

Teachers' Perceptions of Artificial Intelligence Use for Enhancing Teaching Performance: A Case Study at Makedonia Christian School

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Abstract

The rapid development of artificial intelligence (AI) has created new opportunities for improving teaching practices while simultaneously raising challenges related to teachers' competencies, ethical considerations, and effective implementation. This study aims to examine teachers' perceptions of the use of AI technology for enhancing teaching performance at Makedonia Christian School. A descriptive survey design was employed, involving all 30 teachers at the school as the study population through a census approach. Data were collected using questionnaires and interviews to explore teachers' perceptions of AI use in the learning process, particularly in relation to teaching efficiency, learning personalization, adaptive learning, professional development needs, and teachers' confidence in AI integration. The data were analyzed descriptively using percentages and qualitative interpretation of teachers' responses. The findings indicate that 80% of teachers perceived AI use as improving their efficiency and productivity, while 70% perceived AI as supporting more personalized learning experiences. Furthermore, 85% of teachers perceived that AI-supported adaptive learning could improve students' understanding and reduce knowledge gaps. At the same time, 60% of teachers reported the need for additional training to optimize the use of AI in teaching. Despite these challenges, 80% of teachers reported greater confidence in adopting and integrating AI into their teaching practices. These findings suggest that AI is perceived by teachers as a potentially useful tool for supporting teaching efficiency and instructional practices. However, sustained professional development and institutional support are needed to strengthen teachers' capacity to integrate AI effectively and responsibly into educational practice.

Keywords: Artificial Intelligence; Teacher Performance; AI in Education; Teacher Perceptions; Teaching Practice

Abstrak

Perkembangan pesat kecerdasan buatan (Artificial Intelligence/AI) telah membuka peluang baru dalam mendukung praktik pembelajaran, sekaligus menghadirkan tantangan terkait

kompetensi guru, pengembangan profesional, dan integrasi teknologi secara tepat dalam pembelajaran. Penelitian ini bertujuan untuk mendeskripsikan persepsi guru terhadap penggunaan teknologi AI dalam praktik pembelajaran di Makedonia Christian School. Penelitian menggunakan desain survei deskriptif dengan melibatkan seluruh 30 guru sebagai responden melalui pendekatan sensus (total population sampling). Data dikumpulkan menggunakan kuesioner yang memuat pertanyaan kuantitatif dan terbuka untuk mengidentifikasi persepsi guru mengenai kontribusi AI terhadap efisiensi dan produktivitas pembelajaran, personalisasi pembelajaran dan dukungan terhadap pemahaman siswa, tantangan integrasi AI, kebutuhan pengembangan profesional, serta kepercayaan diri dalam mengadopsi dan mengintegrasikan AI dalam praktik mengajar. Data kuantitatif dianalisis secara deskriptif menggunakan frekuensi dan persentase, sedangkan respons terbuka dianalisis secara deskriptif untuk mengidentifikasi informasi yang berulang mengenai manfaat, tantangan, pengalaman, dan kebutuhan pengembangan profesional guru. Hasil penelitian menunjukkan bahwa 80% guru mempersepsikan AI berkontribusi terhadap efisiensi dan produktivitas dalam praktik mengajar, sedangkan 70% mempersepsikan AI mendukung pengalaman pembelajaran yang lebih personal. Sebanyak 83,3% guru mempersepsikan AI dapat mendukung pemahaman siswa dan membantu merespons perbedaan kebutuhan belajar. Selain itu, 60% guru menyatakan masih membutuhkan pelatihan tambahan dalam penggunaan AI, sementara 80% melaporkan kepercayaan diri dalam mengadopsi dan mengintegrasikan AI dalam praktik pembelajaran. Temuan ini menunjukkan bahwa guru memiliki persepsi yang cenderung positif terhadap pemanfaatan AI sebagai teknologi pendukung praktik mengajar, tetapi integrasinya tetap memerlukan pengembangan profesional dan dukungan institusional yang berkelanjutan. Penelitian ini memberikan bukti empiris kontekstual mengenai persepsi guru terhadap integrasi AI di lingkungan sekolah menengah.

Kata Kunci: Kecerdasan Buatan, Persepsi Guru, Integrasi AI, Pembelajaran, Pengembangan Profesional

INTRODUCTION

Artificial intelligence (AI) has increasingly become part of educational practice, creating new opportunities to support teachers in planning, implementing, and assessing learning (Asbara et al., 2024). AI-based applications can assist teachers in preparing instructional materials, generating learning resources, designing assessment tasks, providing feedback, and supporting more individualized learning experiences (Gargiulo & Metcalf, 2023). A systematic review by Celik et al. identified several potential contributions of AI to teachers' work, particularly in instructional planning, implementation, and assessment. However, the effective use of AI in education remains dependent on teachers' professional judgment and pedagogical decision-making (Cakraningtyas, 2025). Teachers are not merely users of technological tools but remain central actors in determining how AI is selected, evaluated, and integrated into meaningful learning practices (Ismafitri et al., 2022).

The growing presence of AI also changes the nature of teachers' professional work. AI may reduce the time required for certain routine tasks and provide assistance in developing instructional resources, but its educational value cannot be determined solely by the availability of technology (Juwairiyah, 2025). Teachers must decide when AI is appropriate, what tasks can reasonably be delegated to AI, how AI-generated outputs should be evaluated, and how these outputs can be aligned with curricular and pedagogical objectives (Kurniawan et al., 2025). Therefore, the integration of AI requires teachers to combine technological awareness with pedagogical knowledge, critical evaluation, and professional judgment. In this context, teachers' perceptions, experiences, confidence, and readiness to use AI become important factors in understanding how AI is adopted in actual educational settings (Agustina et al., 2024).

Previous research has identified both potential benefits and challenges associated with teachers' use of AI. AI can support lesson planning, generate instructional materials, provide immediate feedback, assist teachers in identifying students' learning needs, and facilitate more individualized learning activities. These capabilities may contribute to greater efficiency and productivity in teachers' professional activities (Asbara et al., 2024). Nevertheless, teachers may also face challenges related to technological knowledge, pedagogical integration, the reliability and accuracy of AI-generated information, ethical considerations, data privacy, and the need for continuous professional development (Juwairiyah, 2025). These challenges indicate that the availability of AI technology alone does not necessarily result in improved teaching practices. Rather, the educational contribution of AI depends on how teachers perceive its usefulness, develop confidence in its use, critically evaluate its outputs, and integrate it into their existing professional practices (Yulianti, 2024).

Teacher competence is therefore an important consideration in the implementation of AI-supported education. The emergence of AI introduces competencies that extend beyond conventional digital literacy, including the ability to understand AI-related concepts, apply AI pedagogically, evaluate AI-supported assessment, recognize ethical and social implications, and maintain human-centered educational practices (Putra et al., 2024). Chiu et al., for example, developed and validated the Teacher Artificial Intelligence Competence Self-Efficacy (TAICS) scale, which highlights dimensions of teacher AI competence related to AI knowledge, AI pedagogy, AI assessment, AI ethics, human-centered education, and professional engagement. Although this framework was developed after the data collection period of the present study and was not used as the study's measurement instrument, it provides a contemporary perspective for understanding the broader competencies required for meaningful and responsible AI integration in teaching. The increasing emphasis on teacher AI competence also reinforces the importance of professional development and institutional support in helping teachers move beyond basic technology adoption toward pedagogically appropriate AI use (Gagaramusu et al., 2025).

In secondary education, these issues are particularly relevant because AI integration takes place within existing curricular, pedagogical, technological, and institutional conditions. Teachers may perceive AI as useful for improving the efficiency of their work and supporting more personalized learning while simultaneously experiencing uncertainty regarding its appropriate use, limitations, ethical implications, and reliability (P. S. Aithal, 2016). Their

experiences may also be influenced by students' characteristics, access to technology, school policies, available infrastructure, peer support, and opportunities for professional learning. Consequently, examining teachers' perceptions within a specific school context can provide valuable evidence that may not be fully captured by broader studies conducted across different educational settings. Understanding such context-specific experiences is particularly important during the early stages of AI adoption, when teachers and schools are still developing appropriate practices and support systems (Quratul Aini & Adiyono, 2023).

Makedonia Christian School provides a relevant context for examining teachers' experiences with AI integration in secondary education. Teachers at the school had begun using AI-related technologies in teaching and learning activities, creating an opportunity to examine how they perceived the contribution of AI to their professional practices. The school context also provides a meaningful setting for examining both perceived benefits and challenges because AI integration takes place within particular curricular, technological, institutional, and professional conditions. In such a context, teachers' experiences can provide insight into the extent to which AI is perceived as supporting teaching activities, the areas in which teachers continue to experience difficulties, and the types of professional development and institutional support they consider necessary.

Although previous studies have increasingly discussed the potential of AI in education, teacher AI competence, and the challenges of professional development, there remains a need for context-specific empirical evidence concerning how teachers perceive AI integration across multiple dimensions of their professional practice. In particular, less attention has been given to examining teachers' perceived benefits, challenges, professional development needs, and confidence within the same school-level context. This gap is important because the meaning and usefulness of AI integration may vary according to institutional conditions, teachers' prior experiences, technological access, and opportunities for professional support. Therefore, investigating teachers' perceptions within a specific secondary-school setting can complement broader research by providing contextual evidence about how AI adoption is experienced at the practitioner level.

Based on this rationale, the present study examines teachers' perceptions of AI integration in teaching practices at Makedonia Christian School. The study focuses on five interrelated dimensions: (1) perceived contribution of AI to teaching efficiency and productivity, (2) perceived contribution to personalized learning and support for students' understanding, (3) challenges encountered in integrating AI into teaching practices, (4) professional development needs related to AI use, and (5) teachers' confidence in adopting and integrating AI into their teaching practices. The study does not aim to establish a causal relationship between AI use and teacher performance or to measure students' actual learning outcomes. Instead, it seeks to describe teachers' perceptions and experiences regarding the contribution, challenges, and support needs associated with AI integration in their professional practice.

Accordingly, the study addresses the following research questions:

1. How do teachers at Makedonia Christian School perceive the contribution of AI to teaching efficiency and productivity?
2. How do teachers perceive the contribution of AI to personalized learning and supporting students' understanding?

3. What challenges and professional development needs do teachers perceive in integrating AI into teaching practices?
4. How confident are teachers in adopting and integrating AI into their teaching practices?

This study contributes context-specific empirical evidence on teachers' perceptions of AI integration within a secondary-school setting. By examining perceived benefits, perceived challenges, professional development needs, and teachers' confidence simultaneously, the study provides a more comprehensive view of early AI adoption from the teachers' perspective. The findings may contribute to the growing literature on teacher AI integration and provide practical implications for school-level professional development and institutional support strategies aimed at promoting effective, pedagogically appropriate, and sustainable AI integration in teaching practice.

METHOD

This study employed a descriptive survey design to examine teachers' perceptions of artificial intelligence (AI) use in teaching and learning practices at Makedonia Christian School. The study was conducted from January to March 2023 and involved all 30 teachers at the school. Because the population was relatively small and accessible, the study used a census (total population) approach, in which all members of the population participated as respondents (A. Aithal & Aithal, 2020). Data were collected using a questionnaire designed to obtain information about teachers' perceptions and experiences regarding AI use in teaching practices, particularly its perceived contribution to teaching efficiency and productivity, personalized learning and support for students' understanding, challenges in AI integration, professional development needs, and teachers' confidence in adopting AI. The questionnaire consisted of quantitative-response items and open-ended questions. Quantitative data were analyzed descriptively using frequencies and percentages to identify patterns in teachers' responses, while responses to the open-ended questions were analyzed descriptively by identifying recurring information related to the perceived benefits, challenges, experiences, and professional development needs associated with AI use. The quantitative findings and qualitative responses were then interpreted together to provide a contextual description of teachers' perceptions of AI integration in teaching practices. As the study employed a census approach and focused specifically on teachers at Makedonia Christian School, the findings were interpreted as context-specific descriptive evidence and were not intended for statistical generalization to teachers in other schools or educational settings.

RESULT AND DISCUSSION

Result

The study examined teachers' perceptions of artificial intelligence (AI) use in teaching and learning practices at Makedonia Christian School. Data were collected through questionnaires administered to all 30 teachers using a census approach. The questionnaire examined five aspects of teachers' perceptions: perceived contribution of AI to teaching efficiency and productivity, personalized learning and support for students' understanding, challenges and professional development needs, and confidence in adopting and integrating

AI into teaching practices. The quantitative responses were analyzed using frequencies and percentages, while responses to open-ended questions were descriptively interpreted to provide additional context for the quantitative findings. The quantitative results are presented in Table 1.

Table 1. Teachers' Perceptions of AI Use in Teaching and Learning

No.	Aspect of Teachers' Perception	Frequency (n = 30)	Percentage
1	AI contributes to teaching efficiency and productivity	24	80.0%
2	AI supports more personalized learning experiences	21	70.0%
3	AI is perceived to support students' understanding and reduce learning gaps	25	83.3%
4	Teachers need additional training in using AI	18	60.0%
5	Teachers feel more confident in adopting and integrating AI into teaching practices	24	80.0%

As shown in Table 1, the responses indicate generally positive perceptions of AI use among the participating teachers. The highest proportion was found in teachers' perception that AI supports students' understanding and helps address differences in learning needs, reported by 25 teachers (83.3%). This was followed by the perception that AI contributes to teaching efficiency and productivity, reported by 24 teachers (80.0%). A similar proportion of teachers (24 teachers; 80.0%) reported greater confidence in adopting and integrating AI into their teaching practices.

Meanwhile, 21 teachers (70.0%) perceived that AI could support more personalized learning experiences. This finding indicates that teachers recognized the potential of AI to assist them in responding to differences in students' learning needs. However, the finding represents teachers' perceptions rather than a direct measurement of students' learning outcomes.

An important finding concerns teachers' professional development needs. Eighteen teachers (60.0%) indicated that they still required additional training related to the use of AI. This result suggests that positive perceptions and confidence in AI use do not necessarily indicate that teachers feel fully prepared to use AI effectively in pedagogical practice. The coexistence of relatively positive perceptions and continued training needs provides an important indication that AI adoption should be accompanied by ongoing professional development.

Responses to the open-ended questions further supported these quantitative findings. Teachers generally described AI as useful for assisting with the preparation of teaching materials, generating or developing learning resources, supporting feedback, and reducing the time required for some routine teaching-related tasks. These responses provide contextual support for the relatively high proportion of teachers who perceived AI as contributing to efficiency and productivity.

Several teachers also described AI as potentially useful for adapting learning resources to students' different needs and levels of understanding. However, these responses reflect teachers' perceptions of the potential contribution of AI to personalized learning and student understanding and should not be interpreted as direct evidence that AI improved students' learning outcomes.

At the same time, teachers' open-ended responses indicated that the use of AI was accompanied by challenges. These included the need to understand how AI tools should be used appropriately, how AI-generated information should be evaluated, and how AI could be integrated meaningfully into teaching practices. These responses are consistent with the quantitative finding that 60.0% of teachers perceived a need for additional training.

Overall, the findings indicate that teachers at Makedonia Christian School generally perceived AI positively in relation to teaching efficiency, personalized learning, support for students' understanding, and their confidence in using AI. However, the continued need for professional development suggests that teachers' positive perceptions should not be interpreted as evidence of complete readiness or mastery of AI integration. Instead, the findings point to a combination of positive acceptance and continuing professional learning needs.

Discussion

The finding that 80.0% of teachers perceived AI as contributing to teaching efficiency and productivity suggests that AI was viewed primarily as a supportive tool for teachers' professional activities. The open-ended responses indicate that teachers perceived potential benefits in preparing instructional materials, developing learning resources, and providing feedback. This finding is consistent with previous literature describing AI as a technology that can assist teachers with planning, content development, assessment, and other routine instructional tasks (Ali et al., 2023). The finding also supports the argument that the value of AI in education may emerge not from replacing teachers but from supporting teachers in managing selected aspects of their professional work.

The finding that 70.0% of teachers perceived AI as supporting more personalized learning experiences also reflects the potential of AI to assist teachers in responding to differences among students. Teachers' responses suggested that AI could help them prepare learning materials or activities that are more closely aligned with students' needs and levels of understanding. Nevertheless, this result should be interpreted cautiously because the present study measured teachers' perceptions rather than students' actual learning outcomes (Dilaines et al., 2024). Therefore, the finding indicates perceived support for personalization rather than empirical evidence that AI directly improved student achievement or reduced learning gaps.

The relatively high proportion of teachers who perceived AI as supporting students' understanding (83.3%, assuming 25 of 30 respondents) is another notable finding. Teachers appeared to perceive AI as useful for identifying students' needs and supporting the preparation of learning resources. However, because the study did not collect student achievement data or use a pretest-posttest design, the findings cannot establish that AI actually increased students' understanding. The appropriate interpretation is that teachers

perceived AI as having the potential to support students' understanding within their teaching practices.

An important finding is the coexistence of positive perceptions and continuing professional development needs. Although 80.0% of teachers reported greater confidence in adopting and integrating AI, 60.0% still indicated a need for additional training. This pattern suggests that confidence in using AI does not necessarily correspond to comprehensive competence in integrating AI pedagogically (Aydin et al., 2023). Teachers may feel comfortable experimenting with AI tools while still requiring further development in areas such as evaluating AI-generated information, designing appropriate prompts, aligning AI use with learning objectives, and making pedagogically sound decisions about when AI should or should not be used.

This finding has practical implications for school-level AI implementation. Professional development should not focus solely on introducing teachers to AI tools. Instead, training should address the pedagogical, critical, and ethical dimensions of AI integration. Teachers need opportunities to develop the ability to evaluate AI-generated outputs, recognize limitations and inaccuracies, protect student information, and integrate AI in ways that support rather than replace professional judgment. Such professional development may help transform teachers' initial confidence and positive perceptions into more deliberate and pedagogically appropriate AI practices.

Overall, the results suggest that AI integration at Makedonia Christian School was characterized by positive teacher perceptions accompanied by continuing professional development needs. The findings therefore support a view of AI adoption as an ongoing process of professional learning rather than simply the adoption of technological tools. In the context of this study, AI was perceived as a useful support for teaching activities, while teachers continued to require opportunities to strengthen their knowledge and skills for effective integration. Because the study used a descriptive survey involving all teachers in one school, these findings should be understood as context-specific evidence rather than evidence that can be statistically generalized to other schools.

CONCLUTION

This study concludes that teachers at Makedonia Christian School generally hold positive perceptions of artificial intelligence (AI) integration in teaching and learning practices. AI was perceived as supporting teaching efficiency and productivity, providing opportunities for more personalized learning, and assisting teachers in supporting students' understanding. Teachers also reported relatively positive confidence in adopting and integrating AI into their teaching practices. These findings indicate that AI is perceived by teachers primarily as a supportive technology that can complement their professional activities rather than replace their pedagogical role. However, the findings also reveal that positive perceptions and confidence do not necessarily indicate that teachers have fully developed competencies for effective AI integration. The reported need for additional training highlights the importance of continuous professional development, particularly in developing teachers' pedagogical understanding of AI, evaluating AI-generated information, recognizing its limitations, and using AI appropriately within instructional contexts. Therefore, school-level AI integration should be

accompanied by structured professional development and institutional support that enable teachers to use AI critically, responsibly, and pedagogically appropriately. As this study employed a descriptive survey involving all 30 teachers at a single school, the findings represent context-specific evidence and should not be interpreted as evidence of a causal effect of AI on teacher performance or students' learning outcomes. Future research could involve larger and more diverse samples, validated measurement instruments, and mixed-method or longitudinal designs to examine changes in teachers' AI competence and actual instructional practices over time. Further studies may also investigate students' learning outcomes to complement teachers' perceptions and provide a more comprehensive understanding of the educational impact of AI integration.

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