



DIGITAL TRANSFORMATION THROUGH ARTIFICIAL INTELLIGENCE (AI): A LITERATURE REVIEW OF SCHOOL EDUCATION

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ABSTRACT:

Changes in the demands of Education require innovation and creativity in the learning process. The term Digitalization refers to the conversion of paper mode or written data into digital type. The application of digitalization in the education sector ends up in learning surroundings within the twenty-first century. It shows all concerning replacing the Traditional School System with a new Establishment That Boosted Digital Education. Digitalization can be termed an innovation within the education sector because it highlights the varied activities resulting in the Modernization of Education Sector. Artificial Intelligence is the intelligence exhibited by way of machines or software program. It is the subfield of laptop technology. The development of Artificial Intelligence (AI) in the field of education helps process daily activities including teaching and learning. Artificial Intelligence (AI) has the potential to address some of the biggest challenges in education today, such as innovative teaching and learning practices. With the increase in studies about artificial intelligence (AI) in the educational field, many scholars in the field believe that the role of teachers, schools, and leaders in education will change. Digital transformation in education is the integration of digital technology into all aspects of education, which can improve the learning experience for students and educators.

Digitalization is advancing into the education system of India and is replacing the conventional classroom practice. In this research article, the researcher will try to find out whether digital transformation promotes the understanding of students. Can digital transformation be brought about with the help of artificial intelligence?

KEYWORDS:

DIGITALIZATION, DIGITAL TRANSFORMATION, ARTIFICIAL INTELLIGENCE (AI), EDUCATION.

INTRODUCTION

Education is both the act of teaching knowledge to others and the act of receiving knowledge from someone else. Education also refers to the knowledge received through schooling or instruction and to the institution of teaching as a whole. Education is what makes you human, but human efforts make educational modes easier. As we all know, we are living in a century of technology, there are lot of new advancements on daily basis. Today's technology has become an unavoidable part of the passage of time. Technology has not only changed people's lifestyles but has also changed how we work, learn, and interact. Digital transformation through AI in school education is a rapidly evolving field that has the potential to revolutionize the way we learn and teach.

Digital technologies are revolutionizing the education sector. One such transformative technology is Artificial Intelligence (AI). AI has the potential to make education more effective, personalized, and engaging. In this context AI becomes the most important and tangible advancement of modern times. Artificial intelligence is very important in today's world because we can't imagine our life without AI. If we talk about the digitalisation process in education, AI has become a major aspect because it makes our education system more integrated and automated. The role of

Artificial Intelligence (AI) technology is increasingly evident in various sectors, including the education sector. The presence of AI technology has transformed the educational curriculum, especially in the fields of technology, science, mathematics, and engineering. Digital learning content that is developing today can be presented thanks to the application of AI.

DIGITALIZATION

Digitalization refers to the use of digital technology, and probably digitized information, to create and harvest value in new way. *(Gobble, 2018)*

Digitalization is defined as the way many domains of social life are restructured around digital communication and media infrastructures. In simple terms, digitalization may be defined as the use of digital technologies. *(Sari and Lorentz, 2019)*

Digitalization means transformation of all information types (text, sound, visuals, video and other data from various sources) into the digital language. *(Machekhina, 2017)*

DIGITAL TRANSFORMATION

Digital tools have also empowered students in higher

education, enhancing engagement, participation, and interaction (*D. J. S. Kumar & Shobana, 2024*).

Digital transformation consists of a change in the organization of work motivated by emerging digital technologies and innovative business models. It involves more than the implementation of a technological solution, it is an alignment between digital technologies, human and organizational factors (*Norton et al.2020*).

Digital transformation builds new skills and models through digital technologies in a deep and strategic way. (*Mahlow and Hediger 2019*)

ARTIFICIAL INTELLIGENCE (AI)

AI has the potential to revolutionize the way we learn and teach, making it more personalized, engaging, and efficient (*Alneyadi, Wardat, Alshannag, & Abu-Al-Aish, 2023*).

The use of artificial intelligence (AI) in education has enabled personalized learning, revolutionizing the way students learn (*Rana et al., 2022*).

AI can analyse students' past performance to identify areas of difficulty and provide targeted support in those areas (*Alarabi & Wardat, 2021*).

AI can also adapt to the student's learning pace, slowing down or speeding up instruction as necessary (*Mohammed, et. al 2020*).

The basic definition of artificial intelligence can be expressed as the skilful imitation of human behaviour or mind by tools or programs (*Mohammed & Watson, 2019*).

Artificial intelligence to be the new electricity of this age. (*Ng, 2017*)

It may be an illusion of the current structure to think that artificial intelligence will come within the computer format used at home. It could get into our lives within different functions and shapes. (*Timm's, 2016*)

EDUCATION

Education is a very important factor in human development, and it brings about critical thinking, fosters changes in human life, in teaching someone how to make important decisions, boosts creativity, enhances individual's potentials and importance to the society, and has been ultimately explained to be a passage to progress (*Chirazze, 2023*).

Education is a clear indicator of life outcomes, including of positive perceptions and behaviours; it can promote diversity as well as increase people's wellbeing and decrease resorting to negative coping strategies. (*Amiti, 2021*)

Education is the socially organized and regulated process of socially transference of significant experience from the previous generations to the following generations. (*Naziev, 2017*)

But as we know every coin has two sides so does AI. AI also have two aspects in education, advantages as well as some disadvantages. The positive impact is that AI helps in personalized learning, virtual mentor, student engagement,

smart content, saving time, immediate feedback, effective translation, global courses, cost effective and provides high quality resources regardless of economic status. Thick textbooks can now be presented into content that is more concise, easier to read and understands by students.

The implementation of AI in school education offers numerous benefits:

- i. Personalized Learning: AI can analyse individual student data to tailor educational content and pace, optimizing learning experiences.
- ii. Automated Administrative Tasks: AI can automate routine tasks like grading, attendance tracking, and scheduling, freeing up teachers' time for more impactful interactions with students.
- iii. Innovative Learning Materials: AI can generate interactive and engaging learning materials, such as simulations, games, and virtual labs.
- iv. Intelligent Tutoring Systems: AI-powered tutoring systems can provide personalized guidance and feedback, enhancing student understanding and learning speed.
- v. Predictive Analytics: AI can predict student performance and identify potential challenges, enabling timely interventions.

Several research studies have explored the use of AI in school education. These studies indicate that AI can significantly improve student outcomes, reduce teacher workload, and enhance the overall effectiveness of the education process.

Despite these promising examples of AI applications, some things might be viewed as a drawback to AI, especially in the education sector. AI limits human interaction, the development of social skills, and the ability to build relationships.

However, as with any transformative technology, AI also presents a range of challenges that can potentially have negative consequences for society:

- i. Privacy and Security-The increasing reliance on AI also raises significant privacy and security concerns. With AI ability to collect, analyse, and interpret vast amounts of personal data, there is a potential risk of unauthorized access, misuse, or abuse of sensitive information. Protecting individual privacy becomes a paramount challenge as AI systems become more pervasive in society. Robust and transparent regulations need to be implemented to safeguard personal data and maintain public trust.
- ii. Job Displacement- One of the most prominent concerns regarding AI is its potential to replace human workers, leading to substantial job losses across industries. As AI continues to advance, automation has the potential to disrupt traditional labour markets, leaving many individuals unemployed or underemployed. Job displacement

may disproportionately affect those in low-skilled positions, creating socio-economic disparities and exacerbating income inequality.

- iii. **Bias and Discrimination-** Another pressing concern is the inadvertent reinforcement of biases and discrimination within AI systems. AI algorithms are programmed using vast amounts of data, which may contain inherent biases from historical human decisions. Consequently, AI systems can perpetuate gender, racial, or socio-economic biases, leading to discriminatory outcomes in areas such as hiring, lending, and criminal justice. It is crucial to address these biases not only to ensure fairness but also to preserve societal harmony and inclusivity.
- iv. **Ethical Dilemmas-** AI presents unique ethical dilemmas that must be thoughtfully considered. As AI systems make autonomous decisions that impact individuals' lives, questions arise regarding accountability, transparency, and consent. For instance, who should be held responsible when an AI system makes an unethical decision? How do we ensure transparency and avoid a "black box" problem where AI decisions lack comprehensibility? Addressing these ethical considerations is crucial to fostering a responsible and trustworthy AI environment.
- v. **Social Isolation-** While AI has the potential to enhance connectivity and communication, it may also contribute to social isolation. Increased reliance on AI-driven solutions for tasks like customer service, companion robots, and virtual assistants could lead to reduced face-to-face interactions, eroding social bonds and negatively impacting mental well-being. Striking a balance between AI adoptions and preserving human connection becomes vital to mitigate potential negative effects on society.

TABLE 1: DIGITALLY TRANSFORMED TEACHING METHODS

Authors (year)	Digitally transformed teaching methods
Bai and Zhang (2020)	• Smart classrooms • 3D video, (Ultra high definition) screens • Augmented and virtual reality • IoT framework model for teaching methods

Das et al. (2021)	• Video broadcasting tools • Asynchronous learning systems • Online assessment programs • Online proctoring • Audio-visual analysis • MOOCs
Castaño et al. (2021)	• Remotely proctored testing (RPT)
Hall et al. (2022)	• Remote proctoring process

Educational institutions view technology as an opportunity to improve teaching strategies and establish effective connections with students. Everyone has smart gadgets, including smartphones, computers, laptops, and tablets. A key strategy for improving student learning is to understand how technology can be used to improve teaching approaches. Three studies that evaluated enhanced teaching experience after digital transformation showed a significant level of similarity among these targeted studies.

TABLE 2: IMPORTANCE OF DIGITAL TRANSFORMATION IN EDUCATION

Author (year)	Key elements (importance of Digital transformation in education)
Seres et al. (2018)	Digital transformation helps with • Data collection • Data management • Data reporting
Castro (2019)	Digital transformation in education allow • Datafication • Human-to-human interactions enabled by technology • Human-to-machine interactions enabled by technology • Scalability • Teaching-learning experience
Rao (2021)	Digital transformation helps in the development of • Collaborative and interactive learning environments • Promote personalized learning

The incorporation of digital transformation into educational systems has turned education into a collaborative and interactive activity while preventing students from solely depending on class lectures (Barabanova et al., 2019). Therefore, digital

transformation is assumed to positively affect students' academic performance and learning abilities by providing continuous and massive possibilities and collaboration. Digital learning forces collaboration, creating collaborative and creative learning environments like Google Docs. Online applications make it simpler to conduct blended learning classes.

RESEARCHES RELATED TO ARTIFICIAL INTELLIGENCE (AI), EDUCATION AND DIGITALIZATION

Cathrin and Wikandaru (2023) did their study on, "The future of character education in the era of Artificial Intelligence." The objective of the study to analyse the future and sustainability of character education in the era of Artificial Intelligence. It is philosophical research on the using qualitative research. The data was collected through document studies. It is found that the development of Artificial Intelligence in the field of education is an unavoidable phenomenon. The finding of the study emphasises the importance of developing character education and Artificial Intelligence in education in a harmonious manner in order to maintain the continuity of character education in the future of Artificial Intelligence.

Karwowski et.al (2022) studied on "Explainable Artificial Intelligence for Education and Training." In this research they discussed many examples, methods for evaluating explanations and explored Artificial Intelligence and Tenth Artificial Intelligence use in the training and education domain. They studied many reviews the essential capabilities, limitations and delimitations of Tenth Artificial Intelligence tools developed over recent years and reviews the history of Tenth Artificial Intelligence and Artificial Intelligence in Education. This study focused mainly on Artificial Intelligence and Machine learning in Education.

Xue and Wang (2022) did their research on "Artificial Intelligence for Education and Teaching". In this paper, aimed that combines Artificial Intelligence to progress research on teaching, which is implemented on Artificial Intelligence and promote the development of cognitive and pedagogical skills. The different research methods are literature, case analysis and interview method. Different designs are used in the teaching platform. For Education, this digital platform is useful in each dimension.

Agrusti and Bonavolontà (2021) studied on "Artificial Intelligence and Education: the perceptions of the students of the Department of Educational Sciences at Roma Tre University on the concept of Artificial Intelligence." In the field of Education world, at any level has to consider the predominant role that Artificial Intelligence plays in modern world. They showed that the initial results of an exploratory survey conducted among the students of the department of educational sciences. It is an exploratory study which is use for gathering students' opinion on the concept of Artificial Intelligence.

Joshi et. al (2021) studied on "Evaluating Artificial Intelligence in Education for Next Generation." In this study analysed Artificial Intelligence can help to use teaching

outcomes. The objectives of the paper are to examine teacher's and student's perceptions of the use of Artificial Intelligence in education. Researchers collected the data through online google form. Snowball sampling used in the study. Total sample 79 (41 students and 38 teachers) included in the study. The result of the study presents that teacher and student should understand Artificial Intelligence in Education.

Channa et. al (2021) did work on "Harnessing Artificial Intelligence in Education for Preparing Learners for the 21st Century", provide a discussion of the 21st century skills and some flaws in the present education system to help students develop advanced skills. It is briefly elaborating the concept of Artificial Intelligence in Education concerning the development of 21st century competencies.

Sharma (2021) did a paper "Application of Artificial Intelligence in Education". He explained Artificial Intelligence is the most useful technology in education sector. This paper suggests a prescribed curriculum class 8 to 12 to learn about Artificial Intelligence. NITI Aayog of the Government of India had also released India's National strategy for Artificial Intelligence in June 2018 with the purpose of Artificial Intelligence in India.

Toro et. al (2021) did the study on "The Impact of Artificial Intelligence in Education during the Covid-19 Pandemic." The objective of this study to see how Artificial Intelligence can help the education system in the face of the Covid-19 pandemic. This is meta-analysis as a statistical analysis to measure and summarize the ideas and observations. It was discovered that Artificial Intelligence would play a major role in education.

Ahmad et. al (2020) investigated on "Artificial Intelligence in Education: A panoramic Review". In this article, discussed applications of artificial intelligence in the education sector from different perspectives. This paper reviewed in existing tools and application which is developed in many applications of artificial intelligence in education, research trends in the domain over the back 15 years and the present limitations of artificial intelligence in education.

Aldosari (2020) studied on "The future of higher education in the light of artificial intelligence transformations". He discussed in his study the effect of Artificial Intelligence on higher education in his university. He used qualitative research method by using open question on sample of academics and find the result of the analysis is the decrease in the level of awareness of the mechanisms of applying Artificial Intelligence.

CONCLUSION

Digitalization is the future for schools in this era. Nobody can repudiate the fact that the internet has brought changes in education, as well as in the general lifestyle of people globally. Accordingly, schools must reform their traditional learning environment to attain the significant benefits associated with the digital change. Schools must find ways to formulate goals and transform

them into supportive infrastructures for developing performers within the organization (*Pettersson, 2020*).

According to these study, digital transformation can be illustrated as an ecosystem that readily combines technology, security, and services to create and sustain a personalized, collaborative, and interactive learning environment for students (*Rao, 2021*).

AI is a powerful tool that can reshape school education. By carefully planning and implementing AI solutions, educators can create more effective, equitable, and engaging learning environments. Education is not just about acquiring knowledge. Education is a complex process in which we not only acquire knowledge of various concepts but also learn to apply them in daily life with our social skills. Machines cannot teach empathy, sympathy, and other emotions that are an important part of our personality development. This means that no matter how sophisticated AI is, no matter how many examples of using AI, this technology will not be able to replace the role of teachers or Educators. The role of AI is limited to helping and empowering teachers in making the learning process a fun experience for students.

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