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Analysis of the Use of Artificial Intelligence (AI) in Enhancing Elementary School Students' Motivation to Learn

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis pemanfaatan kecerdasan buatan (Artificial Intelligence/AI) dalam meningkatkan motivasi belajar siswa sekolah dasar serta mengidentifikasi faktor pendukung dan penghambat penerapannya. Penelitian ini dilatarbelakangi oleh rendahnya motivasi belajar siswa yang ditunjukkan melalui kurangnya antusiasme, partisipasi, dan keterlibatan dalam proses pembelajaran. Penelitian menggunakan pendekatan deskriptif kualitatif yang dilaksanakan di SDIT Yasir Cipondoh, Kota Tangerang. Data dikumpulkan melalui observasi, wawancara, dokumentasi, dan kajian literatur, kemudian dianalisis secara deskriptif. Hasil penelitian menunjukkan bahwa pemanfaatan AI membantu guru dalam mempersiapkan pembelajaran, khususnya dalam merancang materi, mengembangkan media pembelajaran, menyusun soal, dan menciptakan aktivitas pembelajaran yang lebih interaktif. Penggunaan AI juga berkontribusi terhadap peningkatan minat, konsentrasi, dan partisipasi siswa selama pembelajaran. Namun, implementasinya masih menghadapi sejumlah kendala, terutama keterbatasan fasilitas teknologi, akses internet, dan kesiapan kompetensi guru dalam memanfaatkan AI secara optimal. Penelitian ini menegaskan bahwa AI berpotensi menjadi teknologi pendukung pembelajaran yang inovatif dan dapat meningkatkan motivasi belajar siswa apabila diintegrasikan secara tepat, kritis, dan bertanggung jawab dengan tetap menempatkan guru sebagai fasilitator utama dalam proses pendidikan.

ABSTRACT

This study aims to analyze the use of Artificial Intelligence (AI) in enhancing elementary school students' learning motivation and to identify the supporting and inhibiting factors influencing its implementation. The study is motivated by students' low learning motivation, as reflected in their limited enthusiasm, participation, and engagement in the learning process. A descriptive qualitative approach was employed at SDIT Yasir Cipondoh, Tangerang City, Indonesia. Data were collected through observations, interviews, documentation, and a literature review, and were analyzed descriptively. The findings indicate that AI supports teachers in preparing instructional activities, particularly in designing learning materials, developing instructional media, preparing assessment questions, and creating more interactive learning experiences. The use of AI also contributes to increased students' interest, concentration, and participation during classroom activities. Nevertheless, its implementation faces several challenges, particularly limited technological facilities, inadequate internet access, and teachers' varying levels of readiness and competence in utilizing AI effectively. This study highlights the potential of AI as an innovative instructional support technology that can enhance students' learning motivation when appropriately, critically, and responsibly integrated into educational practices, while maintaining teachers' central role as the primary facilitators of the learning process.

INTRODUCTION

The rapid development of digital technology has transformed various aspects of human life over recent years, including the education sector. One of the increasingly prominent innovations is Artificial Intelligence (AI). AI is a branch of computer science that focuses on developing systems and machines capable of performing tasks that typically require human intelligence (Sunarko et al., 2025). The integration of Artificial Intelligence (AI) into the

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education sector has marked a significant shift in teaching and learning approaches, particularly in higher education institutions. AI-powered personalized learning platforms, such as adaptive learning systems and intelligent tutoring systems, are transforming how knowledge is delivered, accessed, and understood. These systems dynamically adjust learning content and feedback based on students' learning behaviours, abilities, and preferences, thereby providing more engaging and personalized learning experiences (Keong, 2025).

Furthermore, students, parents, and the wider community have increasingly higher expectations regarding educational quality in the digital era, particularly concerning the development of 21st-century competencies, such as critical thinking, digital literacy, and creativity. Understanding these evolving needs and expectations is therefore essential to ensuring that proposed innovations are effectively implemented and generate positive impacts on the learning process. In this context, elementary schools must maintain their relevance and competitiveness amid rapid technological advancements (Nijo & Wahab, 2024).

Despite these technological advancements, students' learning engagement remains a significant concern. Some students demonstrate limited participation in classroom activities, lack enthusiasm during lessons, become easily bored, and show little motivation to independently explore and understand learning materials. Learning motivation plays a crucial role in shaping students' engagement and academic performance. Students with high levels of learning motivation tend to demonstrate greater concentration, perseverance, and enthusiasm throughout the learning process. Conversely, low learning motivation may lead to limited classroom participation, declining academic achievement, and behavioural problems, including school absenteeism and a lack of discipline (Anisa & Farhana, 2025).

According to Huang et al. (2021), ongoing advances in science and technology have accelerated the development of AI, which is increasingly being adopted across various sectors. Education is no exception, as AI has become an increasingly influential component of teaching and learning practices in schools. Growing recognition of its potential has encouraged the adoption of AI-based technologies in educational settings. Their applications have demonstrated considerable benefits, particularly in supporting instructional processes and classroom management. In Indonesia, studies have also reported the implementation of AI in various elementary education contexts. For instance, research on the application of AI as an interactive learning medium at SDN Sawahlega 02, Bandung Regency, demonstrated its potential to enhance students' learning motivation (Jamilah et al., 2025).

Nevertheless, the implementation of AI in elementary education presents complex challenges to improving educational quality. Amriyah et al. (2025) highlighted that

inadequate digital infrastructure remains a major barrier, contributing to disparities in access and learning quality. Furthermore, teachers' readiness and their capacity for continuous professional development are essential to ensuring the effective and appropriate integration of AI into instructional practices. These challenges indicate that the successful adoption of AI in elementary education requires more than technological availability; it also depends on institutional readiness, adequate infrastructure, and teachers' competencies.

Therefore, investigating the use of AI to enhance elementary school students' learning motivation is particularly important. Learning motivation is a fundamental factor influencing students' engagement, participation, and persistence in the learning process. Without sufficient motivation, the integration of educational technologies may not produce optimal learning outcomes. Accordingly, examining the potential of AI in fostering students' learning motivation is essential to understanding how technological innovation can contribute meaningfully to more engaging, adaptive, and effective learning experiences in elementary education.

RESEARCH METHOD

Qualitative research is a type of research that presents data in verbal form and analyses them without employing statistical techniques. Qualitative research emphasises observation and in-depth understanding in natural settings, with findings presented descriptively and interpreted comprehensively (Zahra et al., 2026). The research stages in this study began with selecting the topic and formulating the research questions. Subsequently, the research was conducted by collecting qualitative data from various sources related to the research focus. Data were obtained through observation, interviews, and documentation, supported by relevant literature, including scholarly journals and academic books related to the research topic. All collected data were then analysed descriptively through the processes of data reduction, data presentation, and conclusion drawing. This analysis was conducted to obtain an in-depth understanding of the phenomenon under investigation in accordance with the conditions observed in the field (Riska et al., 2025). This study was conducted in the context of Natural and Social Sciences (IPAS) learning in elementary schools as an example of the application of AI in the teaching and learning process. However, this study did not focus exclusively on IPAS but also covered the use of AI in supporting teaching and learning processes more broadly across various subject areas in elementary schools.

Descriptive qualitative research was conducted to describe existing research phenomena without manipulating the variables under investigation, through direct interviews (Hanyfah et al., 2022). The descriptive qualitative method was used to describe and analyse the use of Artificial Intelligence (AI) in enhancing elementary school students' learning motivation. This study was conducted at SDIT YASIR, Cipondoh, Tangerang City. Data collection techniques included observation, interviews, and documentation. Throughout the research process, research ethics were prioritised, including obtaining official permission from the school, securing permission from informants before collecting data, and maintaining the confidentiality of informants' identities through anonymisation to protect participants' privacy and comfort.

RESULT AND DISCUSSION

The Utilization of Artificial Intelligence in Elementary School Learning

The development of Artificial Intelligence (AI) in education has been characterised by the emergence of intelligent tutoring systems, adaptive learning environments, and personalised instructional approaches. These developments have expanded the opportunities for integrating AI into teaching and learning activities, particularly through technologies that support instructional planning, content development, and learning assessment. In educational settings, AI enables teachers to perform various instructional tasks more efficiently while providing opportunities to develop more interactive and responsive learning experiences.

The findings of this study indicate that the utilization of AI at SDIT YASIR has extended beyond the conceptual understanding of educational technology and has become part of everyday instructional practices. Based on interviews with classroom teachers, AI is primarily used during the instructional preparation stage, including developing learning materials, designing instructional media, preparing assessment questions, and generating ideas for classroom activities. The applications commonly used by teachers include ChatGPT for developing instructional materials and assessment questions, Canva AI for designing learning media, and Google Gemini for generating ideas for learning activities.

These findings suggest that AI functions as an instructional support tool that assists teachers in preparing and organising learning activities. Its contribution is particularly evident in facilitating the production of instructional content and providing alternative ideas for classroom implementation. This is consistent with Moundridou et al. (2024), who demonstrated that generative AI tools can support teachers in lesson planning, content

creation, instructional activity design, assessment, and feedback. Their findings indicate that AI can serve as an assistant throughout different stages of instructional design rather than functioning merely as a tool for generating information.

Furthermore, the use of AI in instructional preparation provides opportunities for teachers to develop more varied learning resources. The availability of AI-supported applications enables teachers to combine textual information, visual representations, and interactive materials according to instructional objectives. This is particularly relevant in elementary education, where learning materials need to be presented in ways that correspond to students' developmental characteristics and learning needs. Lee and Kwon (2024), through their systematic review of AI education in K–12 classrooms, highlighted the importance of integrating appropriate instructional strategies and technological resources to promote students' learning experiences, motivation, and interest in technology.

From a pedagogical perspective, these findings indicate that the effectiveness of AI does not depend solely on the availability of technological applications but also on teachers' ability to integrate them into meaningful instructional activities. AI-generated materials still require teachers' professional judgement to ensure their accuracy, relevance, and alignment with learning objectives. Therefore, AI should be positioned as a complementary instructional resource that strengthens teachers' pedagogical capabilities rather than replacing their instructional responsibilities.

The Contribution of Artificial Intelligence to Students' Learning Motivation

Learning motivation is an essential component of the educational process because it influences students' willingness to participate, sustain attention, and engage with learning activities. The integration of AI provides opportunities to create more engaging learning environments through interactive content, visual presentations, and learning experiences that can be adapted to students' needs. In this regard, AI has the potential to support students' motivation by making learning activities more varied and accessible. The findings of this study indicate that the use of AI contributes positively to students' learning motivation at SDIT YASIR. Based on teacher interviews, students demonstrated increased interest and enthusiasm when AI-supported media were incorporated into classroom activities. They became more curious, asked questions more frequently, maintained greater concentration during lessons, and participated more actively in discussions and task completion. One teacher explained that:

"Students have become more enthusiastic in participating in lessons, more focused throughout the learning process, and more interested in understanding the learning materials."

This finding suggests that AI-supported learning can create a more engaging classroom atmosphere by providing learning experiences that stimulate students' attention and curiosity. The contribution of AI is not limited to facilitating the delivery of instructional content; it also concerns the ways in which information is presented and experienced by students. Through visual and interactive learning resources, abstract or unfamiliar concepts can be presented in more accessible and interesting forms.

This finding is consistent with Wang et al. (2025), whose meta-analysis of 40 studies involving 5,849 participants demonstrated that AI-supported personalised feedback positively influences learning outcomes and student motivation. Their findings highlight the importance of personalised feedback in supporting students' learning experiences. Although the present study focuses on elementary school classroom practices rather than experimental measurement, both studies indicate the potential contribution of AI-supported learning to students' motivational development.

Similarly, Lee and Kwon (2024) found that AI education in K–12 settings can foster students' motivation, positive attitudes towards technology, and interest in learning. This reinforces the present findings that the integration of AI-supported instructional resources can provide opportunities for more engaging learning experiences at the elementary school level.

From this perspective, the contribution of AI to learning motivation can be understood through several interconnected dimensions, including attention, learning interest, engagement, and persistence. Attention is reflected in students' ability to concentrate on the materials presented by teachers. Learning interest emerges through curiosity and enthusiasm towards the subject matter. Engagement is demonstrated through active participation, questioning, discussion, and task completion. Meanwhile, persistence is associated with students' willingness to continue participating in learning activities and completing assigned tasks.

These dimensions indicate that AI-supported learning can contribute to students' motivational experiences through the combination of visual stimulation, interactive activities, and more varied instructional resources. Nevertheless, the findings should be interpreted as evidence of perceived motivational improvement based on classroom observations and teacher interviews, rather than as proof of a direct causal relationship between AI use and increased learning motivation.

Students' Responses and Engagement in AI-Supported Learning

The findings further reveal that students' responses to AI-supported learning are reflected in several aspects of their classroom engagement. Based on teacher interviews, the influence of AI can be identified through students' attention, learning interest, participation, and persistence during instructional activities. The use of visual media, including pictures, videos, and interactive learning activities, attracted students' attention and encouraged them to become more actively involved in the learning process.

From the students' perspectives, AI-supported learning provided a more enjoyable classroom experience because instructional materials were presented through images, videos, visual examples, and engaging activities. Several students expressed that learning with AI was "enjoyable and not monotonous" and that it increased their enthusiasm for participating in classroom activities. These responses indicate that visual and interactive elements can contribute to students' positive perceptions of the learning environment.

However, the findings also demonstrate that the motivational effects of AI were not experienced equally by all students. One student reported that the use of AI did not significantly influence their learning motivation because they continued to study as usual. This finding is important because it illustrates that students' responses to technological integration are influenced by individual characteristics, learning preferences, and the ways in which teachers incorporate technology into instructional activities.

This finding corresponds with Lo et al. (2024), who examined the influence of ChatGPT on student engagement through a systematic review of 72 studies. Their findings indicated that ChatGPT-supported learning could generate both positive and negative engagement experiences. Consequently, the effectiveness of AI cannot be assumed to be uniform across different learners and instructional contexts. The pedagogical design and the nature of students' interactions with AI remain important considerations in understanding its contribution to learning engagement.

Furthermore, Li et al. (2024), in their study of AI education at the K–12 level, identified the importance of students' intrinsic motivation, technological readiness, confidence, and interaction with AI-supported learning environments in shaping their engagement. These findings reinforce the present study's observation that the effectiveness of AI is partly determined by students' individual readiness and their experiences when interacting with technology.

The variation in students' responses highlights an important pedagogical consideration: AI should not be regarded as an automatic solution to low learning motivation. Instead, its

implementation needs to be accompanied by appropriate instructional strategies that consider students' abilities, interests, and learning characteristics. Teachers therefore remain essential in facilitating meaningful interactions, providing guidance, and ensuring that technological resources contribute to students' active participation rather than merely becoming additional classroom entertainment.

Challenges and Limitations in the Implementation of Artificial Intelligence

Although AI offers significant opportunities for improving instructional practices, its implementation in elementary education also presents various challenges. The integration of AI requires adequate technological infrastructure, teachers' competencies, institutional support, and appropriate policies to ensure that its use remains effective and responsible.

The findings of this study reveal several challenges in implementing AI at SDIT YASIR. Based on interviews, these challenges include the limited availability of technological devices, unstable internet connectivity, and the need to strengthen teachers' skills in using AI applications. The school principal also explained that the success of AI implementation depends on teachers' readiness, institutional support, the availability of facilities, and the selection of AI-based learning media appropriate to students' characteristics.

These findings indicate that technological infrastructure and human resource readiness are interconnected factors influencing the implementation of AI in elementary schools. Limited access to devices and unstable internet connectivity can restrict opportunities for teachers and students to use AI consistently. Similarly, insufficient technological competencies may prevent teachers from maximising the pedagogical potential of available applications.

This situation is consistent with Lee and Kwon (2024), who emphasised the importance of appropriate instructional resources, teacher preparation, and contextual considerations in implementing AI in K–12 education. Their review also identified ethical considerations and the need for appropriate learning strategies as important aspects of AI integration in schools.

Beyond infrastructural and technical limitations, the implementation of AI also raises concerns regarding the changing role of teachers in the educational process. Excessive reliance on AI may reduce direct human interaction between teachers and students, even though such interactions remain essential for developing students' character, moral values, and social competencies. Education is not merely concerned with transferring knowledge but also involves nurturing students' personalities, ethical awareness, and social responsibilities.

Accordingly, AI should be positioned as a supportive educational tool rather than a substitute for teachers. This perspective is consistent with Moundridou et al. (2024), who conceptualised generative AI as an assistant that supports educators in instructional planning, content development, and assessment while retaining teachers' central role in pedagogical decision-making.

Another important concern relates to students' potential dependence on AI applications. Although AI facilitates faster access to information and provides assistance in understanding learning materials, excessive dependence may limit students' opportunities to develop independent learning habits and critical thinking skills. Students may become accustomed to receiving immediate answers without adequately examining the information or developing their own understanding.

The ethical implications of AI use also require attention, particularly regarding students' personal data, information accuracy, and responsible technology use. UNESCO (2023) emphasised the importance of a human-centred approach to generative AI in education, including data protection, age-appropriate use, institutional preparedness, and the preservation of human agency in educational decision-making. These considerations are particularly relevant in elementary education because students require appropriate guidance and supervision when interacting with AI-based applications.

Therefore, the challenges identified in this study demonstrate that successful AI implementation requires more than technological accessibility. It also requires continuous teacher development, institutional support, appropriate infrastructure, ethical awareness, and pedagogical supervision. These elements are essential to ensuring that AI contributes positively to students' learning experiences without undermining the educational role of teachers.

CONCLUSION

The findings of this study indicate that the implementation of Artificial Intelligence (AI) at SDIT YASIR has positively contributed to teaching and learning processes at the elementary school level. AI supports teachers in preparing instructional activities, including designing learning materials, developing instructional media, preparing assessment questions, and generating ideas for more interactive and engaging learning activities. The use of AI is also associated with positive changes in students' learning motivation, as reflected in increased curiosity, concentration, engagement, and participation throughout the learning process. Nevertheless, AI implementation continues to face several challenges, including

limited technological facilities, internet accessibility, teachers' readiness, and the potential for excessive dependence on technology. Therefore, AI should be utilised responsibly as a supportive educational tool that strengthens teachers' roles rather than replacing them.

Theoretically, this study contributes to the understanding of AI integration in elementary education by highlighting the relationship between technological utilisation, pedagogical practices, and students' learning motivation. The findings suggest that AI does not independently generate learning motivation; rather, its contribution emerges through the interaction between technological resources, teachers' instructional strategies, and students' learning experiences. This perspective reinforces the importance of positioning AI as a pedagogical support system that facilitates attention, learning interest, engagement, and learning persistence. Thus, this study provides an empirical perspective for developing a more contextual understanding of technology-supported learning motivation in elementary education.

In terms of practical implications, the findings highlight the importance of strengthening teachers' competencies in integrating AI into instructional activities. Elementary schools need to provide adequate technological infrastructure, facilitate continuous professional development, and establish guidelines for the ethical and responsible use of AI. Teachers should also maintain active supervision and meaningful interactions with students to ensure that AI-supported learning remains aligned with educational objectives and students' developmental needs. This study has several limitations. First, it was conducted in only one elementary school, SDIT YASIR, which limits the transferability of the findings to other educational contexts. Second, the study employed a qualitative descriptive approach, relying on observations, interviews, and documentation. Consequently, the findings primarily reflect participants' experiences and perceptions rather than quantitatively measured changes in students' learning motivation. Third, the study did not examine the effectiveness of specific AI applications separately or compare their contributions across different subject areas.

Future research should involve multiple elementary schools with diverse institutional and technological characteristics to obtain a broader understanding of AI implementation. Further studies could also employ mixed-methods or experimental approaches to examine the relationship between AI utilisation and students' learning motivation more systematically. In addition, future research should investigate how different AI applications, teachers' digital competencies, students' individual characteristics, and instructional strategies influence learning engagement and motivation. Such investigations would provide a more

comprehensive understanding of the pedagogical potential and limitations of AI in elementary education.

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