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The successful use of AI for English teachers' professional development

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Teachers are required to develop their professional capabilities. However, in practice, many problems affect teachers' professional development (TPD), such as overflowing administrative tasks, the lack of competence to integrate technology, and the lack of time allocated for continued professional development. Nowadays, the use of artificial intelligence (AI) is considered a way to solve these problems. This research aimed to investigate how AI is used in TPD. This qualitative case study design involved six in-service teachers who have joined the teachers' professional education program in the Indonesian context. The findings indicate that AI provides an inclusive basis for transforming TPD for several reasons. For example, AI supports teachers' personality competence (commonly known as professional conduct) by helping lighten their administrative workload. AI assists teachers' pedagogical competence by offering easy integration of technology. AI upgrades teachers' professional competence by providing unlimited resources, especially related to online professional development courses. Lastly, AI intensifies teachers' social competence by providing opportunities to connect with each other. This study implies that AI is important to use in today's TPD due to its adaptability, compatibility, and flexibility. While this study references specific AI tools used in TPD practices like ChatGPT, Perplexity, and Google Sites, it did not conduct an in-depth analysis of any single AI system. It is recommended that further studies focus on a particular AI tool to better understand its impact on TPD.

Keywords: artificial intelligence; teachers' professional development; teachers' professional education program

Introduction

Nowadays, artificial intelligence (AI) is considered to be able to help develop teachers' professionalism. A teacher's professionalism is defined as the teacher's ability to carry out his or her main duties as an educator and instructor, including the ability to plan, implement, and evaluate learning (Sachs, 2016). According to the Act of the Republic of Indonesia Number 14 of 2005 Article 8, to become a professional teacher, teachers must master at least four core competencies (Institut Teknologi Sepuluh Nopember, 2012; Pahrudin et al., 2016). Firstly, personality competence (commonly known as professional conduct) is a personal ability that reflects the personality of someone who is mature, wise, authoritative, steady, and stable, with a noble character, and who is a good role model for students, especially in the context of work ethics. Second, pedagogical competence refers to a teacher's ability to understand students, design and implement learning, develop students, and evaluate student learning outcomes to actualize the potential they have. Third, professional competence involves mastery of the learning material comprehensively and in depth. Fourth, social competence is the ability of a teacher to communicate and socialize with students, educational staff, parents of students, and the community around the school. Teachers who have graduated from the teachers' professional development (TPD) program of the Indonesian government must master these competencies to truly be said to be professional.

Several studies have investigated the use of AI in an effort to help improve teachers' performance and professionalism. Verma et al. (2023) developed AI tools that can be used to help teachers' professionalism in understanding students' engagement. Another study also found that AI helps teachers develop their professionalism by complementing and giving additional strengths to teachers, rather than replacing them (Nazaretsky et al., 2022). Lee and Perret (2022) found that AI is a new breakthrough for TPD that is more innovative than before. They discovered that AI is an opportunity to transform TPD, particularly through the integration of AI methods into science, technology, engineering, and mathematics education. However, their discussion of AI is only general, providing a hands-on experiential professional development model using tools such as Google Colab to equip teachers with practical knowledge of AI and relevant pedagogical strategies. Other studies found that AI helps develop the professionalism of English teachers (Karina & Kastuhandani, 2024), provides support for TPD (Chaipidech et al., 2022), and increases teachers' professionalism in terms of technological pedagogical and content knowledge (Chaipidech et al., 2022). Although some studies have shown that AI can support the professional development of English teachers, most of these studies are still general in nature. There is a need for a deeper exploration into how specific types of AI tools are practically integrated into English teaching practices and how they contribute to various aspects of teachers' professionalism. In light of the research gaps, this research aimed to fill these gaps by answering the following question: How can the use of AI support English teachers' professional development? And what are the specific AI tools they have used in teaching?

Method

Research design

To achieve this research objective, this study utilized a qualitative case study design. This design allowed the researchers to present a detailed explanation of how AI is used to support TPD (Kim et al., 2017). The case study design enabled the researchers to select subjects who have implemented TPD using AI actively and successfully.

Research subjects

The subjects of this research were six in-service teachers who are graduates of the teacher’s professional education (Pendidikan Profesi Guru) program from a university rated “A” by the National Accreditation Board for Higher Education, indicating its status as a reputable institution in Indonesia. The researchers selected the subjects on the basis of a preliminary study using a survey to choose six individuals who actively use AI for their TPD. They frequently utilize AI for their professional development, such as ChatGPT, Perplexity, and Google Sites.

Data collection and instruments

Data were collected through qualitative methods, namely interviews. The research instrument for this study was an interview guideline. The instrument was carefully developed by the researchers to address the two main research questions: how teachers use AI to enhance their professional development and what specific AI tools they have used in teaching.

Data analysis

In this study, data were analyzed using a thematic analysis. The thematic analysis involved data coding, organizing codes, and developing themes within the qualitative data collected from the interviews.

Results

In answering the research question on how AI can be used for TPD, the thematic analysis points out the findings (shown in Table 1) based on the interview with the teacher’s professional education graduates.

Table 1. Findings on how AI is used in TPD

Aspects	Themes	Key insights
Personality competence (commonly known as professional conduct)	Mitigating teacher burnout	– AI simplifies administrative tasks, lightening the burden on educators – Preventing teacher fatigue – Teachers can perform well while being completely fresh, aware, wise, and able to control their emotions.
Pedagogical competence	Teachers’ pedagogic assessment and feedback	– Helps assessing their ability in understanding students pedagogically – Gives more media to provide students with support
Professional competence	Personalization and accessibility	– Personalized TPD experiences – Addresses individual educators’ materials needs – Improving accessibility
	Dynamic adaptation to educational trend	– Evolving teaching methodologies and technological trends – Ensures the integration of the latest pedagogical tools
Social competence	Fostering collaboration and knowledge exchange	– AI facilitates virtual networks – Connects educators globally – Fosters collaboration – Enables the exchange of valuable insights and best practices

The results indicate that AI significantly supports teachers’ professional competence by enhancing personality and pedagogical skills while alleviating burnout. AI streamlines administrative tasks, allowing teachers to focus on professional growth. AI-based workload management promotes well-being, job satisfaction, and better performance. Additionally, AI enhances TPD by offering data-driven insights, transforming assessment methods, and fostering personalized development pathways. Teachers benefit from clear, objective feedback on their strengths and weaknesses. Personalized AI-driven TPD improves accessibility, particularly in underserved areas, aligning with the demand for individualized and flexible professional development. Furthermore, AI supports the adaptation of TPD to current educational trends, which is a challenge for traditional methods. By providing up-to-date resources and collaborative platforms, AI helps teachers stay informed and connected, fostering a global community of educators and enhancing collective learning. AI-driven virtual communities allow teachers to exchange insights and best practices, further advancing professional growth.

Discussion

AI has been shown to support teachers’ professional competence, particularly by enhancing their personality competence and alleviating burnout. AI simplifies administrative tasks, which can help educators focus on professional growth. This aligns with the idea that reducing workload can improve teachers’ well-being and job satisfaction, potentially mitigating the stress that often accompanies the teaching profession. Additionally, AI is capable of monitoring and assessing factors contributing to teachers’ stress, offering solutions to help manage these challenges.

AI also plays a transformative role in TPD by improving pedagogical competence. It provides data-driven insights for assessment, offering a more objective approach compared with traditional, subjective methods (Amarasinghe et al., 2022). Personalized AI-driven TPD enables teachers to target areas for improvement based on their performance data. By using machine learning algorithms, AI can adapt materials to individual needs, leading to more effective and impactful learning experiences.

In terms of professional competence, AI revolutionizes TPD by moving away from the one-size-fits-all model. It meets specific teachers' needs and enhances accessibility, particularly in remote or underprivileged areas (Zawacki-Richter et al., 2019). The dynamic nature of AI ensures that TPD programs remain up-to-date with evolving educational trends, addressing the challenge of keeping pace with rapid changes in the teaching landscape. This adaptability allows teachers to remain informed about the latest materials, pedagogical methodologies, and tools, regardless of their location (Um et al., 2023).

Moreover, AI fosters collaboration and knowledge exchange among educators, addressing social competence within TPD. By facilitating virtual networks and connecting teachers globally, AI promotes collaborative learning and the sharing of best practices (Ostovar-Nameghi & Sheikahmadi, 2016). AI-powered platforms help create professional learning communities where teachers can engage in continuous conversations, exchange resources, and solve problems collectively, further enhancing the effectiveness of professional development. This global collaboration fosters the growth of an international teaching community, transcending linguistic and cultural boundaries to improve educational outcomes.

Conclusion

In summary, this study highlights the potential of AI to transform TPD by enhancing four key areas of teachers' professionalism: reducing burnout (personality competence); providing pedagogical delivery of materials, assessment, and feedback (pedagogical competence); offering accessible and adaptive learning materials (professional competence); and fostering collaboration (social competence). The findings emphasize the importance of AI in keeping teachers updated with educational advancements. While the study shows a practical application of AI in supporting teacher growth, it acknowledges the lack of clarity on the specific types of AI used, suggesting the need for future research that focuses on this limitation for a more comprehensive understanding.

Statement on the use of AI in research

In this study, AI was used selectively to support certain stages in the research process. First, AI was used in the qualitative data analysis process, especially in identifying themes. After the manual coding process by the researcher, ChatGPT was used as an initial verification tool to review linguistic patterns and provide suggestions for category groupings. Second, Grammarly and ChatGPT were used to improve readability in the Results and Discussion sections. This section was specifically chosen

because it contains complex interpretations of the results and requires clear, structured, and easily understood delivery for academic readers. The purpose of its use was to ensure that the research findings can be conveyed concisely and effectively without changing the substance or original meaning.

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