



The Impact of Technology and Artificial Intelligence on Self-Training and Professional Development of Iranian Undergraduate TEFL Students

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ARTICLE INFO:

Received date:

2026.01.05

Accepted date:

2026.02.26

Print ISSN: 2251-7995

Online ISSN: 2676-6876

Keywords:

Educational Technology, AIEDU, CALL, MALL, Digital Learning, Self-Training, Professional Development.



Abstract

This study investigates the role of Artificial Intelligence (AI) and digital technologies in supporting self-training and professional development among undergraduate TEFL students at a single branch of Islamic Azad University (South Tehran). Employing an explanatory sequential mixed-methods design, the study first analyzed quantitative survey data and subsequently used qualitative interview responses to explain and elaborate on the statistical findings. Data were collected from 30 undergraduate students selected through convenience sampling. Questionnaire responses were measured using dichotomous categorical variables (agree/disagree), and Chi-square goodness-of-fit tests were conducted to determine whether observed frequencies significantly differed from expected distributions. The results indicate that technology was significantly associated with increased perceptions of learning flexibility, engagement, and language skill development. Qualitative findings revealed that learners relied on AI-powered writing evaluators, conversational chatbots (e.g., ChatGPT), grammar checkers, machine translation tools, and online learning platforms to enhance their English proficiency and autonomous learning practices. Despite certain infrastructural and economic barriers, students generally perceived AI and digital technologies as important components of their academic and professional growth. Given the limited sample size and single-site context, the findings should be interpreted as context-specific and require replication across diverse higher education settings.

Citation: Sheikhzadeh, S. & Mowlaie, B. (2026). The Impact of Technology and Artificial Intelligence on Self-Training and Professional Development of Iranian Undergraduate TEFL Students. *Journal of English Language Teaching and Learning*, 18 (37), 473-490. DOI:10.22034/elt.2026.70966.2841

Introduction

The growing influence of digital technologies and artificial intelligence (AI) has reshaped traditional models of teaching and learning, particularly in language education. English, as a global lingua franca, continues to occupy a central role in educational contexts, and efforts to integrate technology into Teaching English as a Foreign Language (TEFL) have intensified (Burston, 2014; Godwin-Jones, 2015; Rosell-Aguilar, 2009). In the 21st century, language learning has become essential for equipping learners with the competencies required to navigate contemporary academic, professional, and social environments.

Within this evolving landscape, Technology-Enhanced Language Learning (TELL) has emerged as an umbrella term encompassing various digital approaches to language instruction. TELL includes Computer-Assisted Language Learning (CALL), Mobile-Assisted Language Learning (MALL), and, more recently, AI-driven applications. These approaches have been associated, in specific educational contexts, with increased learner engagement, greater instructional flexibility, and enhanced access to authentic language input (Chappelle, 2008).

Computer-Assisted Language Learning (CALL) refers to the use of computer technologies to support and enhance language instruction (Levy, 1997). Originating in the mid-20th century, CALL evolved from behaviorist drill-and-practice software to communicative and learner-centered applications incorporating multimedia, interactive tasks, web-based environments, and learning management systems (LMS). CALL environments typically provide immediate feedback, self-paced learning opportunities, and access to authentic digital materials, thereby supporting learner autonomy.

Mobile-Assisted Language Learning (MALL) developed as an extension of CALL, emphasizing the use of portable digital devices such as smartphones and tablets to facilitate language learning beyond fixed computer stations. By enabling anytime-anywhere access to learning materials, MALL supports continuous and context-sensitive language practice (Kukulska-Hulme, 2020). Mobile applications often include vocabulary trainers, pronunciation tools, interactive exercises, and communication platforms, integrating language learning into learners' daily routines.

In educational contexts, technology encompasses not only hardware devices but also structured digital systems such as learning management systems (e.g., Moodle), online communication platforms, digital corpora, multimedia databases, and cloud-based collaboration tools. Effective technology integration refers to the pedagogically aligned use of these tools to support instructional goals. Research suggests that when supported by adequate training, infrastructure, and digital literacy, such integration can be associated with improved learner engagement and more differentiated instructional practices.

Artificial Intelligence (AI) represents a more recent development within TELL. In language education, AI refers to computational systems capable of performing cognitive tasks such as natural language processing, automated evaluation, adaptive feedback, and pattern recognition (Timms, 2016). AI-powered tools include intelligent tutoring systems, automated writing evaluation platforms, conversational chatbots, speech-recognition programs, and adaptive learning applications (Underwood & Luckin, 2011). These tools can provide personalized

feedback, monitor learner progress, and support self-paced learning. In classroom and self-directed contexts, AI has the potential to assist both teachers and learners by offering data-informed insights and facilitating more individualized learning experiences

Self-training, also referred to as self-directed learning, is the process through which learners independently plan, manage, and evaluate their own learning activities (Haidari et al., 2019). It involves setting goals, selecting appropriate resources, organizing learning strategies, and monitoring progress. Digital technologies, mobile applications, and AI-driven platforms increasingly support self-training by providing adaptive feedback, personalized practice opportunities, and access to authentic materials (Suh et al., 2015; Holmes & Tuomi, 2022). Research suggests that effective self-directed learning fosters learner autonomy, metacognitive awareness, and continuous skill development, which may contribute to long-term professional growth, particularly in contexts where access to formal instruction is limited (Churchill et al., 2016).

Professional development in TEFL refers to the ongoing acquisition of pedagogical, linguistic, and technological competencies required for effective language teaching (Pourhossein Gilakjani et al., 2013). It encompasses both formal activities, such as workshops and certification courses, and informal learning experiences, including engagement with online resources, peer collaboration, and technology-mediated communities of practice. Drawing on the concept of *imagined communities* (Anderson, 1991; Norton, 2001), technology can support EFL students in envisioning and preparing for their prospective professional identities. Through sustained engagement with digital tools and AI-based platforms, learners may gradually bridge the gap between their current competencies and the qualifications required in their anticipated teaching contexts. Rather than viewing technology as a guarantee of professional advancement, recent studies indicate that its effectiveness depends on pedagogically meaningful integration, institutional support, and users' digital literacy (Zawacki-Richter et al., 2019; Holmes & Tuomi, 2022).

In the Iranian context, where English proficiency is widely regarded as an important academic and professional asset, understanding how TEFL students utilize AI, CALL, and MALL for self-directed learning is particularly significant. Emerging research highlights that AI-supported tools such as automated writing evaluation systems, adaptive learning platforms, and conversational agents can provide individualized feedback and flexible learning pathways (Fryer et al., 2020; Lu, 2018). When implemented under appropriate technological and institutional conditions, such tools have been associated with increased learner engagement and perceived autonomy. Therefore, the present study seeks to examine how undergraduate TEFL students in Iran employ AI and digital technologies to enhance their language skills and pedagogical competencies, while also identifying contextual opportunities and constraints.

1. Literature Review

This section reviews empirical and theoretical research on technological tools and applications used in language learning, with particular emphasis on CALL, MALL, and AI-enhanced environments. Previous studies demonstrate that technology can facilitate access to educational resources and reduce geographical and temporal barriers (Chen et al., 2004, Son, 2008). Technology-mediated learning environments also enable multimodal presentation of

information—integrating text, audio, visuals, and interactive content—which may enhance learner engagement in certain contexts (González-Lloret, 2020). Compared to exclusively traditional instruction, technology-enhanced learning has been associated with increased flexibility, broader access to resources, and opportunities for individualized pacing.

Among these approaches, Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL) have played significant roles in reshaping language instruction. CALL has evolved from early drill-and-practice software to communicative, learner-centered environments that support writing, online interaction, and distance learning, thereby promoting autonomy and collaborative learning (Afshari et al., 2009; Ghasemi et al., 2011; Hashemi & Azizinezhad, 2011). More recent research has expanded this focus to include AI-enhanced systems that provide adaptive and data-informed feedback mechanisms (Heffernan & Heffernan, 2014; Holmes et al., 2022). Ghalami Nobar and Ahangari (2012) reported that computer use was associated with improvements in Iranian learners' listening comprehension and motivation. Similarly, Fardy et al. (2012) found statistically significant differences in reading comprehension between CALL users and non-users. Meihami and Varmaghani (2013) confirmed the positive impact of CALL materials on listening comprehension, and Barani (2013) observed significant improvements in vocabulary achievement among CALL users. Additionally, Abdollapour and Asadzadeh Maleki (2012) demonstrated that mobile-assisted dictionary uses enhanced vocabulary retention compared to traditional methods.

International studies corroborate these findings. Baytak et al. (2011) found that technology-supported learning environments can enhance enjoyment and interactivity. Eaton (2010) highlighted that computer-mediated communication may promote more equal participation than face-to-face discussion, while Zhao (2003) emphasized the importance of access to authentic materials for successful language learning. Research conducted in Saudi Arabia, Turkey, and Iran further indicates that learners generally hold positive attitudes toward CALL and digital tools (AbuSeileek, 2010; Öz, 2012; Rahimi & Yadollahi, 2011). Drayton et al. (2010) noted that computer-based classrooms can enhance learners' responsibility and foster authentic learning experiences. Mofareh (2019) reported that technology increases learner interest and motivation, while Hsu and Lin (2022) emphasized its ability to provide learners with anytime access to information. Colpaert and Stockwell (2022) observed that technology facilitates communication and collaboration with native speakers and other learners. Peregoy and Boyle (2012) concluded that technology tools can support reading and writing development by offering user-friendly learning environments. Costley and Han (2014) and Tutkun (2011) further noted that ICTs actively engage learners, promote independence, and support language learning development.

Recent years have witnessed growing interest in AI applications in education. AI systems—including intelligent tutoring systems, automated writing evaluators, speech recognition programs, and adaptive learning platforms—support teaching and learning by offering personalized feedback, progress tracking, and targeted practice (Heffernan & Heffernan, 2014; Lu, 2018; Zawacki-Richter et al., 2019). Within language education, CALL and MALL have evolved from supplementary tools into more integral instructional components. Foundational

CALL research (Chapelle, 2001; Levy, 1997) explored the effectiveness of interactive software and online environments in promoting linguistic development. Likewise, MALL studies (Godwin-Jones, 2017; Stockwell, 2010) emphasize its capacity to extend language learning beyond the classroom by providing flexible, on-demand access to authentic input and communicative tasks.

Empirical studies in Iran indicate that EFL learners benefit from technology-enhanced tools, particularly in vocabulary development and listening comprehension (Ahmadi, 2018; Meihami & Varmaghani, 2013). International research similarly suggests that AI-based systems may support improvements in accuracy, fluency, and learner motivation (Li et al., 2020; Wang & Heffernan, 2010). The Technology Acceptance Model (TAM) (Davis, 1989) provides a useful theoretical lens for interpreting these outcomes, as perceived usefulness and ease of use are key predictors of learners' adoption of educational technologies. Studies confirm that TEFL students engage more readily with digital platforms when they perceive them as intuitive and beneficial (Šumak et al., 2011). Self-Directed Learning Theory (Knowles, 1975) further supports technology integration by emphasizing learners' capacity to regulate pace, select content, and adopt personalized strategies. Technology-rich environments—including MOOCs, mobile applications, and AI-based tools—have been associated with increased learner autonomy and metacognitive engagement (Benson, 2011; Holmes et al., 2022)

Although previous studies have examined the role of CALL and MALL in EFL learning, fewer investigations have specifically explored how AI-based tools contribute to self-training and professional development among TEFL students in Iran. Most existing research focuses on general technology use or evaluates specific language skills (e.g., vocabulary or listening) without distinguishing AI-enabled applications from conventional digital tools. Moreover, there is limited evidence on how undergraduate TEFL learners perceive the integration of AI in their future teaching careers.

Therefore, this study aims to bridge these gaps by examining (1) how Iranian TEFL students use AI-based applications and other digital technologies for self-directed learning, and (2) how these technologies support their perceived readiness for professional development in TEFL. The findings are expected to contribute to the literature by providing context-specific evidence on AI adoption in Iranian higher education and by clarifying the unique role of AI tools compared to traditional CALL and MALL resources.

2. Method

2.1. Research Design

This study adopted an explanatory sequential mixed-methods design, in which quantitative data were collected and analyzed first, followed by qualitative data collection to explain and elaborate on the statistical findings (Creswell & Plano Clark, 2018). This design allowed the researchers to identify general patterns in learners' attitudes toward technology and then explore the reasons behind those patterns through interviews.

2.2. Participants and Sampling

The participants were 30 undergraduate TEFL students from the Faculty of Foreign Languages at Islamic Azad University, South Tehran Branch. Participants were selected through

convenience sampling based on their availability and willingness to participate. The sample included both male and female students, aged between 18 and 45 years, and all were native Persian speakers. Participants' academic year, prior exposure to AI tools, and access to digital technologies (e.g., smartphone ownership, internet availability) were also recorded to provide a clearer profile of the sample.

To explore the quantitative findings in depth, 10 participants were selected for semi-structured interviews. These interviewees were volunteers drawn from the original questionnaire participants.

2.3. Definition of Key Constructs

In this study, self-training refers to learners' independent use of digital and AI-based tools to plan, manage, and evaluate their own English learning, including activities such as independent study, online practice, and interaction with AI tutors or chatbots. Professional development refers to the development of pedagogical, linguistic, and technological competencies that TEFL students perceive as necessary for their future teaching careers.

2.4 Instruments

Data were collected through two adapted questionnaires and semi-structured interviews.

Questionnaire 1 (adapted from Kitchakarn, 2015) measured participants' attitudes toward using technology as a learning tool. The questionnaire included items related to perceived usefulness, perceived ease of use, enjoyment, and perceived impact on language skills (reading, writing, speaking, listening, grammar, and vocabulary).

Questionnaire 2 (adapted from Mollaei & Riasati, 2013) examined participants' perceptions of technology use in their future teaching careers. It focused on readiness to integrate technology, beliefs about its impact on classroom management and instructional practices, and expectations regarding access to authentic input and student engagement.

Both questionnaires included open-ended items to allow participants to elaborate on their responses and provide additional insights. The response scale for both instruments was a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

2.5 Instrument Adaptation and Validation

The original questionnaires were translated into Persian and modified to include items related to AI-based tools (e.g., automated writing evaluators, chatbots, adaptive learning platforms). A panel of three TEFL experts reviewed the adapted instruments for content validity. A pilot study with 15 TEFL students was conducted to ensure clarity and relevance of items. Reliability analysis using Cronbach's alpha showed acceptable internal consistency for both questionnaires ($\alpha = .84$ for Questionnaire 1; $\alpha = .81$ for Questionnaire 2).

2.6. Data Collection Procedure

Data collection occurred in two phases:

1. **Quantitative phase:** The two questionnaires were administered to all 30 participants in paper-based format during class sessions.

2. **Qualitative phase:** After analyzing the quantitative data, 10 volunteer participants were invited for semi-structured interviews to explain and elaborate on the questionnaire results. Interview questions were derived from items that showed significant patterns in the Chi-square analysis (e.g., items with strong agreement or disagreement). Example interview prompts included:

- “Can you describe how you use AI tools (e.g., ChatGPT, grammar checkers) to improve your English skills?”
- “How do you think these tools may support your future teaching career?”
- “What challenges do you face when using technology for self-training?”

2.7. Data Analysis

Quantitative data from the questionnaires were analyzed using the Chi-square goodness-of-fit test to determine whether observed response frequencies differed significantly from expected distributions. The analysis distinguished between AI-specific tools (e.g., AI chatbots, automated evaluators) and general technology tools (e.g., CALL software, mobile apps) to identify differences in participants’ attitudes.

Qualitative data from open-ended questionnaire items and interviews were analyzed using thematic analysis (Braun & Clarke, 2006). The thematic analysis involved six steps: (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the final report. Themes were then compared with quantitative findings to explain and expand on the statistical results.

2.8 Integration of Quantitative and Qualitative Findings

Integration occurred at two points: (1) during the instrument design by including open-ended items in the questionnaires, and (2) during interpretation, where qualitative themes were used to explain the significant quantitative patterns. This sequential integration reflects the explanatory mixed-methods design of the study, where qualitative data help clarify and contextualize the quantitative outcomes

Justification for Sequential Explanatory Design

A sequential explanatory design was considered appropriate for this study because the quantitative phase could identify general patterns in learners’ attitudes toward AI and technology, while the qualitative phase could explain the reasons behind these patterns. Given the exploratory nature of the research questions, particularly regarding learners’ perceptions of AI-specific tools and their role in professional development, the qualitative interviews provided deeper contextual insights that could not be captured through survey data alone.

2.9. Ethical Considerations

Ethical approval for the study was obtained from the university research ethics committee. All participants provided informed consent and participated voluntarily without any coercion. They were informed that their responses would remain confidential and would be used solely for the purpose of this research. Identifying information was removed from the data, and all results were reported in aggregate form.

3. Results

This study examined undergraduate EFL learners' perceptions of the role of technological tools in: (1) supporting their professional development, (2) enabling flexible, self-directed study by removing time and space constraints, and (3) empowering them to control their own learning process. The quantitative results from the Chi-square goodness-of-fit analyses are presented first, followed by qualitative themes that explain and contextualize the statistical findings.

3.1. Technology and EFL Learners' Professional Development

The first research question explored whether the use of technological tools contributes to the professional development of undergraduate EFL learners. Professional development was measured through survey items related to (a) facilitating assignment completion, (b) supporting language skill development, and (c) enhancing motivation and enjoyment in learning. Qualitative interview themes were used to elaborate on participants' reasons for agreement or disagreement.

Quantitative findings

The quantitative sample included 30 participants. Responses were measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) and dichotomized into agree (responses 4–5) and disagree (responses 1–3). With respect to assignment completion, 19 participants agreed that technology helped them complete tasks more easily, while 11 disagreed. The Chi-square goodness-of-fit test showed no statistically significant difference between the two response categories, $\chi^2(1, N = 30) = 2.13, p = .14$.

Qualitative findings

Qualitative data helped explain this mixed response. Participants who disagreed commonly cited insufficient digital and AI literacy, noting that some learners lacked the necessary skills to use certain applications effectively. Some respondents also emphasized that motivation and self-regulation varied across learners, which limited the benefits of self-training through online platforms. Conversely, participants who agreed highlighted advantages such as easier editing, convenient saving and sharing of assignments, and reduced reliance on paper-based work.

Table 1. Observed frequencies and expected frequencies for the item on technology facilitating assignment completion.

	Observed N	Expected N	Residual
Agree	19	15.0	4.0
Disagree	11	15.0	-4.0
Total	30		

Table 2

Chi-Square	2.13 ^a
Df	1
Asymp. Sig.	.14

Technology and Language Skill Development

The second research question examined whether technological tools contribute to learners' language skill development. Language skill development in this dimension was operationalized through survey items assessing learners' perceptions of technology's impact on reading, writing, listening, speaking, grammar, and vocabulary. The same 30 participants ($N = 30$) responded to these items. Responses were measured on a 5-point Likert scale and dichotomized into agree (4–5) and disagree (1–3).

Quantitative findings

A clear majority (21 agree vs. 9 disagree) perceived technology as beneficial for language skill development. The Chi-square goodness-of-fit test indicated a statistically significant difference between the two categories, $\chi^2 (1, N = 30) = 4.80$, $p = .028$, $\phi = .40$ (medium effect size).

Qualitative findings

Qualitative responses highlighted several perceived affordances of technology, including access to authentic reading materials, online listening resources, opportunities for global communication, automated writing feedback, and tools such as grammar checkers. Some participants reported that digital and AI tools allowed them to track progress across different language skills. Conversely, participants who disagreed emphasized economic challenges, including the high cost of devices and weak internet connectivity in Iran, as well as limited updates for certain applications due to international sanctions.

Table 3. Observed and expected frequencies for language skill development

	Observed N	Expected N	Residual
Agree	21	15.0	6.0
Disagree	9	15.0	-6.0
Total	30		

Table 4

Chi-Square	4.80 ^a
df	1
Asymp. Sig.	.028

3.2. Technology and Enjoyment/Engagement in Language Learning

The third dimension explored whether technology enhances learners' enjoyment and engagement in language learning. This dimension was measured using survey items related to motivation, enjoyment, and perceived engagement while using digital tools for learning.

Quantitative findings

A strong majority (23 agree vs. 7 disagree) supported the statement that technology increases enjoyment and engagement. The Chi-square test indicated a statistically significant difference, $\chi^2 (1, N = 30) = 8.53$, $p = .003$, $\phi = .53$ (large effect size).

Qualitative findings

Learners described various features that increased engagement, including customizable interfaces, multimedia resources, instant access to information, convenient functions, and the portability of digital learning materials. Exposure to authentic language through social media and online interaction was also cited as motivating. Participants who disagreed attributed their responses to limited digital literacy and financial constraints.

Table 5. *Observed and expected frequencies for enjoyment and engagement*

	Observed N	Expected N	Residual
Agree	23	15.0	8.0
Disagree	7	15.0	-8.0
Total	30		

Table 6

Chi-Square	8.53 ^a
df	1
Asymp. Sig.	.003

3.3. Summary of RQ1 Findings

Overall, the findings for research question one indicates that while technology is not universally accessible or equally beneficial for all learners, it plays a substantial role in enhancing language learning opportunities, particularly in terms of perceived skill development and engagement. The qualitative data suggest that the benefits of technology are mediated by learners' digital literacy, economic constraints, and infrastructural limitations, which may restrict the effectiveness of technology for some students

3.4. Technology and Flexible Self-Training Beyond Time and Space Constraints

The second research question examined whether technology enabled learners to engage in flexible self-training that was not constrained by traditional time and space limitations. Two dimensions were explored: (1) access to global information, and (2) shifting from traditional to more interactive learning practices. These dimensions were measured through survey items asking participants to indicate their agreement with statements related to information access and changes in study strategies. Responses were recorded on a 5-point Likert scale and dichotomized into agree (4–5) and disagree (1–3).

3.4.1 Access to Global Information

Quantitative findings

The quantitative sample included 30 participants ($N = 30$). A majority (22 agree vs. 8 disagree) reported that technology helped them efficiently obtain global English-related information. The Chi-square goodness-of-fit test indicated a statistically significant difference, $\chi^2(1, N = 30) = 6.53$, $p = .011$, $\phi = .47$ (medium effect size), suggesting that learners perceived technology as a major facilitator of access to global information.

Qualitative findings

Qualitative responses helped explain this pattern. Participants reported extensive use of technology not only for academic purposes but also for daily communication, with some describing feelings of anxiety when disconnected from digital devices (nomophobia). Many learners mentioned using AI and digital tools such as ChatGPT, Google Translate, Google Scholar, and educational platforms to access authentic input and academic resources. These insights suggest that the immediacy and breadth of information available online reduced temporal and spatial barriers, reinforcing the quantitative finding.

Table 7. *Observed and expected frequencies for access to global information*

	Observed N	Expected N	Residual
Agree	22	15.0	7.0
Disagree	8	15.0	-7.0
Total	30		

Table 8

Chi-Square	6.53 ^a
df	1
Asymp. Sig.	.011

3.4.2. Shift from Traditional to Interactive Learning

This dimension measured whether learners perceived that technology encouraged them to abandon or modify traditional learning methods (e.g., rote memorization, paper-based drills, note-taking) in favor of more interactive practices such as online collaboration, AI-generated summaries, and digital communication tools.

Quantitative findings

Again, $N = 30$. Responses were split with 18 agreeing and 12 disagreeing. The Chi-square test indicated no statistically significant difference, $\chi^2(1, N = 30) = 1.20$, $p = .27$, $\phi = .20$ (small effect size). This suggests that learners did not overwhelmingly perceive a shift away from traditional learning habits.

Qualitative findings

Qualitative data clarified this result. Many participants described traditional strategies (e.g., memorization, note-taking, paper-based practice) as deeply ingrained habits from early schooling. While technology introduced alternative methods, learners often used digital tools as complements rather than replacements. Even when using AI-generated summaries, online dictionaries, or digital writing platforms, participants reported that these tools modified rather than fully replaced their established study routines. This pattern explains why the quantitative results did not show a clear shift away from traditional methods.

Table 9. *Observed and expected frequencies for shift to interactive learning*

	Observed N	Expected N	Residual
Agree	18	15.0	3.0
Disagree	12	15.0	-3.0
Total	30		

Table 10

Chi-Square	1.20 ^a
df	1
Asymp. Sig.	.27

3.4.3. Summary of RQ2 Findings

Taken together, the results for research question two indicate that technology significantly enhances learners' access to global information and supports flexible self-training. However, its influence on entrenched study habits remains limited, as learners tend to integrate technology as a complement to traditional methods rather than fully replacing them

3.5. Technology, Learner Autonomy, and Control Over the Learning Process

The third research question investigated whether technological tools empowered EFL learners to take control of their learning through increased autonomy and reduced dependence on physical learning environments. Two dimensions were measured: (1) perceived autonomy and (2) emancipation from physical classroom constraints. These dimensions were assessed using survey items asking participants to indicate their agreement with statements related to independent learning, teacher reliance, and the ability to learn outside the classroom. Responses were recorded on a 5-point Likert scale and dichotomized into agree (4–5) and disagree (1–3). The sample size for these analyses was $N = 30$.

3.5.1. Perceived Autonomy and Independence from Teachers

Quantitative findings

For perceived autonomy, 21 participants agreed and 9 disagreed that technology enhanced their ability to learn independently and reduced reliance on teachers. The Chi-square goodness-of-fit test showed a statistically significant difference, $\chi^2 (1, N = 30) = 6.53$, $p = .011$, $\phi = .47$ (medium effect size).

Qualitative findings

Qualitative data explained why participants perceived increased autonomy. Many students reported that technology provided instant feedback on writing, grammar, vocabulary, speaking, pronunciation, and fluency, allowing them to practice without the anxiety associated with performing in front of teachers or peers. Participants also noted that digital resources enabled them to review content repeatedly and seek clarification at their own pace. Some learners described AI-driven systems as offering personalized learning pathways and data-driven insights, which further supported their independent learning.

Table 11. *Observed and expected frequencies for perceived autonomy*

	Observed N	Expected N	Residual
Agree	21	15.0	6.0
Disagree	09	15.0	-6.0
Total	30		

Table 12

Chi-Square	6.53 ^a
df	1
Asymp. Sig.	.011

3.5.2. Emancipation from Physical Classroom Constraints

This dimension measured learners' perceptions of whether technology allowed them to learn effectively outside traditional classroom settings, such as through online courses, digital resources, or remote learning platforms.

Quantitative findings

A majority of participants (22 agree vs. 8 disagree) reported that technology enabled learning beyond the physical classroom. The Chi-square test indicated a statistically significant difference, $\chi^2(1, N = 30) = 6.53$, $p = .011$, $\phi = .47$ (medium effect size).

Qualitative findings

Qualitative responses highlighted that the COVID-19 pandemic had forced many learners to engage with online learning. Participants described this experience as evidence that meaningful learning could continue outside face-to-face classrooms. Many learners believed that virtual learning environments would remain an important part of education due to their flexibility and accessibility, although this view was expressed as their perception rather than an established fact.

Table 13. *Observed and expected frequencies for emancipation from physical constraints*

	Observed N	Expected N	Residual
Agree	22	15.0	7.0
Disagree	8	15.0	-7.0
Total	30		

Table 14

Chi-Square	6.53 ^a
df	1
Asymp. Sig.	.011

3.5.3. Integrated Summary

Across both dimensions, the findings suggest that technology contributes to learner autonomy and enables learning beyond traditional classroom boundaries. Quantitative results indicate significant positive perceptions, while qualitative themes such as instant feedback, personalized AI support, and the experience of remote learning during the pandemic provide contextual explanations for these perceptions. However, participants also noted barriers such as limited digital literacy and unequal access to devices and internet connectivity, suggesting that the benefits of technology may not be equally available to all learners.

4. Discussion

The present study examined how AI and related technologies influence self-training and professional development among TEFL undergraduate students. The findings indicate that participants generally perceived AI and technological tools as beneficial for language learning, learner autonomy, and flexible study practices.

4.1. Technology Acceptance and Learning Outcomes

Consistent with the Technology Acceptance Model (TAM) (Davis, 1989), participants reported high perceived usefulness and ease of use, which appear to support their intention to adopt digital tools in learning. This aligns with prior studies showing that perceived usefulness and ease of use strongly predict technology adoption in language learning contexts (Šumak et al., 2011).

Moreover, the results regarding increased engagement and motivation correspond with earlier research on CALL and MALL. For example, studies have shown that technology-enhanced environments improve learner motivation, autonomy, and access to authentic input (Ilter, 2009; Shahi, 2016). Participants in the current study similarly reported that AI tools reduced anxiety and provided a safe environment for practice, supporting findings by Ilter (2009) and Shahi (2016) on the affective benefits of technology-assisted learning.

4.2. AI and Learner Autonomy

The present findings also suggest that AI-supported tools can enhance learner autonomy by providing personalized feedback and opportunities for self-regulated learning. This is in line with Pawlak and Kruk (2012) and Honarзад and Rassaei (2019), who argued that CALL environments facilitate self-regulated learning through individualized feedback and scaffolding. Participants' reports of using AI platforms for monitoring progress and receiving immediate feedback support these claims.

4.3. Barriers to AI Integration

Despite positive perceptions, several barriers were reported, including unstable internet access, outdated devices, and limited digital literacy. These findings are consistent with prior research on technological inequalities in EFL contexts (Ghasemi et al., 2011). Such constraints may limit consistent engagement with AI tools and highlight the need for institutional support to ensure equitable access.

4.4. Institutional Support and Curriculum Integration

Participants also noted that formal curricula often lag behind technological developments, echoing concerns in the literature regarding the slow integration of digital tools into language education (Kukulska-Hulme, 2020). This suggests that institutional policies and teacher training programs play a crucial role in realizing the potential of AI in TEFL.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the sample was limited to 30 undergraduate participants from a single branch of Islamic Azad University, which restricts the generalizability of the results to other universities or contexts. Second, the use of self-report questionnaires may be subject to social desirability and recall bias. Third, the study focused on participants' perceptions rather than objective measures of language achievement or professional competence. Future research could include larger, more diverse samples and incorporate performance-based assessments to validate the perceived effects of AI and technology.

Conclusion and Pedagogical Implications

This study examined participants' perceptions of how AI and technology contribute to their professional development, support flexible self-paced learning, and enhance autonomy in the Iranian TEFL context. The findings indicate that participants generally view AI and technology as beneficial for language learning, engagement, and access to global resources. However, challenges such as limited access to devices, unstable internet, and insufficient digital literacy reduce the equitable benefits of these tools.

Pedagogical implications include the need for institutions to provide reliable technological infrastructure and training programs for both learners and teachers. TEFL curricula should incorporate AI-based tools and digital literacy instruction to help learners use technology more effectively and ethically. Teachers can also integrate AI-driven platforms (e.g., automated feedback systems, adaptive learning tools) to support personalized learning and autonomous practice.

Future Research Directions

Future studies could explore AI and technology use in diverse educational contexts, including multiple universities and rural settings. Research could also examine how demographic variables (e.g., proficiency level, prior technological experience) influence learners' engagement with AI tools. Additionally, investigating the long-term effects of AI integration and the ethical implications of AI-supported learning would provide deeper insights into its role in language education.

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