

AI-Augmented Professional Development Systems for English Language Teachers

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Abstract: Professional development of English language teachers involves constant modification in relation to pedagogical practices, technological innovations, and learner-centered approach. Nevertheless, many professional development programs offer only generic training opportunities without proper personalization and continuous assistance. In this regard, the research suggests developing an AI-Augmented Professional Development System for English language teachers, which would facilitate personalized learning, AI-based recommendations, reflective feedback, and constant improvement in terms of teachers' competencies. The suggested framework combines four major elements: teacher profiling, analysis based on artificial intelligence, professional assistance, and evaluation of results. The experiment involved a sample of 150 English language teachers working at secondary schools and universities. Data collection was conducted through competency questionnaires for teachers, AI acceptance surveys, reflection reports about teaching, and teacher's engagement records. Effectiveness of the proposed framework was estimated based on such indicators as PCI (professional competency improvement), AAS (AI acceptance score), RSS (recommendation satisfaction score), TEI (teaching effectiveness improvement). These findings indicated significant improvements in teachers' professional abilities in such areas as lesson planning, teaching with the help of technology, assessing students, reflective teaching, and classroom interaction. The total score was 91.2% for Professional Competency Improvement, 88.8% for Recommendation Satisfaction Score, 88.4% for AI Acceptance Score, and 89.6% for Teaching Effectiveness Improvement. The results of this study prove that AI-assisted professional development can be quite effective in terms of improving teachers' instructional practices through the provision of personalized learning materials and recommendations. This theoretical framework is relevant to English language education as it provides an adaptive approach to professional development based on the use of artificial intelligence as a tool.

Keywords: artificial intelligence, english language teachers, professional development, personalized learning, AI-based recommendation, teacher competency; educational technology

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Introduction

Professional development is very important in making improvements in English language instruction because it allows instructors to develop their pedagogical skills, teaching techniques, assessment techniques, and technology skills. Traditional techniques of teacher development such as workshops, seminars, mentoring, and institutional training have been successful in developing knowledge exchange and improvements in teaching. Nevertheless, such traditional techniques often offer generalized learning experiences without providing enough personalization and continuous support needed to meet the needs of individual instructors. In view of the growing complexities of English language classrooms where

instructors are required to use technology and learner-centered approaches, among others, continuous and personalized professional development has become a necessity (Xu et al., 2025).

AI technology has become a breakthrough in the field of education due to its capacity to personalize learning, automate feedback, provide intelligent recommendations, and perform learning analytics. Concerning language education, AI solutions have been mostly concentrated on the learner-centric aspects such as automated writing evaluations, pronunciation assessment, conversational systems, and intelligent tutoring systems (Singh, 2024). Recent advances in natural language processing and machine learning allow for widening the range of potential applications to include teacher professional development. The use of AI-based systems can help in analyzing the process of instruction, finding competence gaps, recommending resources, and giving feedback to promote professional development (Ding et al., 2024).

Nevertheless, even though AI applications are becoming more common in education, there is very little research related to the use of these systems in order to improve teachers' work (Garg et al., 2025). There are no studies that concentrate on developing AI-based systems aimed at enhancing the competences of English language teachers. Existing approaches do not take into account personalized recommendation systems, adaptivity of professional learning paths, or analysis of teachers' improvement. Additionally, the issues of teachers' acceptance of AI-supported learning, their confidence, and challenges have not been examined sufficiently (Seo et al., 2025).

Key Contributions

1. A teacher-oriented model for artificial intelligence in English language education.
2. An adaptive recommendation system for individualized teacher learning.
3. A system for evaluating the impact on professional competence enhancement, acceptance of AI, and instruction effectiveness.

This paper is structured as follows. A literature review including conventional professional development, applications of artificial intelligence in language learning, and applications of artificial intelligence in teacher development is provided in Section 2. The methodology of the AI-Augmented Professional Development Framework is explained in Section 3. Results and discussion are presented in Section 4. Finally, Section 5 concludes the paper.

Literature Review

Traditional Professional Development Approaches

The traditional professional development for English language teachers primarily concentrates on workshops, seminars, mentoring processes, institution-based training, and collaborative learning methods. Such forms of professional development ensure that teachers gain knowledge in pedagogy, teaching techniques, and classroom management. Traditional professional development programs, however, can fail to meet the individual needs of the teachers as well as their technical skills and challenges in classroom settings. The recent studies stress the necessity to modify teacher professional development to enable a more personal approach and continuous development (Xu et al., 2025). Additionally, professional development of teachers implies the presence of support structures that enable the continuous improvement of their instructional practices rather than focusing on one-time training programs (Vorsah & Oppong, 2024).

AI Applications in Language Education

In language education, artificial intelligence has presented new opportunities in terms of natural language processing, intelligent tutoring systems, automated assessment, adaptive learning, and immersive learning. There have been some applications based on artificial intelligence in order to offer feedback automatically, increase language skills, increase involvement of learners, and provide a personalized learning experience (Singh, 2024). AI-assisted assessment methods have been found to be useful in increasing competency in speaking English by offering adaptive feedback and motivation-based learning methods (Dai et al., 2025). Besides, recent developments of AI combined with augmented reality and virtual environments have opened new doors for interactive language learning and skill development (Zhang & Miao, 2025). Some recent AI-assisted frameworks in assessment for blended English learning have proved the capability of artificial intelligence in optimizing the assessment process and adaptive assessment mechanisms according to learner needs (Pang & Gao, 2025). In addition, some AI-based mixed reality learning environments have been found to be helpful in increasing technical language proficiency in English (Khatoon, 2025). On the other hand, AI applications have focused on increasing the skills of the learners, while very few applications have been made to assist English language teachers in their lesson planning, instructional reflection, and professional development (Omer, 2024).

AI-Supported Teacher Development

Teacher development based on AI allows for the implementation of intelligent systems that help teachers determine their professional needs, receive customized suggestions, and enhance their instructional practices. Scholarly works reveal that it is crucial to raise teacher's AI literacy and give them practice in applying AI-based educational practices (Ding et al., 2024). AI-empowered teacher development models have been shown to be capable of enabling personalized approaches to learning, decision-making, and continuous professional development (Yang, 2025). The implementation of AI tools may help teachers detect weaknesses in their teaching strategies, suggest suitable approaches, create digital teaching materials, and engage in reflective practices (Halimah et al., 2025). Moreover, an AI-enhanced educational system increases the level of teacher readiness and technology acceptance as it provides teachers with continuous guidance and professional support (Seo et al., 2025). There is scientific interest regarding the study of AI in the professional development of teachers as far as intelligent systems using learning analytics, personalization, and adaptation are concerned (Zhang, 2025). Pedagogical applications using artificial intelligence are being explored to facilitate active learning approaches as well as teaching professional development (Pebbili & Mathews, 2025).

It is quite evident from the existing literature that there is much scope for the use of AI in English language teacher professional development, taking into account personalization of learning, recommendations, and assistance. But the existing studies focus much on the applications of AI to learners only.

Research Methodology

Proposed AI-Augmented Professional Development Framework

This AI-Augmented Professional Development System for English Language Teachers consists of several layers including teacher profiling, AI-enhanced analysis, customized support, and outcome evaluation. The proposed system helps to overcome the deficiencies of the existing approaches because it allows carrying out adaptive and continuous professional development of teachers.

In particular, Teacher Profile Layer is responsible for collecting information regarding teacher experience, specialty, proficiency in digital technologies, professional goals and problems in teaching. AI Analysis Layer is aimed at evaluating teacher information with the help of NLP, machine learning recommendations, and learning analytics. Professional Support Layer provides access to customized teaching materials and practices, teaching strategies, AI-assisted lesson planning, and reflection. Finally, Outcome Layer evaluates changes in teachers' skills, AI skills, and efficiency of their work.

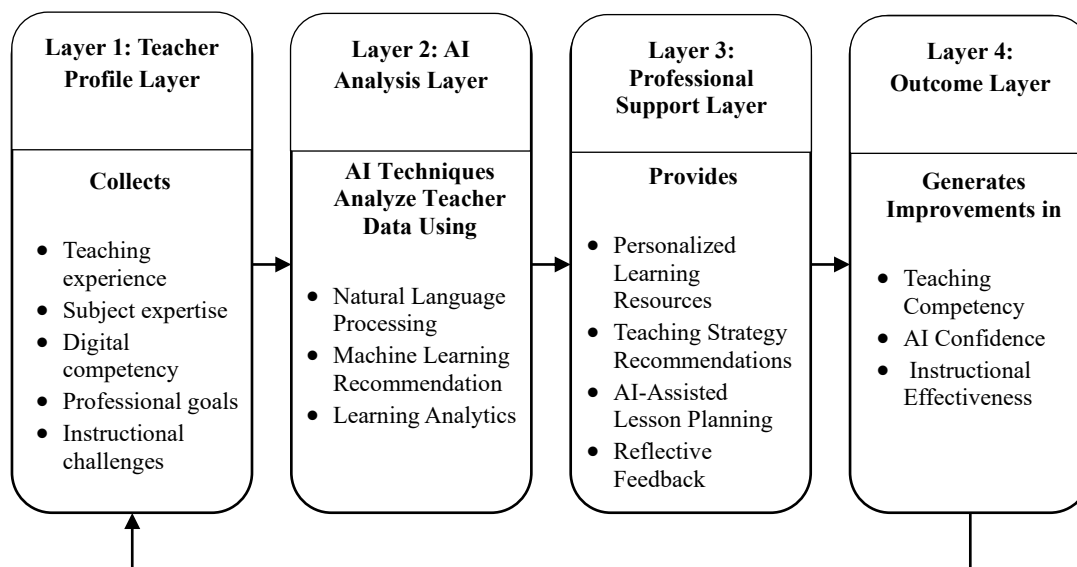


Figure 1: Architecture of AI-Augmented Professional Development System for English Language Teachers

The architecture of the proposed model of professional development augmented with AI is depicted in figure 1. The proposed architecture includes the layers of teacher profiling, AI analytics, professional assistance, and outcomes assessment. The architecture employs AI technologies to customize resources and instructions for teacher development.

Mechanism of Personalized Learning

Technology for personalized learning allows implementing an adaptive professional development process in a systematic way. First, data regarding teachers is collected. Such data may include teacher experience, competence, digital literacy, problems, etc. The analysis of the collected data allows establishing current levels of competence and identifying deficiencies. Based on the analysis, the AI system proposes personalized resources and training activities. Such a training process is implemented based on individual needs, while evaluation improves performance.

Participants and Data Collection

The sample for this study included 150 English language teachers from secondary schools and higher education institutions who were expected to examine the efficiency of the developed AI-supported professional development program. The sample was chosen based on certain criteria. In particular, each teacher had to have at least two years of teaching experience, be actively involved in teaching English language and be ready to participate in AI-enabled professional development programs.

The following data collection methods were employed in the research. First, the questionnaire of teachers' professional competency development was used to estimate changes in teachers' competencies in

terms of pedagogy, instruction strategies, and professional skills. Second, the questionnaire assessing teachers' acceptance of AI was designed to estimate their attitude to the use of AI-supported tools in professional development. Third, teaching reflection reports were collected to analyze teachers' improvements in terms of instructional practices and reflective teaching skills. Moreover, teachers' interaction logs with the system were analyzed to measure their engagement with the tool.

Evaluation Metrics

The effectiveness of the suggested AI-Augmented Professional Development System was assessed based on the following four important measures: Professional Competency Improvement (PCI), Artificial Intelligence Acceptance Score (AAS), Recommendation Satisfaction Score (RSS), and Teaching Effectiveness Improvement (TEI).

1. **Professional Competency Improvement (PCI):** PCI is the metric used to measure the enhancement in professional skills for the teachers, including lesson planning, digital teaching capabilities, assessments, and reflective teaching (Equation 1).

$$PCI = \frac{\text{Post-Training Score} - \text{Pre-Training Score}}{\text{Pre-Training Score}} \times 100 \quad (1)$$

2. **AI Acceptance Score (AAS):** AAS is the score to measure the acceptance and readiness of teachers towards AI-based professional development systems, which depends on usefulness, usability, and continued usage of the tool (Equation 2).

$$AAS = \frac{\sum_{i=1}^n S_i}{n \times S_{\max}} \times 100 \quad (2)$$

3. **Recommendation Satisfaction Score (RSS):** RSS is the score used to measure the relevancy and the value of AI recommendations for the teacher, which include learning resources, teaching techniques, and professional development activities (Equation 3).

$$RSS = \frac{\text{Satisfied Recommendations}}{\text{Total Recommendations}} \times 100 \quad (3)$$

4. **Teaching Effectiveness Improvement (TEI):** TEI is the measure of teaching improvement that occurs due to the implementation of AI-based professional development (Equation 4).

$$TEI = \frac{\text{Post-Implementation Teaching Score} - \text{Pre-Implementation Teaching Score}}{\text{Pre-Implementation Teaching Score}} \times 10 \quad (4)$$

Results and Discussion

Teacher Profile Analysis and Competency Improvement

Analysis of the teacher profile assessed the effectiveness of the proposed system, with the help of AI technologies, to determine personal needs of teachers and to give them adequate development. As it can be seen from the comparison of pre- and post-implemented AI results, there is a considerable increase in competency levels in all aspects of teaching. It shows that personalized advice, feedback, and adaptation through AI helped teachers to improve their planning, teaching, assessment, reflection, and interactions in the classroom.

Table 1 shows that through the analysis of the teacher profile, the system was able to determine individual professional needs and offer development opportunities. There were marked improvements in all competency areas, with reflective teaching competencies scoring the most improvement owing to AI-based feedback and personalized suggestions.

Table 1: Improvement in Teacher Competency Before and After AI Support

Competency Area	Before AI Support (%)	After AI Support (%)
Lesson Planning Skills	72.4	91.6
Digital Teaching Skills	68.7	89.8
Assessment Design Skills	70.5	88.9
Reflective Teaching Ability	74.2	92.1
Classroom Interaction Strategies	76.3	90.4

Effectiveness of AI Analysis and Recommendation Mechanism

The efficiency of the AI analysis layer has been determined on the basis of the quality of personalized recommendations produced via the NLP, machine learning, and learning analytics approaches. It can be seen from the results that the proposed system has managed to analyze data on teachers and provide useful professional development recommendations. All of the high evaluation scores have shown that AI mechanisms are able to identify individual needs for learning, offer useful materials, and produce useful feedback.

Table 2: Evaluation of AI-Based Professional Development Recommendations

Evaluation Factor	Mean Score (5-point scale)
Relevance of AI Recommendations	4.45
Accuracy of Learning Resource Suggestions	4.39
Quality of AI Feedback	4.42
Personalization Effectiveness	4.48
Overall, AI Analysis Performance	4.44

From table 2, it is clear that the AI analysis layer was able to handle information regarding teachers and provided customized recommendations. The high score values reveal the fact that AI analysis was able to identify the need for professional development.

Impact of AI-Supported Professional Assistance

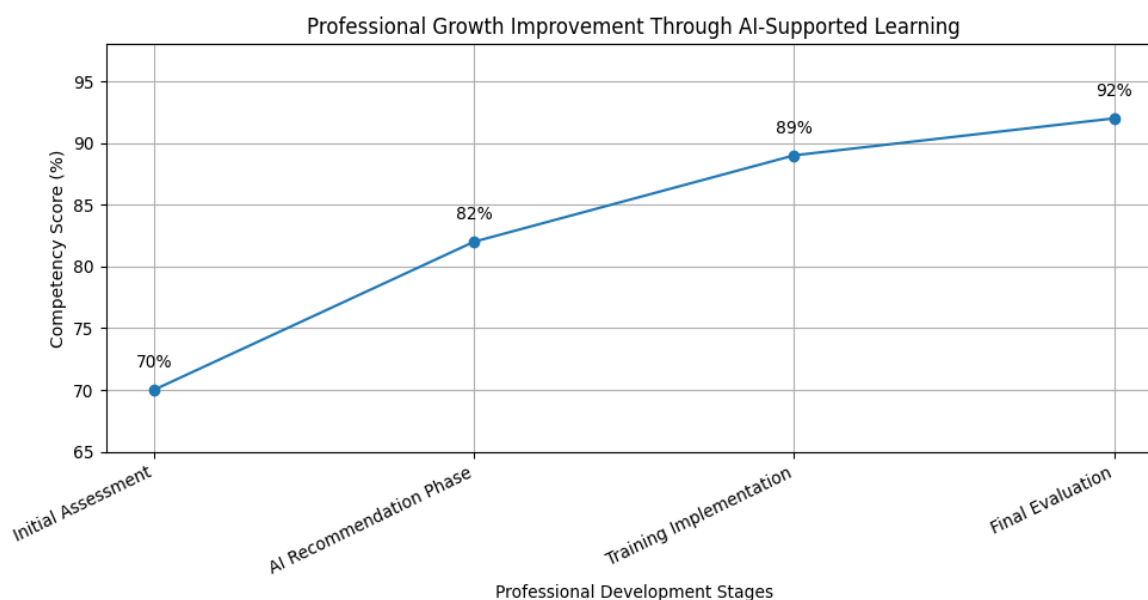


Figure 2: Professional Growth Improvement Through AI-Supported Learning

Evaluation of the influence of assistance using AI technology on professional competence was conducted in order to find out how personalized resources, lesson planning assisted by AI, recommendations on teaching strategies, and reflective feedback affected the professional development of teachers. The gradual increase in the score of competence at various levels of professional development shows the effectiveness of the Professional Support Layer. The research findings reveal that constant assistance using AI helped teachers develop instructional skills and professional growth.

The illustration in figure 2 depicts the increasing levels of competency among teachers at various stages of professional development facilitated by artificial intelligence. The competency level rose from the beginning to the end of the professional development program, indicating that the use of AI recommendations and feedback improved teachers' skills.

Overall Outcomes of AI-Augmented Professional Development

Table 3 shows that the evaluations were conducted for the general assessment of the AI-enhanced professional development system to evaluate its efficiency in terms of developing professional competencies, making recommendations, accepting AI technology, and teaching efficiency. It can be seen that the suggested system has effectively contributed to the professional development of teachers with the help of personalized learning and AI guidance. Good performance scores obtained from all the evaluations suggest that the system has effectively utilized AI technology for teacher development.

Table 3: Overall Evaluation of AI-Augmented Professional Development System

Metric	Performance (%)
Professional Competency Improvement (PCI)	91.2
Recommendation Satisfaction Score (RSS)	88.8
AI Acceptance Score (AAS)	88.4
Teaching Effectiveness Improvement (TEI)	89.6

Pedagogical Implications

From the findings, it is clear that all the layers of the architectural design have made a contribution to developing the professional development of the English language teachers. The teacher profile layer helps in achieving personal identification of learning needs, while the layer of AI analysis helps in achieving intelligent recommendations according to professional demands. The professional support layer helps teachers adapt to the resources and guidance offered to them and thus results in improvement in their teaching abilities. Outcome layer proves that AI can act as an instrument of support for teachers.

Conclusion and Future Directions

In this paper, a proposal for the development of an AI-Augmented Professional Development System for continuous and personalized professional growth of English language teachers. It aims to overcome the limitations of the existing teacher development process, which provides generic teacher training experiences without any follow-up support and with very little personalization. The framework consists of four parts: teacher profiling, analysis using artificial intelligence, personalized professional support, and outcome evaluation based on the individual needs of each teacher.

The efficiency of the suggested framework was tested based on data gathered from 150 English language teachers working in secondary schools and higher education institutions. The results showed positive changes in various domains of professional competencies, such as lesson planning competencies,

digital teaching competencies, assessment design, reflection of teaching practice, and classroom interaction. In general, the efficiency evaluation of the suggested framework gave the following results: PCI score – 91.2%, RSS score – 88.8%, AAS score – 88.4%, and TEI score – 89.6%. These results show that the use of AI in professional development is efficient and can positively influence teacher instructional competencies.

This study demonstrates the capacity of artificial intelligence as an enabling technology for shifting the development of English language teachers away from the traditional model of training towards a more adaptive and data-driven model of professional learning. The suggested approach offers useful implications for those educational organizations which intend to adopt AI technologies in their teacher development programs. Future research may focus on studying the long-term evaluation of AI-enabled professional development, implementation of AI in institutional learning management systems, explanation of the recommendations generated by AI systems, and large-scale experiments.

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