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The Use of Artificial Intelligence in Learning: Primary School and Prospective Teachers' Perceptions

Alfian Fawaidil Wafa[*1] , Dany Wijaya Kesuma[2]

Malang State University; Jl. Semarang 5 Malang 65145 East Java Indonesia
e-mail: [*1]alfianwafa.fis@um.ac.id, [2]dany.wijaya.2401218@um.ac.id

Abstract. This research was conducted to analyze exactly how teachers and prospective elementary school teachers perceive the use of Artificial Intelligence (AI) in the learning process. This research aims to be a means of recommending the implementation of optimal use of AI at the primary education level. This study uses a quantitative approach with a descriptive research design through a survey method. Data were taken from 46 respondents of teachers and prospective elementary school teachers in the city of Malang who were selected using voluntary sampling techniques. Descriptive statistical analysis shows that, in general, respondents gave predominantly positive responses to AI integration, with average perception scores ranging from 19.17 to 21.46, indicating a tendency to agree. Key findings reveal a perception paradox: on the one hand, 73.9% of teachers believe AI can improve teaching effectiveness through personalisation and administrative efficiency; on the other hand, there is significant concern (69.6% agree) that AI has the potential to reduce essential social interaction between teachers and students. In addition, the main obstacles identified are the lack of teacher literacy and limited technological infrastructure in schools. Therefore, this study recommends the need for structured professional training and improved digital infrastructure as prerequisites for balancing the functional benefits of AI with the maintenance of the humanistic pedagogical role of teachers in primary schools.

Keywords. Teacher Perceptions; Artificial Intelligence; Primary School Learning; Student Engagement; Digital Divide

INTRODUCTION

The increasingly intensive use of artificial intelligence (AI) plays an important role in the learning process. Feedback, which used to be focused only from teachers to students, can now be provided directly by AI at every stage of learning (Lin et al., 2023; Hubballi et al., 2025). AI prioritizes a learning process that is able to adapt to educational content that is tailored to learning styles and increase student involvement in the learning process (Rahman & Mehnaz, 2024; Soni, 2025). The changes that occur in the learning process offered by AI are expected to bring major changes to the learning process.

The use of AI has been strongly felt in the learning process. AI makes it easier for students to search reference lists and makes it easier to understand the accepted material that is tailored to the needs of students (Marisa et al., 2025; Faujiah et al., 2024). Artificial intelligence significantly enhances students' academic performance and prepares them to face future challenges (Yusuf, 2024). Innovation in the use of AI is one of the media that can be implemented in the learning process in schools.

Although AI provides various benefits that can be offered to the world of education. AI in learning also presents various challenges. Teachers as the vanguard of

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knowledge delivery expressed concerns about ethics and data bias towards the use of AI (Almethen, 2024). The ethics of the use of AI are essential to prioritize the principles of data correctness and compliance with its users (Zhang, 2025). Ethics is an important foundation in the use of AI in every learning activity so that an in-depth study of the use of AI in education is necessary.

AI poses a serious threat to teachers because it has the potential to replace their role in the classroom. There is great fear among teachers that AI could replace the role of teachers, which would in turn replace the role of interaction between teachers and students (Erol & Erol, 2024). Teachers are concerned that students will become dependent on AI, which will have a negative impact on their critical thinking (Plattner et al., 2024). The threats perceived by teachers need to be taken into consideration for the sake of future learning processes.

The use of artificial intelligence in the learning process, especially in primary schools, needs to be implemented in order to support an optimal learning process. Artificial intelligence is expected to be able to increase student engagement in every learning activity. The optimisation of artificial intelligence use needs to be welcomed by teachers as classroom instructors. In order to see the efforts to utilise artificial intelligence in the learning process, we need to look at the perceptions of primary school teachers and prospective teachers. This initial step was taken to obtain empirical studies on the perceptions of teachers and prospective primary school teachers regarding the use of AI in learning.

The intensive use of AI as a transformative tool in modern education needs to be studied in greater depth. This study was conducted to examine the perceptions of teachers and prospective primary school teachers regarding the use of AI in learning in primary schools as an effort to recommend the use of AI in primary schools. Teachers' perceptions need to be taken into consideration in order to see how teachers view the management, selection, and interpretation of AI in learning.

METHOD

This study utilised a quantitative research approach with a descriptive research design and employed a survey research method with data collection techniques using questionnaires for prospective primary school teachers and primary school teachers in Malang. The research subjects consisted of 46 teachers and prospective teachers, who were selected through voluntary sampling techniques. In this technique, respondents are free to choose whether they want to participate in the research or not (Murairwa, 2015) The analysis technique used is descriptive statistics to process the questionnaire data. Descriptive statistics are statistics used to describe or analyse research results that look at the distribution of values distribution (Mahendra & Parmithi, 2015). This analysis aims to obtain a comprehensive picture of the perceptions, experiences, attitudes and impacts of teachers regarding the use of Artificial Intelligence in the context of teaching.

Table 1. Questionnaire Grid

No	Aspect	Indicator
1	Knowledge and Understanding about AI (Artificial Intelligence)	Understanding the basic concepts of AI, knowing examples of relevant AI tools in educational context
2	Attitudes towards the use of AIin	Interested in using AI technology, Understanding the

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	Learning	impact of AI use
3	Experience in the use of AI	Applying technology AI, Frequency of AI usage, Exploration of AI technology
4	Perceptions of Advantages and Disadvantages of AI in Learning	Concerns regarding student data privacy issues, concerns that AI reduces social interaction, AI accelerates the process of providing feedback feedback
5	Impact of on the Development Teacher Competence	AI drives the development of innovative teaching methods. AI assists in designing lesson plans/materials. Enhancement of pedagogical competencies after the integration of A
6	AI and Its Relationship with Student Learning	Increased student motivation and interest due to AI. AI assists students experiencing learning difficulties . Increased student engagement (student engagement) with AI tools
7	Use of AI in Assessment and Evaluation	Belief in objectivity of the assessment results provided by AI
8	Social and Ethical Impact Use of AI	Understanding of ethical issues related to AI
9	Future Outlook on AI in Learning	The belief that AI will become an essential component of education. The importance of increasing investment in AI infrastructure in schools. Positive views on the use of AI on learning outcomes learning

RESULT AND DISCUSSION

This research produces the perception of teachers and prospective teachers in the learning process at the elementary school level, teachers' experiences in using AI during the learning process, how the social and ethical impact of AI use is, and teachers' attitudes regarding the use of AI in the learning process.

Table 2. Descriptive Statistical Analysis

No	Aspect	N		Mean	Std. error of mean	Median	Fashion	Std. Deviation
		Valid	Missing					
1	Knowledge and Understan-ding about AI (Artificial Intelligence)	46	0	21.46	.401	21.5	20	2.722
2	Attitudes towards the use of AIin Learning	46	0	20.41	.359	20	20	2.437
3	Experience in the use of AI	46	0	20.87	.327	20	20	2.217
4	Perceptions of Advantages and Disadvantage s of AI in Learning	46	0	19.37	.407	20	20	2.760
5	Impact of on the	46	0	19.80	.417	20	20	2,825

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	Development Teacher Competence							
6	AI and Its Relationship with Student Learning	46	0	19.17	.460	20	20	3,122
7	Use of AI in Assessment and Evaluation	46	0	19.70	.629	20	20	4,268
8	Social and Ethical Impact Use of AI	46	0	20.93	.402	20	20	2,728
9	Future Outlook on AI in Learning	46	0	17.93	.609	19	20	4,133

Table 2. Showing the results of the data with an average score from each aspect of the questionnaire with a minimum score of 19.17 and a maximum of 21.46 where the results of the score show the application of AI in learning giving a positive response by elementary school teachers. The middle value of the data distribution shows a value of 20 where teachers agree with the use of AI in learning activities. The positive perception shown of these values is in line with the findings of studies in primary education that underscore the significant impact of AI in creating more effective and engaging learning experiences (Baysha & Astuti, 2024). The positive impact given to students, teachers also feel that AI is able to improve their work efficiency, especially in compiling innovative teaching materials and helping to automatically evaluate, so that it saves time and teachers can focus more on deeper learning aspects.

The Utilization Of AI in Learning

The results of the data that have been collected by the researcher on teachers and prospective elementary school teachers in the city of Malang are obtained as follows.

Table 3. Descriptive Analysis of the Effectiveness of Primary School Teaching Using AI

I believe that AI can enhance the effectiveness teaching in primary schools		
Valid	**Frequency**	**Percentage**
Strongly disagree	0	0
Somewhat disagree	1	2.2%
Somewhat agree	11	23.9
Agree	25	54.3
Strongly agree	9	19.6
	46	

Table 3. The survey results show that 73.9% of elementary school teachers stated that the use of AI in learning can increase the effectiveness of its implementation, this shows a positive impact that the use of AI is beneficial for teachers, In accordance with research conducted by (Arwien et al., 2025). that the majority of teachers in Makassar City

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have a positive perception of the use of AI that is integrated in science learning. This research provides benefits in increasing student motivation, innovative learning experiences. AI technology such as Chat GPT, Gemini, and Perplexity have also often been used by students to help do assignments, complete assignments and help understand material in the learning process (Marisa et al., 2025). The positive perception of elementary school teachers is also driven by the recognition of the role of AI in overcoming various challenges of efficiency and innovation in the classroom which directly increases effectiveness in teaching (Hermawan et al., 2025). According to (Kodir, 2025) In addition to being able to help the learning process, AI is also able to be a very efficient assistant in assisting administrative and evaluation tasks, such as providing automatic assessments and direct feedback, thus saving teachers' time. Saving time allows teachers to focus more on in-depth interactions, individual guidance and more creative pedagogical activities that will later improve the quality and effectiveness of the entire teaching process in elementary schools (Gleneagles et al., 2024). This condition is proof that the use of AI in learning has often been used in education today.

Figure 1. Distribution of data on student engagement in learning Source: SPSS 27

Figure 1 shows that the application of AI also has an impact on The high interest in student involvement in participating in the learning process, so this is a positive indication that students feel comfortable in participating during the learning process. According to (Cabral & Palavras, 2025) Teachers as teachers have the ability to understand the potential of AI in the implementation of learning so that they can optimize the way they teach, so that it is expected to increase student engagement and learning outcomes. Basic education specifically in its application, AI has proven to be effective in adapting learning materials to the level of cognitive ability and learning styles of individual students which are a major factor in increasing engagement (Putra et al., 2025). According to (Karim et al., 2025), The use of AI, especially through virtual learning systems, allows for personalization of materials and learning speed that is tailored to the needs and abilities of each student. With AI-assisted learning processes, students tend to be more enthusiastic about participating and shift their focus to understanding the material.

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Figure 2. Distribution of teacher perception data Source: SPSS 27

Teachers' perceptions have a significant impact on the learning processes used in the classroom. Teachers' perceptions of AI utilisation are significantly influenced by their attitudes, professional development, and ethical considerations (Ofem et al., 2025; Malakul, 2025). The success of the use of AI in learning is due to the factor of teachers' attitudes towards the integration of AI in the learning process (Asanre et al., 2024). Teachers' perceptions of the use of AI in learning are also diverse, where each teacher reflects caution and a sense of positivity in the use of AI in learning. According to (Ahmad & Rahayu, 2024) at the primary education level, studies show that teachers' perceptions greatly determine the success or failure of AI integration in teaching and learning activities. Teachers at this level generally have two views, namely They are optimistic and approve of the application of AI because it is considered capable of personalising material and providing instant feedback, which is very important for primary school students (Musdalifa et al., 2024). However, on the other hand, teachers also show caution regarding practical and ethical challenges, such as a lack of adequate digital literacy knowledge and skills, as well as limitations in technological infrastructure in schools (Ardho & Permana, 2025). These diverse perceptions reflect the need for strong institutional support, both in the form of teacher training and the provision of adequate facilities, so that the potential of AI can be optimised without neglecting humanistic and pedagogical aspects.

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Figure 3. Distribution of teacher perceptions Source: SPSS 27

The obstacles encountered in integrating AI into learning are the lack of adequate training and low literacy among teachers. Many teachers are not prepared to effectively utilise AI in their teaching practices (D. Susanti & Suranto, 2024; Maigina et al., 2024; Hartutik et al., 2025). Inadequate technology in schools hinders the utilisation of AI technology in schools (Nugroho et al., 2024). This condition results in a weak adaptation process of AI technology developments that should be felt and implemented in schools. In a study (Turnando et al., 2025), this condition is confirmed by various studies in Indonesia that focus on primary education, showing that the two main obstacles hindering AI adoption are educator readiness and infrastructure limitations. In addition, many primary schools, especially in 3T (Frontier, Outermost, Disadvantaged) areas, still face fundamental problems in the form of poor internet connectivity and limited availability of hardware, thereby hampering the implementation of AI-based technology and risking widening the digital divide (Putra et al., 2025). The potential for AI utilisation is widely recognised, and the successful integration of AI requires careful handling. Considering the challenges of training, infrastructure, and ethical considerations that teachers need to prepare for.

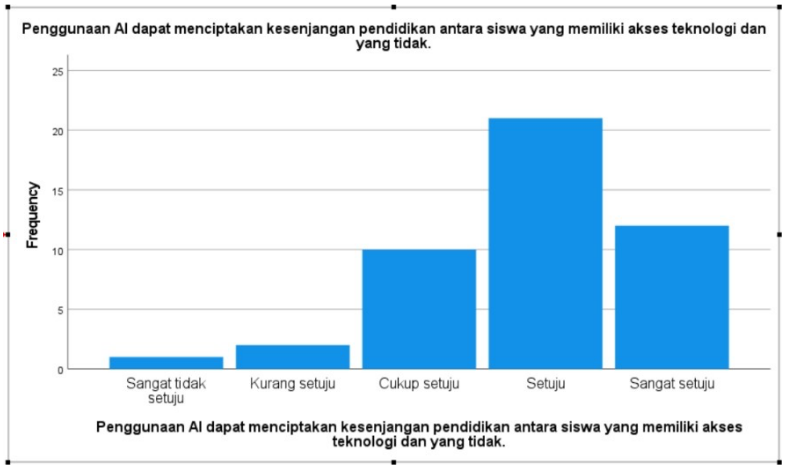

Figure 4. Distribution of teacher perception data Source: SPSS 27

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In general, teachers are open to the use of AI as a tool to support learning. However, teachers have excessive concerns about AI's ability to replace the role of humans in education. The data shows that 69% disagree that AI tutors can match human feedback. In addition, 81% oppose the replacement of books with AI, and 87% disagree with AI replacing face-to-face learning. Furthermore, 97% of teachers agree that AI should be used carefully and consciously in education (Miranda, 2025). Despite the existing problems, teachers remain optimistic that with the right support, the use of AI can be maximised (E. Y. Susanti et al., 2025). The success of AI technology in providing answers to every question in every learning situation is something that should be appreciated. However, these answers need to be scrutinised to determine whether they are accurate or merely responses without any truth. Therefore, this needs to be studied in more depth for the better use of AI in learning.

Table 4. Descriptive Analysis of Perceptions of AI Use

I am concerned that the use of AI may reduce social interaction between teachers and students		
Valid	**Frequency**	**Percentage**
Strongly disagree	2	4.3
Somewhat disagree	5	10.9
Somewhat agree	7	15.2
Agree	16	34.8
Strongly agree	16	34.8
	46	

Teachers' perceptions of the use of AI in learning vary, with each teacher reflecting caution and optimism in the use of AI. This tendency towards caution is particularly evident in the context of primary education, in line with the findings in Table 4, where the majority of teachers agreed to strongly agreed that AI could reduce social interaction between teachers and students by 69.6%. This concern is not isolated, but rather a reflection of the ethical and pedagogical challenges identified in studies on AI in primary schools. According to (Verawati et al., 2024). The reliance on the virtual tutor system on an AI-based adaptive platform has the advantage of shifting the focus from the role of the teacher as a facilitator to establishing interaction and character formation, this creates isolation and obstacles in the development of students' social skills. Other research conducted in elementary schools ensures that teachers have a vital role as role models, mentors and motivators who are able to model and teach critical thinking skills and character. Where AI has not been able to reach this ability which only focuses on data analysis (GTK Dikdasmen, 2016). Therefore, the concerns expressed by elementary school teachers indicate that the use of AI must be directed as an effort to support the role of teacher facilitation, this allows teachers to have more time for direct interaction, class discussions and student character development (Hakeu et al., 2023).

CONCLUSION

This study concludes that the perceptions of primary school teachers and prospective teachers towards the integration of Artificial Intelligence (AI) in learning reveal a critical paradox between functional optimism and pedagogical caution. In general, the research objective was answered by the finding that teachers had a predominantly positive response to the use of AI, supported by the belief that AI

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significantly improves teaching effectiveness by 73.9% through content personalisation and administrative task efficiency. However, the generalisation of the findings shows that AI integration is hampered by two critical factors: high socio-pedagogical concerns, with 69.6% agreeing that AI reduces social interaction, and structural barriers in the form of minimal teacher literacy and inadequate infrastructure. These concerns underline the importance of the humanistic role of teachers as character builders at the primary school level, which cannot be replaced by technology. Therefore, the recommendation for the next step is the need for a Balanced AI Implementation Strategy, which requires investment in teacher training focused on pedagogical integration and equitable improvement of digital infrastructure, as well as the development of clear ethical guidelines to ensure that AI functions as a tool that supports and strengthens the quality of interaction, rather than reducing it.

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