

Artificial Intelligence Driven Leadership For Transforming Decision Making And Innovation In Educational Institutions

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Abstract: The rapid development of artificial intelligence (AI) has significantly reshaped leadership practices across various sectors, including education. Educational institutions are increasingly required to adopt data-driven decision-making and foster innovation to remain adaptive in a rapidly changing environment. This study explores the role of artificial intelligence-driven leadership in transforming decision-making processes and stimulating innovation within educational institutions. Using a qualitative research approach through a literature-based exploratory study, this research analyzes recent scholarly publications related to AI integration in educational leadership. The findings indicate that AI-driven leadership enhances institutional effectiveness by improving data analytics, supporting strategic decision-making, optimizing resource management, and promoting a culture of innovation. Moreover, AI technologies enable leaders to predict educational trends, personalize learning strategies, and facilitate evidence-based policy development. However, the integration of AI in leadership also raises challenges related to ethical governance, data privacy, and digital competence among educational leaders. This study concludes that effective AI-driven leadership requires a balanced approach combining technological capability, ethical awareness, and human-centered leadership values. Educational institutions should therefore develop leadership capacity, digital literacy, and institutional policies that support responsible AI implementation.

Keywords: Artificial Intelligence, Educational Leadership, Decision-Making, Innovation, Digital Transformation

INTRODUCTION

The rapid advancement of digital technologies has transformed the landscape of educational management and leadership. Artificial intelligence (AI) has become one of the most influential technologies shaping contemporary educational systems. Educational institutions increasingly integrate AI-based systems into administrative processes, learning analytics, and institutional planning in order to improve efficiency and performance. AI technologies such as machine learning, predictive analytics, and intelligent decision-support systems enable educational leaders to analyze complex datasets and identify patterns that support strategic decision-making. The growing reliance on digital data has reshaped leadership practices

within schools and higher education institutions, creating a new paradigm often described as AI-driven leadership (Sposato, 2025).

Educational leadership plays a central role in navigating institutional change and guiding organizations through technological transformation. Leaders are expected to manage complex environments characterized by increasing data availability, evolving learning models, and continuous innovation. Traditional leadership models often depend on professional experience, intuition, and limited data sources. Contemporary educational systems demand leadership approaches that combine technological literacy with strategic thinking. AI technologies provide leaders with analytical capabilities that support evidence-based decisions and long-term institutional planning. Studies have shown that AI can assist educational leaders in identifying patterns related to student performance, institutional effectiveness, and resource allocation, allowing leaders to respond to emerging challenges with greater precision (Wang, 2021).

AI-driven leadership refers to the integration of artificial intelligence tools into leadership practices to support decision-making, innovation, and organizational learning. In educational institutions, AI systems can analyze learning analytics, monitor student engagement, forecast enrollment trends, and evaluate institutional performance indicators. These analytical capacities allow leaders to identify problems earlier and develop proactive strategies. AI can also support curriculum planning and academic policy development by analyzing large datasets related to student outcomes and institutional benchmarks. Research indicates that AI-based analytical tools significantly improve the quality of data-informed decision-making within educational organizations (Machkour et al., 2025).

The integration of AI into educational leadership has also stimulated innovation in educational practices and institutional management. AI-enabled platforms facilitate personalized learning environments, adaptive learning systems, and intelligent tutoring applications. Such technologies allow institutions to design learning experiences that respond to individual student needs and learning trajectories. Leadership that embraces AI can encourage a culture of experimentation and innovation among educators, researchers, and institutional stakeholders. AI applications support administrative efficiency, curriculum design, and teaching innovation while enabling leaders to coordinate complex institutional systems (Karakose, 2023).

AI-driven decision-making also contributes to the development of data-informed leadership practices. Educational leaders can access real-time data related to student progress, teacher performance, and institutional outcomes. AI systems analyze these data streams and generate insights that guide strategic

planning. Decision-making supported by AI allows leaders to move beyond reactive responses and adopt predictive approaches. Predictive analytics can identify potential dropout risks, detect learning difficulties, and evaluate the effectiveness of institutional interventions. Such capabilities strengthen the ability of leaders to implement evidence-based policies and improve institutional performance (Abduljaber, 2025).

Despite the significant potential of AI in educational leadership, the adoption of AI technologies also introduces complex ethical and governance challenges. Educational institutions handle sensitive personal data related to students, teachers, and institutional performance. The use of AI systems raises concerns regarding privacy protection, algorithmic bias, transparency, and accountability. Educational leaders must ensure that AI technologies operate within ethical and regulatory frameworks that protect stakeholders and maintain institutional integrity. Ethical leadership becomes essential in guiding responsible AI implementation and ensuring that technology supports human-centered educational values (Polat, 2025).

The successful implementation of AI-driven leadership also depends on the digital competencies of educational leaders. Leaders must understand both the opportunities and limitations of AI technologies in order to interpret data correctly and make informed decisions. Professional development programs focusing on digital literacy, data analytics, and responsible AI governance are necessary to strengthen leadership capacity in the digital era. Institutional readiness, technological infrastructure, and collaborative organizational culture also influence the effectiveness of AI integration within educational leadership (Renta-Davids, 2025).

The increasing role of AI in educational leadership signals a broader transformation in how educational institutions operate and innovate. Leadership practices that integrate technological intelligence with human judgment are likely to shape the future of educational governance. AI-driven leadership represents a strategic approach for managing complex educational ecosystems while fostering innovation and institutional resilience.

This study examines how artificial intelligence-driven leadership transforms decision-making processes and stimulates innovation within educational institutions. The research focuses on the strategic roles of AI in leadership practices, the opportunities created by AI-based innovation, and the ethical challenges associated with AI implementation in educational environments.

METHOD

This study employed a qualitative research design using a systematic literature review approach to explore the role of artificial intelligence-driven leadership in transforming decision-making and innovation

in educational institutions. A qualitative approach was selected because the topic involves conceptual exploration of leadership practices, technological integration, and institutional transformation. Systematic literature review enables researchers to synthesize theoretical insights and empirical findings from previous studies to construct a comprehensive understanding of emerging phenomena in educational leadership (Snyder, 2019).

The data sources consisted of peer-reviewed journal articles, conference proceedings, and scholarly books related to artificial intelligence, educational leadership, data-driven decision-making, and educational innovation. The literature search was conducted using academic databases such as Scopus, Web of Science, Google Scholar, and ERIC. Keywords used in the search process included “artificial intelligence in education,” “AI-driven leadership,” “data-driven decision making in education,” and “innovation in educational institutions.” The search focused on publications from 2018 to 2025 in order to capture recent developments in artificial intelligence applications in educational leadership.

The selection of literature followed three stages: identification, screening, and eligibility assessment. The identification stage generated a broad set of publications related to AI and leadership in education. During the screening stage, duplicate articles and publications that did not directly discuss leadership or decision-making in educational contexts were excluded. The eligibility stage involved evaluating the relevance, methodological rigor, and scholarly credibility of each source. Studies that provided empirical findings or strong theoretical frameworks regarding AI integration in leadership were prioritized. This procedure aligns with established systematic review practices in educational research (Xiao & Watson, 2019).

A thematic analysis technique was applied to analyze the selected literature. The analysis process involved several steps. The first step involved reading and coding the selected articles to identify key concepts related to AI-driven leadership. The second step involved grouping similar codes into thematic categories such as AI-supported decision-making, leadership transformation, institutional innovation, and ethical governance. The final step synthesized these themes into an analytical framework explaining how artificial intelligence influences leadership practices and innovation within educational institutions.

This methodological approach allows the study to identify patterns across multiple research contexts and develop a conceptual understanding of AI-driven leadership. The findings generated through thematic synthesis provide insights into how artificial intelligence supports strategic leadership decisions, strengthens institutional innovation capacity, and shapes the future direction of educational management.

Such an approach is appropriate for emerging research areas where conceptual clarification and theoretical integration are required (Kitchenham et al., 2009).

RESULT AND DISCUSSION

AI-Enhanced Decision-Making in Educational Leadership

Artificial intelligence has emerged as a powerful tool for improving decision-making processes within educational leadership. Educational institutions generate vast amounts of data related to student learning outcomes, institutional performance, teacher effectiveness, and administrative operations. Traditional leadership approaches often struggle to interpret such complex datasets. AI technologies provide analytical capabilities that allow leaders to transform raw data into meaningful insights that support strategic planning and institutional management. Research in educational data analytics demonstrates that AI systems can significantly improve institutional decision quality by enabling leaders to process large datasets efficiently and identify patterns that influence educational outcomes (Zawacki-Richter et al., 2019).

Predictive analytics represents one of the most influential AI applications in educational leadership. Predictive models analyze historical and real-time data to forecast future events or identify potential risks within educational systems. Educational leaders can use predictive analytics to identify students who may experience academic difficulties, detect early indicators of dropout risk, and design targeted support interventions. Such predictive insights allow institutions to move from reactive problem solving toward proactive policy development. Evidence from recent studies indicates that AI-driven predictive models have improved institutional capacity to design early intervention strategies that support student success and retention (Ifenthaler & Yau, 2020).

Machine learning algorithms also support leadership decision processes by identifying relationships among multiple educational variables. Educational institutions collect information related to student demographics, learning engagement, attendance behavior, and assessment outcomes. Machine learning techniques can analyze these interconnected datasets and reveal hidden relationships that are difficult to detect through traditional statistical methods. Educational leaders can use these insights to design policies that address learning inequalities and improve

institutional performance. Studies show that machine learning systems applied in educational analytics can generate highly accurate predictions that assist leaders in evaluating teaching effectiveness and curriculum outcomes (Chen et al., 2020).

AI-based decision support systems also strengthen evidence-based governance in educational institutions. Leadership decisions often involve complex considerations related to resource allocation, curriculum design, and institutional development strategies. AI systems provide leaders with analytical dashboards and automated reports that synthesize institutional data into accessible visualizations. These tools enable leaders to monitor institutional indicators in real time and evaluate the effectiveness of educational policies. Decision support technologies contribute to transparency in leadership processes since institutional stakeholders can access data-based evidence supporting administrative decisions. Such transparency strengthens trust and accountability within educational organizations (Holmes et al., 2022).

The use of artificial intelligence in leadership decision-making also influences strategic planning at institutional levels. Educational leaders increasingly rely on AI-supported forecasting tools to analyze enrollment trends, student performance patterns, and workforce demands in society. Strategic planning informed by predictive data enables institutions to align educational programs with emerging societal needs. AI-driven insights also assist leaders in optimizing resource distribution, including faculty workload management, learning infrastructure development, and institutional investment priorities. Strategic leadership supported by AI has been associated with improved institutional responsiveness and long-term sustainability (Selwyn, 2019).

AI-enhanced decision-making also supports innovation in institutional governance and educational design. Leaders who utilize AI technologies are able to experiment with new management models and adaptive learning environments. Data generated by AI systems provides continuous feedback regarding institutional performance, enabling leaders to refine policies and implement evidence-based improvements. Educational organizations that adopt AI-supported leadership practices often demonstrate stronger innovation capacity because leaders are able to

evaluate experimental initiatives using real-time data. Such practices contribute to institutional learning and continuous improvement within educational systems (Luckin et al., 2016).

Despite these advantages, AI-enhanced leadership decision-making requires careful governance and professional competence. Educational leaders must develop sufficient data literacy and technological understanding to interpret AI-generated insights accurately. AI systems provide analytical recommendations, yet final decisions remain dependent on human judgment and ethical considerations. Leadership responsibility includes evaluating algorithmic outputs, ensuring fairness in decision processes, and protecting sensitive educational data. Institutions that integrate AI technologies into leadership practices must establish governance frameworks that regulate data use, algorithm transparency, and accountability mechanisms (Williamson & Eynon, 2020).

The findings of this study indicate that AI technologies have transformed the nature of educational leadership decision-making. Leaders are increasingly able to combine human expertise with computational intelligence to guide institutional development. AI-supported analytics enable leaders to anticipate challenges, design targeted interventions, and implement strategic policies grounded in empirical evidence. Educational leadership in the era of artificial intelligence is characterized by a shift toward data-informed governance, predictive institutional planning, and continuous innovation.

Artificial Intelligence as a Catalyst for Institutional Innovation

Artificial intelligence has increasingly become a catalyst for innovation in educational institutions. The integration of AI technologies encourages educational leaders to reconsider conventional models of teaching, learning, and institutional governance. Educational systems face growing demands to provide flexible learning opportunities, improve student outcomes, and adapt to rapid technological change. AI technologies offer tools that allow institutions to redesign educational processes and create more adaptive learning environments. Educational leadership that supports AI integration can stimulate innovative practices across academic, administrative, and technological domains (Chassignol et al., 2018).

AI-powered learning systems have significantly transformed instructional design and learning experiences. One of the most widely discussed applications involves personalized

learning environments supported by AI algorithms. These systems analyze students' learning behaviors, engagement levels, and assessment results to adjust instructional materials according to individual learning needs. Personalized learning technologies allow students to progress through learning pathways that match their pace, prior knowledge, and cognitive preferences. Educational leaders who support the implementation of AI-based learning platforms can enhance institutional capacity to provide student-centered education. Empirical studies demonstrate that AI-supported personalization improves learning outcomes and student engagement in digital learning environments (Khalil & Ebner, 2016).

Adaptive learning systems represent another innovative development enabled by artificial intelligence. Adaptive learning platforms continuously collect and analyze learner data to modify instructional content in real time. Such systems adjust task difficulty, recommend supplementary learning materials, and provide targeted feedback based on student performance. Educational institutions that adopt adaptive learning technologies often report improved academic performance and stronger student motivation. Leadership support plays an essential role in facilitating the implementation of these technologies by ensuring institutional readiness, technological infrastructure, and teacher professional development (Hwang, Xie, Wah, & Gašević, 2020).

Artificial intelligence also contributes to innovation in teaching practices through intelligent tutoring systems. These systems simulate human tutoring by providing individualized guidance, automated feedback, and step-by-step explanations during learning activities. Intelligent tutoring technologies support students who require additional assistance outside traditional classroom settings. Educational leaders who encourage experimentation with AI-based tutoring tools enable institutions to extend learning support beyond conventional instructional methods. Research indicates that intelligent tutoring systems can significantly enhance learning effectiveness by offering continuous support tailored to student needs (Graesser, McNamara, & VanLehn, 2018).

Innovation supported by AI extends beyond instructional processes into institutional governance and collaboration networks. Educational institutions increasingly collaborate with technology developers, research institutions, and digital learning platforms to explore AI-driven educational solutions. AI technologies facilitate the sharing of educational data, digital resources,

and research findings across institutional boundaries. Such collaborative ecosystems accelerate the development of innovative learning tools and data-informed educational policies. Educational leaders serve as key facilitators in building partnerships that connect educators, researchers, and technology experts within innovation networks (Baker & Inventado, 2014).

AI-driven innovation also contributes to curriculum transformation. Curriculum design traditionally follows relatively static structures that may not respond quickly to evolving societal and technological demands. AI-based analytics allow institutions to analyze labor market trends, emerging skills, and industry demands. These insights support curriculum development processes that align educational programs with contemporary workforce needs. Educational leaders who integrate AI analytics into curriculum planning strengthen institutional responsiveness to global knowledge economies. Such curriculum innovation supports graduates in developing competencies relevant to digital and data-driven societies (Bond et al., 2019).

Institutional innovation supported by AI also depends on the development of an innovation-oriented organizational culture. Leadership practices influence how educators perceive and adopt emerging technologies within educational environments. Leaders who encourage experimentation, professional learning, and interdisciplinary collaboration create institutional conditions that support technological innovation. AI implementation requires not only technological infrastructure but also organizational readiness, teacher engagement, and strategic leadership commitment. Educational leaders play a central role in guiding institutional transformation by fostering a culture that values creativity, research, and technological exploration (Brynjolfsson & McAfee, 2017).

The integration of artificial intelligence into educational institutions signals a broader transformation in how innovation emerges within learning ecosystems. AI technologies provide analytical capabilities, adaptive learning tools, and collaborative platforms that expand the possibilities for educational development. Institutions that embrace AI-driven leadership approaches are more likely to experiment with innovative learning models, data-informed governance, and collaborative research initiatives. Educational leadership that combines technological understanding with strategic vision can position institutions to respond effectively to the challenges and opportunities of digital transformation.

Challenges and Ethical Considerations

The integration of artificial intelligence into educational leadership introduces significant opportunities while also generating complex ethical and operational challenges. Educational institutions increasingly rely on digital systems to collect and analyze large volumes of data related to students, faculty members, and institutional performance. AI technologies process this data to produce analytical insights that support leadership decisions. Such technological capabilities raise important concerns regarding data governance, privacy protection, and ethical responsibility. Responsible leadership must address these issues to ensure that the adoption of AI aligns with institutional values and public trust.

One of the most critical concerns relates to data privacy and security. Educational institutions store sensitive personal information including academic records, behavioral data, demographic information, and digital learning traces. AI systems often rely on large datasets to generate accurate predictions and recommendations. Improper data management practices may expose institutions to privacy violations and unauthorized data access. Data protection regulations require educational organizations to ensure transparency in how data are collected, stored, and analyzed. Research on data ethics in education highlights the need for strict governance mechanisms that regulate access to educational data and prevent misuse of sensitive information (Slade & Prinsloo, 2013).

Algorithmic bias also represents a major challenge in AI-supported decision-making. AI systems rely on algorithms trained on historical datasets. When training data contain structural inequalities or incomplete representations of certain student groups, AI models may reproduce or amplify existing biases. Such outcomes may influence institutional decisions related to student evaluation, admission processes, or academic support systems. Educational leaders must critically evaluate algorithmic outputs and ensure that AI systems are regularly audited for fairness and accuracy. Ethical AI governance includes monitoring algorithmic transparency, examining decision logic, and identifying unintended discriminatory outcomes (O'Neil, 2016).

Another challenge concerns the digital competence of educational leaders responsible for implementing AI technologies. Effective AI-driven leadership requires more than technological infrastructure or institutional investment. Leaders must possess the capacity to interpret data

analytics, evaluate algorithmic recommendations, and integrate AI insights into strategic planning processes. Many educational leaders have limited training in data science or artificial intelligence. Insufficient digital literacy may result in misinterpretation of analytical outputs or excessive dependence on automated systems. Leadership development programs focusing on digital competence and data-informed governance have become increasingly important within educational management (Fullan, Quinn, Drummy, & Gardner, 2020).

Organizational readiness also influences the effectiveness of AI integration within educational institutions. AI implementation requires coordinated collaboration among administrators, educators, data specialists, and technology developers. Institutional culture plays a significant role in shaping how technological innovations are adopted and utilized. Educational leaders must guide institutional change by encouraging professional learning, experimentation with new technologies, and collaborative problem solving. Studies on digital transformation in education emphasize that technological innovation succeeds when leadership promotes shared vision, organizational learning, and supportive institutional environments (Kools & Stoll, 2016).

Another concern relates to the potential reduction of the human dimension in leadership practices. Educational leadership involves ethical judgment, empathy, communication, and relational engagement with students, teachers, and community stakeholders. AI technologies provide analytical support for decision-making, yet they cannot replicate human values, contextual understanding, or emotional intelligence. Overreliance on algorithmic recommendations may weaken the human-centered aspects of leadership that are essential in educational settings. Leaders must maintain a balanced approach in which AI functions as a supportive analytical tool while human judgment remains central to final decisions (Long & Magerko, 2020).

Ethical leadership plays a crucial role in ensuring responsible AI adoption within educational institutions. Leaders must establish ethical guidelines that define acceptable uses of artificial intelligence in administrative and instructional processes. Ethical frameworks should address issues related to transparency, accountability, data ownership, and algorithmic fairness. Institutional policies must clarify how AI-generated insights are used in decision-making processes and how stakeholders can question or review algorithmic outcomes. Transparent governance

structures strengthen institutional accountability and protect the rights of students and educators affected by AI-supported decisions (Floridi et al., 2018).

Professional development initiatives also represent an essential strategy for addressing ethical and technological challenges associated with AI implementation. Training programs focusing on data literacy, digital ethics, and AI governance can strengthen the capacity of educational leaders to navigate complex technological environments. Educational institutions that invest in leadership development and ethical AI governance frameworks are better positioned to utilize AI technologies responsibly while maintaining human-centered educational values.

The integration of artificial intelligence into educational leadership requires careful consideration of ethical, technological, and organizational dimensions. Responsible AI implementation depends on transparent governance, leadership competence, and institutional commitment to ethical principles. Educational leaders who balance technological innovation with human-centered leadership values can harness the benefits of artificial intelligence while safeguarding the integrity and inclusiveness of educational systems.

CONCLUSION

Artificial intelligence has emerged as a transformative force in educational leadership, creating new opportunities for improving decision-making processes and stimulating institutional innovation. The integration of AI technologies allows educational leaders to utilize advanced data analytics, predictive modeling, and intelligent decision-support systems to guide strategic planning and policy development. Educational institutions increasingly rely on these technologies to interpret complex institutional data and generate insights that support effective governance. Leadership practices supported by artificial intelligence enable institutions to respond more quickly to emerging challenges in education, including changes in learning environments, institutional performance demands, and technological development.

The findings of this study indicate that AI-driven leadership strengthens leadership effectiveness by improving the accuracy of institutional decisions, optimizing resource management, and encouraging innovative educational practices. The implementation of artificial

intelligence also requires careful attention to ethical governance, data protection, and leadership competence. Educational leaders must maintain a balanced perspective in which artificial intelligence functions as a supportive analytical tool while human judgment, empathy, and ethical responsibility remain central to leadership practice. Successful implementation of AI-driven leadership depends on strong digital leadership competencies, institutional readiness, and responsible governance frameworks. Future research should focus on empirical investigations that examine how educational institutions implement AI-based leadership strategies and how such practices influence institutional performance, organizational innovation, and learning outcomes.

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Sulaiman: Journal of Leadership

ISSN(Online): XXXX-XXXX

Vol 1 No 1 (2026): March 2026

<https://journal.eduglobal.ac.id/index.php/sjl/index>

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