

DIGITAL TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE IN EDUCATION

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Abstract: *This work attempts to investigate about the usage of artificial intelligence and digital technologies on contemporary educational systems regarding how it relates with teaching, learning, and student evaluation. Although increasingly implemented, there is a large gap in knowledge about ethical issues, the long term impact on autonomy as a learner, and changing roles for the educator. In order to address this, the study employs a qualitative literature analysis of previous research and observation of the context of Uzbekistan's education sector. Results show that although AI based systems offer structured support in handling content delivery and evaluation, risks associated with academic dishonesty, data privacy, and if depended on too much, AI based systems can easily end up as a bad company. The proposals of the results are that it is necessary to develop balanced digital strategies aimed at reinforcing both technologic capacity and human centered values in learning. Indeed, the resulting implications necessitate the construction of ethical guidelines and ongoing research of the cognitive and behavioral consequences of AI environments of learning.*

Keywords: *artificial intelligence, digital education, student evaluation, academic ethics, teacher roles, data privacy, Uzbekistan education system*

It is now a defining feature of development, that information technologies are integrated into various sectors during the contemporary era of accelerated digital transformation. For redefining the rules in almost all the departments of human life and for changing the way things are done, digital technologies and artificial intelligence (AI) have created havoc in many of the fields, but one of the most critically impacted fields is education. However, smart systems and cyber physical technologies brought intelligent educational tools and platforms to support innovative, individualised and efficient learning environment.[1]

Digital technologies are those based on processes for storing, transmitting, and processing information in digital form (i.e., as 0s and 1s). The stages of the digital revolution are linked to the emergence of electronic computing machines, the spread of the Internet, the development of cloud technologies, and the field of Big Data. Each new stage has offered fresh opportunities and led to economic, social, and cultural changes on a global scale. In the 1980s and 1990s, advances in computers and the widespread

adoption of the Internet brought digital technologies into everyday life. Since the 2000s, mobile phones, smartphones, and stronger inter-network connectivity have emerged, giving rise to new platforms and services. Today, digital technologies-especially cloud computing, the Internet of Things (IoT), and blockchain-enable society to become faster, more efficient, and more interactive[2].

The use of AI in education has made it possible for various improvements in teaching, assessment and management of institutions. Roles of teachers and learners are being redefined in applications from adaptive learning systems to automated grading and predictive analytics. There is a close alignment with the theory of connectivism, that is based upon the use of digital networks and shared knowledge in the vibrant, real time, of contemporary education. However, the rise of this digital shift is not without limitations as studies and debates related to questions of academic integrity, data privacy, and critical thinking skills begin to erode have arisen.[3].

Artificial intelligence technologies can have a negative impact on students in the field of education. These technologies can reduce students' creativity and critical thinking skills, as they may not develop independent thinking and problem-solving abilities when using artificial intelligence systems. If students rely solely on technology during the learning process, it may limit their ability to express their thoughts and solve problems. Furthermore, excessive dependence on technology can also negatively affect students' social and emotional development. The reduction in direct communication and interaction among students may lead to difficulties in teamwork and the development of collaborative skills. As a result, students may be restricted in their social development. In addition, artificial intelligence technologies can also negatively impact students' psychological well-being. Prolonged screen time while studying can increase students' stress and anxiety levels. This can adversely affect their mental state, leading to difficulties in self-expression and communication with others. These issues are certainly significant for the overall development of students[4].

Currently, digital technologies and artificial intelligence are being widely implemented in all areas of human activity, particularly in the education system. Research conducted globally shows that artificial intelligence tools play a crucial role in organizing the educational process effectively. For example, according to UNESCO's 2024 report, over 60% of higher education institutions worldwide have implemented AI-based technologies at least at one stage. Additionally, according to forecasts from HolonIQ, by 2024, the global education technology market will reach 400 billion USD. In China, by the end of 2024, more than 20 million students had received education based on an individualized approach using artificial intelligence.

According to a 2024 survey conducted at Jizzakh State Pedagogical University, 80 % of 180 students stated that AI helps in lesson preparation, writing reports, and translating. Moreover, 70% of students emphasized the importance of adhering to academic integrity principles when using AI. The above statistics demonstrate that the integration of digital

technologies and artificial intelligence in education is a contemporary necessity, and the reforms being implemented in this field are yielding positive results both globally and nationally.

Although there have been a good number of studies investigating the operational benefits of AI in classroom, there is some gaping ambiguity on its pedagogical implications and the long term consequences on quality of learning. There has been much research into technological feasibility and metrics for performance, without addressing human centered concerns (e.g. ethical responsibility, teacher student dynamic, psychological readiness towards the digital transformation). Through qualitative and contextual inquiry, this study attempts to examine, if and how AI and digital technologies can be adapted as advantages and risks in educational systems[5].

This article uses methodology of integrative analysis of theoretical and empirical literature with the emphasis on the global trends as well as own adaptations in Uzbekistan's education system. Such attention is given to the influence of AI on motivating students, academic integrity, instructional effectiveness.

The paper then evaluates AI tools as to whether they are compatible to current educational frameworks, and finally looks at the role of teachers in the management of digital classrooms. In this sense, the study provides a balanced perspective on educational innovation by examining the dual impact of facilitating and potentially undermining of digital integration.

It is expected that the findings will prove that while AI can help teachers to enhance access to knowledge and streamline educational processes, misuse of AI could reduce students' cognitive engagement. This research has important implications for policy makers, educators and ed tech developers because it implies the need for ethical standards, digital literacy training, and culturally responsible implementation

strategies. This study contributes to a nuanced understanding of the role of AI in education to support the development of more sustainable and human centered digital learning systems[6].

The purpose of using artificial intelligence in education is to give learners opportunities for effective studying, exploration, and analysis. AI supports students during the learning process by helping them assimilate new material, process it, and apply it in practice. This requires students to engage with content in a variety of ways. There are several methods for employing AI in education. Teachers can use innovative technologies and various technical tools—computers, projectors, interactive whiteboards, and so on—to organize lessons more effectively. Such innovations make the learning process more engaging and efficient.

Moreover, important aspects of AI use in education include employing interactive methods both during and outside class, conducting deep analyses of students' learning processes, reinforcing their knowledge and experiences, and fostering a sense of responsibility for their own progress and outcomes. Using AI in the learning process makes

it possible to: Increase students' engagement with material both during and after class. Maintain sustained interest in the subject. Model and visualize complex processes and phenomena across different disciplines. Encourage students to conduct independent research, select and analyze relevant information online[8].

At Jizzakh State Pedagogical University, extensive opportunities have been established in the teaching and research of artificial intelligence. The university offers "Artificial Intelligence and Expert Systems" and "Machine Learning" courses within its "Computer Science" bachelor's program, and "Deep Learning" and "Big Data Analytics" courses at the master's level; additionally, AI modules are available as part of the STEM pedagogy track. In the AI laboratory at the "Digital Education Center," work is being carried out on an adaptive learning platform and a speech-recognition system for the Uzbek language using GPU-powered workstations. Students participate in weekly sessions and an annual hackathon through the "JDPU AI Club," while instructors have free access to certified AI courses via "Coursera for Campus. Moreover, artificial intelligence is rapidly developing today, and many countries have adopted it, integrating it into several sectors, including the education process. For example, in Japan, robots are replacing teachers in some schools, conducting lessons, while students are able to ask questions on any topic they are interested in. In this context, it should be noted that Professor Andrew Ng from Stanford University emphasized that artificial intelligence is 'the new electricity of this century'[9].

Finally, the study discusses the application of artificial intelligence and digital technologies in educational systems and their impact in increasing efficiency of teaching, student evaluation as well as administrative processes. Among the benefits (enhanced information access, automation of routine tasks, personalized learning pathways) and critical concerns (threats to academic integrity, data privacy, reduced learner autonomy), it is highlighted. These findings indicate that although these technologies hold the potential to change education for the better, if they are used unregulated they may counter the learning process. Consequently, balanced strategies focused on education stakeholders must use ethical usage, teacher training, and student preparedness until such time that he recognized that it is one of the substitutes. The study suggests that policies meant to ensure digital tools are used within certain bounds should be adopted. Future research should study long term behavioral and cognitive effects of AI based learning, the role of educators within digital ecosystems and culturally responsive frameworks of technological adoption in accordance with pedagogical goals.

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