

The Nexus Between Informal Digital Learning of English and L2 Willingness to Communicate Among Indonesian EFL University Students

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Abstract

Rapid advances in digital technology have made informal digital learning of English (IDLE) increasingly accessible, enabling learners to engage with English beyond formal classrooms. However, it remains unclear whether greater engagement in IDLE translates into learners' willingness to communicate in a second language (L2 WTC), particularly in Indonesian EFL settings where opportunities for authentic English interaction are relatively limited. This study examined the association between IDLE activities and L2 WTC in three distinct communicative contexts: in-class, out-of-class, and extramural digital contexts. A quantitative research method with a correlation design was adopted. A total of 318 Indonesian undergraduate EFL students from four different faculties at one state Islamic university in Central Java participated in an online survey upon invitation. Jamovi 2.2.5 was used to perform statistical computations regarding the reliability test of the instruments, the generation of descriptive statistics results, Pearson correlation analysis, and linear regression analysis. The results showed that the students were more engaged in receptive IDLE activities (RIA) than in productive IDLE activities (PIA), although the mean values of RIA and PIA did not exceed 3.00. In contrast, the mean value of L2 WTC exceeded 3.00, suggesting that the students were generally willing to communicate in English. Regarding correlation, both RIA ($r = 0.39$; $p < 0.001$) and PIA ($r = 0.31$; $p < 0.001$) were positively associated with L2 WTC, where RIA (β



= 0.34; $p < 0.001$) significantly predicted L2 WTC, but PIA ($\beta = 0.07$; $p > 0.05$) did not. RIA explained 15% of the total variance in L2 WTC. This implies that, despite their considerable L2 WTC, students should still utilize digital devices to learn English in extramural digital contexts. Although PIA did not significantly predict L2 WTC in this study, interaction-based digital activities may still provide opportunities for communicative language practice. This study also extends the IDLE literature by revealing the distinct roles of receptive and productive IDLE activities in L2 WTC across three communicative contexts.

Keywords: Computer-assisted language learning, EFL students, extramural English, informal digital learning of English, L2 willingness to communicate.

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1. Introduction

Currently, language learning frequently occurs beyond formal educational settings (Sylvén & Sundqvist, 2017) because English language teaching (ELT) in the 21st century has witnessed the ubiquity of information and communication technology (ICT) advancements (Nugroho & Triana, 2021). Having witnessed the rapid advancements and affordances of digital technologies for educational purposes, many contemporary second language (L2) learners have been practicing target languages (TLs) in a variety of extramural digital contexts. ELT scholars have been concerned about how English as a foreign language (EFL) learners learn and use English beyond the classroom using a variety of digital devices and resources. This phenomenon is ultimately termed informal digital learning of English (IDLE) and is further defined as independent English language learning in extramural digital contexts using a variety of digital devices (e.g., smartphones, tablets, laptops, and personal computers) and resources (e.g., websites, games, applications, and social media) without formal instructions (Lee, 2017; Lee & Drajadi, 2019b; Lee, 2020a, 2020c; Lee & Lee, 2020a). Extramural language learning refers to activities initiated by learners outside formal educational institutions that occur without language learning goals or objectives, resulting in target language enhancement (Zhang et al., 2021). For example, an Indonesian EFL student socializes with other English users from Egypt and Brazil through social media, and a group of Indonesian EFL students watch English language entertainment programs autonomously in extramural digital contexts (Lee, 2020a).

Young people prefer to learn English online rather than in formal educational settings. Consequently, EFL students perceive computer-assisted language learning (CALL) and mobile-assisted language learning (MALL) positively. There is ample evidence to support

the relevance of technology in language learning, especially in EFL learning (Huzairin et al., 2020). Numerous studies have focused on this emerging phenomenon by employing various similar concepts (Huzairin et al., 2020; Lee, 2020c), including online informal learning of English (Sockett, 2013, 2014; Toffoli & Sockett, 2015; Yurieva et al., 2021), extramural English (Sundqvist & Olin-Scheller, 2013; Sundqvist & Sylvén, 2016; Sylvén & Sundqvist, 2012), autonomous out-of-class language learning with technology (Lai, 2017, 2019; Lai & Gu, 2011), and language learning beyond the classroom (Reinders & Benson, 2017; Richards, 2015). By engaging in these activities, learners may overcome the constraints of classroom instruction and promote their L2 development (Lee & Dressman, 2017). These emerging perspectives collectively highlight the growing importance of informal, technology-mediated English learning beyond the classroom. This development has led to the conceptualization of informal digital learning of English (IDLE) as a distinct research area.

In general, contemporary EFL students engage in two types of IDLE activities: receptive IDLE activities (RIA) and productive IDLE activities (PIA). The first type, RIA, includes IDLE activities in which EFL students obtain information, such as reading English-language news online, listening to English-language songs, watching YouTube videos, and watching English-language movies. In contrast, the second type, PIA, denotes IDLE activities in which EFL students create information, such as writing comments in English on social media, having chit-chats with family members and friends through applications, and sending e-mails to others using English (Lee & Drajiati, 2019b; Wijaya et al., 2021; Zhang et al., 2021). Given their different functions, RIA and PIA may have distinct relationships with learners' willingness to communicate (L2 WTC).

These affordances suggest that IDLE may not only facilitate language development but also provide learners with greater exposure to authentic English use and opportunities for meaningful communication beyond the classroom. Such opportunities may be particularly relevant to learners' willingness to communicate in a second language (L2 WTC), as frequent engagement with English in authentic contexts may shape their confidence and readiness to use the language. L2 WTC in extramural digital contexts refers to the willingness to engage in oral and written conversations in extramural digital environments at a particular moment with specific interlocutors using L2. Naturally, L2 WTC in extramural digital contexts involves both speaking and writing, as technology-mediated communication often requires learners to type messages and participate in oral interactions (Lee, 2019c).

However, not all learners are equally willing to communicate in English. While some students readily participate in English communication, others avoid interactions in the target language, resulting in differences in their levels of English use (Khany & Nejad, 2017). For many EFL students, L2 WTC remains challenging due to factors such as learning anxiety, limited opportunities for authentic communication, and insufficient feedback (Zhang et al.,

2024). Although Asian EFL students often experience limited exposure to English, which may reduce their confidence and motivation to communicate (Rotjanawongchai, 2024), learners with higher L2 WTC tend to use English more frequently and fluently (Liu et al., 2024; Zhang et al., 2024). Given these challenges, recent studies have examined the association between IDLE engagement and learners' L2 WTC, considering the potential of digital environments to provide authentic opportunities for English use (Lee, 2019c).

Several studies have examined the association between IDLE and L2 WTC in diverse EFL contexts using qualitative, quantitative, and mixed-methods approaches. Qualitative investigations have highlighted the role of digital interaction and social media activities in shaping learners' willingness to communicate in extramural digital contexts (Lee, 2019c; Malyndra et al., 2020). Meanwhile, quantitative and mixed-methods studies have demonstrated that IDLE activities, affective variables, and individual differences are associated with learners' L2 WTC across various educational settings, including Korea, Indonesia, Taiwan, China, and other EFL contexts (Lee & Drajati, 2019a; Lee & Hsieh, 2019; Lee et al., 2021; Lee & Lu, 2021; Lee & Sylvén, 2021; Nugroho, 2021). Collectively, these findings suggest that engagement in digital environments may play an important role in facilitating learners' willingness to use English.

Despite these advances, several limitations remain. Previous studies have often focused on particular educational levels or specific communication settings, while the relationship between different types of IDLE activities and L2 WTC across multiple communicative contexts remains insufficiently understood. Moreover, although previous IDLE research has employed various methodological approaches, quantitative evidence on how receptive and productive IDLE activities relate to L2 WTC remains limited (Soyoof et al., 2021). In addition, previous L2 WTC studies have predominantly focused on face-to-face settings, including in-class and out-of-class contexts, while digital communication contexts remain relatively underexplored (Lee, 2019c; Lee & Hsieh, 2019). Furthermore, limited attention has been given to the extent to which different types of IDLE activities are associated with L2 WTC across multiple communication contexts. To address these research gaps, this study examines how different types of IDLE activities (RIA and PIA) are associated with L2 WTC across three communication contexts. Specifically, this study addresses the following research questions:

- 1) Do IDLE activities (RIA and PIA) correlate with L2 WTC?
- 2) Which types of IDLE activities (RIA and PIA) are significant predictors of L2 WTC?

2. Method

2.1. Participants and Context

A total of 318 Indonesian undergraduate EFL students (average age = 18.93 years, range = 17–25 years) from a state Islamic university in Central Java, Indonesia, participated in the

online survey upon invitation. They came from four different faculties: 183 (57.5%) from the Faculty of Usuluddin and Da'wah, 53 (16.7%) from the Faculty of Islamic Economics and Business, 43 (13.5%) from the Faculty of Sharia, and 39 (12.3%) from the Faculty of Tarbiyah (Education). The cohort comprised 59 males (18.6%) and 259 females (81.4%). They were all non-English department students, comprising 263 (82.7%) first-year, 42 (13.2%) second-year, 10 (3.1%) third-year, and 3 (0.9%) fourth-year students. Non-English department students at this university usually take a basic or general English course (2–3 hours of study per week) and a Test of Standard English (TOSE) preparatory course (2 hours of study per week) in their first year. Several non-English departments at this university also require their students to take either an English for Specific Purposes (ESP) course related to their fields of study (2–3 hours per week) or an Advanced English course (2–3 hours per week). In general, students must take at least two to three English courses during their undergraduate studies.

Table 1. General Information of the Participants

No.	Information	n	Percentage
1	Student Batch		
	First Year	263	82.7%
	Second Year	42	13.2%
	Third Year	10	3.1%
	Fourth Year	3	0.9%
2	Faculty		
	Usuluddin and Da'wah	183	57.5%
	Islamic Economics and Business	53	16.7%
	Sharia	43	13.5%
	Tarbiyah	39	12.3%
3	Gender		
	Males	59	18.6%
	Females	259	81.4%

2.2. Data Collection and Analysis

After receiving authorization from the Institutional Review Board, the survey was conducted through online invitations. Only students who had provided informed consent, which explained the study aims, procedures, benefits, risks, and participants' rights, were eligible to participate in the survey. The online survey was conducted for one month in January 2026.

Jamovi 2.2.5 was used to generate the results of the descriptive and inferential statistics. Specifically, the associations among RIA, PIA, and L2 WTC were examined using Pearson's correlation analysis. The effects of IDLE activities, comprising RIA and PIA, on L2 WTC were further analyzed using linear regression analysis.

2.3. Instruments

The questionnaire comprised four sections. The first section included informed consent, which was provided to the participant candidates before they agreed to participate and voluntarily continued to participate in this study. The second section gathered the participants' demographic information, including age, academic year, gender, and faculty. The third section elicited two types of IDLE activities, RIA (nine items) and PIA (seven items), by referring to Lee and Drajiati (2019a) and Lee and Drajiati (2019b). Responses were graded based on a 5-point Likert scale ranging from 1 = never to 5 = very often (many times per day). Finally, the fourth section included L2 WTC items adapted from previous studies (Lee & Drajiati, 2019a; Lee & Hsieh, 2019) and employed to gauge the participants' L2 WTC in three distinct communicative contexts: in-class (four items), out-of-class (four items), and extramural digital (four items). Responses were graded on a 5-point Likert scale from 1 = definitely not willing to 5 = definitely willing, as shown in Table 2.

Table 2. Questionnaire Items of RIA, PIA, and L2 WTC

No.	Receptive IDLE Activities	M	SD
<i>How often do you undertake the following activities outside the classroom?</i>			
1	I play games in English.	2.50	1.13
2	I listen to English news programs online or on TV.	2.43	1.03
3	I listen to English songs.	3.89	1.11
4	I listen to English podcasts.	2.19	1.06
5	I read English digital comics online or offline.	1.82	1.00

6	I watch English sports events online or on TV.	2.18	1.09
7	I watch English movies or dramas with English subtitles.	2.73	1.19
8	I read English news or articles online.	2.24	1.02
9	I read e-books or online scientific journals in English.	1.96	1.01
Productive IDLE Activities			
<i>How often do you engage in the following activities outside of the classroom?</i>			
1	I chat with others in English through social media (e.g., Facebook, KakaoTalk, Line, WeChat, and WhatsApp).	2.23	1.02
2	I make video calls or video conferences in English (e.g., Google Meet, Zoom, Skype, and Microsoft Teams).	1.66	0.89
3	I send emails to others in English.	1.47	0.77
4	I create English content online (e.g. videos, texts, posters, speeches, and songs).	1.67	0.88
5	I use technology to communicate with native English speakers (e.g., American, British, Australian, Irish, New Zealand, and Canadian citizens).	1.51	0.86
6	I use technology to communicate with non-native English speakers worldwide (e.g., Japanese, Chinese, Russian, Indonesian, Egyptian, Saudi Arabian, and Brazilian citizens).	1.69	0.97
7	I write comments, posts, captions, or tweets in English on social media (e.g., Facebook and Instagram).	2.67	1.15
L2 Willingness to Communicate			
<i>How much are you willing to communicate in English in the following situations?</i>			
1	When you are given a chance to talk freely in an English class.	3.42	0.95
2	When you have the chance to talk in front of the class in an English class.	3.10	1.01
3	When you have a group discussion in an English class.	3.44	0.99

4	When you have the opportunity to give a presentation to a large group.	3.13	0.99
5	When you find a friend standing in front of you in line.	3.63	0.93
6	When you find an acquaintance standing in a line.	3.65	0.90
7	When you discuss with a small group of friends.	3.81	0.93
8	When you have a chance to talk within a small group of strangers.	3.33	0.98
9	When you chat with non-native English speakers (e.g., Korean, Japanese, and Chinese) on social media (e.g., Facebook and Instagram).	3.32	1.06
10	When you chat with native speakers of English (e.g., American, Australian, and British) on social media (e.g., Facebook and Instagram).	3.35	1.04
11	When you post comments to foreign friends' posts on social media (e.g., Facebook and Instagram).	3.41	0.99
12	When you talk to other English speakers while playing games.	3.15	1.08

Three ELT scholars individually evaluated the content validity of the questionnaires by checking the items to assess whether they accurately represented all dimensions of IDLE and L2 WTC. All ELT scholars stated that all items accurately represented the dimensions of IDLE and L2 WTC and provided constructive recommendations for refining several items in terms of contextual appropriateness and linguistic aspects to enhance clarity. Subsequently, given its adaptation from the previously validated IDLE questionnaire (Lee & Drajati, 2019a; Lee & Drajati, 2019b) and L2 WTC scale (Lee & Drajati, 2019a; Lee & Hsieh, 2019), a tryout was administered to 12 students voluntarily recruited from the same university outside the participants with similar characteristics, resulting in an improvement in the questionnaire items. The items were enhanced in terms of contextual appropriateness, word accuracy, and clarity of meaning. Furthermore, the reliability of the IDLE questionnaire and L2 WTC scale was evaluated using the Jamovi 2.2.5 program through reliability analysis and determined to be reliable, as the Cronbach's alpha (α) values exceeded 0.70.

3. Results and Discussion

The results of the descriptive statistics on IDLE activities (RIA and PIA) and L2 WTC are shown in Table 3, which comprises the mean and standard deviation values. This demonstrates that the students were more engaged in RIA ($M = 2.44$; $SD = 0.76$) than in PIA ($M = 1.84$; $SD = 0.64$). Nevertheless, the mean values of RIA and PIA did not exceed 3.00 (neutral grade). This implies that students' engagement in IDLE activities (RIA and PIA) should be encouraged and enhanced. In contrast, the mean value of L2 WTC ($M = 3.39$; $SD = 0.70$) was higher than those of RIA and PIA. This suggests that the students were generally willing to communicate in English, as the mean value of L2 WTC was higher than 3.00 (neutral grade).

Table 3. The Results of Descriptive Statistics on IDLE Activities (RIA and PIA) and L2 WTC

<i>Variables</i>	<i>M</i>	<i>SD</i>
RIA	2.44	0.76
PIA	1.84	0.64
L2 WTC	3.39	0.70

Note: M = mean, SD = standard deviation

After obtaining the descriptive statistics, Pearson's correlation analysis was conducted to examine the associations among RIA, PIA, and L2 WTC. The results of the correlation analysis are presented in Table 4. The results indicate that IDLE activities (RIA and PIA) are significantly correlated with L2 WTC. In particular, both RIA ($r = 0.39$; $p < 0.001$) and PIA ($r = 0.31$; $p < 0.001$) were positively associated with L2 WTC.

Table 4. The Results of Pearson's Correlation Analysis

Variables	RIA	PIA	L2 WTC
RIA	—	0.73***	0.39***
PIA		—	0.31***
L2 WTC			—

Note: *** $p < 0.001$

Following the results of the correlation analysis, a linear regression analysis was conducted to investigate which of the IDLE activities (RIA and PIA) predicts L2 WTC. The results suggest that RIA ($\beta = 0.34$; $p < 0.001$) significantly predicts students' L2 WTC. In contrast, PIA ($\beta = 0.07$; $p > 0.05$) did not significantly predict students' L2 WTC. RIA explains 15% of the total variance in the L2 WTC score (Adjusted R^2), as seen in Table 5.

These results suggest that RIA significantly predicts the students' L2 WTC, whereas PIA does not significantly predict the students' L2 WTC. This implies that not all types of IDLE activities significantly predicted L2 WTC in this study. Currently, RIA is a significant predictor of students' L2 WTC.

Table 5. The Results of Linear Regression Analysis of IDLE Activities (RIA and PIA) on L2 WTC

Model	Predictors	Regression Coefficients			t	p
		β	SE	β		
L2 WTC	Constant	2.50	0.13		19.87	< 0.001
	RIA	0.31	0.07	0.34	4.46	< 0.001
	PIA	0.07	0.08	0.07	0.86	0.39

Note: $R^2 = 0.15$; Adjusted $R^2 = 0.15$; $F(2, 315) = 27.9$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
 $p > 0.05$ = not significant

Overall, the findings revealed that students' engagement in IDLE activities was positively related to their L2 WTC, although RIA was the only significant predictor of L2 WTC. These findings provide important insights into the differential roles of IDLE activities in shaping L2 WTC and are further discussed in relation to previous research and theoretical perspectives.

Students engage in various digital activities in informal contexts to enhance their receptive and productive English skills (Nugroho & Triana, 2021). Regarding IDLE activities, most previous studies have revealed that students are more likely to engage in RIA than PIA. For example, students watch English-language YouTube videos, read English-language comments on social media, read English-language comics, and watch English-language movies online twice or thrice a week, whereas they chat with other users of English on social media and talk to other gamers in English only once a week (Lee et al., 2019; Lee & Drajiati, 2019b; Lee & Lee, 2020a; Lee & Sylvén, 2021). Similarly, the results of this study align with those of many previous studies. RIA activities are more accessible and less demanding than producing language independently. In contrast, PIA requires learners to actively construct messages, negotiate meaning, and take greater risks in using English, which may be influenced by learners' perceived competence, confidence, and communication anxiety (Lee & Drajiati, 2019a; Lee & Sylvén, 2021). Therefore, EFL learners may prefer RIA because it provides abundant exposure to authentic English with relatively low pressure to produce

accurate language. Furthermore, students' engagement in IDLE activities may be influenced by contextual and personal factors, including study experience, digital literacy, technological awareness, metacognitive knowledge, preparation for communication, and beliefs about language learning (Lai & Gu, 2011).

Regarding L2 WTC, it was found that students were willing to communicate in English. This finding is consistent with previous studies showing that students tend to demonstrate higher L2 WTC in extramural digital contexts, followed by out-of-class and in-class contexts (Lee & Hsieh, 2019). Similarly, another study reported that students had higher L2 WTC in extramural digital contexts than in in-class contexts (Lee & Lu, 2021). Factors that might influence L2 WTC in extramural digital contexts are sociopolitical (language policy), contextual (familiarity with interlocutors and communities), and individual variables (self-confidence and anxiety) (Lee, 2019c). Furthermore, students' L2 WTC in in-class contexts was affected by various factors, including group size, classroom environment, students' background knowledge about the topic of the lesson, students' self-awareness, students' cohesiveness, students' familiarity with interlocutors, classroom organization such as seating arrangement, and stable variables such as gender (Amalia et al., 2019). These findings suggest that L2 WTC is not a fixed learner characteristic but is influenced by multiple factors. Therefore, learning environments should consider these factors when designing learning experiences that promote students' L2 WTC across different communication contexts.

Previous studies have consistently demonstrated a positive association between IDLE activities and L2 WTC. Specifically, both receptive and productive IDLE activities have been found to contribute to learners' willingness to communicate by providing greater exposure to English, opportunities for authentic interaction, and increased confidence in using the language (Lee & Drajiati, 2019a; Lee et al., 2021; Lee & Sylvén, 2021; Nugroho, 2021; Malyndra et al., 2020; Fu, 2025). The findings of the present study are consistent with this body of research, confirming that engagement in IDLE activities is positively related to students' L2 WTC. These results further suggest that informal digital learning experiences may serve as valuable resources for supporting learners' communicative readiness, in addition to formal classroom instruction.

Research on IDLE has generally indicated that engagement in these environments positively predicts L2 WTC (Lee et al., 2021; Lee & Sylvén, 2021; Nugroho, 2021). Such engagement may contribute to learners' willingness to communicate by providing greater exposure to English and opportunities for language use. However, the predictive roles of specific IDLE activities have not been consistent across studies. While some studies have found that both RIA and PIA significantly predicted L2 WTC (Lee et al., 2021; Nugroho, 2021), others have reported that only one type of IDLE activity emerged as a significant predictor (Lee & Drajiati, 2019a; Lee & Sylvén, 2021). In contrast to these previous findings,

the present study found that only RIA significantly predicted L2 WTC, whereas PIA did not show a significant predictive effect.

The stronger predictive role of RIA compared with PIA in this study may be explained by the importance of language exposure in developing learners' confidence and readiness to communicate in English. Frequent engagement with English input through digital media may gradually increase learners' familiarity with the language, enhance their perceived competence, and reduce their uncertainty when communicating in English. These factors serve as important antecedents of L2 WTC, as they shape learners' psychological readiness and willingness to engage in L2 communication (MacIntyre et al., 1998; Lee, 2019c). Although PIA provides valuable opportunities for actual language use and interaction, its contribution to L2 WTC may depend on learners' willingness, confidence, and opportunities to engage in meaningful exchanges in the target language. For many EFL learners, productive digital activities may remain challenging because they require not only linguistic knowledge but also confidence to initiate and sustain communication with others (Lee & Hsieh, 2019). This indicates that exposure-oriented IDLE activities may provide a more accessible pathway to developing L2 WTC, whereas productive engagement may require a higher level of readiness to communicate than exposure-oriented activities.

The findings of this study suggest that IDLE activities contribute to learners' L2 WTC rather than being a sole determinant. L2 WTC is a complex construct shaped by various cognitive, affective, and individual factors, including ideal L2 self, grit, self-confidence, motivation, perceived communicative competence, classroom enjoyment, self-efficacy, and L2 proficiency (Cheng, 2021; Lan et al., 2021; Lee & Lee, 2020b; Lee & Lu, 2021; Youvalari, 2021; Lee, 2020b; Lee & Drajati, 2019a; Lee & Hsieh, 2019; Shirvan et al., 2019; Darasawang & Reinders, 2021). Furthermore, the relationship between IDLE activities and L2 WTC may be influenced by affective processes, such as L2 enjoyment and L2 anxiety (Lee et al., 2021). Therefore, this study contributes to the understanding of L2 WTC by demonstrating the role of IDLE activities as one of the broader set of factors that shape learners' willingness to communicate. This study enriches the limited body of evidence on Indonesian higher education by showing that the relationship between IDLE and L2 WTC varies by the type of digital learning activity, underscoring the importance of distinguishing between receptive and productive engagement in future research and pedagogical practice.

4. Conclusion

The findings of this study demonstrate that IDLE activities are associated with learners' willingness to communicate in English. Both RIA and PIA were positively associated with L2 WTC, indicating that greater engagement in informal digital English learning was related to higher willingness to communicate. However, only RIA emerged as a significant predictor of L2 WTC, while PIA did not demonstrate a significant predictive effect. These findings suggest that different types of IDLE activities contribute differently to learners' willingness

to communicate in English. By distinguishing between receptive and productive IDLE activities, this study provides a more nuanced understanding of the relationship between IDLE and L2 WTC across in-class, out-of-class, and extramural digital communication contexts.

These findings contribute to the theoretical understanding of IDLE and L2 WTC in several ways. First, they extend the IDLE literature by demonstrating that receptive and productive IDLE activities should not be viewed as a single, homogeneous construct, as they contribute differently to learners' willingness to communicate. Second, the findings support the conceptualization of L2 WTC as a multifaceted construct influenced by contextual learning experiences, suggesting that informal digital language exposure is an important contextual resource for fostering communicative readiness. Finally, by distinguishing the distinct roles of RIA and PIA, this study provides a more nuanced explanation of the relationship between IDLE and L2 WTC, offering a foundation for future theoretical models that separately consider different forms of digital learning engagement.

From a pedagogical perspective, the findings suggest several implications for language teachers and learners. First, EFL teachers should encourage students to engage in IDLE beyond the classroom by using digital devices (e.g., smartphones, laptops, tablets, and personal computers) and diverse digital resources (e.g., websites, social media, applications, and games) to support autonomous English learning. Second, teachers should promote more frequent engagement in IDLE activities and guide students to balance their participation in receptive IDLE activities (RIA) and productive IDLE activities (PIA). Third, although PIA was not a significant predictor of L2 WTC in this study, teachers can facilitate collaborative tasks and peer reviews to encourage students' productive English use and provide more opportunities for authentic communication.

Future research should further investigate the differential roles of receptive and productive IDLE activities in relation to L2 WTC. In particular, future studies may explore why RIA appears to contribute more strongly to learners' willingness to communicate than PIA, and examine whether different forms of PIA (e.g., interaction-based and content-creation-based activities) produce distinct effects. Future studies should also consider other potential influencing variables and mediating mechanisms that may explain the relationship between IDLE activities and L2 WTC. Employing diverse research designs, such as narrative inquiry, grounded theory, and experimental approaches, may provide deeper insights into how IDLE activities shape learners' communicative experiences, particularly in extramural digital contexts. Further investigation across different educational levels, ELT contexts, and populations is encouraged to enhance the generalizability and contextual understanding of the relationship between IDLE and L2 WTC.

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