Examining the relationships among motivation, informal digital learning of English, and foreign language enjoyment: An explanatory mixed-method study

Guangxiang Leon Liu

The Chinese University of Hong Kong, China (G.Liu@link.cuhk.edu.hk)

Yue Zhang*

The Education University of Hong Kong, China (yuezhang@eduhk.hk)

Rui Zhang

Dhurakij Pundit University, Thailand (ruizhang427@outlook.com)

Abstract

This explanatory mixed-method study seeks to understand the relationships between second language (L2) motivation (including the ideal L2 self and the ought-to L2 self) and students' informal digital learning of English (IDLE) and whether such relationships are mediated by the most prominent positive emotion – enjoyment. A total of 391 Chinese university students participated in the survey, and 15 of them were interviewed later. Quantitative analysis revealed a strong positive relationship between the ideal L2 self and participants' IDLE, which was partially mediated by foreign language enjoyment (FLE), while the hypotheses that the ought-to L2 self significantly predicted FLE and IDLE were rejected. The qualitative data added details to how a vivid and elaborate L2 vision contributed to enhanced English learning enjoyment and served as the most influential motivator for IDLE practices. Meanwhile, the external and instrumental motives could not predict Chinese university students' enjoyment, disempowering them to invest in productive language learning practices in the informal and digitalized environment. The discussion of these findings and pedagogical implications helps to chart the path for utilizing the power of the ideal L2 self to engage Chinese university students with the extramural and digitalized language learning ecology.

Keywords: informal digital learning of English; L2 motivation; foreign language enjoyment; Chinese EFL learners

1. Introduction

Informal digital learning of English (IDLE) has emerged as an increasingly significant subfield of inquiry among researchers and practitioners interested in computer assisted language learning. Aligning with many other constructs focusing on language learning beyond the classroom, such as extramural English (Sundqvist & Sylvén, 2016), the digital wilds (Sauro & Zourou, 2019), and out-of-class English learning with technology (Lai, Zhu & Gong, 2015), IDLE refers to

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*All correspondence regarding this publication should be addressed to Yue Zhang (Email: yuezhang@eduhk.hk)

"self-directed, informal English learning using a range of different digital devices (e.g. smartphones, desktop computers) and resources (e.g. web apps, social media) independent of formal contexts" (Lee, 2019a: 768). To further differentiate IDLE from these related concepts, Lee (2021) underlines that IDLE studies are usually situated within extramural contexts, giving particular heed to how students engage in receptive IDLE activities (e.g. reading/listening to English content via social media) and productive IDLE activities (e.g. posting comments in English on social media) without being assessed by language instructors.

IDLE has recently received attention from scholars in countries such as Indonesia (Lee & Drajati, 2019), Kazakhstan (Zadorozhnyy & Lee, 2023), Sweden (Lee & Sylvén, 2021), and Morocco (Dressman & Lee, 2021), yet the majority of relevant literature is situated in Korean English as a foreign language (EFL hereafter) contexts (Lee, 2019a; Lee, 2020; Lee & Lee, 2021; Lee, Xie & Lee, 2021). In China, although scholars have started to examine students' technology-mediated self-initiated language learning beyond the classroom (e.g. Liu & Darvin; 2023; Liu, Ma, Bao & Liu, 2023; Liu, Zhang & Zhang, 2023), more academic research is needed to explore the extent to which IDLE can account for the complexity of the online learning ecology. Such a contextual gap is particularly significant given that the unique controlled and censored internet reality in China may be able to largely shape the language learning conditions and opportunities that Chinese EFL learners can access in the digital and out-of-class setting (Liu, 2023a). Moreover, recent research has highlighted the importance of the emotional turn in second language (L2) education, with issues of positive and negative emotions receiving close attention in Chinese EFL contexts (Dewaele & Li, 2020; Jiang & Dewaele, 2019; Li, 2020; Li, Jiang & Dewaele, 2018). Prior research has established a strong association between positive psychology and students' English language learning outcomes in formal and exam-focused contexts (e.g. Li, 2020; Li *et al.*, 2018). Nevertheless, the role of positive emotions, notably foreign language enjoyment (FLE), and second language (L2) motivation in influencing Chinese students' English language learning in extramural and digital settings remains poorly understood. On these grounds, we highlight that the empirical significance of the present research will rest upon its revelation of the intricate interplay among FLE, L2 motivation, and IDLE in the complex learning realities lived by EFL learners.

This study aims to examine the extent to which FLE and L2 motivation serve as strong predictors of Chinese university EFL learners' IDLE activities. By doing so, this study can not only unpack the affective and motivational dimensions of IDLE in a unique Asian EFL context but also generate pedagogical implications for creating enabling conditions that facilitate and support EFL learners' engagement with IDLE with creativity and productivity.

2. Literature review

2.1 FLE and IDLE

Since the advent of the positive renaissance in L2 acquisition, there has been a flourishing wave of research on enjoyment, which is often positioned as a common but significant positive emotion (Dewaele & Li, 2020; Dewaele & MacIntyre, 2014; Piniel & Albert, 2018). Parallel to the well-researched notion of foreign language anxiety (FLA), FLE can be understood as a complex feeling that captures "interacting dimensions of challenge and perceived ability that reflect the human drive for success in the face of difficult tasks" in foreign language learning situations (Dewaele & MacIntyre, 2016: 216). As the stake that students take in learning a language is uncertain, specific learning outcomes may function to explain the emergence of enjoyment or anxiety. The current empirical literature on FLE demonstrates three major themes. First, there is a surge of interest in the development and refinement of instruments for the measurement of FLE (Dewaele & MacIntyre, 2014, 2016; Li *et al.*, 2018). The second is how FLE relates to an array of learner-centered and teacher-centered factors (Dewaele, Witney, Saito & Dewaele, 2018; Lee, 2022; Lee &

Lee, 2021). The third theme, as Li (2020) puts it, lies in understanding the complicated relationship between FLA and FLE and their contribution to actual L2 performance.

Recent years have also witnessed burgeoning scholarship on the association between IDLE and affective constituents of L2 acquisition, such as anxiety (Lee, 2019b), confidence (Lai et al., 2015; Lee & Drajati, 2019), and enjoyment (Lai et al., 2015; Lee, 2019b; Lee & Lee, 2021). Among these studies, the relationship between IDLE and FLE has come to the fore with its thought-provoking and, at times, inconsistent findings. For instance, Lai and her colleagues (2015) conducted a mixed-method study of 82 Chinese EFL secondary school students to explore their out-of-class technology use for English learning. Their quantitative and qualitative results emphasized that FLE plays a significant role in predicting these secondary students' technology-assisted out-of-class language learning activities. Adding details to the dynamic relationship between FLE and IDLE, Lee's (2019b) hierarchical linear regression analysis of 71 Korean EFL university students demonstrated a positive impact of students' IDLE activities on the enhancement of their FLE.

However, it is worth noting that Lai et al. (2015) and Lee (2019b) have been criticized for their use of a single-item measure to assess FLE. This approach to measuring FLE has been deemed problematic as it may not accurately capture the multidimensional nature of this construct and may lead to imprecise or incomplete findings. To generate a more comprehensive understanding and measurement of FLE, Lee and Lee (2021) employed the 10-item FLE questionnaire developed by Dewaele and MacIntyre (2014) to investigate the association between IDLE and FLE among Korean EFL learners in middle school, high school, and university settings. Their hierarchical regression analysis drew the conclusion that participation in extramural English learning practices with technology could enhance FLE among all student cohorts.

2.2 L2 motivation, IDLE, and FLE

Building on its theoretical cornerstone of integrativeness/integrative motivation that underscored learners' willingness to integrate into the target language culture and society (Gardner, 1985), the socio-psychological paradigm had dominated L2 motivation studies for many decades. Since the late 1980s, the cognitive turn has largely shaped the field of L2 motivation research by drawing attention to how individual mental processes influence motivational desires. Against this backdrop, Gardner's L2 motivation theory has faced quite a few criticisms. One significant critique is that it does not align with the theme of globalization, as the desire to integrate with anglophones has become increasingly inconsequential due to the decentralization of English as a global language (Al-Hoorie, 2017). To restructure integrativeness in a cognitive light, Dörnyei (2005, 2009) combined theoretical insights from motivational psychology and L2 motivation to propose the L2 motivational self-system (L2MSS) that features the *ideal L2 self* and the *ought-to self*:

1. The ideal L2 self presents an ideal image that L2 learners desire to possess in the future. Serving as a fundamental motivator that drives learners to shorten the distance between their actual and ideal selves, the ideal L2 self is concerned with "traditional integrative and internalised instrumental motives" (Dörnyei, 2009: 29).
2. The ought-to L2 self turns out to be more extrinsic and is defined as the attributes that learners ought to have to shun potential negative impacts and live up to the expectations of their important others (Dörnyei, 2005). In this respect, the ought-to L2 self can become a powerful motivator if the person does not want to disappoint their parents or fail a high-stake exam.

Empirically, researchers have modified Gardner's (1985) motivation test battery to examine the association between L2 motivation and IDLE (Lee & Drajati, 2019; Lee & Lu, 2023). Notwithstanding their findings showing that L2 motivation positively predicted students' IDLE, these studies might come short of rigor as Gardner's (1985) instrument failed to accurately reflect

the motivational beliefs of EFL learners in the global age. To address this methodological concern, Lee and Lee (2021) drew upon L2MSS and surveyed 661 Korean EFL students across different educational stages. Their correlation analyses displayed that the ideal L2 and ought-to L2 selves are significantly correlated with EFL students' IDLE practices, but it remains unknown whether students' IDLE activities can be predicted by their ideal L2 or ought-to L2 selves. In the Chinese EFL context, Zheng, Liang, Li and Tsai (2018) adapted the L2MSS questionnaire developed by You and Dörnyei (2016) to understand 293 Chinese university students' motivation in online self-regulated learning environments. The results demonstrated that, while the ideal L2 self could positively predict EFL learners' online self-regulated activities, there was no significant prediction of the ought-to L2 self for online self-regulated learning. Although some have raised concerns regarding the lack of specificity in Zheng *et al.*'s (2018) description of online self-regulated English learning experiences, their study may provide valuable insights into the influence of L2 motivation and self-regulation on online language learning outside the traditional classroom setting.

The current body of literature has also revealed the close relationship between L2 motivation and FLE by highlighting that motivated L2 learners usually demonstrate multiple affective variables (Lee & Drajati, 2019; Li, 2020). As Dewaele and MacIntyre (2014) pointed out, emotions (e.g. FLE) have often been researched within a broader context of motivation. For example, in Yung and Chiu's (2023) analysis of survey responses from 2,216 Hong Kong senior secondary students, students with clearer ideal L2 and ought-to L2 selves usually benefited from a high level of enjoyment in learning English in extracurricular settings. Similarly, Lee and Lee's (2021) findings in Korean EFL contexts indicated that the more vivid the images of middle school students' ideal L2 and ought-to L2 selves, the higher the level of FLE they will demonstrate in the extramural English learning activities.

2.3 Identifying research gaps

This review of the relevant literature provides a snapshot of the intricate and dynamic relationships between L2 motivation, FLE, and IDLE. However, there still exists limited research focusing on how Chinese EFL students engage in IDLE by capitalizing on their motivational power and enjoyment emerging from learning English. Additionally, as most research (e.g. Lee & Drajati, 2019; Lee & Lee, 2021; Zhang & Liu, 2022) only conceptualize and measure FLE, IDLE, and L2MSS following a positivist-oriented paradigm, there should be more studies undertaking a fine-grained and complete analysis to understand the empowering role of FLE and L2 motivation in IDLE across contexts. To address these gaps, this study adopts an explanatory mixed-method design that integrates the quantitative structural equation modeling analysis and the qualitative interview analysis. We seek to answer two questions:

1. To what extent does FLE influence Chinese university EFL learners' IDLE?
2. To what extent and how do the ideal L2 self and the ought-to L2 self leave an impact on Chinese university EFL learners' FLE and IDLE?

Based on the review of previous literature, we put forward the following structural model (Figure 1) that includes the hypothesized inter-factor relationships to quantitatively present the two research questions.

In light of this hypothesized model, five hypotheses were posed:

H1: FLE positively predicts IDLE.
H2: The ideal L2 self positively predicts IDLE.
H3: The ought-to L2 self positively predicts IDLE.
H4: The ideal L2 self positively predicts FLE.
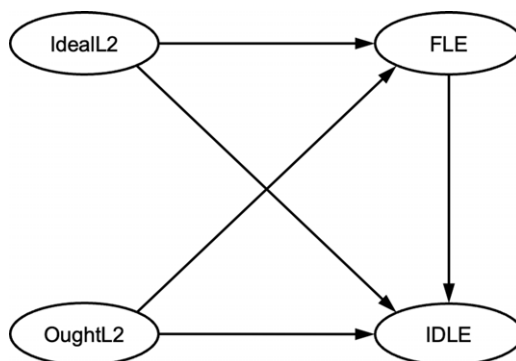H5: The ought-to L2 self positively predicts FLE.

Figure 1. The hypothesized model

3. Methodology

3.1 Context and participants

This study was conducted at Y University, a tier-one comprehensive higher education institution in South China. Situated in one of the most economically and commercially vibrant regions, Y University features international cooperation and communication, and thus a growing number of its graduates choose to further their education abroad.

Using convenience and purposive sampling techniques (Dörnyei & Taguchi, 2009), we reached out to our contacts teaching undergraduate English courses at Y University. We requested them to help with sending the questionnaire e-poster to their students in class. The e-poster included a QR code by which students could voluntarily scan to read and answer the questionnaire in Chinese. We also highlighted that students were qualified to participate in this study if they (1) had used digital technologies to learn English in informal settings for the past six months and (2) were willing to give their informed consent. By doing so, a total of 391 EFL students from 15 freshman English classes answered the online questionnaire. Among these 391 participants (222 males, 169 females), the overwhelming majority were first-year students ($N = 384$). Only six of them were second-year, and one a third-year. These participants were enrolled in a range of undergraduate programs including English ($N = 6$, 1.53%), math and science ($N = 35$, 8.95%), business ($N = 94$, 24.04%), engineering ($N = 181$, 46.29%), and others ($N = 75$, 19.18%). With one exception, 390 out of the 391 informants were born after 2000. In the online survey, respondents were given the latitude to provide their contact information if they wanted to attend the follow-up interview. Fifty-three students submitted their contact details, but only 15 students were randomly selected to participate in the post-survey interview.

3.2 Instrument

Data collection instruments included a modified survey (see Appendix A) and a semi-structured interview guide (see Appendix B). The survey was divided into two sections. Section one was concerned with participants' demographic background to obtain information about their gender, age, major, and year level. The second section consisted of 25 items adapted from three well-developed and validated scales examining students' L2 motivation, FLE, and IDLE respectively. All participants were required to answer these questions using a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*).

3.2.1 L2 motivation (twelve items)

To measure students' ideal L2 and ought-to L2 selves, we adapted You and Dörnyei's (2016) questionnaire designed to understand the motivational disposition of language learners in Chinese EFL contexts. You and Dörnyei's (2016) questionnaire consists of seven factors, yet only those related to the ideal L2 self and the ought-to L2 self were retained for further consideration. Then five expert researchers and doctoral students were invited to check the content validity (they also helped with confirming the content validity of FLE and IDLE questionnaires). With their feedback, we modified the original questionnaire by deleting and revising problematic items. For example, the original item "My parents/family believe that I must study English to be an educated person" was revised to "I consider learning English important because the people surrounding me think that I should do it" to expand its semantic coverage. Eventually, both the ideal L2 self and the ought-to L2 self were measured by six different items respectively.

3.2.2 FLE (five items)

With regard to FLE, we drew upon the three factors (FLE-Private, FLE-Teacher, FLE-Atmosphere; 11 items in total) scale that Li *et al*. (2018) developed and validated to understand the level of enjoyment that Chinese high school students possessed. After several rounds of discussion with other senior researchers, items that made explicit references to formal instruction and the influences of teachers were removed. Therefore, five items were finally retained to assess the amount of enjoyment that focused university EFL learners demonstrated in their IDLE activities.

3.2.3 IDLE (eight items)

To operationalize language learners' IDLE activities, we combined items in the questionnaires employed by Lee and Drajati (2019) and Lee and Lee (2021). These items were put forward to measure the frequency and diversity of IDLE activities that EFL students engaged in. The items focused on both students' receptive IDLE activities (e.g. watching English movies) and productive IDLE activities (e.g. chatting with others in English on social media). Following the suggestions of the five expert researchers and doctoral students, eight items were ultimately chosen to examine Chinese university EFL learners' IDLE.

3.3 Data collection procedure

Quantitative data were collected via administering an online questionnaire from May 2022 to July 2022. Before taking the survey, all participants needed to go through the opening words of this questionnaire. Once they got started, no missing values were allowed. Further, we made it explicit that if they felt unclear about certain items in this online survey, they should consult their teachers or reach out to us before moving on. Notably, the questionnaire was piloted among 87 students from Y University. The questionnaire's initial reliability and validity were assessed through Cronbach's alpha (α) and Kaiser–Meyer–Olkin (KMO) test. The results showed that the α of the entire 25 items was 0.96, exceeding the recommended minimum threshold of 0.7, and the KMO value reached 0.80, higher than 0.6 (Kline, 2015). These suggested that the questionnaire was suitable for further administration.

We also conducted semi-structured interviews with 15 students to explore their experiences more thoroughly following their responses to the questionnaire. In this sense, this research aligns with the explanatory sequential design as proposed by Creswell and Creswell (2017: 186), which can interpret "the data at a more detailed level by using qualitative follow-up data collection" to make sense of quantitative results. Specifically, based on previous literature (Lai *et al*., 2015; Lee & Lee, 2021), the semi-structured interview guide was formulated to elicit students' lived experiences and stories regarding how they were motivated to engage in IDLE practices. Attention was also
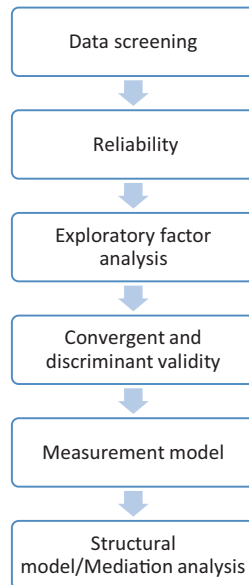
Figure 2. Quantitative data analysis

given to acquiring an in-depth understanding of the impacts of enjoyment on students' engagement with IDLE. All interviews were conducted in Mandarin Chinese and ranged from 30 to 60 minutes.

3.4 Data analysis

SPSS Statistics 26.0 and Amos 26.0 were utilized to analyze quantitative data, which includes six steps (Figure 2). Step one was concerned with systematically screening the large data set to guarantee that there were no errors, outliers, and respondent misconduct. Thirty responses were deleted due to the short completion time (< 60 seconds) and high similarity value (80%) of the answers, and there were 361 left. Meanwhile, data distribution normality was then checked by evaluating the 25 items' skewness and kurtoses (Table 3). Step two was to measure questionnaire reliability by calculating Cronbach's α. To statistically examine the questionnaire construct validity, exploratory factor analysis (EFA) was conducted in step three. Confirmatory factor analysis (CFA) was done by assessing the convergent and discriminant validity in step four and examining the measurement model, which comprised the four factors in step five. Finally, with a well-developed measurement model, the path analysis was conducted to test hypotheses among the four factors and examine the mediation effects of FLE on IDLE.

In qualitative data analysis, we transcribed the Chinese interviews in English. Then we compared and contrasted our respective translations of the 15 audio-recorded interviews to achieve inter-coder consistency. The transcribed texts were also sent to the participants for member-checking to enhance accuracy. Then thematic analysis (Braun & Clarke, 2021) was undertaken to code the interview data and identify the prominent themes emerging from the data. However, given the nature of the explanatory sequential design, only those transcribed excerpts and codes helpful to interpret the quantitative findings were selected and appeared in the following section (Creswell & Creswell, 2017). All interviewees' names were substituted with pseudonyms.

Table 1. Reliability, convergent validity, and discriminant validity

Cronbach's alpha α (> 0.7)	CR (> 0.7)	AVE (> 0.5)		Ideal L2 self	Ought-to L2 self	FLE	IDLE
0.89	0.83	0.504	Ideal L2 self	**0.71**			
0.81	0.80	0.45	Ought-to L2 self	0.55	**0.67**		
0.80	0.76	0.52	FLE	0.69	0.44	**0.72**	
0.84	0.79	0.58	IDLE	0.70	0.42	0.68	**0.76**

Note. In the squared correlation coefficient (*r*) matrix above, the square root of AVE is demonstrated along the diagonal line in bold. CR = composite reliability; AVE = average variance extracted; FLE = foreign language enjoyment; IDLE = informal digital learning of English.

4. Findings

4.1 Questionnaire reliability and validity

The modified instrument's internal consistency was checked by testing Cronbach's alpha. It was found that the α values of the four scales ranged from 0.80 to 0.89, which means that internal reliability was achieved (Table 1).

The modified questionnaire's construct validity was examined using EFA and CFA. In EFA, the principal components analysis with varimax rotation was run to examine whether the 25 items could cluster to form the four factors. The values of KMO (.93) and Bartlett's test of sphericity ($\chi^2 = 4624.65$, $df = 300$, $p < 0.001$) were computed, and they all fulfilled the underlying assumptions before conducting factor analysis. Then, as shown in Table 2, the factor structure and loading of the 25 items supported the naming of the four factors: FLE (five items, factor loading from .56 to .73), ideal L2 self (six items, factor loading from .51 to .72), ought-to L2 self (six items, factor loading between .52 and .76), and IDLE (eight items, factor loading from .51 to .78). The percentages of variance after rotation of the four factors (17.63%, 16.14%, 13.36%, 10.82% correspondingly) and the final cumulative percentage of variance (57.95%, > 50%) also approved the four-factor solution (Kline, 2015).

In CFA, we used composite reliability (CR) and average variance extracted (AVE) to examine the convergent validity of each factor (Table 1). It was found that all CR values exceeded the suggested threshold value of .80, while AVE values of FLE, ideal L2 self, ought-to L2 self, and IDLE were .52, .504, .45, and .58 respectively. Although there is one AVE value smaller than the suggested threshold of .5, convergent validity may still be believed to exist because it is often too difficult to have all AVE values higher than the suggested value in CFA. Discriminant validity was evaluated by comparing the squared inter-construct correlation estimates and the square root of AVE (Table 1). The results showed that the four factors' square roots of AVE were all greater than their corresponding estimates, which corroborated that the four factors were distinct constructs. Table 3 revealed the fit indices of the measurement model in CFA using the maximum likelihood method, which indicated a good fit. Altogether, the results of CFA and EFA confirmed the establishment of construct validity.

4.2 Descriptive statistics

Table 2 reported the mean (*M*) values, standard deviation (*SD*), skewness, and kurtosis of the 25 survey items after initial data screening (*N* = 361). The 25-item mean values fluctuated between 2.62 and 4.24, and standard deviations ranged from 0.98 and 1.45. Put simply, respondents had relatively clear images of the ideal L2 and ought-to L2 selves, while they perceived them as moderately enjoyable when it comes to learning English, especially in terms of item 26 "In my class, I am proud of my English grade." Generally, their IDLE practices were on the slightly above average level. All items' skewness and kurtosis indices oscillated between −0.57 and 0.54, and

Table 2. Descriptive statistics and construct validity

	Item	M	SD	Skewness	Kurtosis	Communality (> 0.4)	Loading (> 0.5)	% of variance rotated
						Sample (N = 361)		
FLE	Q9	3.65	1.19	−0.38	0.17	0.70	0.71	17.63%
	Q15	3.32	0.98	−0.10	0.47	0.46	0.56	
	Q23	3.95	1.10	−0.50	0.61	0.64	0.73	
	Q26	2.96	1.20	0.14	−0.36	0.48	0.56	
	Q36	3.78	1.17	−0.32	0.08	0.60	0.65	
Ideal L2 self	Q7	3.66	1.13	−0.20	0.11	0.48	0.51	16.14%
	Q10	3.50	1.22	−0.09	−0.48	0.58	0.57	
	Q29	3.68	1.20	−0.36	−0.05	0.72	0.66	
	Q33	4.16	1.21	−0.54	0.11	0.56	0.63	
	Q49	3.86	1.15	−0.24	−0.09	0.70	0.72	
	Q57	4.14	1.18	−0.44	0.03	0.64	0.69	
Ought-to L2 self	Q11	3.86	1.26	−0.19	-0.43	0.41	0.52	13.36%
	Q16	3.90	1.12	−0.40	0.08	0.58	0.74	
	Q37	4.02	1.06	−0.41	0.39	0.69	0.76	
	Q38	3.83	1.14	−0.16	−0.04	0.61	0.73	
	Q41	4.24	1.09	−0.57	0.61	0.51	0.54	
	Q45	4.12	1.14	−0.32	−0.05	0.57	0.65	
IDLE	Q8	4.15	1.27	−0.53	−0.26	0.49	0.51	10.82%
	Q12	2.62	1.45	0.54	−0.64	0.62	0.77	
	Q21	3.63	1.22	−0.23	−0.46	0.56	0.67	
	Q22	2.90	1.15	0.50	0.27	0.58	0.61	
	Q28	3.31	1.29	0.13	−0.53	0.73	0.78	
	Q31	3.04	1.29	0.39	−0.42	0.60	0.42	
	Q34	3.52	1.20	−0.09	−0.29	0.61	0.60	
	Q52	3.78	1.36	−0.17	−0.64	0.36	0.78	
Cumulative % of variance (rotated)						57.95%		
KMO (> 0.6)						0.93		
Bartlett's test of sphericity	Approx. chi-square					4624.65		
	Degree of freedom					30		
	p value (< 0.05)					0.000		

Note. Item Q52 in IDLE was deleted because its communality (.36) was less than the recommended .40 (Kline, 2015). FLE = foreign language enjoyment; IDLE = informal digital learning of English; KMO = Kaiser–Meyer–Olkin test.

Table 3. Model fit indices

	χ^2/df	GFI	NFI	CFI	RMSEA	TLI	RMR
The initial model	3.261	0.836	0.826	0.871	0.079	0.856	0.104
The final model	1.989	0.933	0.919	0.958	0.052	0.949	0.068
Recommended values (Kline, 2015)	<3	>0.9	>0.9	>0.9	≤0.8	>0.9	≤0.10

Note. GFI = goodness-of-fit index; NFI = normed fit index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; TLI = Tucker–Lewis index; RMR = root-mean-square residual.

Table 4. Hypotheses testing results

	β	p	t	Results
H1: FLE positively predicts IDLE.	0.55	<0.001	4.451	Accepted
H2: The ideal L2 self positively predicts IDLE.	0.48	<0.001	3.475	Accepted
H3: The ought-to L2 self positively predicts IDLE.	−0.08	0.245	−1.163	Rejected
H4: The ideal L2 self positively predicts FLE.	0.83	<0.001	8.072	Accepted
H5: The ought-to L2 self positively predicts FLE.	0.01	0.918	0.103	Rejected

Note. FLE = foreign language enjoyment; IDLE = informal digital learning of English.

−0.64 and 0.61, respectively, which demonstrates that the data were normally distributed because the cutoffs of |3.0| for skewness and |8.0| for kurtosis were not exceeded (Kline, 2015).

4.3 The measurement model and structural model

After confirming the factorability and normality of the data, we examined the initial measurement model. The model goodness of fit was indicated through computing a range of indices, including the ratio between χ^2 and degree of freedom (χ^2/df), the goodness-of-fit index (GFI), normed fit index (NFI), comparative fit index (CFI), root-mean-square error of approximation (RMSEA), Tucker–Lewis index (TLI), and root-mean-square residual (RMR). Table 4 indicates that the initial model fit was unacceptable, as six out of the seven indices did not reach the recommended values. In this case, modification indices (MI) were derived to detect items whose cross-loadings on other factors were too strong to contribute to a statistically acceptable model. Thus, six items (items 9 and 15 in the factor FLE, item 29 in ideal L2 self, item 16 in ought-to L2 self, and items 12 and 22 in IDLE) were removed, which helped to improve model fit greatly. Meanwhile, the errors of items 28 and 31, items 37 and 38, and items 7 and 10 were correlated due to high MI values (all > 10). As shown in Table 4, the modified measurement model indicates a good fit, with all indices surpassing the threshold values.

All model-fit indices in the structural model indicated the same good fit (Figure 3). A close look at Table 4 could find that among the five hypotheses, three were accepted and two were rejected. Specifically, FLE had a significant and positive impact on IDLE (β = .55, p < 0.001, t-value = 4.451). The ideal L2 self could positively and significantly predict both IDLE (β = .48, p < .001, t-value = 3.475) and FLE (β = .83, p < .001, t-value = 8.072), while the ought-to L2 self failed to predict IDLE (β = −.08, p = 0.245, t-value = −1.163) and FLE (β = .01, p < .918, t-value = 0.103). Looking back at Table 1, the correlation coefficients (namely r) of the three accepted hypotheses were .68 (FLE → IDLE), .70 (IdealL2 → IDLE), and .69 (IdealL2 → FLE) respectively, which were all greater than .5 and thus indicated three large effect sizes (Cohen, 2013). The large effect size could also be observed in the scores of R^2. Specifically, the R^2 of FLE was .70, suggesting that 70%
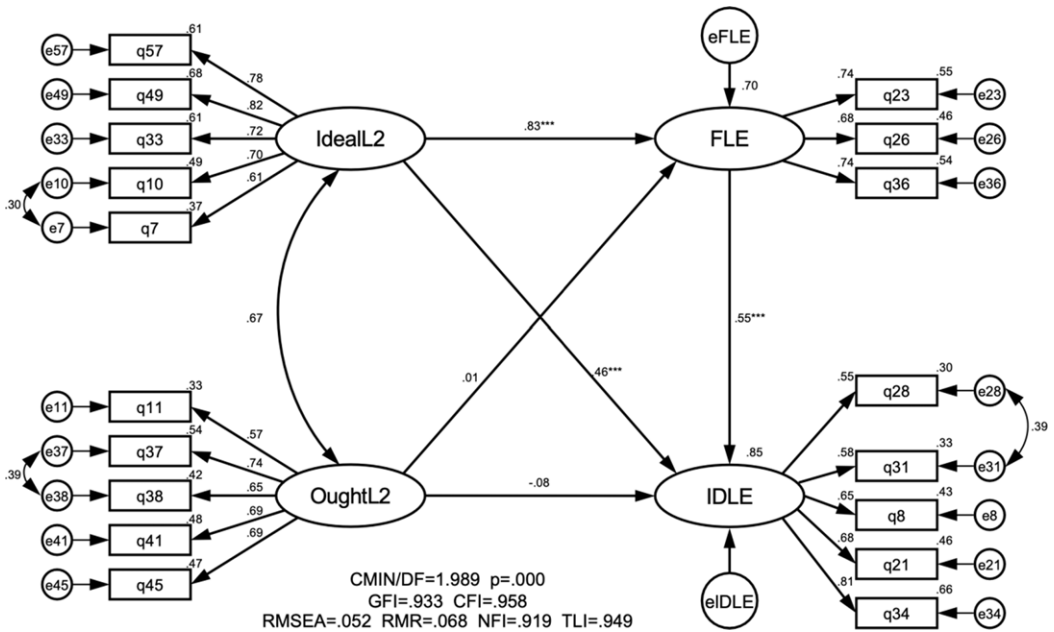
Figure 3. The final structural model: R^2 (FLE = 0.70, IDLE = 0.85)

of the total variance of FLE was explained by the two exogenous variables, namely ideal L2 self and ought-to L2 self; while 85% of the total variance of IDLE was explained by all the other variables (Figure 3).

Since hypotheses 1 (FLE → IDLE), 2 (IdealL2 → IDLE), and 4 (IdealL2 → FLE) were all supported, the mediation effect of FLE on the relationship between the ideal L2 self and IDLE should be assessed. In light of Collier (2020), a bootstrap analysis in Amos was conducted based on 10,000 samples and 95% confidence intervals, together with the output of the indirect effect between the ideal L2 self and IDLE. It showed that the indirect effect between the two constructs was 0.50. The lower bound and upper bound were 0.236 and 0.918 respectively, which did not cross zero. Moreover, the two-tailed significance p value was lower than 0.001. These combined to prove that the ideal L2 self had a significant indirect effect on IDLE through the factor of FLE. In other words, the strong effect of the ideal L2 self on IDLE was partially mediated by FLE.

4.4 Qualitative findings

Adding details to the statistically identified relationships among the four factors, the analysis of the 15 interviews further confirmed that students with a clear image of the ideal L2 self usually enjoyed learning English, and both the imagination for their future language use and a sense of enjoyment was able to drive them to engage in IDLE-related activities. Specifically, 13 out of the 15 interviewees indicated that a vivid ideal L2 self could increase the feeling of enjoyment and motivate them to engage in IDLE activities. For example, Angela, a first-year undergraduate student majoring in journalism, articulated that

> I often imagine that I can speak English fluently and use this language to interview big figures in the global arena as an international journalist, just like Glen Greenwald, who disclosed the American and British global surveillance programs. He's the greatest journalist of all time ... Learning English for me is quite enjoyable and spontaneous, and it is not like something

intended and laborious . . . Just like I check China Daily and BBC News on my phones every day. That's something I [as a future journalist] need to do, and I will, to get close to my dream.

In a similar vein, as a first-year English major, Ian, who was also a daily active user of many English-medium apps such as YouTube and Instagram, shared that

I like English debate very much and have been longing to join the university English debating team because that's very cool. This made me feel like English learning is fun, and English is a language that I will use quite a lot in the future, either for the sake of joining the debating team [in the short run] or seeking a job as an English-major graduate [in the long run]. So every time I go on YouTube and watch some interesting content in English or English-Chinese bilingual subtitles, I often pause to take notes of new words or expressions . . . I enjoy this process.

The cases of Angela and Ian highlighted that a clear vision of one's future self might serve as a powerful motivator for learning English in informal and digitalized settings. Such a vivid future self, in turn, could lead to an increased sense of enjoyment, which sustained students' commitment to learning the target language.

However, the relationship between L2 motivation, language learning enjoyment, and IDLE practices was not always straightforward. External factors such as obligations imposed by teachers or institutions could hinder the positive effects of L2 motivation on IDLE. In fact, out of the 15 interviewees, eight expressed concerns that their motivation to learn English was mainly extrinsic, which did not lead to the sense of enjoyment that sustained their IDLE practices. This is exemplified in the case of Ella, a second-year engineering student who failed the College English Test level four (CET-4) twice. As Ella stated in the interview excerpt, her motivation was primarily driven by external factors rather than intrinsic enjoyment:

Ella: I learn English only for passing the CET-4 and acquiring the certificate because in our major courses we seldom use English, but I heard that there was an unwritten rule that if you didn't pass CET-4, you would find it difficult to graduate.

Researcher: So if there is no such requirement, would you continue to learn English?

Ella: Absolutely not. It is such a pain.

. . .

Researcher: You mentioned earlier that you sometimes used English learning apps out of class; could you please further elaborate on that?

Ella: It's called 百词斩 baicizhan, an English vocabulary app. I use it occasionally and actually just every month before the CET-4 [laugh]. I actually would like to spend more time doing paper-based CET exercises.

This excerpt, in effect, reflected the perspectives of numerous Chinese EFL learners who believed that external and instrumental motivations, such as the need to pass high-stakes exams, significantly impacted their out-of-class English language learning practices. The negotiation of an ought-to L2 self influenced by external entities or significant others might reduce learners' ability to claim the ownership of English and to participate in creative and innovative language learning practices within extramural and digitalized settings. Consequently, learners might experience reduced enjoyment in the language learning process and view their engagement with learning practices as a tedious and unpleasant experience.

5. Discussion and implications

This research sheds light on the complex connections between L2 motivation (the ideal L2 self and the ought-to L2 self), FLE, and IDLE in a Chinese university EFL context. The quantitative and qualitative data yielded five major findings. First, building on previous inconsistent results regarding the relationship between FLE- and IDLE-related activities (Lai *et al.*, 2015; Lee, 2019b; Lee & Lee, 2021), this study provided empirical evidence that FLE could significantly predict Chinese EFL learners' participation in English learning activities with technology in extramural settings. This was also qualitatively explained by the cases of Angela and Ian, whose feeling of enjoyment sustained their participation in IDLE activities, which reiterated the power of positive emotions in L2 learning (Dewaele & Li, 2020; Dewaele & MacIntyre, 2014). Although it is tempting to assertively argue that it was FLE that produced significant influences on students' IDLE practices (not the other way around), it still should be acknowledged that the interview results of Ian somehow did not conflict with the belief that when students engaged in IDLE activities, their level of enjoyment might be enhanced consequently (Lee, 2019b; Lee & Lee, 2021). This may push researchers to reconsider the multifaceted and intricate ways in which FLE interfaces with IDLE and draw the inference that FLE can spur students' participation in IDLE activities, while in turn, investing in IDLE is a powerful means to strengthen EFL learners' level of enjoyment. As such, the first finding leaves room for future research to explore the complex and perhaps mutually constitutive relationship between FLE and IDLE.

The second primary finding showed that the ideal L2 self significantly contributed to both FLE and IDLE. Dovetailing with previous out-of-class English learning research with a focus on the ideal L2 self (Lee & Drajati, 2019; Lee & Lee, 2021; Yung & Chiu, 2023; Zheng *et al.*, 2018), this finding further confirms that fostering an L2 vision is capable of promoting EFL learners' enjoyment. Taking a step forward, the interview results demonstrated that curating one's vivid and elaborate ideal L2 self (e.g. an international journalist like Glen Greenwald in the case of Angela) could even constitute a stable and sustainable source of enjoyment for their English learning. Meanwhile, echoing empirical studies situated within the conceptual framework of IDLE (Lee & Lee, 2021; Lee & Lu, 2023), this study corroborates that students with a clear picture of the ideal L2 self tend to engage in IDLE practices more proactively. This can be well reflected in the quantitative result that the most variance in IDLE was explained by the ideal L2 self. Taken together, these results regarding the ideal L2 self are reminiscent of Dörnyei's (2009) argument that the motivational power can be better exerted on the grounds of learners' acquisition of a clear and enhanced desired future self-image. In the case of Angela, her desired future self-image was indeed strengthened by the vividness of her imagery (with Glen Greenwald, "the greatest journalist of all time," as her role model). Her vision for future language use was then anchored in her daily digital practices, such as "checking China Daily and BBC News on her phone," with the imagined identity of "a future journalist." Thus, in the process of substantiating the vision of her desired L2 self, Angela would enjoyably invest more efforts in IDLE practices, which, as it was, served as a pathway for her expectations.

The third significant finding is the revelation of FLE as a mediator between the ideal L2 self and IDLE, which offers novel insights into the complex (direct or indirect) effect of internalized motives on English learning in informal and digitalized settings. This finding suggested that the route from the ideal L2 self to IDLE was non-linear and indeed circuitous. Despite the fundamental role of a vivid L2 vision, EFL learners' out-of-class trajectories of technology use for language learning also seemed to be inseparable from FLE, which allowed students to explore the language with resilience rather than simply learning it (Zhang, Dai & Wang, 2020). In this sense, this research contributes to the dynamic process in which EFL learners harness motivational power more effectively to consume and generate English content informally as they respond to "the changing face of language learning beyond the classroom" in technologized and globalized times (Richards, 2015: 5).

Fourthly, this study contributes to the existing literature by laying bare the non-significant effect of the ought-to L2 self on both FLE and IDLE in the focused Chinese university EFL context. Specifically, Lee and Lee (2021) found that motives growing out of meeting the expectations of students' significant others and the fear of educational failure could significantly promote Korean EFL middle school students' enjoyment. However, in this study, the ought-to L2 self image was not able to be positively and significantly predictive of students' FLE in the Chinese context where EFL learners often submitted to the washback effect of high-stake examinations (Lee & Lu, 2023). This is supported by the case of Ella, whose motivation for English learning mainly stemmed from passing CET-4 and regarded her English learning as a pain. Her commitment to language learning also did not fall within the category of IDLE, as it was strictly connected with the formal assessment. Thus, even though Ella might feel pleasure occasionally in achieving positive academic results, she hardly enjoyed learning the English language because "enjoyments occur when people not only meet their needs, but exceed them to accomplish something new or even unexpected" in the wider learning realities (Dewaele & MacIntyre, 2016: 217).

It also bears noting that the acceptance of H2 (IdealL2 → IDLE) and the rejection of H3 (OughtL2 → IDLE) may indicate that Chinese university EFL learners' engagement with IDLE is deeply influenced by the vision of their idealized persona other than motives exerted by societal forces or expectations of important others. Similarly, as Zheng and her colleagues (2018) put it, students whose motivation was developed from the avoidance of negative academic outcomes were less likely to learn English online in a self-regulated manner. Therefore, these empirical insights can further confirm the previous discussion on Chinese EFL learners' motivation that externally sourced images often do not afford to energize and sustain students' learning behaviors and efforts across various language learning contexts (Dörnyei & Chan, 2013; You & Dörnyei, 2016).

Informed by these findings and discussions, we would like to bring up implications for pedagogical considerations. In particular, one task is still to construct, strengthen, and, most importantly, substantiate EFL learners' ideal L2 self through designing motivation-enhancing (especially the desired L2 selves) activities. As Dörnyei (2009: 33) highlights, an ideal self is constructed in the junction of students' "multiple aspirations, dreams, desires … [the social pressure of their] peer groups … [or even] the impact of role models." Such a goal may be achieved over an extended period (e.g. one semester or the whole academic year) by allowing students to reflect on and discover their possible selves (e.g. becoming a student journalist or a member of the English debating team). As indicated in the case of Angela, once such initial selves are singled out, they need to be constantly enhanced and substantiated through making feasible language learning plans in the informal and digital contexts where students can draw upon the affordances of technologies to engage in diverse literacy or communicative activities that help to perform their ideal selves. Equally significantly, the whole process should be scaffolded by teachers or supported by other stakeholders such as parents, the university curriculum designers, or even student career path instructors whose impacts figure in negotiating students' fruitful language learning and life trajectories.

6. Conclusion

This research has examined the relationships between L2 motivation (the ideal L2 self and the ought-to L2 self) and Chinese university EFL learners' IDLE practices and how such relationships were mediated by the most prominent positive emotion – enjoyment. The results of structural equation modeling revealed the strong predictive effect of the ideal L2 self on FLE and IDLE and rejected the conjecture that the ought-to L2 self significantly influences the same two variables. Also, FLE could partially mediate the path from the ideal L2 self and IDLE. The qualitative data offered details about how a vivid and elaborate L2 vision contributed to enhanced English learning

enjoyment and thus served as the most influential motivator for IDLE practices. On the contrary, the external and instrumental motives failed to equip Chinese EFL learners with the feeling of enjoyableness, disempowering them to invest in language learning practices in the informal and digitalized environment. These quantitative and qualitative results combine to contribute to our understanding of the motivational and affective dimensions of IDLE. The discussion of these findings and pedagogical implications can facilitate charting the path for utilizing the power of the ideal L2 self to engage Chinese EFL learners with the extramural digital learning ecology.

The present study is not beyond reproach. One limitation is that we only sampled undergraduate students (mostly first-year students) in a top university with a history of international cooperation in an economically developed region of China. It remains unclear about the extent to which similar findings can be replicated in contexts such as lower-tier institutions or colleges in less developed provinces. In these contexts, students may have a relatively lower sense of ideal selves and a clearer image of ought-to selves (You & Dörnyei, 2016). In addition, although this study combined quantitative with qualitative data, it still necessitates future longitudinal research to delve into how Chinese university EFL students' motivation flows over a long period and how these changes act on learners' emotions as well as their efforts in learning or using English in the out-of-class and digital learning realities shaped by their access to material and symbolic resources (e.g. Liu, 2023b) and the increasingly popular generative artificial intelligence (e.g. Liu & Ma, 2023).

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About the authors

Guangxiang Leon Liu is a PhD candidate in the English Department at the Chinese University of Hong Kong. His research areas include digital literacies, social class, and informal digital learning of English. He has published in SSCI journals such as *TESOL Quarterly*, *English Today*, and *Computer Assisted Language Learning*.

Yue Zhang is an assistant professor at The Education University of Hong Kong. Her research areas include IDLE, L2 identity/investment/motivation, critical pedagogy, and language teacher education. She has published in *Computer Assisted Language Learning*, *TESOL Quarterly*, *Language Awareness*, *System*, and the *Journal of Multilingual and Multicultural Development*.

Rui Zhang is currently pursuing a PhD in management at Dhurakij Pundit University, Thailand. He obtained his MSc in TESOL from the University of Edinburgh, UK. His research areas encompass education management, cross-cultural communication in business, and AI applications in management.

Author ORCiD. ⓘ Guangxiang Leon Liu, https://orcid.org/0000-0002-5361-268X
Author ORCiD. ⓘ Yue Zhang, https://orcid.org/0000-0003-4109-2506
Author ORCiD. ⓘ Rui Zhang, https://orcid.org/0009-0002-8172-4694