BILINGUAL PUBLISHING GROUP

Forum for Linguistic Studies
https://journals.bilpubgroup.com/index.php/fls

ARTICLE

Exploring the Effectiveness of Teachers' Professional Development Activities on AI Integration in English Language Education: A Case Study

Zafar Iqbal Khattak , ***Mohsen Ghorbanpoor*** , ***Binu Pathippallil Mathew**** , ***Faisal Abdul Sattar Al-Balushi***

Preparatory Studies Centre, University of Technology and Applied Sciences, Al Mussanah PC-314, Oman

ABSTRACT

This study examines the impact of EFL teachers' professional development activities on the integration of AI tools in teaching and learning. A mixed-methods approach, combining a questionnaire survey and focus group discussions, was used in the current study, which aimed to address the following research questions: (a) To what extent have teachers incorporated AI tools into their teaching practices after attending professional development sessions? (b) How significantly have EFL teachers' professional development training on AI integration contributed to enhancing student engagement in classroom participation across various language skills? The results indicate that the professional development activities on AI integration were instrumental in helping teachers focus on utilising AI tools to optimise student engagement in English language learning tasks. However, it was also found that students' motivation levels sometimes declined as AI overshadowed the task of achieving language production. The study has implications for stakeholders and policymakers to recognise the urgent need for an AI-driven pedagogical approach. It also proposes several necessary recommendations to enhance teachers' professional development activities, aiming to boost AI literacy and innovative technology in English Language Teaching and to bring about positive changes in the planning and implementation of future Teacher Professional Development (TPD) projects.

Keywords: AI Integration; Digital Literacy; English Language Education; Pedagogical Practices; Professional Development; Teacher Training; Technology Adoption

*CORRESPONDING AUTHOR:
Binu Pathippallil Mathew, Preparatory Studies Centre, University of Technology and Applied Sciences, Al Mussanah PC-314, Oman; Email: Binu.mathew@utas.edu.om

ARTICLE INFO
Received: 16 June 2025 | Revised: 25 June 2025 | Accepted: 8 July 2025 | Published Online: 22 August 2025
DOI: https://doi.org/10.30564/fls.v7i8.10534

CITATION
Khattak, Z.I., Ghorbanpoor, M., Mathew, B.P., et al., 2025. Exploring the Effectiveness of Teachers' Professional Development Activities on AI Integration in English Language Education: A Case Study. Forum for Linguistic Studies. 7(8): 1118–1134. DOI: https://doi.org/10.30564/fls.v7i8.10534

1. Introduction

Since the Covid 2019 epidemic, there has been a significant shift from traditional to online education that has mandated the integration of technology, especially AI, in the teaching and learning process across the globe [1]. AI influences educational contexts largely by providing tools to help teachers improve their teaching methodologies besides facilitating personalised learning experiences for students [2]. As academia has moved progressively towards digitised and AI-driven environments, there is a growing demand for teachers to develop the necessary skills to effectively integrate AI tools into their teaching practices. On the backdrop of these positive approaches to AI technology integration, the question arises whether teachers possess the necessary skills to effectively integrate AI tools into their teaching. This question becomes even more pertinent for two main reasons: (1) the integration of AI tools is vastly practiced by teachers without having any prior training, (2) AI tools have taken over the basic smart technology so rapidly that the stakeholders had insufficient time to plan and implement professional development for teachers [3]. Teachers Professional Development (TPD) is constantly needed, and English language teachers are no exception in this regard. In the wake of ongoing digitisation of education, the need for TPD becomes even more significant as the majority of English language teachers may not feel adequately equipped with the use of technology, especially AI tools, for transmission of knowledge and development of skills [4]. English Language teachers play a critical role in equipping students with essential communication skills to help them succeed in a rapidly evolving technological landscape. According to Kristiawan et al.[5], the integration of AI into English language teaching is critical to optimise learning engagement, personalisation, and language skill development. However, the effective integration of AI in the classroom requires teachers not only to familiarise themselves with the technology itself but also with its effective incorporation into their teaching strategies.

Addressing the needs of teachers, stakeholders will have to offer professional development programmes to enable them to use AI tools and methodologies in their teaching. Recent studies also suggest that TPD in AI should be regularly conducted to enable teachers to effectively incorporate it into their daily practice [6,7]. The Professional Development Committee (PDC) at the University of Technology and Applied Sciences, Al-Mussanah (UTAS-A) has been organising professional development activities for EFL teachers since the Academic Year 2023-24. The PDC advocates that the development and professional growth of teachers are central to the continued success of AI integration in classrooms. The PDC conducted workshops and webinars on AI tools to provide teachers with the knowledge, skills, and confidence to incorporate various aspects of AI into their teaching practice. Some of these AI tools include ChatGPT, Elevenlabs.io (text to speech), VIDNOZ (a tool to convert text to video), PI (a free personal AI assistant), Reading Coach on Microsoft Teams, Midjourney (text to image) and many more.

While teachers are increasingly urged to integrate AI tools in their teaching, it is still unclear whether they have these skills in their repertoire as AI tools integration has not recently been covered in TPD's programmes. Although educational institutions across the globe have started integrating AI tools into teachers' continuous professional development activities, the effect of such training programmes on teaching and learning remains relatively unexplored [8].

Statement of the Problem

English as a Foreign Language (EFL) teachers, often trained in traditional pedagogies, may face challenges when it comes to using AI tools and integrating them into their lessons. To what extent teachers' professional development activities on AI may improve teaching practices of English Language teachers is the question that needs to be addressed. Research studies have suggested that teachers' professional development activities on AI tools can lead to positive changes in teaching practices [4,9]. However, there is limited research on the specific impact of AI-focused development activities for English language teachers. This study aims to fill this gap by investigating the impact of professional development activities on equipping teachers with the necessary knowledge and skills to integrate AI tools and applications into their English language classrooms.

At the Preparatory Studies Centre (PSC), the PDC has been actively conducting professional development activities for EFL teachers. In the spring semester of the

academic year (2023-2024), the PDC conducted three intensive AI training workshops in which around 20 teachers participated. As a normal procedure, the committee collects feedback on these activities and prepares reports for PSC management and quality assurance purposes. Though these internal evaluations regularly strengthen the courses for the professional development of teachers and other academic activities, such internal evaluations can be taken as subjective and partial. In this backdrop, to avoid subjectivity and partiality, the present study has been carried out to evaluate the effectiveness of the courses for the professional development of teachers. Besides, in general terms, the desired philosophy of teachers' professional development programmes stresses the need to adjust to the whole exercise, both externally and internally. Hence, this study has been conducted to probe into the impact of these AI activities on the teaching of trained teachers.

This study aims to evaluate the effectiveness of teachers' development activities on AI by assessing their impact on EFL teachers' skills, confidence, and overall teaching performance. Specifically, it will explore whether AI-specific teachers' professional development activities lead to significant improvements in the adoption and application of AI tools in the English language classroom, and how these activities influence teachers' pedagogical approaches. Understanding the effectiveness of these activities will provide valuable insights for the design of future professional development programmes for teachers. The following research questions were addressed using a mixed-methods approach to evaluate the impact of teachers' professional development on teachers:

1. *To what extent did the teachers incorporate AI tools into their teaching practices after attending professional development sessions?*
2. *How significantly has EFL teachers' professional development training on AI integration contributed to enhancing student engagement in classroom participation across various language skills?*

2. Literature Review

AI, as defined by Baker and Smith [10], is the "capability of digital systems to simulate cognitive tasks." According to Sadiku [11], machines mimic human intelligence in learning, planning, problem-solving, speech recognition, decision-making, motion, manipulation, perception, and creativity. It is evident that all these areas are related to the field of education, enabling experience of tailored and autonomous teaching and learning processes with a range of AI-powered and automated applications [9].

BI, is revolutionising the field of education, opening new horizons for how teaching and learning are undertaken, particularly when teaching the English language [12]. AI tools enable English language teachers to streamline their tasks, allowing them to save valuable time in their instructional activities [13]. The Higher education (HE) sector has been greatly influenced by AI advancements in the recent past. It increasingly presents enormous opportunities to educate educators along with other professionals across the educational ecosystem to incorporate data-driven learning environments and intelligent tutoring systems, employing improvisation to traditional academic practices [14]. It is important to ensure that the educational ecosystem does not lag. Therefore, it is critical that educational institutions speed up in adopting artificial intelligence and other technologies related to education [15].

Research studies on AI in teachers' professional development are emerging. There have been a few studies from the last decade which highlight the importance and presence of AI in education. They show how AI can transform both teaching and learning. According to Luckin et al. [16], the use of AI tools like adaptive learning systems, automated grading, and intelligent tutoring systems has been useful in increasing personalised learning experiences for students and in facilitating them with real-time feedback. However, for AI to be effectively integrated into the classroom, its practical application is dependent on teachers' readiness to use these AI tools in real classroom environments [17]. In this regard, Roshan et al. [18] assert that teachers must be equipped with the necessary knowledge and skills to use these tools. Research suggests that teachers' lack of technical expertise and understanding of AI may hinder its adoption [14,19].

According to Hwang et al. [20], integrating AI into teaching and learning contexts has created opportunities for advanced technology-enhanced learning tools [21]. In recent years, various research studies have been conducted on the integration of AI tools for educational purposes.

For instance, Yousuf and Wahid [22] assert that the use of AI applications has increased rapidly in education facilitating dialogue, improving knowledge sharing, and promoting self-directed learning. These studies, however, emphasise the need for conducting targeted professional development sessions to help teachers use these tools effectively. Kaya [23] reported an increase in the use of AI tools among teachers who participate in AI professional development programs, facilitating the transition from outdated to AI-enabled teaching practices.

Trained teachers, however, perceive AI tool integration as a double-edged sword. They have mixed feelings and sometimes they may feel that after attending a one- or two-day AI professional development session, they feel comfortable using AI; however, some may find it challenging to replicate the new tasks in classrooms if training sessions are offered inadequately and unsustainably [18]. A study conducted by Tiwari [24] shows that trained teachers felt optimistic about AI's potential to revolutionise language learning through personalised experiences and immediate feedback. However, they also have voiced their apprehensions. The study emphasises responsible and inclusive AI usage in language education that necessitates thoughtful consideration of both benefits and challenges.

Researchers have explored teachers' views on AI tools like chatbots and virtual assistants in educational settings. According to Straková and Válek [25], AI is viewed positively if it enhances the learning process and does not influence students' interactions with teachers. They conclude that AI eases teachers' burden; however, these applications can prove useful only if teachers themselves know how to use it effectively in the classroom. Teachers can incorporate AI applications to manage teaching-related administrative work attendance and report generation. Moreover, AI-driven applications could be utilised by teachers to function as assessment systems in evaluating learning outcomes. Achieving a successful deployment of AI tools in real classroom settings requires not only basic technology knowledge but also a high level of focused AI sessions which allow teachers to capitalise on newly learned competencies that help them become more confident in using AI technology in classrooms [18].

Various research studies have emphasised the need for policies and guidelines to regulate the use of AI technologies for teachers' education [26–29] underscoring the significance of long-term professional development for teachers using AI tools. They argue that one key component of TPD should be AI literacy, which involves understanding AI, its capabilities and limitations, and its potential benefits and drawbacks in education. Another essential component is hands-on activities that engage teachers, their peers, and students actively using these tools during the training process.

Though professional development activities for teachers are designed to facilitate AI integration in classroom settings, there are some barriers encountered by teachers that could impact AI integration even after attending professional development sessions. According to a study conducted by Roshan et al. [18] which investigated the impact of teacher training and professional development on the integration of AI-based educational tools in classrooms, it is revealed that 60 % of participants reported a lack of training, while 40 % cited insufficient resources or infrastructure as the main barrier to AI integration in education. In addition, some outdated HEI policies and regulations on academic integrity may impede the successful use of AI in education. Finally, some teachers become hesitant to use AI tools in the classroom due to data, security and privacy concerns. The findings of Al-Shidi [30], which explored the effectiveness of AI tools on teaching and learning, contribute to the ongoing discourse on technology integration in education and provide recommendations for optimising the use of AI tools to improve teaching and student learning outcomes.

According to Qiao and Zhao [31], AI supports language skills development. They found that AI-based instruction effectively enhances L2 speaking skills and fosters self-regulatory processes among language learners, highlighting the potential of AI technology to optimise language learning experiences and promote learners' autonomy and metacognitive strategies in the speaking domain. Similarly, Pham [32] found that engaging with AI tools improved the anxiety level of the students in the educational process of generating ideas and ultimate skills development. Moreover, Zainuddin [9] emphasises that providing teachers with AI professional development sessions can enhance teachers' teaching skills and self-efficacy, which positively influences their ability to engage students in

classrooms and encourage active participation.

Teacher training based on AI can improve students' knowledge; however, the use of technology should be combined with the traditional learning approach [33]. This may imply that there are challenges such as inadequate infrastructure, lack of technical support, and gaps in AI-related pedagogical knowledge which may not allow for effective adoption of AI tools in teaching. This finding is consistent to another study's findings that suggest that though AI tools greatly enhance students' engagement, their integration should be carefully balanced with traditional instructional methods to meet holistic learning [34]. AI tools are considered useful tools to expand instructional variability for teachers; they cannot be a total replacement for the traditional teacher's role [12].

The above overview of a brief literature review shows that teachers' professional development in AI has been practiced with mixed results. There have been research studies that report that these professional development activities prove effective for teachers in gaining the requisite skills to integrate AI into their classroom practices. However, some research studies suggest that to attain the impact of these professional development activities, proper and clear policies supported by the availability of sufficient resources and infrastructure are strongly needed. Also, it has been reported through some research studies that there is a need for the adoption of a balanced approach to utilise AI tools in English language teaching. There is a marked focus of the researchers on keeping this balance between AI and traditional approaches. In this regard, the authors of this research feel that the trained teachers' views on the effectiveness of professional development activities on AI tools integration are very critical. The analysis of teachers' perceptions and experiences using a mixed methods approach will help us reach evidence-based conclusions about the effectiveness of professional development activities on AI. Hopefully, these will help us make informed decisions for curriculum design, planning, and implementation of academic projects.

3. Research Design

A mixed methods research design was utilised to comprehensively explore the impact of the Professional Development (PD) workshops on AI tools through the views and experiences of those English language teachers who actively took part in them. The mixed methods approach was used to incorporate the strengths of both quantitative and qualitative data. The synthesis of such data helps researchers conduct a thorough analysis and cross-validation of findings. Creswell and Plano Clark [35] advocated mixing qualitative and quantitative approaches with a viewpoint that this enhances the validity of educational research, especially in evaluating professional development activities. Similarly, Tashakkori and Teddlie [36] state that integrating qualitative and quantitative approaches enhances the understanding of the research topic, allows for the triangulation of findings, and helps validate the results.

The quantitative component of the study comprised a detailed questionnaire administered using Microsoft Forms to English language teachers who actively participated in the PD workshops on AI integration organised by PDC at UTAS-A. The questionnaire focused on several key aspects, including teachers' perceptions, frequency of AI tool usage, challenges encountered, and the perceived impact on teaching practices. To complement and validate the quantitative data, a face-to-face focused group interview was conducted with five volunteer teachers from the same participant group. The participant teachers were selected based on their willingness to participate and represent diverse perspectives. The focus-group interview comprised semi-structured questions aligned with the themes of the questionnaire. The qualitative data was used to cross-validate the findings and insights obtained through the questionnaire and offered a deeper understanding of teachers' experiences and interpretations regarding AI tool integration.

3.1. Participants

Convenience sampling was adopted to select the participants of this study due to the voluntary nature of the PD workshops at the PSC of UTAS-A. During the spring semester of the academic year (2023–2024), three intensive AI training workshops were held by one of the senior teachers of the centre. These sessions were held in weeks 4, 8, and 12. Two sessions were conducted in person while one was held online via MS Teams. A total of 21 teachers participated in these sessions; however, 12 teachers participated in all the workshops. After discussing the objec-

tives of the study with them and obtaining their consent, a post-PD questionnaire was sent to them to complete. The gender, age, teaching experience and the teaching level of teachers have been outlined in **Table 1** below.

Table 1. Population Descriptives.

Gender			Age			Teacher's Experience (in Years)			Level Taught by Teacher		
	Freq	**Percent**		**Freq**	**Percent**		**Freq**	**Percent**		**Freq**	**Percent**
Male	2	16.7	20–30	1	8.3	Below 5	2	16.7	Level 1	2	16.7
Female	10	83.3	31–40	2	16.7	6–10	2	16.7	Level 2	1	8.3
			41-50	6	50.0	11–15	2	16.7	Level 3	7	58.3
			51+	3	25.0	16–20	6	50.0	Level 4	2	16.7
						21+	2	16.7	Post Foundation	2	16.7
Total	12	100.0	Total	12	100.0	Total	21	100.0	Total	21	100.0

3.2. Instruments

An online questionnaire (see Appendix A) and a face-to-face focus group discussion (see Appendix B) were used to investigate the impact of the training workshops and evaluate the perceptions of the PSC English language teachers. The survey comprised four parts, and Microsoft Forms was used to reach out to the participants. The first section asked participants to identify various AI tools they had used, and the other three sections were dedicated to exploring the impact of the workshops on their AI integration and empowerment, frequency of use, and teaching effectiveness and student learning outcomes. Sections two and four used a five-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree' while section three used a five-point Likert scale ranging from "Never" to "Very Frequently." The frequency adverbs were defined as follows to avoid subjective interpretations: "Rarely" (1–2 times per semester), "Occasionally" (3–4 times per semester), "Often" (5–10 times per semester), and "Very Frequently" (more than 10 times per semester). The data was then recorded into values from 1–5 and analysed via IBM Statistical Package for Social Sciences (SPSS) version 27. Subsequently, half of the participants (N = 6) were invited to a focus group discussion to find out rich insights into what challenges the teachers faced in integrating AI tools into teaching practices, how the training sessions have contributed to their professional development, and whether they had any recommendations to enhance AI integration at the PSC.

Prior to data collection, the survey was submitted to a senior researcher at PSC for expert review and feedback. This assessment helped refine the survey items further and enhanced their comprehensiveness and relevance. The internal consistency of the last three sections was analysed separately since they measure different constructs. The Cronbach's Alpha scores of these constructs were 0.88, 0.82, and 0.76 for the constructs of training impact on Teacher Empowerment, Frequency of AI Use, and Teaching Effectiveness and Student Learning Outcomes as depicted in **Table 2** below.

Table 2. Reliability Statistics.

Survey Sections	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
2. Training Impact on Teacher Empowerment	0.884	0.895	5
3. Training Impact on Frequency of AI Use	0.828	0.836	9
4. Training Impact on Student Learning Outcomes	0.724	0.742	10

4. Results and Analysis

The following is the detailed analysis and interpretation of the data obtained through questionnaires and focus group interviews.

4.1. Section One Findings- Frequency of Used AI Tools

The purpose of this section was to investigate whether attending AI training PD sessions at PSC had encouraged the participants to use the introduced AI tools and their features in teaching. Therefore, the first question asked the participants to state whether they had used any of these tools. The results indicate that almost all the participants felt motivated to try AI tools (see **Table 3** below).

Next, they were asked to report which AI tools they had used. To analyse their responses, a crosstabulation multiple-response set was created first. The results of this new variable have been illustrated in **Table 4**.

Table 3. Did you use any of the AI tools/features introduced?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	91.7	91.7	91.7
	No	1	8.3	8.3	100.0
	Total	12	100.0	100.0	

Table 4. Frequency of Used AI Tools.

List of AI Tools	Responses		Percent of Cases
	N	Percent	
ChatGPT for Text Generation	10	24.4%	83.3%
Reading Coach (MS Teams)	7	17.1%	58.3%
TWEE	6	14.6%	50.0%
PI	5	12.2%	41.7%
Magic School	3	7.3%	25.0%
Elevenlabs.io	2	4.9%	16.7%
PowerPoint Speaking Coach for Fillers, Word Choice, and Delivery	2	4.9%	16.7%
Muse.ai	1	2.4%	8.3%
Bing Image Creator	1	2.4%	8.3%
Talkpal	1	2.4%	8.3%
VEED.io	1	2.4%	8.3%
ChatGPT 4 for Discourse	1	2.4%	8.3%
ChatGPT 4 for Handwriting to Text (OCR)	1	2.4%	8.3%
Total	41	100.0%	372.7%

Note: Dichotomy group tabulated at value 1. Percent of Cases is based on 12 respondents.

The total of 41 responses from the 12 EFL respondents, with a cumulative 372.7% percent of cases, shows the diverse application of the AI tools and the variability of EFL teachers' selection. ChatGPT for Text Generation was the most frequently used tool, comprising 83.3% of cases which indicates its dominance in text generation tasks. The second most popular tool was Reading Coach, an extension of Microsoft Teams, with 7 respondents (58.3%). TWEE, a platform that provides innovative resources for English language teachers to enhance lesson planning and content creation through AI-generated text, was used by 6 respondents (50.0%). PI, a personal AI assistant designed to facilitate meaningful dialogues, was selected by 5 (41.7%) EFL teachers which indicates moderate usage. Magic School, an AI platform designed to combat teacher burnout by simplifying teaching tasks and saving time, was the next tool with 3 (25.0%) respondents.

Elevenlabs.io, a platform to generate realistic AI-powered voice, and PowerPoint Speaking Coach, a feature in PowerPoint that helps users to rehearse presentations privately and provides feedback on their pacing, pitch, and use of filler words, were each used by 2 respondents (16.7%). This result shows some interest in listening and speaking tools. At the bottom of the list with 1 respondent (8.3%) stood Muse.ai (a video management and text-to-image platform), Bing Image Creator, Talkpal (an AI language tutor), VEED.io (a tool for creating, editing, and sharing videos), ChatGPT 4 for Discourse, and ChatGPT 4 for Handwriting to Text (OCR).

The results of the crosstabulation and frequency analysis of AI tools' functions in this sample underscore that the primary goals of EFL teachers were planning and content creation (see **Table 5** below). Lesson Planning and Materials Development were the most utilised functions, with 9 respondents (75.0% of cases) and 8 respondents (66.7%) respectively. Five respondents (41.7%) reported using AI tools for Image Generation and Voice Generation, which suggests moderate use of AI for creating multimedia-supported educational materials. The other functions, including Feedback on Writing and Coaching Speaking (each selected by 2 respondents), and Feedback on Speaking (1 respondent), show minimal inclination to use AI tools for spoken and written feedback.

Table 5. Frequency of Used AI Functions.

List of AI Tool Functions	Responses		Percent of Cases
	N	Percent	
Lesson Planning	9	28.1%	75.0%
Materials Development	8	25.0%	66.7%
Image Generation	5	15.6%	41.7%
Voice generation	5	15.6%	41.7%
Feedback on Writing	2	6.3%	16.7%
Coaching Speaking (fillers, word choice, and delivery)	2	6.3%	16.7%
Feedback on Speaking	1	3.1%	8.3%
Total	32	100.0%	266.7%

Note: Dichotomy group tabulated at value 1. Percent of Cases is based on 12 respondents.

4.2. Section Two Findings- Training Impact on Teacher Empowerment

Section two of the survey aimed to investigate whether attending PD training impacts EFL teachers' attitudes about using AI tools. There were five questions, and the results presented in **Table 6** below indicate a substantial positive effect on the respondents at the PSC, UTAS-A. The mean of 3.66 with a standard deviation of 0.98 in comfort-level suggests a moderate level of ease with AI tools after AI training workshops. The highest mean was for acquiring new skills (4.17) reflecting the positive impact of the PD on teachers' technical and ped-

agogical capabilities. The low standard deviation (0.58) implies a high level of consistency in their attitudes. The mean score for increased confidence in using AI tools was 3.83 (SD = 0.83), leaning toward agreement with PD's contribution to confidence boost. Post-PD job satisfaction and teaching effectiveness averaged 3.75 (SD = 0.62) and 3.83 (SD = 0.58), respectively. Consensus among respondents is revealed in the relatively low standard deviations across all measures (ranging from 0.58 to 0.98). This result highlights the uniform impact of training and suggests that the PD workshops positively contributed to the empowerment of teachers by elevating their comfort, skills, confidence, satisfaction, and teaching effectiveness.

Table 6. Training Impact on Teacher Empowerment.、

	Mean	Std. Deviation	N
Comfort after PD	3.66	0.98	12
New Skills	4.16	0.57	12
Confidence Boost	3.83	0.83	12
Increased Job Satisfaction.	3.75	0.62	12
Enhanced Teaching Effectiveness	3.83	0.57	12

4.3. Section Three Findings- Training Impact on Frequency of AI Use

The respondents were first asked to report how PD training had influenced the frequency with which they used AI tools for classroom preparation after six months. The results, on a 4-point Likert scale, are presented in **Table 7**. The majority (58.3%) reported that they use AI more often now, which suggests the beneficial effect of training on their preparation habits. Two other participants (16.7%) noted that they are using AI significantly more often, which further supports the training's constructive influence. However, another two respondents reported less frequent use of AI, and one participant (8.3%) stated no impact at all, highlighting that the PD influenced nearly all participants to some degree. These results reveal that most of the respondents (75%) integrated AI for class preparation more often, and that the PD workshops largely served their purpose. However, a small subset of teachers (25%) remained unaffected or discouraged from using AI.

Table 7. Post-PD Frequency of AI Use for Class Preparation.

	Frequency	Percent	Valid Percent	Cumulative Percent
I use AI less often	2	16.7	16.7	16.7
No impact at all	1	8.3	8.3	25.0
I use AI more often now	7	58.3	58.3	83.3
I use AI significantly more often now	2	16.7	16.7	100.0
Total	12	100.0	100.0	

Table 8 provides the frequency of post-PD AI tool utilisation for different purposes among the 12 respondents. This self-report was measured on a 5-point Likert scale. However, to maintain consistency and avoid subjective interpretation of the alternatives, the frequency intervals were defined as 1. Never, 2. Rarely (one or two times per semester), 3. Occasionally (three or four times per semester), 4. Often (between five to ten times per semester), 5. Very frequently (more than ten times per semester).

Table 8. Training Impact on Frequency of AI Use.、

	N	Mean	Std. Deviation
AI for Listening Materials	12	3.00	1.12
AI for Reading Materials	12	2.91	1.24
AI for Creating Assignments	12	2.83	0.57
AI for Speaking Materials	12	2.83	.937
AI for Writing Materials	12	2.83	1.02
AI for Speaking Feedback	12	2.08	1.08
AI for Writing Feedback	12	1.83	0.93
AI for Grading Assignments	12	1.75	0.75

Despite the EFL teachers' overall positive report in the previous question (see **Table 7**), the results of the questions addressing individual skills and components reveal a low to moderate usage pattern. Using AI to prepare materials for receptive skills, listening and reading, led with a mean of 3.00 (SD = 1.12) and 2.92 (SD = 1.24), respectively. This was closely followed by productive skills, speaking and writing, and creating assignments at a similar frequency (mean = 2.83). Other functions received lower frequencies indicating rare use of AI for these purposes. Speaking and writing feedback averaged 2.08 (SD = 1.08) and 1.83 (SD = 0.93) respectively while grading assignments showed the lowest mean at 1.83 (SD = 0.94). Additionally, the higher standard deviations, especially in reading (1.24) and listening (1.13), underscore more variability in usage frequency among the training attendees.

Thus, it can be interpreted that although previous data showed elevated post-PD comfort, skills and overall perceived usage (as seen in **Table 6** and **Table 7**), the frequency of AI use did not exceed 3 (occasional usage) when more specific areas of language teaching were evaluated (as seen in **Table 8**). This result implies there could be certain factors at play that impede the incorporation of AI tools into teaching practices.

4.4. Section Four Findings- Training Impact on Student Learning Outcomes

The next part of the survey sought to evaluate the perceived effects of AI tools integration on student performance. The respondents answered 10 questions on a 5-point Likert scale. The data, demonstrated in **Table 9** below, reveal moderate to high perceived improvements ranging from 3.33 to 3.83. Speaking and reading comprehension both had the highest means of 3.83 (SD = 0.38), which consistently highlights a belief in AI supporting the development of these skills. A closely similar advantageous impact on listening comprehension (mean = 3.75, SD = 0.45) and pronunciation (mean = 3.75, SD = 0.62) was perceived by the PSC EFL teachers. Positive attitude towards learning through AI prepared activities (mean = 3.66, SD = 0.65), vocabulary retention (mean = 3.58, SD = 0.51), and writing improvement (mean = 3.50, SD = 0.67) showed moderate enhancements. More active student engagement (mean = 3.41, SD = 0.51) and grammar improvement (mean = 3.33, SD = 0.65), indicated a slightly positive, less pronounced perception. The low standard deviations across all the responses imply a high level of agreement and slight variability among teachers.

The findings of this section demonstrate that EFL teachers at PSC perceive AI tools to have a moderate to high influence on improving student learning outcomes. However, this moderate to strong gain perception cannot explain the relatively low frequency of use in the previous section, further supporting the existence of impeding factors.

Table 9. Training Impact on Student Learning Outcomes.

	N	Mean	Std. Deviation
Reading Improvement	12	3.83	0.38
Speaking Improvement	12	3.83	0.38
Pronunciation Improvement	12	3.75	0.62
Listening Improvement	12	3.75	0.45
Students' Attitude: AI Tools Enhance Learning	12	3.66	0.65
Increased Student Achievement	12	3.58	0.66
Enhanced Vocabulary Retention	12	3.58	0.51
Writing Improvement	12	3.50	0.67
Increased Student Engagement	12	3.41	0.51
Grammar Improvement	12	3.33	0.65

4.5. Comparative Analysis of Pre-PD and Post-PD Perceptions

The comparison of post-PD findings in this paper with pre-PD perceptions presented in Khattak et al. [4] unveils strong consistencies across the approximately six-month interval between the two surveys conducted at the PSC, UTAS-A. Prior to PD training, teachers perceived a high level of comfort with AI tools, with a mean score of 4.19 (SD = 0.60) among 21 respondents [4]. This same perception, albeit lower, is evident in the post-PD comfort mean of 3.66 (SD = 0.98) for 12 respondents (see **Table 6**). Although both figures indicate high comfort, the reduced post-PD value might be due to unfamiliarity with the new AI tools that were introduced in the training workshops.

Furthermore, utilising the generative power of AI tools for materials development and assessment reflects moderately positive changes in nearly all areas although the overall means on both pre and post PD surveys are not high (see **Table 10** below).

Table 10. Comparison of the Frequency of AI Use between Pre and Post PD.

Teacher's Perceptions	Pre-PD (Table 5[1])			Post-PD (Table 8)		
	N	Mean	SD	N	Mean	SD
AI for Listening Materials	21	2.43	0.978	12	3.00	1.12
AI for Reading Materials	21	3.00	1.140	12	2.91	1.24
AI for Creating Assignments	21	2.14	1.014	12	2.83	0.57
AI for Speaking Materials	21	2.19	1.030	12	2.83	.937
AI for Writing Materials	21	2.48	1.209	12	2.83	1.02
AI for Speaking Feedback	21	1.67	1.065	12	2.08	1.08
AI for Writing Feedback	21	1.33	0.483	12	1.83	0.93
AI for Grading Assignments	21	1.24	0.539	12	1.75	0.75

Note: [1] The data is based on the reference [4], p. 659, ***Table 5****.*

The only item that witnessed a slight decline was using AI for preparing reading materials which recorded a mean frequency of 3.00 (SD = 1.14) in the pre-PD survey, and the post-PD mean for reading materials development (2.91, SD = 1.24) while the rest of the areas showed an increase. The consistent rise in the reported frequency of using AI tools after a six-month period indicates the productive contribution of the training workshops.

Table 11 below compares the perceptions of EFL teachers at PSC regarding the impact of AI tools on student learning outcomes before and after PD training covering six months. The reverse-worded item on student engagement had a pre-PD mean of 2.48 (SD = 0.87), showing slight disagreement with AI's contribution to engagement. Post-PD, the mean increased slightly to 2.58 (SD = 0.51). In other words, despite the small difference, both means suggest a moderate belief in AI's positive impact. Another reverse-worded item, speaking proficiency, from a pre-PD mean of 2.62 (SD = 0.80) changed to 2.16 (SD = 0.38) in post-PD. A closer disagreement with the negative statement means a stronger belief in AI's effectiveness for speaking. The stronger post-PD perceived impact was reinforced in several other items including pronunciation (from 3.52, SD = 0.75 to 3.75, SD = 0.62), listening comprehension (from 3.62, SD = 0.74 to 3.75, SD = 0.45), reading comprehension (from 3.67, SD = 0.73 to 3.83, SD = 0.38). Writing proficiency remained almost unchanged, which suggests stability in perceptions. Values for vocabulary retention decreased marginally from 3.62 (SD = 0.80) to 3.58 (SD = 0.51). Although this change indicates a minor drop in perceived effectiveness, it is still moderately positive. The last reverse-worded item was grammar, which declined from a pre-PD neutral of 3.00 (SD = 0.89) to 2.66 (SD = 0.65) in the post-PD survey. As disagreement with the negative statement has increased, this change reflects a growing belief that AI improves grammar. Overall, these comparisons highlight generally stronger beliefs in the beneficial effect of using AI tools across most learning outcomes.

Table 11. Comparison of the Impact of AI on Student Learning Outcomes between Pre and Post PD.

Teacher's Perceptions	Pre-PD (Table 6[1])			Post-PD (Table 9[2])		
	N	Mean	SD	N	Mean	SD
Using AI tools does not contribute to student engagement.	21	2.48	0.87	12	2.58	0.51
Using AI tools does not improve students' speaking proficiency.	21	2.62	0.80	12	2.16	0.38
Using AI tools improves students' pronunciation.	21	3.52	0.75	12	3.75	0.62
Using AI tools improves students' listening comprehension.	21	3.62	0.74	12	3.75	0.45
Using AI tools improves students' reading comprehension.	21	3.67	0.73	12	3.83	0.38
Using AI tools improves students' writing proficiency.	21	3.52	0.92	12	3.50	0.67
Using AI tools enhances students' vocabulary retention rates.	21	3.62	0.80	12	3.58	0.51
Using AI tools has no effect on students' grammar range and accuracy.	21	3.00	0.89	12	2.66	0.65

Note: [1] The data is based on reference [4], p. 659, **Table 6. [2] **Table 9** presents the recoded values of the reverse-worded items. However, because **Table 6**[1] presents the original values of these items, the same approach has been adopted here to avoid confusion.*

4.6. Qualitative Insights from Focus Group Discussions

Half of the total participants of the AI training workshops, 6 EFL teachers at PSC, joined a semi-structured focus group discussion. Their perceptions revealed several important themes that align with and expand upon the quantitative findings. All participants asserted that the workshops greatly raised their awareness of the significance and capabilities of AI tools. This basic familiarity motivated the EFL teachers to attempt to integrate some of the AI tools that were introduced in the training into their practices. The participants, particularly Level 4 (CEFR B2) teachers, noted that they ventured using practical tools such as Reading Progress, Search Progress, and Speaking Progress which are embedded in Microsoft Teams. This corrobo-

rates the quantitative data on teacher empowerment, where post-PD results showed a mean comfort level of 3.66 (SD = 0.98) and new skills acquisition at 4.16 (SD = 0.57) (**Table 6**). Teachers reported an increased frequency of AI, particularly with PI AI Assistant. This corresponds with the post-PD survey finding that 75% of respondents used AI more or significantly more often for class preparation (**Table 7**). As for the functions of AI tools, PSC teachers said they primarily used them for materials development and language games. This report highlights a broader application to interactive games which was not included in the survey. PSC teachers' discussion also captured themes related to students' learning outcomes. They asserted that the use of AI tools to create more interactive materials and games increased student engagement, motivation, and interest. Additionally, exposure to diverse English accents alongside with Reading Progress improved learners' pronunciation. These comments support the quantitative finding of enhanced student learning outcomes, such as speaking and pronunciation improvements (both means of 3.83, **Table 9**).

Despite these strengths, teachers observed many challenges that reduced the practicality and effectiveness of AI integration. These include inadequately equipped classrooms, and weak internet connections, causing delays and malfunctions. In addition to infrastructural deficiencies, the lack of clear institutional guidelines, policies, and AI-driven pedagogical frameworks hindered consistent usage. These could potentially explain the moderate frequency of AI use (e.g., mean ≤ 3.00, **Table 8**) by EFL teachers at PSC. Other culprits indicated in the focus group discussion were the lack of investment in buying a premium subscription and level-appropriateness of AI tools. Teachers mentioned that although all AI tools come with free trials or limited daily premium access, they usually would suffice only for experimenting with and learning how these AI tools could best be used for the purposes of language teaching. Moreover, AI often produces complex language which is not suitable for A1-B1 CEFR students, limiting its use during class. Other demotivating factors were student anxiety, lack of readiness, extreme dependence on or overuse of AI for assignments, and reduced critical thinking.

The discussion concluded with some recommendations from the participants. They expressed the importance of conducting ongoing, goal-oriented teacher training rather than general introductions to the tools and their features. Also, they stated that institutional investment in AI integration and the incorporation of AI detection tools could promote ethical use among students. Lastly, the development of clear guidelines and pedagogical frameworks could address these challenges and facilitate the effective use of AI capabilities, further supporting the achievement of learning outcomes.

5. Discussion

5.1. AI Integration in Teaching Practices

As the results of this study indicate, teachers who received targeted professional development training on integrating artificial intelligence into English language education report a significant increase in the use of AI tools in their classrooms. They also state a steady rise in their level of confidence in experimenting with several new AI tools, in addition to the ones they were trained on, which reveals a shift towards an AI-integrated pedagogy among the participants. These findings align with the views of earlier researchers [4,37,38], who claim that providing targeted professional development training to teachers enhances their professional practices.

The participants stated that ChatGPT and Microsoft Teams Reading Coach were their most preferred AI tools. They also mentioned that these tools were primarily used for providing feedback, implementing differentiated instruction, and facilitating self-learning. Recent research reveals that AI tools can be used for giving effective feedback [39], individualised instruction [40] and self-learning [41]. Another positive aspect of AI-integrated professional development sessions, as stated by the participant teachers, is an increase in their comfort level when using AI tools. These positive remarks underscore the importance of continuous professional development activities in equipping teachers with the necessary skills and tools to navigate the complexities of modern English language education.

5.2. Impact of AI-integrated Professional Development on Student Engagement

The increase in the frequency of AI usage by teach-

ers after training indicates their trust in the potential of this new technology for enhancing student engagement. Studies confirm that integrating AI tools into teaching facilitates more interactive and personalised learning experiences [42,43]. As the participants reported, integrating AI tools into teaching enhanced student engagement to some extent, as AI tools, like ChatGPT, are capable of providing personalised learning experiences tailored to individual needs and preferences. Moreover, assigning loud reading tasks on Microsoft Teams Reading Progress was particularly beneficial in promoting self-learning strategies. As learners received instant feedback generated by the system using colour codes and suggestions for improvement, it significantly contributed to students' reading proficiency and increased their motivation to learn. The respondents stated that with AI-generated data, they could gain a comprehensive understanding of student progress and adjust their instructional strategies accordingly.

5.3. Challenges of AI Integration in English Language Education

Despite the participants' increased interest in using AI tools, serious challenges remained, including inadequate infrastructure and a lack of policies and guidelines for the responsible use of AI. These hurdles may have discouraged some teachers from utilising advanced artificial intelligence tools, echoing the findings of previous studies that a lack of institutional support, as well as guidelines and procedures, can hinder the successful integration of technology in teaching and learning. As Theodorio [44] states, "Educators, while generally comfortable with integrating digital technologies into their teaching methods, still require technical assistance to effectively employ technology within the classroom setting" (p. 12). Therefore, it is essential to address these challenges for the effective integration of artificial intelligence into English language education.

Weak internet connectivity and a lack of access to advanced AI tools were some of the challenges that the participant teachers reported. This underlines the fact that professional development training should not be limited to skill development but also consider other factors necessary for the effective use of technology. Furthermore, the responses from focus group discussions indicate that some teachers noticed a decline in student motivation and language skills due to their overreliance on AI tools. It suggests that while AI tools enhance English language learning, there needs to be proper guidelines and restrictions for students' use.

6. Conclusion and Recommendations

This study reveals that EFL teachers' professional development training on AI integration in teaching and learning has significantly increased their level of confidence, comfort, and essential skills in using AI tools in the classroom. While the findings reveal positive perceptions regarding student engagement and learning outcomes, they also highlight several challenges, including inadequate infrastructure, a lack of institutional support, and the absence of policies and procedures for the successful implementation of AI-integrated curricula. These findings have pedagogical implications for a wide range of stakeholders. Teachers' professional development sessions should be tailored to provide ongoing support in equipping them with the essential tools and strategies for the successful implementation of an AI-driven pedagogy. In addition, educational institutions should modernise their infrastructure and create an environment conducive to teaching and learning in an increasingly digital world. Finally, policymakers should design frameworks for integrating AI technologies into English language education.

Author Contributions

The contributions of the authors were as follows: Conceptualization, Z.I.K..; methodology, Z.I.K., M.G., B.P.M., and F.A.S.A.-B.; software, M.G..; validation, M.G.., B.P.M..; formal analysis, M.G..; investigation, Z.I.K., M.G..; resources, F.A.S.A.-B..; data curation, M.G..; writing—original draft preparation, Z.I.K., M.G., and B.P.M..; writing—review and editing, B.P.M., F.A.S.A.-B..; visualization, Z.I.K., M.G..; supervision, Z.I.K., B.P.M..; project administration, Z.I.K., M.G..; funding acquisition, Z.I.K.. All authors have read and agreed to the published version of the manuscript.

Funding

This study received financial support from the Internal Research Fund of the University of Technology and Applied Sciences, Al Mussanah (UTASA-IRF-2025-01).

Institutional Review Board Statement

This study obtained ethical clearance from the Research and Consultancy Department of the University of Technology and Applied Sciences, Al Mussanah. The research was conducted in accordance with ethical standards to ensure the protection of the rights and welfare of all participants.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data that supports the findings of this study are available from the author upon reasonable request.

Acknowledgments

The Researchers would like to express their sincere gratitude to the administration of the University of Technology and Applied Sciences, Al Mussanah, for their support and resources that made this study possible. We also extend our heartfelt thanks to the participating teachers, whose insights and contributions were invaluable to our research.

Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Hwang, G.J., Tu, Y.F., Tang, K.Y., 2022. AI in online-learning research: Visualizing and interpreting the journal publications from 1997 to 2019. International Review of Research in Open and Distributed Learning. 23(1), 104–130. DOI: https://doi.org/10.19173/irrodl.v23i1.6319

[2] Rochsantiningsih, D., Aniq, L.N., 2023. Teachers' voices of TPACK practices on ELT in the post-COVID-19 pandemic. Journal of English Language Teaching Innovation and Materials. 5(1), 17. DOI: https://doi.org/10.26418/jeltim.v5i1.59090

[3] Zhao, Y., Pugh, K., Sheldon, S., et al., 2002. Conditions for Classroom Technology Innovations. Teachers College Record. 104(3), 482–515. DOI: https://doi.org/10.1177/016146810210400308

[4] Khattak, Z.I., Ghorbanpoor, M., Mathew, B.P., 2025. Perceptions of EFL teachers on integrating AI tools for foundation-level English language instruction. International Journal of Educational Practice. 13(2), 653–668. DOI: https://doi.org/10.18488/61.v13i2.4122

[5] Kristiawan, D., Bashar, K., Pradana, D.A., 2024. Artificial Intelligence in English Language Learning: A Systematic Review of AI Tools, Applications, and Pedagogical Outcomes. Artistic Teaching of English as a Foreign Language. 5(2), 207–218. DOI: https://doi.org/10.36663/tatefl.v5i2.912

[6] Hixon, E., So, H.J., 2019. Preparing teachers for AI in the classroom: Challenges and strategies. International Journal of Educational Technology in Higher Education. 16(1), 23–34. DOI: https://doi.org/10.1186/s41239-019-0179-4

[7] West, D.M., Seltzer, E., O'Brien, P., 2021. Artificial Intelligence in Education: Applications and implications, 1st ed. Brookings Institution Press: Washington, United States. pp. 1–78

[8] Awadh Al-Saiari, M., Al-Mughairiyah, Y.M., Nasser Al-Mashaikhiya, B., et al., 2024. Investigating the Impact of Training Program on Generative AI Applications in Improving University Teaching. Qubahan Academic Journal. 4(3), 315–332. Available from: https://journal.qubahan.com/index.php/qaj/article/view/760 (cited 12 March 2025).

[9] Zainuddin, M., 2024. Teachers' perceptions of AI tools in enhancing student engagement for English language learning. Research Studies in English Language Teaching and Learning. 2(6), 367–380. Available from: https://rseltl.pierreonline.uk/index.php/J/article/view/64 (cited 10 March 2025).

[10] Baker, T., Smith, L., 2019. Educ-AI-tion Rebooted? Exploring the Future of Artificial Intelligence in Schools and Colleges. Available from: https://media.nesta.org.uk/documents/Future_of_AI_and_education_v5_WEB.pdf (cited 20 March 2025).

[11] Sadiku, M.N.O., Ashaolu, T.J., Ajayi-Majebi, A., et al., 2021. Artificial Intelligence in Education. International Journal of Scientific Advances. 2(1), 1–6. DOI: https://doi.org/10.51542/ijscia.v2i1.2

[12] Liang, X., Wu, Y., Zhang, J., 2021. Research trends of artificial intelligence applications in language education: A bibliometric analysis. Computer Assisted Language Learning. 34(5–6), 674–697. DOI: https://doi.org/10.1080/09588221.2019.1681465

[13] Micheni, E., Machii, J., Murumba, J., 2024. The Role of Artificial Intelligence in Education. Open Journal for Information Technology. 7(1), 43–54. DOI: https://doi.org/10.32591/coas.ojit.0701.04043m

[14] Fadel, C., Holmes, W., Bialik, M., 2019. Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. Independently published: Chicago, Illinois.

[15] Verma, S., Tomar, P., 2020. Impact of AI Technologies on Teaching, Learning, and Research in Higher Education. IGI Global: Hershey, PA, USA.

[16] Luckin, R., Holmes, W., Griffiths, M., et al., 2016. Intelligence Unleashed: An Argument for AI in Education: London, UK.

[17] Zawacki-Richter, O., Marín, V.I., Bond, M., et al., 2019. Systematic review of research on artificial intelligence applications in higher education – where are the educators? International Journal of Educational Technology in Higher Education. 16(1), 39. Available from: https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-019-0171-0 (cited 24 March 2025).

[18] Roshan, S., Zaffar Iqbal, S., Qing, Z., 2024. Teacher Training and Professional Development for Implementing AI-Based Educational Tools. Journal of Asian Development Studies. 13(2), 1972–1987. DOI: https://doi.org/10.62345/jads.2024.13.2.154

[19] Al Zakwani, M., P.M., B., 2025. Exploring student insights on ChatGPT as a resource for learning English and its influence on learner independence. Forum for Linguistic Studies. 7(2), 813–824. DOI: https://doi.org/10.30564/fls.v7i2.7955

[20] Hwang, G.J., Xie, H., Wah, B.W., et al., 2020. Vision, challenges, roles and research issues of artificial intelligence in education. Computers and Education: Artificial Intelligence. 1, 100001. DOI: https://doi.org/10.1016/j.caeai.2020.100001

[21] Al-Abri, M., Al Mamari, A., Al Marzouqi, Z., 2025. Exploring the implications of generative AI tools in teaching and learning practices. Journal of Education and E-Learning Research. 12(1), 31–41. DOI: https://doi.org/10.20448/jeelr.v12i1.6355

[22] Yousuf, M., Wahid, A., 2021. The role of artificial intelligence in education: Current trends and future prospects. In: 2021 International Conference on Information Science and Communications Technologies (ICISCT), Tashkent, Uzbekistan, 4–6 November 2021; pp. 1–7. Available from: https://bit.ly/3xAgc4W (cited 30 March 2025).

[23] Kaya, M.H., 2024. A professional training to make English language instructors AI-ready. ELT Journal. 78(4), 466–477. DOI: https://doi.org/10.1093/elt/ccae041

[24] Tiwari, H., 2024. AI-driven English language learning: leveraging applications/APIs for dynamic content and feedback. World Journal of Advanced Research and Reviews. 22(3), 1611–1616. DOI: https://doi.org/10.30574/wjarr.2024.22.3.1882

[25] Straková, N., Válek, J., 2023. Chatbots as a learning tool: Artificial intelligence in education. Journal of Educational Technology. 15(2), 45–62. DOI: https://doi.org/10.53349/resource.2024.is1.a1259

[26] Amado, J.A., Dayson, C.J.P., Gipaya, P.N., et al., 2024. Assessing the impact of AI generative tools on administrative and supervisory practices in education. Sustainable Development. 12(1), 32–40. Available from: https://research.lpubatangas.edu.ph/wp-content/uploads/2024/07/3.-APJMSD-2024-06.pdf (cited 4 April 2025).

[27] Dignum, V., 2019. Responsible Artificial Intelligence: How to Develop and Use AI in a Responsible Way, 1st ed. Springer: Cham, Switzerland. pp. 1–135.

[28] Pedro, F., Subosa, M., Rivas, A., et al., 2019. Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development. United Nations Educational, Scientific and Cultural Organization: Paris, France. pp. 1–36.

[29] Brandão, A., Pedro, L., Zagalo, N., 2024. Teacher professional development for a future with generative artificial intelligence – an integrative literature review. Digital Education Review. (45), 151–157. Available from: https://revistes.ub.edu/index.php/der/article/view/46517 (cited 6 April 2025).

[30] Al-Shidi, S., 2024. Exploring the implications of generative AI tools in teaching and learning practices. Journal of Education and E-Learning Research. 12(1), 1–15. Available from: https://www.researchgate.net/publication/382869008 (cited 10 April 2025).

[31] Qiao, H., Zhao, A., 2023. Artificial intelligence-based language learning: illuminating the impact on speaking skills and self-regulation in Chinese EFL context. Frontiers in Psychology. 14, Article 1297405. DOI: https://doi.org/10.3389/fpsyg.2023.1297405

[32] Pham, T.N., 2022. Using artificial intelligence applications for teaching and learning foreign language: facts and solutions. International Journal of English Language Education and Literary Studies. 1, 12–15. DOI: https://doi.org/10.22161/ijeel.1.4.2

[33] Wu, D., Chen, M., Chen, X., et al., 2024. Analyzing K-12 AI education: A large language model study of classroom instruction on learning theories, pedagogy, tools, and AI literacy. Computers and Education: Artificial Intelligence [Internet]. 7, 100295. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2666920X24000985 (cited 11 April 2025).

[34] Adolphs, S., Clark, L., Dörnyei, Z., et al., 2018. Digital innovations in L2 motivation: Harnessing the power of the Ideal L2 Self. System. 78, 173–185. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0346251X17305754 (cited 11 April 2025).

[35] Creswell, J.W., Plano Clark, V.L., 2018. Designing and Conducting Mixed Methods Research, 3rd ed. SAGE Publications: Thousand Oaks, CA, USA.

[36] Tashakkori, A., Teddlie, C., 2003. Issues and Dilemmas in Teaching Research Methods Courses in Social and Behavioral Sciences: US Perspective. International Journal of Social Research Methodology. 6(1), 61–77. DOI: https://doi.org/10.1080/13645570305055

[37] Cukurova, M., Kralj, L., Hertz, B., et al., 2024. Professional Development for Teachers in the Age of AI. European Schoolnet: Brussels, Belgium.

[38] P.M., B., 2024. Affordances and challenges of integrating artificial intelligence into English language education: A critical analysis. English Scholarship Beyond Borders. 10(1), 34–51. Available from: https://www.englishscholarsbeyondborders.org/wp-content/uploads/2024/06/Binu-1-1.pdf (cited 10 February 2025).

[39] Iyer, A.P., Karthikeyan, J., Khan, R.H., et al., 2020. An analysis of artificial intelligence in biometrics—the next level of security. Journal of Critical Reviews. 7(1), 571–576. Available from: https://jcreview.com/archives/volume-7/issue-1/287 (cited 10 February 2025).

[40] Celik, I., Dindar, M., Muukkonen, H., et al., 2022. The promises and challenges of artificial intelligence for teachers: A systematic review of research. TechTrends. 66(4), 616–630. DOI: https://doi.org/10.1007/s11528-022-00715-y

[41] Mohebbi, A., 2025. Enabling learner independence and self-regulation in language education using AI tools: a systematic review. Cogent Education. 12(1). DOI: https://doi.org/10.1080/2331186X.2024.2332904

[42] Hong, W.C.H., 2023. The impact of ChatGPT on foreign language teaching and learning: Opportunities in education and research. Journal of Educational Technology Innovation. 5(1). DOI: https://doi.org/10.61414/jeti.v5i1.103

[43] Kohnke, L., Moorhouse, B.L., Zou, D., 2023. ChatGPT for language teaching and learning. RELC Journal. 54(2), 537–550. DOI: https://doi.org/10.1177/00336882231162868

[44] Theodorio, A.O., 2024. Examining the support required by educators for successful technology integration in teacher professional development program. Cogent Education. 11(1). DOI: https://doi.org/10.1080/2331186X.2023.2298607