	Variance	-.001	.02	.31	.40
AI-IDLE 5	M	-.0003	.03	4.41	4.54
	SD	-.00126	.02	.55	.63
	Variance	-.001	.02	.30	.40
AI-IDLE 6	M	-.0011	.03	4.40	4.53
	SD	.00009	.02	.54	.61
	Variance	.000	.02	.29	.37
AI-IDLE 7	M	-.0015	.04	4.37	4.51
	SD	-.00071	.02	.56	.64
	Variance	.000	.03	.32	.41
AI-IDLE 8	M	-.0004	.03	4.37	4.50
	SD	-.00138	.02	.55	.63
	Variance	-.001	.02	.30	.39

The relationship between AI-IDLE and L2 enjoyment

For Research Question 2, we first attempted to examine convergent and discriminant validity. Results show that AVE for IDLE was less than .5, and we were advised to remove Item 7 to improve AVE of this construct. After the removal of IDLE7, the value of AVE increased to .5, and the statistics were satisfactory (see Table 8).

Table 8.

Convergent and discriminant validity

	CR	AVE	HTMT	
			L2Enjoyment	IDLE
L2Enjoyment	.895	.630	–	
IDLE	.875	.500	.804	–

As Research Question 2 aims to investigate the correlational relationship between AI-IDLE and L2 enjoyment, we used Pearson product-moment correlation coefficient (hereafter Pearson correlation). We referenced Patrick and Christa (2018) to determine the correlation level: weak (<.4), moderate (.4 - .69), strong (.7 or higher). Results show that the correlation between AI-IDLE and L2 enjoyment was positively strong (r=.712) with a significance level (2-tailed) smaller than .001 (see Table 9). In other words, AI-IDLE and L2 English enjoyment were found to be positively correlated. However, this does not mean a cause-effect relationship as Pearson correlation basically indicates two independent variables (Patrick & Christa, 2018).

Table 9.

Pearson correlation between AI-IDLE and L2 enjoyment

IDLE	Pearson Correlation	1	.712[**]
	Sig. (2-tailed)		<.001
	N	304	304

**. Correlation is significant at the 0.01 level (2-tailed).

In general, results show that Vietnamese university L2 English students generally used AI-IDLE very often, with a mean score of greater than 4.43 (see Table 1). AI-IDLE was positively strongly correlated with L2 enjoyment. Attempts to investigate reliability and validity show that the statistics were satisfactory.

Discussion

AI-IDLE and L2 enjoyment

A strong positive link between AI-IDLE and L2 enjoyment was found in the current research (r =.71, *p* <.001), indicating a significant association between students' utilization of AI tools and positive emotions to learn. Although they are in line with previous IDLE research highlighting the motivational and affective impacts of exposure to informal language (Lee & Lee, 2021; Rezai et al., 2025), it is imperative to view them in the context of the correlational nature of the study. While the results suggest that learners who use AI more often are more

likely to report enjoying learning, causation cannot be assumed.

Unlike the more general IDLE work on traditional digital media (Lee, 2022; Zhang et al., 2021), this research underlines AI-driven tools (e.g., chatbots, speech recognition systems, and adaptive learning platforms) that could potentially mediate the experience of enjoyment. These tools have the potential to add a greater sense of agency and personalization, which are two well-known affordances connected with emotional involvement in learning. This confirmed Liu et al.'s (2024b) study discovering that AI-IDLE in Chinese contexts boosted learner motivation. Similarly, enjoyment was found to be a mediator in learners' continued use of AI-assisted tools (Fan & Zhang, 2024).

Nevertheless, it remains unclear how AI-IDLE contributes to increased enjoyment. It is not known whether the pleasure results from the novelty and the gamification of using AI, or from the flexibility of self-paced learning, or from more profound cognitive-affective processes. More work, including experimental or longitudinal designs, is required to study these pathways and to determine whether this type of engagement is associated with lasting emotional and linguistic benefits.

AI-IDLE and student engagement patterns

Descriptive statistics indicated that students commonly used AI tools to enhance English exposure out of class (M = 4.47), access digital learning resources (M = 4.48), and engage with English-language cultural content (M = 4.47). These patterns indicate that students are successfully appropriating AI to cultivate their receptive language abilities and understanding of the cultures in authentic settings and beyond the constraints of the classroom. This is consistent with Lee and Sylvén (2021) and Liu et al. (2024a), who found that informal digital learning environments facilitate learner autonomy and satisfaction.

However, students somewhat less commonly accessed AI tools for productive language skills. In particular, the average scores for AI-enabled speaking and writing tasks were 4.45 and 4.46 respectively. Although still relatively high, this indicates a reluctance to deploy AI for generative purposes. This is also supported by Liang and Tse (2024), who discovered that although AI could promote initiative to chat, students were less confident when having interactive dialogues with an AI system. This discrepancy might result from students' uncertainties regarding the reliability of AI-mediated feedback or the absence of social interaction and validation followed by speaking and writing in the classroom.

The regression analysis indicated that AI-IDLE accounted for 53.4% of the variance in L2 enjoyment (r^2=.534, p <.001). This result supports the perspective that AI-enabled tools impact learners' emotional experiences. However, despite the strong statistical association, this correlation does not imply causation, suggesting a direction for future research.

Theoretical and pedagogical implications

The results have a few implications for theory and practice in language education. First, the positive link between AI-IDLE and enjoyment suggests the introduction of AI tools in a language curriculum. It might offer opportunities to increase student engagement. For instance, Chatbots, speech recognition systems, and gamified applications could offer more personalized

and interactive experience. Yet, it might be essential for teachers to provide tasks supporting AI-mediated speaking and writing and guide students to integrate AI-provided feedback into their works.

The current study extends the growing literature on the role of AI-IDLE in enhancing learners' positive emotion. In this regard, enjoyment cannot be examined as an isolated phenomenon but interaction with AI-IDLE. However, as aforesaid, the relationship of AI-IDLE to L2 enjoyment in the current study should not be misinterpreted as a causal relationship.

Conclusion

Drawing on the AI-IDLE Scale (Liu & Ma, 2024) and the L2 Enjoyment Scale (Liu et al., 2024c) in the context of emerging adoption of AI in language education in Vietnam, this study examines the association between students' AI-IDLE practices and their levels of enjoyment in learning English. The results reveal a positively strong correlation between these two variables, implying that AI-IDLE is closely linked to students' enjoyment in learning English in such informal spaces. AI offers them rich exposure to the target language and L2 culture and, to some extent, expands their opportunities for interacting in English and sharpening speaking and writing skills. This shows that Vietnamese university students were cognizant of the diverse resources for language practice mediated by AI and the value of conducting autonomous learning via digital platforms and tools outside classrooms. These spaces not only had positive impacts on their cognitive development and language skills but also provided conducive and pleasurable learning experiences.

The present study extends the proliferating literature on language education in informal settings beyond classrooms through the support of AI. The overwhelming prominence of digital resources for language learning and the versatility of AI tools have facilitative effects on the learning process, creating ample spaces for exposure to authentic language and L2 culture. However, this AI-IDLE mode may challenge students in exercising a higher degree of autonomy and accountability for learning. The positive emotions derived from these learning spaces, as this study unfolds, predict students' proactive engagement, sustained interest, and resilience in this independent but rewarding undertaking. It may be necessary that teachers be encouraged to integrate AI-powered tools like interactive chatbots, in their teaching to create dynamic and enjoyable learning experiences and foster students' regular utilization of informal digital platforms for language learning. To this end, it is essential to incorporate AI-mediated tasks for language practice in course design, offering students the opportunities to work on them in classroom and out-of-class settings. This policy helps promote their positive attitudes toward using emerging AI technologies for language learning and frequency of leveraging these tools beyond the traditional classroom confines.

There are four possible limitations. First, this study was restricted to a sample size of marginally over 300 students in Vietnam. Future research can involve a larger sample in other contexts to increase research generalizability. Second, although this study used various tests (e.g., Pearson Correlation and simple linear regression), it aimed to examine the correlation between IDLE and L2 enjoyment through questionnaires. Experimental data might shed better light on whether

IDLE could cause greater L2 enjoyment. Third, as this study is of a quantitative nature, future studies drawing on mixed-methods approaches may provide evidence on what aspects of IDLE can provoke L2 enjoyment. Finally, this study neither included learners' demographic data to explore potential differences across subgroups nor considered control variables in the regression model. Future research can examine if learner differences can impact the association between AI-IDLE and L2 English enjoyment.

References

Boudreau, C., MacIntyre, P. D., & Dewaele, J.-M. (2018). Enjoyment and anxiety in second language communication: An idiodynamic approach. *Studies in Second Language Learning and Teaching*, *8*(1), 149–170. https://doi.org/10.14746/ssllt.2018.8.1.7

Chen, T. H. (2023). Dynamic fluctuations in foreign language enjoyment during cognitively simple and complex interactive speaking tasks. *Studies in Second Language Learning and Teaching, 13*(3), 627–661. https://doi.org/10.14746/ssllt.31194

Choi, J., & Nunan, D. (2018). Language learning and activation in and beyond the classroom. *Australian Journal of Applied Linguistics*, *1*(2), 49-63. https://doi.org/10.29140/ajal.v1n2.34

Davison, A. C. & Hinkley, D. V. (2006). *Bootstrap methods and their application*. CUP.

Dewaele, J.-M. (2015). On emotions in foreign language learning and use. *The Language Teacher, 39*, 13–15. https://doi.org/10.37546/JALTTLT39.3-3

Dewaele, J.-M., & MacIntyre, P. D. (2014). The two faces of Janus? Anxiety and enjoyment in the foreign language classroom. *Studies in Second Language Learning and Teaching*, *4*(2), 237–274. https://doi.org/10.14746/ssllt.2014.4.2.5

Dewaele, J. M., MacIntyre, P. D., Boudreau, C., & Dewaele, L. (2016). Do girls have all the fun? Anxiety and enjoyment in the foreign language classroom. *Theory and Practice in Second Language Acquisition, 2*(1), 41–63. https://journals.us.edu.pl/index.php/TAPSLA/article/view/3941/3090

Dewaele, J. M., & Dewaele, L. (2017). The dynamic interactions in foreign language classroom anxiety and foreign language enjoyment of pupils aged 12 to 18: A pseudo-longitudinal investigation. *Journal of the European Second Language Association, 1*(1), 12–22. https://doi.org/10.22599/jesla.6

Dewaele, J. M., & Li, C. (2022). Foreign language enjoyment and anxiety: Associations with general and domain-specific English achievement. *Chinese Journal of Applied Linguistics, 45*(1), 32–48. https://doi.org/10.1515/cjal-2022-0104

Dewaele, J.-M., Botes, E., & Greiff, S. (2023). Sources and effects of foreign language enjoyment, anxiety, and boredom: A structural equation modeling approach. *Studies in Second Language Acquisition*, *45*(2), 461–479. https://doi.org/10.1017/S0272263122000328

Dressman, M. (2020). Informal English learning among Moroccan youth. In M. Dressman and R. W. Sadler (Eds.), *The handbook of informal language learning* (pp. 303-318). Wiley-Blackwell.

Duong, Q. P., & Pham, T. N. (2022). Moving beyond four walls and forming a learning community for speaking practice under the auspices of Facebook. *E-Learning and Digital Media*, *19*(1), 1-18. https://doi.org/10.1177/204275302110280

Everitt, B.S. (2002). *The Cambridge dictionary of statistics* (2nd ed.). CUP.

Fan, J., & Zhang, Q. (2024). From literacy to learning: The sequential mediation of attitudes and enjoyment in AI-assisted EFL education. *Heliyon*, *10*(17), e37158-. https://doi.org/10.1016/j.heliyon.2024.e37158

Field, A. (2005). *Discovering statistics using SPSS* (5th ed.). SAGE Publishing.

Guan, L., Li, S., & Gu, M. M. (2024). AI in informal digital English learning: A meta-analysis of its effectiveness on proficiency, motivation, and self-regulation. *Computers and Education. Artificial Intelligence*, *7*, 100323-. https://doi.org/10.1016/j.caeai.2024.100323

Hejazi, S. Y., & Sadoughi, M. (2023). How does teacher support contribute to learners' grit? The role of learning enjoyment. *Innovation in Language Learning and Teaching, 17*(3), 593–606. https://doi.org/10.1080/17501229.2022.2098961

Indrayani, N., Cahyono, B. Y., Mukminatien, N., & Ivone, F. M. (2024). Self-directed informal digital learning of English: Identifying its nature and activities for English proficiency. *rEFLecticons*, *31*(2), 791-814. https://doi.org/10.61508/refl.v31i2.275261

Lai, C., Chen, Q., Wang, Y., & Qi, X. (2024). Individual interest, self-regulation, and self-directed language learning with technology beyond the classroom. *British Journal of Educational Technology*, *55*(1), 379-397. https://doi.org/10.1111/bjet.13366

Lee, J. S. (2018). *Informal digital learning of English: the case of Korean university students* (Doctoral dissertation, University of Illinois at Urbana-Champaign). https://www.ideals.illinois.edu/items/107439

Lee, J. S. (2019). 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. (2022). *Informal digital learning of English: research to practice*. Routledge.

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, J. S., & Lee, K. (2021). The role of informal digital learning of English and L2 motivational self system in foreign language enjoyment. *British Journal of Educational Technology*, *52*(1), 358–373. https://doi.org/10.1111/bjet.12955

Lee, J. S., & Sylvén, L. K. (2021). The role of Informal Digital Learning of English in Korean

and Swedish EFL learners' communication behavior. *British Journal of Educational Technology*, *52*(3), 1279–1296. https://doi.org/10.1111/bjet.13082

Lee, J. S., Chen, J., & Drajati, N. A. (2024a). Informal digital learning of English and perceptions of using EIL materials: Attitude toward varieties of English as a mediator. *Journal of Multilingual and Multicultural Development*, *45*(5), 1762–1777. https://doi.org/10.1080/01434632.2021.2021213

Lee, J. S., Yeung, N. M., & Osburn, M. B. (2024b). Foreign Language Enjoyment as a mediator between Informal Digital Learning of English and willingness to communicate: a sample of Hong Kong EFL secondary students. *Journal of Multilingual and Multicultural Development*, *45*(9), 3613–3631. https://doi.org/10.1080/01434632.2022.2112587

Li, C. (2022). Foreign language learning boredom and enjoyment: The effects of learner variables and teacher variables. *Language Teaching Research, 26*, 13621688221090324. https://doi.org/10.1177/13621688221090324

Li, C., Jiang, G., & Dewaele, J.-M. (2018). Understanding Chinese high school students' foreign language enjoyment: Validation of the Chinese version of the foreign language enjoyment scale. *System*, *76*, 183-196. https://doi.org/10.1016j.system.2018.06.004

Liang, H., & Tse, A. W. C. (2024). The influence of interacting with Generative AI chatbots in informal English learning environments on undergraduate students' willingness to communicate in Mainland China: a case study. *Proceedings of the 2024 16th International Conference on Education Technology and Computers*, 26–32. https://doi.org/10.1145/3702163.3702167

Liu, G., & Ma, C. (2024). Measuring EFL learners' use of ChatGPT in informal digital learning of English based on the technology acceptance model. *Innovation in Language Learning and Teaching*, *18*(2), 125-138. https://doi.org/10.1080/17501229.2023.2240316

Liu, H., & Fan, J. (2025). AI-mediated communication in EFL classrooms: The role of technical and pedagogical stimuli and the mediating effects of AI literacy and enjoyment. *European Journal of Education*, *60*(1), 1-13. https://doi.org/10.1111/ejed.12813

Liu, G. L., Zhang, Y., & Zhang, R. (2024a). Examining the relationships among motivation, informal digital learning of English, and foreign language enjoyment: An explanatory mixed-method study. *ReCALL*, *36*(1), 72–88. https://doi.org/10.1017/S0958344023000204

Liu, G. L., Darvin, R., & Ma, C. (2024b). Exploring AI-mediated informal digital learning of English (AI-IDLE): a mixed-method investigation of Chinese EFL learners' AI adoption and experiences. *Computer Assisted Language Learning*, 1–29. https://doi.org/10.1080/09588221.2024.2310288

Liu, G. L., Darvin, R., & Ma, C. (2024c). 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. *Computers in Human Behavior*, *160*, 108362-.

https://doi.org/10.1016/j.chb.2024.108362

Liu, G. L., Zou, M. M., Soyoof, A., & Chiu, M. M. (2025). Untangling the relationship between AI -mediated informal digital learning of English (AI-IDLE), foreign language enjoyment and the Ideal L2 Self: Evidence from Chinese university EFL students. *European Journal of Education*, *60*(1). https://doi.org/10.1111/ejed.12846

Ma, Q., Crosthwaite, P., Sun, D., & Zou, D. (2024). Exploring ChatGPT literacy in language education: A global perspective and comprehensive approach. *Computers and Education. Artificial Intelligence*, *7*, 100278-. https://doi.org/10.1016/j.caeai.2024.100278

Misha, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anesthesia, 22*, 67-72. https://doi.org/10.4103/aca.ACA_157_18

Patrick, S. & Christa, B. (2018). Correlation coefficients: Appropriate use and interpretation. A*nesthesia & Analgesia, 126*(5), 1763-1768. https://doi.org/10.1213/ANE.0000000000002864

Rezai, A. (2023). Investigating the association of informal digital learning of English with EFL learners' intercultural competence and willingness to communicate: A SEM study. *BMC Psychology*, *11*(1), 1–314. https://doi.org/10.1186/s40359-023-01365-2

Rezai, A., Soyoof, A., & Lee Reynolds, B. (2024a). Ecological factors affecting students' use of informal digital learning of English: EFL teachers' perceptions. *Teaching and Teacher Education*, *145*, 104629-. https://doi.org/10.1016/j.tate.2024.104629

Rezai, A., Soyoof, A., & Reynolds, B. L. (2024b). Effectiveness of informal digital learning of English on EFL learners' vocabulary knowledge: A mixed-methods investigation. *Computer Assisted Language Learning*, 1-26. https://doi.org/10.1080/09588221.2024.2350419

Rezai, A., Ashkani, P., & Moradian, M. R. (2025). Is informal digital learning of English significantly correlated with online motivation for learning, online foreign language enjoyment, and telecollaborative foreign language anxiety? Evidence from higher education. *International Journal of Human-Computer Interaction*, 1–15. https://doi.org/10.1080/10447318.2024.2445102

Sundqvist, P., & Sylvén, L. K. (2016). *Extramural English in teaching and learning: From theory and research to practice*. Palgrave Macmillan. https://doi.org/10.1057/978-1-137-46048-6

Tafazoli, D. (2024). Exploring the potential of generative AI in democratizing English language education. *Computers and Education. Artificial Intelligence*, *7*, 100275-. https://doi.org/10.1016/j.caeai.2024.100275

Taherian, T., Shirvan, M. E., Yazdanmehr, E., Kruk, M., & Pawlak, M. (2024). A longitudinal analysis of informal digital learning of English, willingness to communicate and foreign language boredom: A latent change score mediation model. *The Asia-Pacific*

Education Researcher, *33*(4), 997–1010. https://doi.org/10.1007/s40299-023-00751-z

Toffoli, D., Sockett, G., & Kusyk, M. (2023). *Language learning and leisure: Informal language learning in the digital age.* De Gruyter. https://doi.org/10.1515/9783110752441

Wang, Z., Shen, B., & Zhang, Y. (2024). What makes EFL learning enjoyable for Chinese tertiary-level students? Insights from Q methodology. *System*, 1-15. https://doi.org/10.1016/j.system.2024.103337

Wei, L. (2023). Artificial intelligence in language instruction: impact on English learning achievement, L2 motivation, and self-regulated learning. *Frontiers in Psychology*, *14*, 1261955–1261955. https://doi.org/10.3389/fpsyg.2023.1261955

Yoko, N. & Rafi, M. (2022). Statistics. In P. L. Goethals, N. M. Scala, & D. T. Bennett (Eds.), *Mathematics in cyber research*. CRC Press.

Yuan, L., & Liu, X. (2025). The effect of artificial intelligence tools on EFL learners' engagement, enjoyment, and motivation. *Computers in Human Behavior*, *162*, 108474-. https://doi.org/10.1016/j.chb.2024.108474

Yuan, L., & Liu, X. (2025). The effect of artificial intelligence tools on EFL learners' engagement, enjoyment, and motivation. *Computers in Human Behavior*, *162*, 1-10. https://doi.org/10.1016/j.chb.2024.108474

Zadorozhnyy, A., & Lee, J. S. (2024). Linking EFL students' psychological needs to engagement in informal digital learning of English: a structural equation modeling analysis. *Computer Assisted Language Learning*. Advance Online Publication https://doi.org/10.1080/09588221.2024.2387269

Zhang, R., Zou, D., Cheng, G., Xie, H., Wang, F. L., & Au, O. T. S. (2021). Target languages, types of activities, engagement, and effectiveness of extramural language learning. *PloS One*, *16*(6), e0253431–e0253431. https://doi.org/10.1371/journal.pone.0253431

Zhang, Y., & Liu, G. L. (2023). 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. *Computer Assisted Language Learning*, 1–28. https://doi.org/10.1080/09588221.2023.2267627

Zhang, Y., & Liu, G. (2024). 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

Zhang, Z., Gao, X. (Andy), & Liu, T. (2024). Enjoyment in foreign language learning: A systematic review. *Heliyon*, *10*(17), e37215-. https://doi.org/10.1016/j.heliyon.2024.e37215

Zheng, S. (2024). The effects of chatbot use on foreign language reading anxiety and reading performance among Chinese secondary school students. *Computers and Education.*

Artificial Intelligence, *7*, 100271-. https://doi.org/10.1016/j.caeai.2024.100271

Zhou, C., & Hou, F. (2024). Can AI empower L2 education? Exploring its influence on the behavioral, cognitive and emotional engagement of EFL teachers and language learners. *European Journal of Education*, *59*(4), 1-13. https://doi.org/10.1111/ejed.12750

Zong, Y., & Yang, L. (2025). How AI-enhanced social-emotional learning framework transforms EFL students' engagement and emotional well-being. *European Journal of Education*, *60*(1), 1-12. https://doi.org/10.1111/ejed.12925

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