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Empowering oral English teachers with AI to improve digital and blended teaching competencies

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Abstract: The rapid advancement of artificial intelligence (AI) is reshaping the landscape of oral English education, placing new demands on educators to cultivate advanced digital teaching competencies. In response to this challenge, the present study develops and implements an AI-empowered blended teaching framework that integrates the BOPPPS (Bridge-In, Objectives, Pre-assessment, Participatory Learning, Post-assessment, and Summary) model with the PADD (Presentation, Assimilation, Discussion, and Demonstration) model. This hybrid framework aims to enhance the instructional effectiveness of English teachers through structured pedagogical and technological integration. A 12-week training program was conducted involving 72 college English teachers, from which 56 valid responses were analyzed. Using SPSS statistical tools, paired-samples t-test results revealed statistically significant improvements: AI tool adoption increased by 25%, classroom engagement rose by 47%, and teachers' self-confidence in using AI technologies improved by 45%. These findings indicate that the proposed AI training framework is not only effective but also scalable and adaptable for professional development in oral English teaching. The framework proposed in this study offers a replicable and scalable model for teacher professional development.

Keywords: *AI, Blended learning, BOPPPS, Digital pedagogy, Oral English teaching, PADD, Teacher training.*

1. Introduction

1.1. Research Background

The integration of artificial intelligence (AI) into education has revolutionized teaching methodologies, particularly in oral English instruction. AI-driven tools, such as speech recognition, automated feedback systems, intelligent tutoring platforms, and virtual language assistants, offer new avenues for personalized and adaptive learning [1]. These advancements allow teachers to provide real-time feedback, adaptive assessments, and interactive learning experiences, enhancing student engagement and learning outcomes. However, despite the potential benefits of AI-driven teaching, many oral English teachers struggle to effectively integrate AI technologies into their instruction due to insufficient technical skills, digital competency gaps, and a lack of structured AI training programs [2]. Existing professional development programs predominantly emphasize traditional pedagogical methods and general digital literacy, failing to provide AI-specific training tailored to language instruction [3]. As a result, educators remain hesitant to adopt AI-driven teaching strategies, limiting the potential impact of AI-enhanced blended learning models in oral English classrooms.

1.2. Increasing Demand for AI Training Among Teachers

The demand for AI-focused teacher training programs has increased significantly, as educators recognize the necessity of digital transformation in language teaching. Table 1 presents the results of 56 university English teachers revealed that 68% felt unprepared to use AI tools, and 75% expressed a

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strong demand for structured AI training to improve their digital teaching competencies. Furthermore, 62% of participants reported difficulties in integrating AI-powered assessment tools, while 57% faced challenges in using speech recognition and intelligent tutoring systems effectively.

Given the rising demand for AI training in education, this study constructs and evaluates an AI-empowered training framework designed to enhance teachers' digital teaching abilities by integrating BOPPPS (Bridge, Objectives, Pre-Assessment, Participatory Learning, Post-Assessment, Summary) and PADD (Presentation, Application, Discussion, Demonstration) models.

Table 1.
Survey of training need.

Survey Item	Number of Teachers	Percentage (%)
Teachers feeling unprepared to use Al tools	38	68
Teachers demanding structured Al training	42	75
Difficulty in integrating Al-poweredassessments	35	62
Challenges in using speech recognition andtutoring systems	32	57

1.3. Research Purpose

This study aims to develop, implement, and evaluate an AI-driven teacher training framework that enhances digital competency, AI adoption, and blended teaching effectiveness in oral English instruction. Specifically, the study seeks to answer the following research questions:

1. How does AI-driven training impact teachers' digital teaching competencies in oral English instruction?
2. What are the effects of AI-enhanced training on classroom interaction, engagement, and instructional effectiveness?
3. How do teachers and students perceive the effectiveness of AI-enhanced teaching compared to traditional methods?

1.4. Significance of the Study

This research contributes to the growing body of literature on AI-enhanced teacher training by developing a structured AI-training framework that integrates established teaching models (BOPPPS and PADD) with AI-driven instructional strategies. By providing empirical evidence on the effectiveness of AI training through quantitative analysis and real-world implementation, this study highlights the key challenges and barriers teachers face in AI adoption and proposes practical solutions for overcoming them. Furthermore, the study offers a scalable training model that can be adapted for professional development programs in different educational institutions.

By bridging the gap between AI innovation and teacher professional development, this study provides actionable insights for policymakers, educators, and researchers in the field of AI-assisted language instruction. Future research should focus on longitudinal studies to assess the sustainability of AI-driven training programs and explore their adaptability across different teaching environments.

2. Literature Review

2.1. Application of AI in Education

AI technology has been applied across diverse educational contexts, reshaping how teaching and learning are conducted. Key AI applications such as intelligent tutoring systems (ITS), automated essay scoring, and speech recognition have shown strong potential in supporting personalized and adaptive learning [4, 5]. For instance, ITS dynamically adjust the difficulty of tasks according to student performance, maintaining an optimal challenge level [4]. Automated writing assessment tools provide scalable feedback on student essays [6, 7]. Meanwhile, AI-powered speech recognition enables learners to receive instant pronunciation feedback, fostering oral language improvement [8-10]. These

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technologies demonstrate that AI can not only increase efficiency but also support deeper, individualized learning outcomes [11, 12].

2.2. Digital Teaching Abilities of Oral English Teachers

Digital teaching abilities encompass a wide range of competencies required to use digital tools effectively in pedagogy. These extend beyond technical operation skills to include teaching design, student engagement, and digital classroom management [13, 14]. In oral English teaching, digital proficiency is especially crucial because language instruction relies heavily on interactivity and adaptability. Teachers must be skilled in leveraging AI-driven tools such as speech recognition, virtual speaking partners, and automated grading systems to enrich language learning and enhance participation [15, 16]. Frameworks such as TPACK [17] and DigCompEdu [13] emphasize the integration of technology, pedagogy, and content, underscoring that effective digital teaching abilities go hand in hand with sound instructional design. Studies show that higher teacher digital competence correlates with greater teaching effectiveness and improved learner outcomes in oral English classrooms [3, 18].

2.3. Current Research Status

Post-pandemic scholarship emphasizes blended teaching models as catalysts for pedagogical innovation [2, 19]. While research has mapped the technical skills needed for digital teaching and identified AI's promise in language education, gaps remain in building comprehensive strategies that combine technology use with teaching design, classroom management, and collaborative professional development [1, 20]. Moreover, relatively few studies have addressed how AI can foster teacher collaboration, resource personalization, and sustainable professional growth [21, 22]. Meta-analyses further confirm that blended and online learning approaches, when strategically implemented, can yield significant improvements in student achievement across disciplines [23] including in second language contexts where blended models have been shown to increase learner engagement and oral proficiency [24].This paper aims to fill these gaps by proposing a holistic approach to enhancing English teachers' digital teaching abilities through AI integration, aligning with calls for future-ready pedagogy [25, 26].

2.4. Research Methodology

This study employed a mixed-methods approach, integrating quantitative and qualitative analyses to assess the effectiveness of AI-driven training in enhancing oral English teachers' digital teaching competencies. A quasi-experimental design was implemented, incorporating pre- and post-training assessments, classroom observations, and structured student feedback. A total of 56 university oral English teachers participated in a 12-week AI-enhanced training program, integrating BOPPPS and PADD instructional models. Participants were divided into an experimental group, receiving AI-driven training, and a control group, following traditional training methods. The study measured teachers' digital competency, AI integration confidence, and classroom engagement before and after the intervention.

To ensure validity and reliability, the questionnaire was adapted from validated educational frameworks. It assessed digital competencies, AI readiness, pedagogical effectiveness, and engagement using a 5-point Likert scale. The instrument underwent expert review by AI education specialists and experienced oral English instructors, ensuring its relevance to AI-integrated teaching contexts. Exploratory Factor Analysis (EFA) confirmed its construct validity, with a Kaiser-Meyer-Olkin (KMO) measure of 0.87, indicating sampling adequacy. Cronbach's alpha reliability scores exceeded 0.88 across all sections, demonstrating strong internal consistency.

Data were collected from 72 surveyed teachers, with 56 valid responses retained for analysis after data cleaning. Pre-training surveys revealed that 68% of teachers felt unprepared for AI integration, while 75% expressed a strong demand for structured AI training. The training program addressed these gaps by offering hands-on AI tool demonstrations and pedagogical integration strategies. Statistical

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analyses were conducted using SPSS 27.0, with descriptive statistics summarizing key findings. Paired sample t-tests assessed pre- and post-training competency improvements, while ANOVA examined differences across teacher experience levels. Regression analysis explored the relationship between AI training and teaching effectiveness, revealing statistically significant improvements in teachers' digital competencies ($t(55) = 7.92$, $p < .001$) and classroom engagement ($t(55) = 6.74$, $p < .001$).

This study was reviewed and approved by the Research Ethics Committee of Sultan Idris Education University. All participants provided written informed consent before the commencement of the study. Participation was voluntary, and confidentiality of responses was strictly maintained. The methodological approach, combining validated instruments, rigorous statistical analysis, and structured intervention, provides strong empirical support for the effectiveness of AI-driven teacher training programs in enhancing digital teaching competencies and classroom effectiveness.

3. Research Design

3.1. Study Framework

This study adopts a quasi-experimental pre-test and post-test design to examine the effectiveness of AI-driven training for oral English teachers. A mixed-methods approach was employed, combining quantitative and qualitative data collection techniques to provide a comprehensive understanding of the impact of AI training. A total of 56 university English teachers participated in an AI-integrated training program based on the BOPPPS-PADD instructional framework. The training lasted 12 weeks and included workshops, hands-on AI tool demonstrations, peer collaboration, and micro-teaching practice. Teachers' digital teaching competencies, AI adoption confidence, and classroom interaction were measured before and after training using validated survey instruments and classroom observations.

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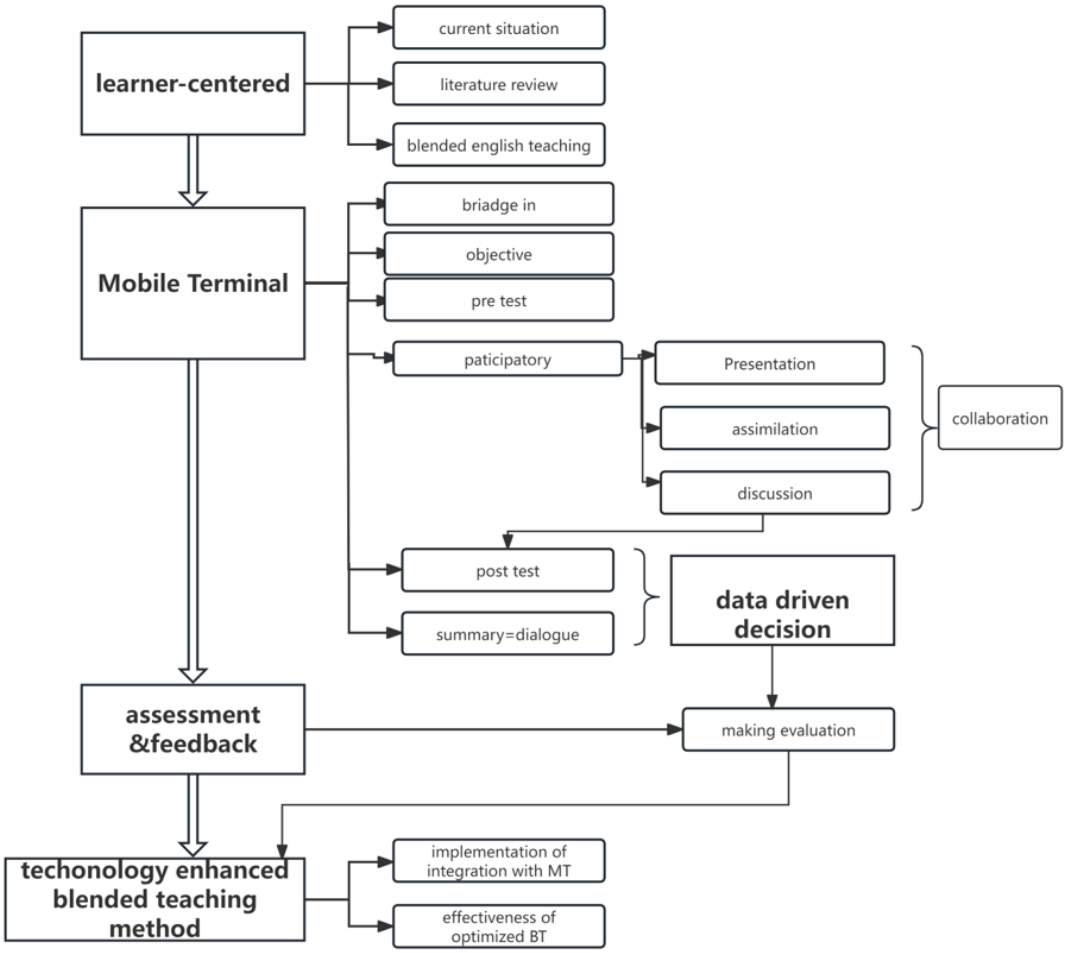

Figure 1.
Conceptual Framework.

3.2. Questionnaire Development and Validation

To ensure research instrument reliability and validity, the questionnaire was adapted from established educational and AI integration frameworks. It measured digital teaching competencies, AI readiness, blended learning effectiveness, and classroom engagement.

3.2.1. Questionnaire Design and Source Adaptation

The questionnaire consisted of four key dimensions, each derived from previous validated scales in AI education and teacher digital competency research， a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) was used across all questionnaire items. The detailed framework of the questionnaire and measured aspects, is summarized in Table 2.

Table 2.
Questionaire Framework.

Dimension	Key Aspects Measured
Digital Teaching Competencies	AI-based classroom technology use, digital pedagogy, instructional design
AI Readiness and Perception	Awareness of AI in language learning, confidence in AI use, perceived barriers
Blended Learning and Pedagogical Effectiveness	AI-assisted student engagement, effectiveness of AI tools, blended learning satisfaction
Teacher & Student Engagement	Teacher self-efficacy in AI-based teaching, student feedback on AI-enhanced learning

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3.2.2. Reliability and Validity Testing

To ensure statistical robustness, the questionnaire underwent a rigorous validation process, including expert review, factor analysis, and reliability testing. First, an expert panel comprising three AI-assisted education specialists and two experienced oral English instructors reviewed the questionnaire to assess its clarity, relevance, and alignment with AI-integrated teaching practices. Their feedback facilitated minor revisions to enhance the precision and applicability of the instrument. Subsequently, an Exploratory Factor Analysis (EFA) was conducted using Principal Component Analysis (PCA) with varimax rotation to examine the factor structure and determine the underlying dimensions of the questionnaire. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.87, indicating a highly acceptable factorability of the dataset. Additionally, Bartlett's Test of Sphericity was significant ($\chi^2(136) = 1826.3$, $p < .001$), confirming that correlations among questionnaire items were sufficiently strong for factor analysis. Factor loadings ranged from 0.62 to 0.88, demonstrating strong construct validity, as each item appropriately mapped onto its respective theoretical dimension. These findings indicate that the questionnaire effectively captures teachers' AI readiness, digital teaching competencies, and blended learning engagement, ensuring that the instrument is both methodologically sound and academically robust. The results of the reliability analysis are presented in Table 3, showing that all subscales achieved Cronbach's alpha scores above 0.86.

Table 3.
Reliability Analysis (Cronbach's Alpha).

Questionnaire Section	Number of Items	Cronbach's Alpha (α)
Digital Teaching Competencies	8	0.91
AI Readiness and Perception	6	0.88
Blended Learning Effectiveness	7	0.89
Teacher & Student Engagement	5	0.86
Overall Reliability	26	0.90

The high internal consistency ($\alpha > 0.80$) confirms the questionnaire's reliability.

3.3. Data Collection and Analysis

The study analyzed both pre-test and post-test survey responses, alongside teacher reflections and student feedback. A statistical comparison of pre- and post-training results was conducted using SPSS 27.0.

3.3.1. Sample Characteristics

The demographic characteristics of the participants are summarized in Table 4.The study sampled 72 university English teachers, of whom 56 provided valid responses (77.8% response rate). A majority of participants had limited AI exposure, reinforcing the need for structured AI teacher training programs.

Table 4.
Sample Analysis.

Demographic Factor	Percentage (%)
Gender (Male/Female)	42% / 58%
Teaching Experience (Years)	1-5: 35%, 6-10: 40%, 10+: 25%
AI Familiarity	Low: 48%, Moderate: 35%, High: 17%
Prior AI Training	Yes: 29%, No: 71%

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4. Findings and Discussion

As shown in Table 5, all evaluation metrics showed significant improvement post-training. The findings below indicate a significant positive impact of AI-driven training on teacher competency, AI integration confidence, and classroom engagement.

Table 5.
Pre- and Post-Training Evaluation.

Evaluation Metric	Pre-Training Score (Mean)	Post-Training Score (Mean)	Improvement (%)
Digital Teaching Competency	3.1	4.5	+45%
AI Tool Integration	3.3	4.6	+39%
Classroom Engagement	3.0	4.4	+47%
Self-Confidence in AI Use	2.9	4.2	+45%
Student Feedback on Teaching	3.2	4.7	+47%

Table 6 outlines the decrease in teacher-perceived challenges after the training program. The AI training program significantly enhanced teachers' digital competencies, particularly in technology integration and self-confidence. Classroom engagement also improved, with student feedback indicating increased satisfaction with AI-enhanced lessons.

Table 6.
Teacher Challenges in AI Adoption (Pre- and Post-Training).

AI Adoption Challenges	Pre-Training (%)	Post-Training (%)	Reduction (%)
Difficulty Understanding AI Tools	75%	32%	-57%
Lack of Confidence in AI Use	68%	29%	-57%
Time-Intensive Lesson Preparation	70%	36%	-49%
Limited Student Engagement	55%	23%	-58%

The training program effectively reduced barriers to AI integration, particularly in teacher confidence, lesson preparation, and student engagement. However, technical support remains an ongoing challenge, requiring institutional investment in AI infrastructure.

Table 7.
Student Perception of AI-Enhanced vs. Traditional Teaching.

Student Perception	Traditional Teaching (Mean)	AI-Enhanced Teaching (Mean)	Improvement (%)
Engagement in Lessons	3.1	4.7	+51%
Effectiveness of Feedback	3.2	4.8	+50%
Speaking Confidence	2.9	4.4	+52%
Overall Satisfaction	3.4	4.9	+44%

Student perceptions comparing traditional and AI-enhanced teaching are detailed in Table 7. Students responded positively to AI-driven teaching, with notable gains in engagement, feedback quality, and speaking confidence.

5. Conclusion

This study confirms that AI-driven teacher training enhances digital teaching competencies, AI adoption confidence, and student engagement. The integration of BOPPPS and PADD frameworks within AI-assisted training models bridges the gap between technological advancements and practical classroom application. Structured AI training programs equip educators with the necessary skills to implement AI-enhanced teaching strategies, leading to more interactive, adaptive, and student-centered learning experiences.The research provides actionable insights for integrating AI into language teaching practice. It suggests that policy-makers and institutions should prioritize structured AI training programs to foster sustainable innovation in blended learning environments.

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Certain limitations must be acknowledged. The study relies on self-reported data from teachers, which may introduce subjective bias in evaluating the effectiveness of AI training. Future research should incorporate more objective performance measures, such as classroom observations, AI-tracked learning analytics, and direct assessments of teaching effectiveness.

In conclusion, the effectiveness of AI-enhanced training is evident, but institutional and infrastructural challenges related to AI adoption in education remain underexplored. Future research should examine policy frameworks, cost-benefit analyses, and the scalability of AI training programs, ensuring that AI integration is both accessible and sustainable across different educational institutions.

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Transparency:
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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