LEVERAGING ARTIFICIAL INTELLIGENCE FOR DATA, DECISIONS, AND EFFICIENCY IN SCHOOL GOVERNANCE

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ABSTRACT

This article examines the strategic significance of Artificial Intelligence (AI) in modern school management. It highlights the key directions of AI application — deep data analysis, identification of individual learning needs, efficient use of resources, and monitoring of safety. The study also emphasizes the necessity of human–AI collaboration, the importance of addressing ethical issues such as data protection and algorithmic errors, and the development of digital literacy among educational leaders.Particular attention is paid to the Presidential Decision No. PQ-4996 of 17 February 2021 (“On measures to create conditions for the accelerated introduction of AI technologies”) and the Presidential Decree No. PF-6079 of 5 October 2020 (“On approval of the Digital Uzbekistan – 2030 Strategy”), which provide the political and practical foundations for the integration of AI into educational processes and school governance.The article concludes that the main challenges lie in maintaining the balance between automation and human oversight, as well as ensuring equitable access to technology. Ultimately, AI should not replace school leaders but rather serve as an effective tool to support and enhance their management functions.

Keywords: Artificial Intelligence,school management,decision support,data analysis,digital transformation,resource management, education policy in Uzbekistan.

INTRODUCTION

In the 21st century, the processes of globalization and digital transformation have become key drivers of human development. The rapid advancement of information and communication technologies (ICT), especially the emergence and widespread adoption of artificial intelligence (AI) technologies, has brought about significant systemic changes across various fields, particularly in education. Today, digital shifts on a global level are creating a new paradigm for the educational process, not only in terms of content and format but also in the management mechanisms themselves.

Digital transformation is not just a technological upgrade but also a complex systemic approach focused on data-driven decision-making in management, monitoring education quality, forecasting, efficient resource allocation, and problem prevention. From this perspective, artificial intelligence technologies serve as a strategic tool in education management.

The main advantage of artificial intelligence is its ability to quickly and accurately analyze large amounts of data, identify patterns, make predictions, and generate automated recommendations. Such technological approaches are of great importance, particularly in such tasks as improving the quality of management at

the school level, monitoring student performance and the social environment, evaluating and optimizing pedagogical activities, and focusing on the professional development of teachers.

Modern global educational policies (e.g., OECD, UNESCO, World Bank,) develop recommendations for decision-making management using artificial intelligence. Countries such as the USA, Great Britain, South Korea, China, Singapore have advanced experience in digitalization of education and the introduction of AI technologies; their school systems actively use forecasting, assessment and management systems based on artificial intelligence.

The Presidential Decision No. PQ-4996 of 17 February 2021 ('On measures to create conditions for the accelerated introduction of AI technologies'), along with the Presidential Decree No. PF-6079 of 5 October 2020 ('On approval of the Digital Uzbekistan – 2030 Strategy'), provides the political and practical basis for integrating AI technologies into the educational process and education management. This shows the relevance of the topic not only from a theoretical but also from a practical and political point of view.

Also, the human factor in education management, subjectivity, bureaucratic delays, and erroneous data decisions can be prevented with the help of AI-based analytical systems, which is considered one of the topical problems in modern scientific circles. As a result, the use of artificial intelligence technologies in school management allows predicting, monitoring, identifying problems, and developing effective solutions.

Functionality of Artificial Intelligence in School Management

In recent years, the integration of digital technologies, in particular artificial intelligence (AI), into educational systems has revolutionised management processes. AI technologies in school management improve the efficiency and quality of decision-making by harmonising traditional management mechanisms with modern information technologies (Ifenthaler, 2023). From this point of view, analysing the functional capabilities of AI in school management is of scientific and practical importance.

Collecting, integrating, and analysing data in depth

Effective management of school operations requires collecting data from various sources and analysing it in a comprehensive way. AI algorithms are able to quickly process big data and identify hidden patterns within it. This, in turn, enables continuous monitoring of individual student achievement, engagement levels, teacher effectiveness, material resources, and other indicators (Romero & Ventura, 2020).

In the process of data collection, AI technologies utilise multiple interactive platforms such as sensors, electronic journals and assessment systems, and online student activity. Thus, managers are empowered to make quick and informed decisions based on comprehensive analyses.

As Romero and Ventura (2020) note: 'Advanced AI techniques can extract meaningful concepts from large and heterogeneous educational datasets, making it easier to implement evidence-based management in schools' (p. 15).

The future of data-driven decision making in school governance depends on the ability of Artificial Intelligence to collect, integrate, and deeply analyse big data. This technological approach allows school leaders to not only look at data, but also to strategically use it to predict and shape the future. However, these capabilities come

with important issues such as data privacy, ethical concerns, risk of algorithm errors (bias), and the need for training. Nevertheless, AI-powered data management and analytics tools can restructure learning and make it more effective, personalised for each learner.

Automation and Decision Support

Artificial intelligence will revolutionise the quality of decision-making in school governance, especially through decision support systems and the automation of certain operational processes. These technologies enable managers to make predictive and proactive decisions based not only on data but also on outcomes, resulting in more efficient use of resources, improved academic outcomes, and better overall quality of education. However, the effective and courteous use of these powerful tools requires addressing important ethical and practical concerns such as algorithmic errors, data protection, and maintaining human control. The future school leader should strive for an augmented intelligence model that can harness the synergy of AI and human expertise. The decision-making process in school management faces many variables and uncertainties. AI systems make it possible to automate this process, analyse different options, and predict their outcomes. Such systems provide strategic support for optimal resource allocation, instructional planning, and early identification of problems (Ifenthaler, 2023).

Also, Decision Support Systems (DSS) based on AI algorithms provide managers with effective options, which significantly improves the quality of management.

As Siemens and Baker (2012) point out, 'AI-enhanced decision support systems facilitate data-driven management decisions, enabling school leaders to anticipate challenges and optimise learning outcomes' (p. 254).

Monitoring and diagnosing individualised learning

With the help of AI, students' learning at school level is monitored and assessed individually. This capability helps to identify students' weaknesses, identify learning difficulties, and develop personalised learning strategies (Drachsler & Kalz, 2016).

For example, AI algorithms analyse students' grades, engagement levels, online activity and other metrics, predict their potential for educational development and recommend additional assistance as needed. This reinforces a learner-centred approach to school management.

Managing resources and improving cost-effectiveness

Managing school facilities, allocating financial resources and optimising staff utilisation are greatly facilitated by AI technologies. Automatic scheduling systems are an effective tool for scheduling students and teachers, forecasting material needs (Siemens & Baker, 2012).

In addition, AI-powered systems allow for the creation of monitoring systems aimed at ensuring that school infrastructure is operating efficiently. In this case, technical faults or misallocation of resources are detected in a timely manner.

As Siemens and Baker (2012) note, 'AI-based resource management improves operational efficiency through predictive maintenance, optimal staff allocation, and effective cost budgeting' (p. 253).

Artificial intelligence opens up fundamentally new possibilities in school resource management. Not only does it increase efficiency by reducing administrative burden and automating processes, but it also makes school management proactive with predictive analytics tools and introduces a new level of

intelligence in resource utilisation. AI-powered predictive maintenance, dynamic spreadsheets, intelligent energy management and data-driven budgeting can stabilise school facilities, optimise costs, and finally reallocate the resources needed to deliver the core mission of quality education. However, fully capitalising on these opportunities requires investment in quality data, appropriate infrastructure, training, and the development of equitable algorithms. AI is an important tool for making schools not only "smart," but also economically sustainable and resource-efficient.

School security and environmental monitoring

The functions of artificial intelligence in school security are also very broad. CCTV, facial recognition, motion analysis,and other sensors are used to create a safe and comfortable school environment. Artificial intelligence technologies are also used to detect and prevent threats and respond quickly to unusual situations occurring on school grounds (Williamson & Piattoeva, 2022).

AI opportunities in professional development for teachers and school leaders

AI plays an important role in creating professional development platforms for school leaders and educators. Online trainings, professional development courses, recommendations for pedagogical innovations, and individualised feedback are developed through AI (Ifenthaler, 2023).

This process serves to develop educators' continuous learning skills and application of modern educational technologies.

Artificial intelligence creates the opportunity to take professional development for teachers and school leaders to a whole new level. These technologies are replacing traditional top-down professional development models with personalised, data-driven, dynamic, and deeply integrated teacher growth platforms.' The in-depth diagnostics, personalised recommendations, contextual innovations, automated feedback, and strategic leadership support tools provided through AI serve to continuously improve teacher competencies, enhance the implementation of innovative pedagogies, and ultimately improve student learning outcomes. However, to unlock the full potential of these capabilities, important issues such as data protection, transparency, and fairness of algorithms, digital equity, and the psychological preparation of staff for new technologies must be addressed. AI is a powerful tool, but its effectiveness ultimately depends on the ability of human professionals - teachers and leaders - to use these tools wisely and responsibly.

Collaboration of human and AI

The effective use of artificial intelligence (AI) technologies in school management is directly related to the active participation of the human factor. In modern management systems, AI tools perform such functions as high-speed analysis of large amounts of information, suggesting options based on statistical and predictive models. However, since any management decision is multifactorial, social, and contextual, the final choice and decision should be made by a human being, i.e., an experienced and responsible manager (Ifenthaler, 2023).

From this point of view, the implementation of AI technologies in school management is not only related to the availability of technological tools, but also to ensuring effective human-computer interaction. This determines the importance of the following conditions:

1. Optimisation of human-computer interaction - AI systems should be provided with user-friendly, intuitive interfaces. The interfaces should be adapted to

the needs and knowledge level of the manager without complicating the decision-making process.

2. Improving digital literacy and qualification of managers - to effectively use AI tools, management personnel must have a high level of analytical thinking, the ability to apply information technologies, and understand technological innovations.

3. Formation of principles of mutual trust and responsible co-operation - Trust plays an important role in co-operation between Human and AI. Managers should have the competence to evaluate the recommendations of AI systems, critically analyse them, and apply them accordingly.

Successful integration of artificial intelligence technologies into school management practice is impossible without the active and conscious participation of the human factor, in particular, managers. This process requires harmonisation of technological innovations with human potential, digital transformation on a scientific basis, taking into account the socio-psychological features of the management process.

CONCLUSION

The introduction of artificial intelligence (AI) technologies into modern educational management systems serves to improve management efficiency at different stages of school operations (Luckin et al., 2016). AI tools enable the automation of functions such as data analysis, identification of individual learning needs, optimal resource allocation, and safety monitoring (Ifenthaler, 2023).

However, successful integration of AI technologies is directly dependent on active human involvement, digital literacy, and ethical principles (Holmes et al., 2022). The fact that final decisions are made by humans, with AI recommendations serving only as supportive, ensures that the management process is robust and socially responsible.

Thus, while AI technologies are striving to occupy a significant place in school governance, it is important to build human capacity and form mechanisms based on ethical norms in order to fully and sustainably implement these technologies.

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