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The Role of Artificial Intelligence in School Leadership

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Abstract: This paper examines the transformative role of Artificial Intelligence (AI) in school leadership and management. It examines how AI can enhance decision-making, personalize learning experiences, improve digital pedagogy, and increase administrative efficiency. Additionally, the study discusses the challenges and ethical concerns associated with AI integration in educational leadership, such as bias and transparency. To address these issues, the review proposes strategies for implementing AI tools that align with educational goals while promoting equity and accountability. Furthermore, it reviews relevant literature on digital pedagogy, which extends traditional teaching methods into the digital space. A clear understanding of technological possibilities and their practical applications is essential for effectively integrating AI into education.

Keywords: artificial intelligence, school leadership, digital pedagogy, educational management

Résumé : Cet article examine le rôle transformateur de l'intelligence artificielle (IA) dans la direction et la gestion des écoles. Il examine comment l'IA peut améliorer la prise de décision, personnaliser les expériences d'apprentissage, améliorer la pédagogie numérique et accroître l'efficacité administrative. En outre, l'étude aborde les défis et les préoccupations éthiques associés à l'intégration de l'IA dans la direction de l'éducation, tels que les préjugés et la transparence. Pour répondre à ces questions, l'étude propose des stratégies de mise en œuvre d'outils d'IA qui s'alignent sur les objectifs éducatifs tout en favorisant l'équité et la responsabilité. En outre, elle passe en revue la littérature pertinente sur la pédagogie numérique, qui étend les méthodes d'enseignement traditionnelles à l'espace numérique. Une compréhension claire des possibilités technologiques et de leurs applications pratiques est essentielle pour intégrer efficacement l'IA dans l'éducation.

Mots-clés : intelligence artificielle, direction d'établissement scolaire, pédagogie numérique, gestion éducative

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1. Introduction

The rapid advancement of digital technologies necessitates changes in societies' lifestyles, communication methods, access to information, and individual time management. In particular, digital tools and social media platforms influence every aspect of social life (Doğan et al., 2024). In this context, Artificial intelligence (AI) is becoming increasingly important in the ongoing digital transformation of society. With its ability to automate processes, analyze vast amounts of data, and offer predictive insights, AI is set to significantly impact various aspects of everyday lives (Yang, 2022). In addition to this, John McCarthy introduced the term Artificial Intelligence (AI) during the Dartmouth Artificial Intelligence Conference in 1956. This event united researchers from diverse fields to explore key topics like deriving meaning from sensory inputs, the role of randomness in creativity, and the idea of "thinking machines." The conference marked the formal beginning of AI as a field, as participants debated the potential for computers to mimic human intelligence and tackled the central questions of *how* and *when* this might be achieved (Russell & Norvig, 2010, p. 17). AI technologies, including conventional machine learning and deep learning, enable products to deliver "intelligent services" by mimicking human inference and behaviour. Today, AI is widely applied in visual and voice recognition, decision-making, and natural language processing, including language translation. These capabilities are integrated into various forms, including software applications, embedded control systems, and robots (Hwang et al., 2020).

Artificial Intelligence in Education involves machines simulating human thinking and behaviour to enhance learning, using technology to enable digital systems to perform tasks typically carried out by intelligent beings. As is widely known, education is built on three key foundations: pedagogy, curriculum, and assessment, with assessment serving as a vital component (Hill & Barber, 2014). Furthermore, digital pedagogy essentially extends traditional pedagogy into the digital space. Defining digital pedagogy requires a deep understanding of technological possibilities and how they can be applied in real educational settings in the AI era. Recent experiences suggest that only certain aspects of digital technologies in education provide authentic value and contribute to developing new pedagogical meanings (Istrate, 2022).

Additionally, Kafa (2025) states that AI tools like ChatGPT can transform school leadership by automating routine tasks, allowing leaders to focus on strategic and pedagogical responsibilities. Educational policymakers must provide continuous training and guidance on future AI trends to ensure effective AI adoption. Likewise, clear frameworks should be established to ensure AI's safe and ethical use in school leadership. The rapid rise of artificial intelligence has sparked considerable debate (Duan et al., 2019). AI is increasingly integrated into education, offering personalized student support, performance evaluation, and adaptive learning materials (Çaresiz et al., 2024). AI-powered learning platforms stand out for their ability to deliver customized content, enhancing student engagement and learning outcomes. Contemporary research explores AI applications across nearly all educational domains, including knowledge-based, data-driven, and logic-based AI systems. These applications encompass personalized teaching, exploratory learning, educational data mining, student essay analysis, intelligent agents, chatbots, special education support, child-robot interaction, AI-based assessments, and automated test generation systems—all aimed at improving learning experiences (İncemen & Öztürk, 2024). Moreover, AI can significantly enhance educational processes by supporting various pedagogical approaches. Research indicates that AI-driven applications improve the effectiveness and efficiency of teaching by optimizing instructional methods, strategies, and techniques (Altun, 2024).

There is significant growth in the application of AI in educational leadership, with a notable increase in research outputs in recent years. Integrating artificial intelligence into educational practices can transform teaching, learning, school management, and leadership. AI tools, such as machine learning algorithms, natural language processing, and data analytics, offer school leaders unprecedented opportunities to optimize decision-making, improve school administration, and enhance the overall learning experience (Arar et al., 2024). As educational institutions face increased pressure to innovate and maintain efficient operations, adopting AI technologies can be a strategic tool for school leaders to achieve these objectives. In this sense, in the future education, artificial intelligence (AI) will radically transform learning processes and provide students with a more personalized and practical learning experience. The integration of AI in education has the potential to transform teaching and learning significantly. However, the successful adoption of AI heavily relies on school leaders' actions and perspectives (Marrone et al., 2024).

In this context, education has always been subject to change due to technological advancements. As schools move toward a future where digital technology becomes seamlessly integrated into everyday life, AI's post-digital paradigm

transforms educational administration and leadership (Dai et al., 2024). The study of artificial intelligence is to proceed based on the conjecture that every aspect of learning or any other intelligence feature can, in principle, be so precisely described that a machine can simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves.

2. School Leaders in AI

According to Wollscheid et al. (2024), there is a growing need for new skills and competencies among teachers and school leaders, focusing on school leadership. Key responsibilities include managing digital infrastructure, supporting teachers' professional development, and addressing educational organizations' privacy and information security challenges. In this sense, using AI tools in school leadership offers benefits and challenges. Kafa (2025) emphasizes the importance of digitalization and AI integration in school leadership. School leaders should prioritize digital infrastructure and communication tools while learning to use AI technologies like ChatGPT to support administrative tasks. As schools increasingly incorporate AI into their classrooms, it is essential to understand how education leaders perceive this technology and the factors influencing their decision-making around its implementation (Marrone et al., 2024). AI-generated textual content is expected to soon surpass the volume of scientific content produced by researchers, professionals, experts, and students in educational sciences. Emerging fields such as e-learning and computer-assisted education will be particularly impacted, as they are highly dynamic and less constrained by traditional scientific discourse norms (Istrate et al., 2022). Wang (2021) argued that educational leadership is influenced by two key factors: decisions made by individual leaders and organizational decisions, which are shaped by organizational members who, under the influence and authority of leaders, determine how information is collected and processed for decision-making.

From the perspective of Day et al. (2016), the changing education policies in many countries have led to shifts in the role of school leadership. However, one remains clear: Policymakers and researchers agree that practical school autonomy depends on effective leaders. Studies worldwide have shown that leadership, especially by school principals, plays a crucial role in shaping schools' organization, culture, and environment. This, in turn, affects the quality of teaching and learning and, ultimately, student performance, with both positive and negative outcomes (Fullan et. 2024). For instance, Duran and Ermiş (2024) explore school leaders' perceptions of their roles in ensuring equal access to educational technology in the AI era in Turkey. Researchers conducted in-depth interviews with school principals and vice principals. The findings highlight AI's critical role in enhancing technological infrastructure, addressing economic disparities, and promoting educational equity. School leaders emphasize the need for long-term policies that the Ministry of National Education has led to support AI integration in Turkey. Additionally, AI is a valuable tool for leadership strategies, strategic planning, and innovation adaptation, ultimately contributing to equal educational opportunities.

In this regard, AI can support school leaders by providing actionable insights from vast amounts of data. School leaders can use AI to analyze performance data, student demographics, and other relevant metrics to make informed decisions regarding curriculum development, resource allocation, and student support services (Brynjolfsson & McAfee, 2017). AI tools can also predict trends, such as student dropout rates or achievement gaps, helping leaders take proactive measures. For instance, AI-powered data analytics enable school leaders to identify student performance and behaviour patterns, facilitating more personalized interventions. Leaders can allocate resources more effectively by leveraging predictive models to address emerging challenges within the school environment. Additionally, AI is a practical tool that reduces teachers' workload while providing students with more efficient and tailored learning experiences (EDUCAUSE, 2023).

Leadership plays a vital role in educational management. According to Leithwood et al. (2004), effective leadership is indispensable to the success of academic institutions. They emphasize that successful leaders articulate a compelling vision for the institution, set clear goals and objectives, nurture and support a skilled staff, and foster a positive and inclusive school culture. Additionally, According to Beytekin and Göktürk (2012), effective leaders can develop their organizations to the extent that they accurately perceive the right moments to collaborate with employees, listen to them, or take action. Understanding organizational behaviours and establishing effective management models become more predictable and comprehensible by identifying administrators' managerial behaviours and their emotional and social competencies. The human element in organizations is vital for both individual and organizational success. The

effectiveness of managers should not be evaluated solely based on their expertise in their fields; it should also be considered alongside their ability to manage their emotions and relationships with their surroundings.

Wang (2021) argues that the integration of AI in educational leadership is less about addressing technical challenges and more about refining leadership processes. In the context of academic organizations, AI can be conceptualized as playing a symbiotic role with human decision-making. This partnership is shaped by decision-makers individual predispositions (e.g., risk-averse vs. risk-seeking tendencies), core values, access to data and information, and consideration of social impacts. The human-AI symbiotic decision-making process operates through individual, dyadic, and group behaviours, ultimately influencing organizational performance. The school context, including factors such as government policies, economic conditions, and the influence of community stakeholders, further moderates this relationship. Whether this role will be classified as leadership or management remains unclear, but appropriate standards will be essential to oversee AI systems effectively. Research on leadership has identified behaviours such as charisma and relationship-building as pivotal when leading humans. However, AI leadership will likely necessitate adjustments to these approaches. Building relationships with AI machines will require a shift in focus toward ethical and moral guidance, employing both top-down and bottom-up robotic frameworks. Unlike traditional leadership, there will be less emphasis on fostering a sense of belonging or inclusion within an "in-group" for machine followers (Smith & Green, 2018).

3. Administrative Efficiency with AI

AI can significantly enhance school administrative functions, reducing the workload on leaders and staff while improving efficiency. For instance, AI systems can automate routine administrative tasks, such as scheduling, attendance tracking, and grading, freeing up time for school leaders to focus on strategic planning and decision-making (Aoun, 2017). Furthermore, AI offers three key benefits. First, it automates repetitive, time-consuming tasks, freeing humans for higher-value work. Second, it extracts insights from vast unstructured data, including videos, reports, and social media. Third, AI integrates computing resources to tackle complex problems (Nishant et al., 2020). These systems can also help optimize resource management, including budgeting and staffing, to ensure the school operates efficiently. Additionally, AI can improve school communication by streamlining information sharing among staff, students, and parents, enhancing transparency and collaboration (Chen, 2020).

Johansson and Björkman (2018) suggest that AI will significantly impact leadership roles in the future workplace. They argue that technological advancements have historically shaped leadership, and this trend is expected to continue. According to the authors, leaders' expectations align with existing literature regarding the future implications for leadership. They conclude that leaders are well-informed in the field and prepared for AI's future impact, as supported by managers who see AI as a helpful colleague and understand there is no need to compete with machines. While human judgment remains crucial, intelligent machines can significantly assist decision-making, data simulations, and discovery tasks. 78% of managers believe they will trust AI advice in business decisions. For example, Kensho Technologies offers a system that lets investment managers ask questions in plain English, such as, "What sectors perform best around a rate hike?" and receive answers quickly. AI will enhance managers' work and allow them to interact with machines as supportive advisors using intuitive interfaces (Kolbjørnsrud et al. (2016).

AI technologies enable personalized learning experiences by adapting educational content and assessments to meet individual students' needs. School leaders can leverage AI tools to support teachers in delivering customized student learning experiences based on their strengths, weaknesses, and learning styles (Luckin et al., 2016). This individualized approach helps improve student engagement, motivation, and academic success. Moreover, AI-driven chatbots and virtual assistants can provide real-time support to students, answering questions, guiding them through assignments, and even offering emotional support, which is particularly important for remote learning environments (Popenici & Kerr, 2017). When data is imprecise or difficult to interpret, leaders may rely on subjective judgment, drawing from past experiences to find a solution. In contrast, AI can process and analyze large amounts of data without cognitive biases, generating answers free from subjective influence (Parry et al., 2016). Likewise, AI can provide more accurate solutions (Parry et al., 2016). Additionally, Parry, Cohen, and Bhattacharya (2016) suggest that AI can be especially beneficial in addressing the principal-agent problem. They argue that AI can assist in making difficult decisions that might conflict with a leader's objectives, acting as a neutral decision-maker and ensuring complete transparency in the decision-making process.

4. AI Integration in School Leadership

Digital technologies have demonstrated their potential to expand and transform education, offering a pathway for its reinvention. This transformation is driven by technological advancements and cultural, social, professional, economic, and, most importantly, humanistic foundations (Istrate, 2022). For AI to integrate successfully into school leadership and management, specific strategies must be employed. First, school leaders should invest in professional development to ensure staff are adequately trained to use AI tools. Collaboration between educational technology experts and school leaders is crucial to identifying the most effective AI applications for their needs (Selwyn, 2016). Furthermore, schools should engage with students, parents, and communities to ensure AI applications align with their values and educational goals. Implementing robust data governance practices is essential to ensure that AI is used ethically and responsibly.

Meanwhile, On January 24, 2025, UNESCO marked the International Day of Education at the United Nations Headquarters in New York, focusing on "Artificial Intelligence and Education: Challenges and Opportunities." AI's potential to transform education, address inequalities, and expand access was discussed. It emphasized the need for AI to complement human intelligence, with examples from countries integrating AI into education systems. Challenges such as privacy concerns, digital divide, and ethical issues were also highlighted, with calls for global collaboration to ensure AI benefits all students, especially those in underserved areas. It stressed the importance of balancing AI's potential with human creativity and the role of educators in fostering critical thinking and connection. Despite AI's numerous benefits in school leadership, challenges and ethical concerns must be addressed. One key issue is the potential for bias in AI algorithms, which could reinforce existing inequalities in the educational system (O'Neil, 2016). Furthermore, increasing attention is being given to the ethical dimensions of AI in education. García and Hernández (2021) explore the moral challenges linked to AI-driven educational systems, including concerns about data privacy breaches and algorithmic bias. They emphasize the need for well-defined ethical frameworks to govern the implementation of AI in educational settings.

In this context, school leaders must be mindful of how AI tools are implemented and ensure they do not inadvertently perpetuate discrimination. The ethical and responsible integration of tools like ChatGPT into education systems demands immediate attention before generative AI becomes a standard feature in classrooms worldwide. This technology's true impact— its benefits and potential drawbacks—has yet to be thoroughly assessed. Current research lags behind the rapid pace of advancements in GenAI, leaving educators struggling to keep up as new versions of these tools are introduced (Fullan et al., 2024). Another challenge is the digital divide, which may prevent some students and schools from accessing AI technologies, leading to unequal educational opportunities. Leaders must consider equity in deploying AI and work to bridge the gap by providing adequate resources and training. On the other hand, Brynjolfsson and McAfee (2017) note that while AI can analyze large amounts of data and reach conclusions, it cannot explain how those decisions were made, which may lead to misinterpretations. The authors emphasize the importance of human staff in understanding AI systems' capabilities. Additionally, due to the system's complexity, it can be challenging to identify the cause when AI makes mistakes. Brynjolfsson and McAfee (2017) also warn of the risk of bias in AI systems, as humans create the data they rely on; nevertheless, AI has played a crucial role in building secure and interconnected campuses while simultaneously facilitating academic research and enhancing students' overall teaching and learning experiences (Dogan et al. 2024). Additionally, Kharbach (2024) emphasized that the first and most crucial step in the practical implementation of AI is ensuring its integration aligns with curriculum goals and actively supports existing learning objectives and building on the strategic planning phase. Considering this, the principle established a clear AI framework and laid the groundwork for critical AI literacy through a collaboratively developed classroom AI policy.

Despite everything, artificial intelligence should not be seen as a threat; instead, it is a technological tool that helps school leaders and makes tasks more manageable. When used correctly, AI can increase efficiency in many areas, from education to healthcare and business to daily life. The key is to develop and apply this technology ethically and human-centred. To fully benefit from the potential of AI, school leaders must use the technology consciously and responsibly, manage its impact on the workforce, and implement appropriate regulations to ensure societal benefits.

5. Conclusion

In conclusion, integrating artificial intelligence into school leadership presents transformative opportunities for enhancing decision-making, personalizing learning, and increasing administrative efficiency. However, realizing AI's potential requires addressing ethical considerations, equity challenges, and professional development for educators. By adopting strategic implementation practices and fostering collaboration with all stakeholders, school leaders can ensure AI technologies are leveraged to create innovative and inclusive educational environments. As AI continues to evolve, its successful integration will depend on a balanced approach that combines technological advancements with human-centred values and practices, including digital pedagogy. This approach ensures that technology enhances learning while preserving the importance of human interaction, critical thinking, and personalized educational experiences.

Regarding social sustainability, ensuring equality of opportunity in education is seen as necessary. Technology is used as an essential tool in achieving this equality. Digital learning platforms facilitate access to educational resources for disadvantaged groups. However, in this process, it is necessary to prevent the digital divide and ensure that every student has equal access to technological tools. Finally, educational administration should ensure the fair distribution of digital resources by developing inclusive policies. In addition, technology-supported education models aim to provide students with sustainable skills. Academic programs that increase environmental awareness and contribute to sustainable development goals will become widespread.

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