RESEARCH ARTICLE

Informal digital learning of English in teachers: development and validation of a scale

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Abstract

Informal digital learning of English (IDLE) is a promising way of learning English that has received growing attention in recent years. It has positive effects on English as a foreign language (EFL) learners and also creates valuable opportunities for EFL teachers to improve their teaching skills. However, there has been a lack of a valid and reliable scale to measure IDLE among teachers in EFL contexts. To address this lacuna, this study aims to develop and validate a scale to measure IDLE for EFL teachers in Iran. For this purpose, a nine-step rigorous validation procedure was undertaken: administering pilot interviews; creating the first item pool; running expert judgment; running interviews and think-aloud protocol; running the pilot study; performing exploratory factor analysis, Cronbach's alpha, and confirmatory factor analysis; creating the second item pool; conducting expert reviews; and performing translation and translation quality check. Findings yielded a 41-item scale with six subscales: IDLE-enhanced benefits (12 items), IDLE practice (five items), support from others (nine items), authentic L2 experience (three items), resources and cognition (four items), and frequency and device (eight items). The scale demonstrated satisfactory psychometric properties such that it can be used for research and educational purposes in future.

Keywords: informal digital learning of English; EFL teachers; exploratory factor analysis; confirmatory factor analysis

1. Introduction

In the field of English as a foreign language (EFL) education, an increasing number of teachers and learners have shifted their focus to informal language learning (Lee, 2020; Liu, Zhang & Zhang, 2023; Rezai, 2023; Toffoli, Sockett & Kusyk, 2023; Soyoof, Reynolds, Vazquez-Calvo & McLay, 2023). According to Chun (2016), we are witnessing the rise of ecological computer-assisted language learning (CALL), where EFL teachers and learners are able to acquire English outside the classroom through constantly evolving technologies like mobile and wearable devices. This phenomenon has been termed informal digital learning of English (IDLE) by Lee (2019). Lee (2020) defines IDLE as "learning English autonomously in extramural digital contexts independent of formal English instruction" (p. 51). In other words, IDLE refers to the self-directed and autonomous use of digital technologies to learn English outside of formal classroom settings. IDLE encompasses a range of activities, including watching videos, playing games, listening to podcasts, reading blogs, engaging with others on social media, and the like (Lee, 2022; Reinders, Lai & Sundqvist, 2022; Zadorozhnyy & Lee, 2023). In Iran, EFL teachers are

instrumental in weaving IDLE into their pedagogy, fostering awareness, offering support, and crafting tasks that merge informal with formal learning modalities (Rezai, Soyoof & Reynolds, 2024). Moreover, in this context, EFL teachers can themselves harness IDLE to refine their language skills and teaching practices through digital platforms and communities (Hedayati & Marandi, 2014; Rezai *et al*., 2024). Thus, IDLE not only influences EFL learners but also equips Iranian EFL teachers with valuable sources for continuous professional development.

Considering the significant benefits of IDLE for teachers, it is crucial to develop a model and scale that effectively highlights its various dimensions and measure it accurately. In the literature, several scholars have developed and validated scales to assess IDLE among EFL learners. For example, Lai, Zhu and Gong (2015) constructed and validated a scale that measured four dimensions of IDLE: diversity, balance, engagement, and autonomy. Through factor analysis and multiple regression, they investigated the relationships between these dimensions and discovered that EFL learners who engaged in diverse, balanced, engaging, and autonomous IDLE activities exhibited better learning outcomes and higher motivation. Furthermore, Zhang and Liu (2022) devised and validated a scale that captured six subconstructs of IDLE: support from others, authentic L2 experience, frequency and devices, IDLE practices, IDLE-enhanced benefits, and resources and cognition. Using structural equation modeling, they examined the interplay among these subconstructs. Their findings indicated that support from others, resources and cognition, and authentic L2 experience were significant predictors of IDLE-enhanced benefits, while resources and cognition, authentic L2 experience, and frequency and devices were significant predictors of IDLE practices.

As it is evident from the above discussion, there remains a lack of studies devoted to devising and validating an IDLE scale for EFL teachers, particularly within the Iranian context. Prior scales have been mainly learner-oriented while disregarding the particular needs and experiences of EFL teachers. Thus, this study endeavors to address this lacuna by introducing a scale meticulously created for EFL teachers. The development and validation of this IDLE scale for EFL teachers is beneficial in CALL in terms of theoretical and practical perspectives. Theoretically, it propels the expansive domain of L2 acquisition forward by illuminating the specialized needs and instructional experiences of Iranian EFL teachers. Such insights refine our understanding of the symbiosis between pedagogical practices and language learning beyond the classroom. Practically, this scale functions as a dependable instrument for gauging and enhancing EFL teachers' IDLE engagements. Its utilization promises to guide pedagogical strategies, curricular advancements, and continuous professional development among EFL teachers. By capturing the diverse facets of Iranian teachers' IDLE experiences, the scale equips teachers to critically evaluate their teaching methods, pinpoint areas for enhancement, and make strategic choices for their professional development. Ultimately, this scale stands to significantly bolster the language proficiency and pedagogical expertise of EFL teachers, culminating in tangible improvements in educational delivery and student achievements.

2. Review of the literature

2.1 IDLE in teachers

With the advent of new technologies, EFL teachers now have access to a wide range of digital resources and platforms that facilitate IDLE (Guo & Lee, 2023; Liu & Wang, 2024; Taherian, Shirvan, Yazdanmehr, Kruk & Pawlak, 2024). As noted by Rezai *et al*. (2024), digital tools, such as online language learning platforms, mobile applications, social media groups, and educational websites, have significantly transformed the learning landscape for EFL teachers. According to Zadorozhnyy and Yu (2023), IDLE for teachers refers to the acquisition of new knowledge, skills, and competencies in English by teachers through non-traditional, self-directed, and technology-enhanced means outside of formal educational settings. IDLE for teachers is

encouraged through interactive platforms, virtual communities, and online language exchanges (Lai *et al*., 2015; Taherian *et al*., 2024). These avenues provide flexibility, convenience, and personalized learning experiences for EFL teachers (Jiang *et al*., 2020; Lee, 2022; Liu & Wang, 2024; Sockett, 2013). EFL teachers can self-direct their learning by accessing resources, collaborate with peers, and engage in informal language practices, all within the digital environment (Lai, 2017; Lee & Dressman, 2018).

Benson's (2011) framework, originally conceptualized for IDLE for EFL learners, can be adapted for illuminating the dimensions of IDLE for EFL teachers. This adaptation is crucial for understanding IDLE for teachers, who are not just facilitators but also active learners in digital environments. The first dimension of this framework, *formality*, assesses the structured and unstructured nature of digital learning and encompasses both formal courses and independent, self-directed learning activities undertaken by EFL teachers (Lai, 2017; Zhang & Liu, 2022). Its second dimension, *location*, explores the diverse settings of IDLE, which, for EFL teachers, may include traditional classrooms, online platforms, mobile apps, or immersive virtual environments (Sundqvist & Sylvén, 2016; Tsang & Lee, 2023). The third dimension is pedagogy, which delves into the instructional strategies and approaches that EFL teachers employ in their IDLE, considering the integration of digital tools, collaborative efforts, fostering learner autonomy, and the role of teacher-led guidance in language development (Benson, 2011; Liu, Zhang & Zhang, 2024). The dimension is *locus of control*, which scrutinizes the degree of autonomy EFL teachers possess over their IDLE. It analyzes the interplay between external guidance and self-regulation in their learning processes (Lai, 2017; Lee & Lee, 2020). By aligning these dimensions with the IDLE experiences of teachers, the framework provides a comprehensive lens through which EFL teachers can introspect on their digital learning practices.

In his exploration of IDLE, Lee (2022) articulates principles that are particularly applicable to EFL teachers. The first principle is *autonomy*, which empowers EFL teachers to independently navigate their learning processes, selecting objectives, materials, and a pace that align with their personal and professional aspirations (Zadorozhnyy & Lee, 2023). *Authenticity* is another principle, emphasizing engagement with genuine language resources, such as videos, articles, podcasts, and social media that mirror real-world language use (Dressman & Sadler, 2019; Lee, 2022). The next principle is *community of practice*, which underscores the value of collaborative learning within networks of peers who share common goals (Liu & Wang, 2024). Such communities offer a platform for mutual support, idea exchange, and resource sharing. The last principle is *affective filter*, which addresses the emotional and psychological dimensions of language learning and advocates for an environment that encourages risk-taking and language experimentation (Lee, 2022).

Another critical aspect to consider when discussing the concept of IDLE for EFL teachers is the differentiation made by Lee (2019) between two distinct types of IDLE: extracurricular and extramural. Extracurricular IDLE encompasses activities outside the formal classroom setting, such as self-study through digital resources, language apps, or interactions on language exchange platforms (Soyoof, 2023; Zadorozhnyy & Lee, 2023). This type allows EFL teachers to enrich their formal education with diverse language experiences. Conversely, extramural IDLE refers to informal learning that transpires outside the traditional educational framework, often during commutes, leisure, or beyond professional duties (Lee & Sylvén, 2021). It enables EFL teachers to integrate language learning seamlessly into their daily lives (Lee & Taylor, 2022). Both types facilitate the development of language proficiency and pedagogical skills in a flexible, self-directed manner.

2.2 A theoretical framework of IDLE in EFL teachers

In formulating a theoretical framework to delineate the dimensions of IDLE for EFL teachers, the author synthesized insights from Zhang and Liu's (2022) IDLE framework, initially conceived for

EFL learners. This framework, augmented by contributions from Lai *et al.* (2015), Lee (2022), Guo and Lee (2023), Soyoof *et al.* (2023), Liu and Wang (2024), and Rezai *et al.* (2024), was pivotal in devising a theoretical framework that encapsulates the IDLE dimensions germane to Iranian EFL teachers. This framework comprises six distinct dimensions, the first one being *IDLE-enhanced benefits*. This dimension underscores the affirmative impact of IDLE on EFL teachers' linguistic competencies, motivation, self-assurance, and professional identity (Zhang & Liu, 2022). EFL teachers participating in IDLE activities frequently report heightened self-efficacy, interest, enjoyment, and contentment in both learning and teaching English (Rezai *et al.*, 2024; Zadorozhnyy & Yu, 2023). The literature acknowledges that the merits of IDLE are instrumental for EFL teachers. For instance, Zadorozhnyy and Yu (2023) found that IDLE was advantageous for pre-service teachers in Kazakhstan, a finding that resonates with the Iranian context, where teachers seek to enhance their English teaching proficiency. Similarly, Du, Xing and Zhu (2023) observed that teachers' informal online learning communities exhibited significant centrality and clustering, which substantially shaped their pedagogical practices. Additionally, the study by Liu and Wang (2024) indicated that EFL teachers' propensity to integrate IDLE into their pedagogy is significantly swayed by three factors: their stance on IDLE, the subjective norms regarding its usage, and their perceived control over this behavior. These findings are particularly relevant in Iran, where EFL teachers are navigating the integration of digital technologies into their instructional practices.

The second dimension, *IDLE practice*, delves into the specific practices and activities that EFL teachers engage in within IDLE environments. This dimension encompasses the spectrum of behaviors and actions exhibited by teachers as they interact with digital resources to support their English language teaching (Rezai *et al.*, 2024; Yu, Liu, Huang & Cao, 2021). The nature and intensity of these activities vary among teachers, shaped by personal preferences, pedagogical objectives, and the realities of time in a busy educational landscape (Liu & Wang, 2024; O'Dowd & Dooly, 2022). In Iran, where traditional opportunities for language immersion may be scarce, IDLE stands as a crucial source of linguistic input and a platform for practical application (Hedayati & Marandi, 2014). Through dedicated participation in IDLE, Iranian EFL teachers can not only enhance their language skills but also refine their instructional strategies to meet the evolving needs of their learners. This engagement is essential for EFL teachers who are committed to continuous learning and adapting to the digital age of L2 education.

The third dimension is *support from others*. It explores the social and emotional aspects of IDLE and the value of collaborative interactions among EFL teachers, their learners, and the wider English-speaking community (Macià & García, 2016; Zhang & Liu, 2022). In Iran, where collective learning and mutual assistance are integral to the educational fabric, this dimension is crucial (Rezai *et al.*, 2024). EFL teachers immersed in IDLE often seek and thrive on the support network available to them, which includes constructive feedback, guidance, encouragement, and opportunities for collaboration (O'Dowd & Dooly, 2022). Furthermore, as Yu *et al.* (2021) highlight, IDLE nurtures a stronger sense of community and belonging among EFL teachers, a sentiment that resonates with the Iranian ethos of camaraderie. Understanding the intricacies of this dimension equips EFL teachers in Iran to cultivate a supportive and cooperative environment, ultimately benefiting their learners and enhancing the overall language learning experience.

The fourth dimension is *authentic L2 experience*, which relates to the direct engagement with genuine and meaningful English language resources and contexts within IDLE (Zhang & Liu, 2022), a facet that is particularly crucial in Iran. Rezai *et al.* (2024) note that Iranian EFL teachers actively involved in IDLE frequently encounter a wealth of authentic L2 experiences. This encompasses activities such as viewing films or TV series, attending online seminars, and interacting with global events via news articles or blogs. Liu *et al.* (2023) emphasize the significance of this dimension for EFL teachers, as it enables them to incorporate tangible, real-world tasks and materials into their structured lesson plans. Moreover, IDLE acts as a gateway for these teachers to broaden their horizons and allow them to delve into the extensive spectrum of

English language and cultural nuances (Lee & Lee, 2020). This immersion is essential for Iranian EFL teachers, as it enhances their ability to provide a more enriched and contextualized learning experience for their learners.

Resources and cognition is the fifth dimension of this theoretical framework that is pivotal in the Iranian EFL setting. This dimension scrutinizes the assortment and quality of digital tools and resources that EFL teachers harness within IDLE frameworks, coupled with the cognitive tactics and strategies they deploy to bolster educational outcomes (Rezai *et al.*, 2024). As noted by Soyoof *et al.* (2023), teachers engaged in IDLE frequently utilize a variety of digital resources that align with their distinct pedagogical needs and cultural context. This includes, but is not limited to, online dictionaries, podcasts, videos, social networking platforms, and blogs. Such tools are carefully chosen to resonate with the Iranian academic milieu and the English language proficiency goals set by educators. Furthermore, IDLE is a conduit for enhancing EFL teachers' metacognitive abilities, encompassing the planning, monitoring, evaluation, and reflection of their teaching practices and learning trajectories (Lee & Taylor, 2022; Reinders *et al.*, 2022). These skills are particularly crucial for Iranian EFL teachers, as they reflect on and adapt their instructional methods to the evolving demands of English language education in a digitally interconnected world.

The final dimension, *frequency and device*, focuses on the regularity and consistency with which EFL teachers engage in IDLE, as well as the diversity of devices they employ to access digital educational content (Zhang & Liu, 2022). For instance, EFL teachers in Iran might prefer smartphones for listening and speaking exercises, tablets for reading and writing activities, and laptops for conducting research and preparing lessons. Recognizing the importance of this dimension is vital for Iranian EFL teachers, as it enables them to optimize the use of their time and efforts related to IDLE (Soyoof *et al.*, 2023). Recent findings by Rezai *et al.* (2024) indicated a significant correlation between frequent IDLE participation and enhancements in job engagement and technological pedagogical content knowledge among EFL educators.

3. Materials and method

The author followed a nine-step rigorous procedure to develop and validate the IDLE scale for EFL teachers in Iran. These steps are detailed as follows.

Step 1: Administering pilot interviews

The first step in creating the IDLE scale for teachers was administering pilot interviews with 10 EFL teachers (five males and five females). The participants were selected using purposive sampling, which is a non-probability sampling technique that relies on the researcher's judgment and purpose of the study (Riazi, 2016). The criterion for selection of EFL teachers in this step was having at least two years of experience in IDLE. The main objective of administering pilot interviews was to explore EFL teachers' perceptions, attitudes, motivations, practices, and outcomes regarding IDLE, as well as the factors that had facilitated or hindered their IDLE behaviors. The pilot interview questions (See the supplementary materials) were meticulously designed to elicit rich, detailed responses and were grounded in the existing literature on IDLE and the researchers' expertise in IDLE. Conducted in the Persian language to ensure comfort and clarity for the participants, the interviews took place over Zoom at times that suited the EFL teachers. Each session lasted around half an hour and was audio-recorded with the participants' consent. Interviews were transcribed word for word to facilitate a thorough analysis and to inform the subsequent development of the IDLE scale's items. The author utilized thematic coding analysis (Gibbs, 2007) to identify the key subconstructs of IDLE derived from the pilot interview data. This involved the following steps: (a) familiarizing oneself with the data by reading and rereading the transcripts; (b) generating initial codes by identifying and labeling meaningful

segments of the data; (c) searching for themes by grouping the codes into broader categories; (d) reviewing and refining the themes by checking their coherence and relevance; (e) defining and naming the themes by describing their essence and scope; and (f) reporting the findings by presenting the themes and supporting them with quotes from the data. Based on the pilot interview findings, as well as a comprehensive review of the existing literature on IDLE, the author obtained a pool of potential items for the IDLE scale. The potential items cover six dimensions of IDLE for teachers: IDLE-enhanced benefits, IDLE practice, support from others, authentic L2 experience, resources and cognition, and frequency and device. It is important to note that these dimensions are distinct from those proposed by Zhang and Liu (2022), emerging instead from the data collected through interviews with teachers and the subsequent analysis.

Step 2: Creating the first item pool

The second step was creating a pool of potential items that measured the six dimensions of IDLE. This item-generation phase was informed by insights gleaned from the pilot interviews with the 10 EFL teachers. The author precisely synthesized the findings from the pilot interviews with the literature review to generate 124 preliminary items. These items were crafted to encapsulate the nuanced perceptions, attitudes, behaviors, and experiences of the EFL teachers in relation to IDLE. Presented as statements, these items were designed to be evaluated by the participants using a 5-point Likert scale, where 1 signifies *strongly disagree* and 5 denotes *strongly agree*. This approach ensures that the scale reflects both the empirical evidence from the interviews and the theoretical underpinnings from the literature, thereby strengthening the validity and reliability of the IDLE scale.

Step 3: Running expert judgment

The third step included conducting an expert judgment study to evaluate the relevance and appropriateness of the subscales and items. The authors invited four university professors in applied linguistics at Lorestan University who had expertise in IDLE and scale development to review the first item pool. The experts were asked to rate each item on a 4-point scale (1 = *not relevant*, 2 = *somewhat relevant*, 3 = *relevant*, 4 = *very relevant*) according to its relevance to the corresponding subscale. The experts were also asked to provide comments or suggestions for improving the items, such as rephrasing, reordering, or deleting them. The author calculated the content validity ratio (CVR) and content validity index (CVI) for each item based on the experts' ratings. The CVR is a measure of the proportion of experts who rated an item as relevant or very relevant, while the CVI is a measure of the average rating of an item across all experts (Almanasreh, Moles & Chen, 2019). The author used a minimum threshold of 0.6 for CVR and 0.8 for CVI to retain the items in the item pool. The items that had CVR values less than 0.6 or CVI values less than 0.8 were modified or discarded from the item pool. The authors also incorporated the experts' feedback and made necessary changes to the wording, format, or order of the items. After this step, the number of items was reduced from 124 to 76.

Step 4: Running think-aloud protocol and cognitive interviewing

The fourth step was to conduct an interview and think-aloud study to further evaluate the validity and clarity of the items. The author selected 12 EFL teachers (six males and six females) who had engaged in IDLE and who had not participated in the previous pilot steps. The authors asked the EFL teachers to complete the scale and verbalize their thoughts and feelings while answering each item. This technique, known as think-aloud protocol (Cowan, 2019), allows researchers to examine how the respondents understand and interpret the items, as well as to identify any cognitive or linguistic difficulties they may encounter. The author also interviewed the EFL

teachers after they finished the scale and asked them about their understanding, interpretation, and preference of the items. This technique, known as cognitive interviewing, allows researchers to obtain feedback and suggestions from the respondents on how to improve the items, as well as to assess their relevance and appropriateness (Willis, 2004). The author recorded and transcribed the EFL teachers' responses and analyzed them for any issues or problems with the items. They incorporated the EFL teachers' feedback and made adjustments to the wording, format, or order of the items. After this step, the number of items was reduced from 76 to 58.

Step 5: Running the pilot study

The fifth step of the study involved conducting a pilot study to assess the revised scale with a larger group of EFL teachers. The author employed stratified random sampling to select 284 EFL teachers, evenly split between 142 males and 142 females, from Khorram Abad City and Borujerd City in Iran. These teachers were employed at secondary public high schools, and the teachers who had experience using IDLE for over a year were selected for the study. The age range of the participants was 24 to 54 years, with a mean age of 41.20 and a standard deviation of 9.25. Their teaching experience varied from 3 to 26 years, averaging 12.90 years, with a standard deviation of 5.80. The EFL teachers held various academic degrees, including MA (165 teachers), BA (94 teachers), and PhD (25 teachers), and specialized in different fields: applied linguistics (145 teachers), English literature (110 teachers), and translation (29 teachers). After receiving authorization from the education deputies of each city to access the EFL teachers' contact details, the author extended voluntary invitations to participate in the study. All 284 teachers consented and agreed to fill out the digital scale, which was accompanied by a consent form in Persian. The author distributed the scale through Google Forms and gathered the responses. The pilot study's data were then utilized to run exploratory factor analysis (EFA), Cronbach's alpha, and confirmatory factor analysis (CFA), thereby further validating the scale for the subsequent phase of the study.

Step 6: Performing EFA, Cronbach's alpha, and CFA

The sixth step was to assess the construct validity and reliability of the scale using EFA, Cronbach's alpha, and CFA. The author used SPSS version 24 and LISREL version 11 software to conduct these analyses. For EFA, he used principal axis factoring as the extraction method and varimax as the rotation method. He used several criteria to determine the number of factors, such as eigenvalues greater than one, scree plot, parallel analysis, and theoretical considerations. The results of EFA showed that six factors were extracted, which explained 62.34% of the total variance. The six factors corresponded to the six dimensions of IDLE: IDLE-enhanced benefits, IDLE practice, support from others, authentic L2 experience, resources and cognition, and frequency and device. The author utilized data from the second pilot study to calculate the Cronbach's alpha coefficient for each subscale, as well as for the entire scale. This analysis was conducted following the EFA and preceding the CFA. For the CFA, the author deployed maximum likelihood as the estimation method and tested a six-factor model based on the results of the EFA. The author used several fit indices to evaluate the model fit, such as chi-square, comparative fit index, Tucker–Lewis index, root-mean-square error of approximation (RMSEA), and standardized root-mean-square residual.

Step 7: Creating the second item pool

The seventh step was creating the second item pool for the IDLE scale based on the results of the EFA, Cronbach's alpha, and CFA. The author evaluated the items and their psychometric properties, such as factor loadings, average variance extracted (AVE) values, item-total correlations, and reliability coefficients. He revised or removed any items that had low factor loadings ($p < 0.5$), low

AVE values ($p < 0.5$), low item-total correlations ($p < 0.3$), or negative effects on the reliability coefficients. At the end of this step, the number of items was reduced from 51 to 41.

Step 8: Conducting expert reviews

The eighth step was conducting expert reviews to evaluate the final version of the IDLE scale. The author invited three professors of applied linguistics from Tehran University to review the second item pool and rate each item on a 4-point scale (1 = *not clear*, 2 = *somewhat clear*, 3 = *clear*, 4 = *very clear*) based on its clarity and comprehensibility. He also asked the experts to provide comments or suggestions for improving the items. The author computed the clarity index (CI) for each item based on the experts' ratings. The items that had CI values lower than 0.8 were revised or removed from the item pool. The author also integrated the experts' feedback and made necessary changes to the wording, format, or order of the items. With the completion of this step, no further changes were made to the items or the structure of the IDLE scale.

Step 9: Performing translation and translation quality check

The last step was performing translation and translation quality check to ensure the linguistic equivalence of the scale in Persian and English languages. For this purpose, the author got the IDLE scale translated into English. He used a forward-backward translation procedure to translate the scale from Persian into English. First, two bilingual translators independently translated the scale from Persian into English. Then, a third bilingual translator compared and reconciled the two translations and produced a single English version of the scale. Next, another bilingual translator back-translated the English version into Persian without referring to the original version. Finally, a fifth bilingual translator compared and verified the back-translated Persian version with the original Persian version and resolved any discrepancies or inconsistencies. The author also randomly selected five EFL teachers who were different from the participants in Step 5 to complete both versions of the scale and provide feedback on their equivalence and clarity. They confirmed that the items of the IDLE scale were easy to understand (See the supplementary materials).

4. Results

Before conducting the EFA, the author assessed the suitability of the data for these statistical procedures. He used the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity to evaluate the factorability of the correlation matrix (Cabrera-Nguyen, 2010). The results showed that the KMO index was 0.963, indicating a high degree of common variance among the items. Bartlett's test was highly significant (Chi = 10204.682, $df = 820$, $p < 0.001$), indicating that the correlation matrix was not an identity matrix (See the supplementary materials). These results suggested that the EFA was appropriate for the collected data.

The author performed the EFA using principal axis factoring as the extraction method and oblimin as the rotation method. The initial EFA yielded six factors with eigenvalues greater than one, explaining 66.12% of the total variance. However, nine items (EB11, IDLEP6, SFO6, ALE2, ALE5, RAC2, RAC6, FAD4, and FAD9) had low factor loadings (below 0.5) or high cross-loadings (above 0.3) on more than one factor. These items were removed to improve the clarity and parsimony of the factor structure. The author repeated the EFA with the remaining items and obtained a six-factor solution with improved factor loadings and explained variance. The findings indicated that all the items had factor loadings higher than 0.5 on their respective factors. The EFA results confirmed the six-factor structure of the scale, with eigenvalues greater than one for each factor. The six factors accounted for 74.49% of the total variance in the data. Moreover, the factor

loadings indicated that each item measured the intended construct with high specificity and low cross-loadings (See the supplementary materials).

The author also examined the internal consistency reliability of each factor using Cronbach's alpha coefficient. The findings revealed that the Cronbach's alpha coefficients for the six factors ranged from 0.86 to 0.96, demonstrating high internal consistency reliability (See the supplementary materials). Therefore, the author concluded that the scale had acceptable reliability for each factor. Next, the author tested the normality assumption of the data using skewness and kurtosis values. The results indicated that the skewness of the data was −1.638 and the critical value for skewness was −0.234, showing that the multivariate normality assumption was met for the data (See the supplementary materials). Next, the author performed first- and second-order CFA to test the hypothesized model. Figures 1 and 2 display the standardized coefficients and significance levels of the first- and second-order CFA, respectively.

Afterward, the author ran the first- and second-order CFA of the model. The findings evidenced that the factor loadings of the first- and second-order CFA for the subscales ranged from 0.78 to 0.87 and from 0.68 to 0.73, respectively. These values exceeded the recommended cut-off of 0.6, revealing that the subfactors had satisfactory reliability. Moreover, the composite reliability values of the subfactors ranged from 0.87 to 0.97, which were above the threshold of 0.7. The average variance extracted values of the subfactors ranged from 0.67 to 0.71, which were above the cut-off of 0.5 (See the supplementary materials). Since the composite reliability values were higher than the average variance extracted values, the convergent validity of the subfactors was also supported. To assess the discriminant validity of the subfactors, the author used the Fornell–Larcker criterion (Schreiber, Nora, Stage, Barlow & King, 2006). The results of this test revealed that the square root of AVE for each latent variable was greater than the correlation of that latent variable with any other latent variable. This indicated that the latent variables shared more variance with their own indicators than with other latent variables, thus supporting the discriminant validity of the subfactors. Furthermore, the values of the maximum shared variance and the average shared variance were lower than the AVE values for each latent variable, which also confirmed the discriminant validity of the subfactors (See the supplementary materials). To evaluate how well the proposed model fit the data, the author used several fit indices. The acceptance or rejection of the model was based on the values of these indices. The results are presented in Table 1.

As shown in Table 1, all the fit indices were within the acceptable range, demonstrating that the proposed model and the observed data were compatible and the model was adequate. Overall, the results indicated that all six subfactors, namely IDLE-enhanced benefits, IDLE practice, support from others, authentic L2 experience, resources and cognition, frequency and device, had significant factor loadings ranging from 0.68 to 0.73 on the latent variable of IDLE. The path coefficients revealed that IDLE-enhanced benefits had the highest influence and frequency and device had the lowest influence on IDLE among the EFL teachers.

5. Discussion

The current study was conducted to create and validate an IDLE scale for EFL teachers in Iran. The findings yielded a six-dimensional scale comprising IDLE-enhanced benefits, IDLE practice, support from others, authentic L2 experience, resources and cognition, and frequency and device. The first subfactor, *IDLE-enhanced benefits*, underscores the pivotal role of digital tools in reinforcing the professional development and instructional efficacy of the Iranian EFL teachers (Zadorozhnyy & Yu, 2023). The evidence indicates that the ability of IDLE to bolster the EFL teachers' competencies and skills (Lee, 2022) significantly contributes to these advantages. Engaging with IDLE permits them to tap into an extensive pool of linguistic assets, informative materials, and dynamic platforms, thus enriching their English language mastery and teaching
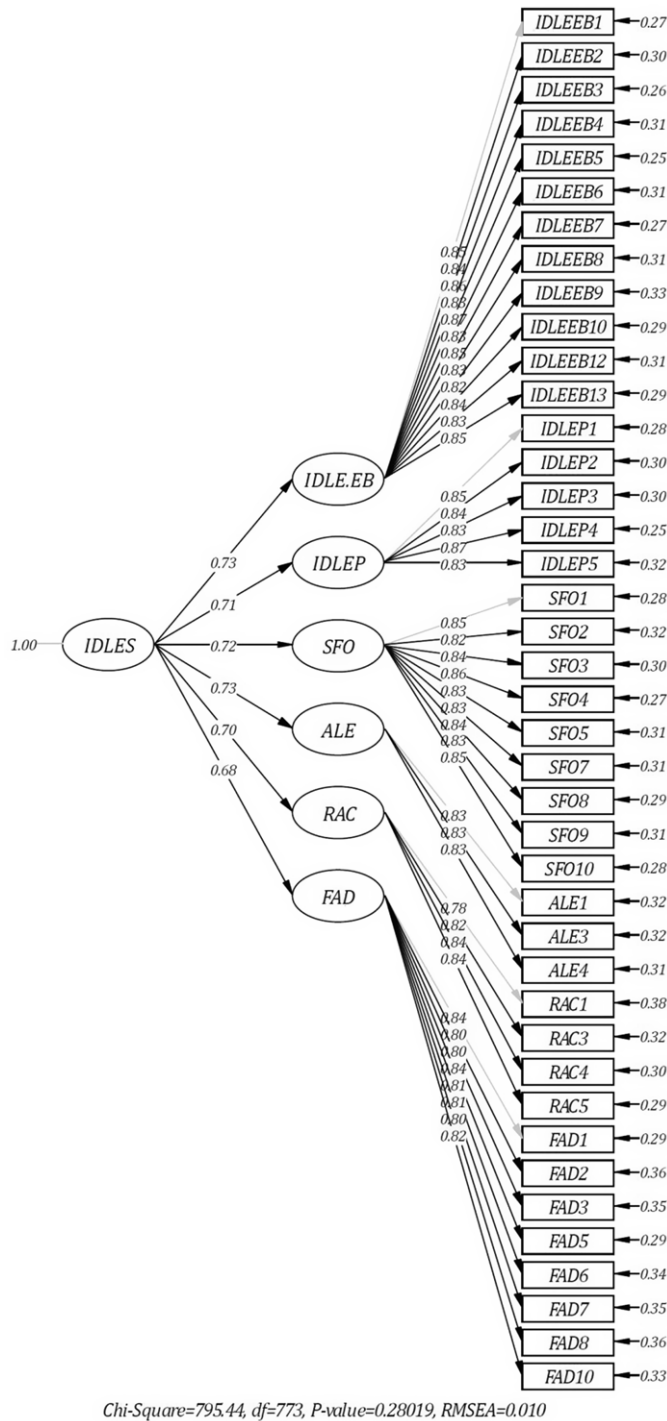
Chi-Square=795.44, df=773, P-value=0.28019, RMSEA=0.010

Figure 1. Standardized coefficients of the first- and second-order confirmatory factor analysis for the IDLE scale.
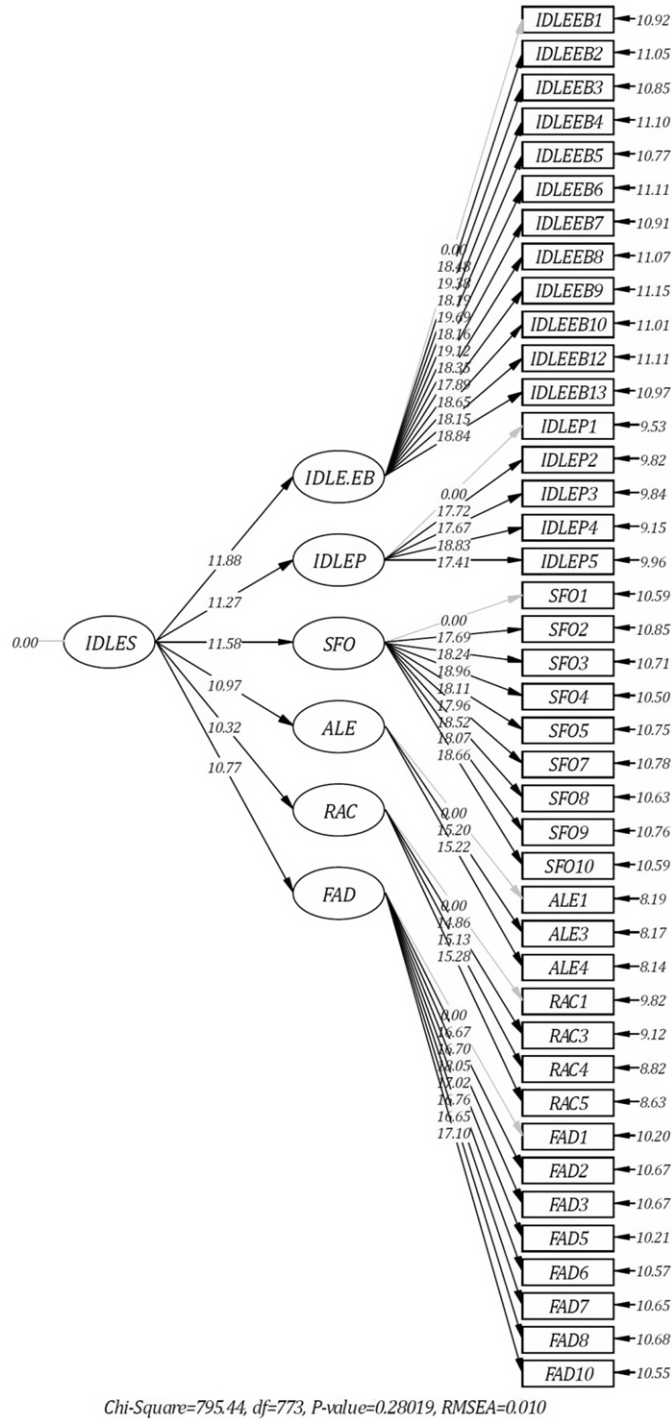
Figure 2. Significance levels of the first- and second-order confirmatory factor analysis for the IDLE scale.

Table 1. Fit indices of the model

Fit indices	Recommended value	Estimated value	Result
χ^2/df	< 3	1.029	Acceptable
RMSEA	< 0.08	0.010	Acceptable
GFI	> 0.80	0.88	Acceptable
AGFI	> 0.80	0.87	Acceptable
CFI	> 0.90	1.00	Acceptable
NFI	> 0.90	0.98	Acceptable
NNFI	> 0.90	1.00	Acceptable

Note. RMSEA = root-mean-square error of approximation; GFI = goodness-of-fix index; AGFI = adjusted goodness-of-fit index; CFI = comparative fit index; NFI = normed fit index; NNFI = non-normed fit index.

methodologies. Moreover, active participation in IDLE is conducive to both personal and career progression (Rezai *et al.*, 2024; Lee & Taylor, 2022). By immersing themselves in virtual educational networks, leveraging digital pedagogical forums, and engaging in online dialogues and partnerships, the Iranian EFL teachers can broaden their professional circles, exchange valuable perspectives, garner feedback, and continually refine their teaching practices (Rezai *et al.*, 2024; Soyoof *et al.*, 2023).

The *IDLE practice* subfactor is the second cornerstone of the scale, emphasizing the practical application of IDLE methodologies by the Iranian EFL teachers. Its inclusion is predicated on the premise that simply having digital tools is not enough; it is the hands-on application that truly drives the progress of language education. A key insight from the research is the criticality of how the Iranian EFL teachers actively harness digital platforms to enhance their English language proficiency and instructional strategies (Rezai *et al.*, 2024). Through regular participation in self-directed tasks, interactive activities, online language programs, or digital collaborations, these teachers can experience first-hand the substantial benefits of IDLE for their language skills and teaching effectiveness. Furthermore, this dimension underscores the experiential aspect of IDLE, highlighting that the Iranian EFL teachers, through their direct engagement in authentic communication endeavors, such as participating in online forums, collaborative projects, or virtual simulations, adopt a learner-centric stance (Yu *et al.*, 2021). In this paradigm, the EFL teachers are also learners, navigating the tangible challenges and successes of digital education. These immersive experiences can profoundly influence their pedagogical approach and, by extension, enrich their learners' learning processes.

The *support from others* subfactor emerges as a vital element of the scale, spotlighting the influence of collaborative efforts, social interactions, and support networks on the IDLE experiences of Iranian EFL teachers. It affirms that learning is inherently social, significantly enriched by the contributions and backing of fellow teachers (Pöntinen, Dillon & Väisänen, 2017; Roberts, 2004). This facet accentuates that the full potential of IDLE is realized through active community participation: Iranian EFL teachers can forge connections, exchange knowledge, and bolster one another through online platforms, discussion forums, and virtual communities (Brindley, Blaschke & Walti, 2009; Rezai *et al.*, 2024). Such exchanges are crucial in nurturing professional growth and motivation, promoting the diligent use of digital tools, and cultivating a sense of belonging within the educational community (Liu & Wang, 2024). Moreover, the dimension acknowledges the pivotal role of mentorship, with teachers gaining from tailored advice, constructive feedback, and insights on effective language instruction methodologies and technology integration (Cai, 2019; Macià & García, 2016; Wu & Ma, 2022). This aspect of the scale underscores the profound impact of mentorship and collegial support in amplifying the efficacy of digital learning for Iranian EFL teachers (Guo & Lee, 2023; Lai, 2017).

The *authentic L2 experience* subfactor is another crucial component of the IDLE scale. It underscores the importance of real-world English language experiences that the Iranian EFL teachers acquire through IDLE. It affirms that immersion in authentic language usage is essential for enhancing language teaching outcomes (Marull & Kumar, 2020). Authentic experiences surpass conventional textbook learning by providing exposure to diverse linguistic and cultural environments (Maley & Tomlinson, 2017), allowing the EFL teachers to explore various accents, idioms, cultural nuances, and sociolinguistic aspects of English through credible digital resources (McFarlane, 2014; Wu & Ma, 2022). Additionally, the role of genuine communication and interaction within IDLE is significant (Ong & Quek, 2023). As noted by Zadorozhnyy and Yu (2023), online platforms and social media facilitate EFL teachers' participation in authentic conversations, integration into virtual language communities, and interaction with native or proficient English speakers. This dimension emphasizes that such meaningful exchanges are instrumental in bolstering Iranian EFL teachers' communicative abilities and their adeptness in real-world English scenarios.

Resources and cognition was the other subfactor. It scrutinizes the assortment and quality of digital tools and resources that EFL teachers harness within IDLE frameworks, coupled with the cognitive tactics and strategies they deploy to bolster educational outcomes (Rezai et al., 2024). As noted by Soyoof et al. (2023), teachers engaged in IDLE in frequently utilize a variety of digital resources that align with their distinct pedagogical needs and cultural context. This includes, but is not limited to, online dictionaries, podcasts, videos, social networking platforms, and blogs. Such tools are carefully chosen to resonate with the Iranian academic milieu and the English language proficiency goals set by educators. Furthermore, IDLE is a conduit for enhancing EFL teachers' metacognitive abilities, encompassing the planning, monitoring, evaluation, and reflection of their teaching practices and learning trajectories (Lee & Taylor, 2022; Reinders et al., 2022). These skills are particularly crucial for Iranian EFL teachers, as they reflect on and adapt their instructional methods to the evolving demands of English language education in a digitally interconnected world.

The last subfactor was *frequency and device*. It deals with the digital engagement patterns of the Iranian EFL teachers and focuses on how often and in what ways they interact with digital resources and the devices they use for educational purposes. A contributing factor to these patterns may be the types of technology available to EFL teachers in Iran. With the widespread adoption of smartphones, tablets, laptops, and other mobile devices, the Iranian EFL teachers are likely to encounter more frequent and varied opportunities to engage with IDLE (Hedayati & Marandi, 2014; Rezai *et al.*, 2024). This dimension, in summary, emphasizes the link between the use of digital technology, the opportunities it creates for learning and teaching, and the outcomes of these educational practices for EFL teachers in the context of Iran.

6. Conclusions

In the present study, the author developed and validated a scale aiming to assess IDLE for EFL teachers in the Iranian context. The scale consisted of six dimensions: IDLE-enhanced benefits, IDLE practice, support from others, authentic L2 experience, resources and cognition, and frequency and device. The findings from this study demonstrated that EFL teachers are capable of extending their influence beyond the traditional classroom boundaries, adopting IDLE activities that are not only initiated by key figures in the educational field but also actively facilitated by the teachers themselves. This is particularly impactful in the Iranian context, where formal education is prevalent, and opportunities for informal learning are less explored. In essence, this study highlights that IDLE is a multifaceted construct that equips EFL teachers with the means to enhance their teaching methodologies and embrace a more holistic educational approach.

This study acknowledges certain limitations, which may pave the way for future research. First, the research was specific to the EFL context of Iran, necessitating the validation of the developed scale in various EFL settings globally to assess its wider relevance and adaptability. Second, while the study concentrated on creating an IDLE scale for EFL teachers, subsequent research could examine the connections between the scale's dimensions and teacher-centric factors like language proficiency and job engagement. Such investigations could yield insights into IDLE's role in teacher development. Third, further studies are warranted to evaluate the influence of particular digital resources or tools on IDLE's different aspects. Identifying the most beneficial resources could significantly improve English language teaching. Fourth, given the study's focus on EFL teachers, comparative research into IDLE practices among both teachers and learners would be insightful, highlighting similarities and differences in their IDLE usage and effectiveness. Lastly, the potential integration of informal digital learning with formal teacher training programs merits exploration. This could offer valuable perspectives on incorporating IDLE into teacher education, thus enriching professional development.

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