TRANSFORMING EDUCATION: ROLE OF ARTIFICIAL INTELLIGENCE IN TEACHING, LEARNING, AND BEYOND

Charu Gupta

Assistant Professor in the Department of Computer Science, Khalsa College for Women,

Civil Lines, Ludhiana

Bhawna

Assistant Professor in the Department of Computer Science, Khalsa College for Women,

Civil Lines, Ludhiana

ABSTRACT

While technology has always been vital to education, its application is now more widespread than before because of the growing accessibility of smart devices and web-based curricula. Artificial intelligence is being applied in education in a wide range of ways to support students' learning. The study emphasises the AI-powered technologies that have an immediate impact on education and will have a lasting impact. This study aims to investigate the use of artificial intelligence applications (AIA) in the educational environment. In many aspects, artificial intelligence (AI) applications offer a solution to the exponential increase of contemporary issues, which restrict access to education and learning. Yet we also suggested that the problems in education could be brought on by AI in terms of improper use of AI methods, shifting teacher and student roles, and ethical and societal concerns. The study offers an overview of the field of artificial intelligence (AI) in education, which contributes to the theoretical underpinnings of AI in education and offers educators and AI engineers a viable avenue for future cooperative study.

Keywords: - Artificial intelligence (AI), Chatbots, Learning Management System (LMS), Robotics, Virtual Reality (VR).

1 INTRODUCTION

One of the most important facets of civilization is education. It has a significant impact on all other industries and is interconnected with them. Because of this importance, education is beyond all barriers and essential for every social group in society. For instance, it is evident that the education sector encountered a hurdle during COVID-19, which has drawn the attention of numerous scholars. However, some of the societal problems are constant and are not just related to pandemics. These include financial difficulties, access to education, and obstacles to physically entering classes. Numerous solutions exist and will continue to exist for the issues; however, the focus of this study is on the technological solution provided by artificial intelligence (AI).

The science of creating computers and other devices with the ability to think, learn, and behave in ways that would typically require human intelligence or entail data sets too large for people to process is known as artificial intelligence.

The digital age has brought about a modernization of education and learning standards as well as quicker and more efficient access to research for students. Young children (8 to 15 years old) now utilise smartphones and other apps to work on school projects, and a variety of websites offer digital books, audiobooks, and videos that help pupils learn about difficult ideas and concepts. University students read the blog post, send queries to their lecturers via

email, and even participate in a live videoconference with them to get more in-depth information about their project. Using technology-based resources like wikis and Google Docs, audio-visual aids, and AI technologies, students can share their presentations with other group members while working collaboratively on a project.

2 LITERATURE REVIEW

This comprehensive analysis investigates the use of artificial intelligence (AI) in education, including technological developments in this field.

Chassignola M. et. al. (2018) presented a viewpoint on how artificial intelligence is affecting schooling. They also discussed how AI can be used to create new educational experiences, enhance a community's imagination, and decipher students' challenges and figure out how to support them. Four categories were taken into consideration in the literature study that was presented: customised material, creative teaching strategies, technology-enhanced assessment, and teacher-student contact.

Nalbant K. G. et. al. (2021) emphasises that purpose of the study is to talk about the advancements and innovations that artificial intelligence has made in the field of education. In their study, the benefits, drawbacks, and necessity of artificial intelligence in education are explored. Artificial intelligence is a fundamental component of education. The study also looks at the benefits artificial intelligence offers to special education (disabled) students in terms of their educational experience and training.

Ahmad S. F. et. al. (2021) aimed to investigate the function of artificial intelligence applications (AIA) in the field of education. In many aspects, artificial intelligence (AI) applications offer a solution to the exponential increase of contemporary issues, which impede access to education and learning. Among other things, they are essential to the formation of intelligent tutoring systems (ITS), social robots (SR), and smart learning (SL).

Huang J. et. al. (2021) stated that AI will be utilised in education more and more in the future as the technology advances. The first section of this article discussed the use of AI in education, including virtual classrooms, adaptive learning, and teaching assessment and then examines its effect on education, which is beneficial for raising the standard of instruction provided by teachers and the quality of education received by pupils. Lastly, it outlined the potential difficulties that AI applications in education may encounter going forward and offers resources for AI to support educational change.

3 EXPLORING THE IMPACT OF AI IN EDUCATIONAL TECHNOLOGY

Artificial intelligence (AI) is a collection of technologies that provide computers with the capacity to carry out a wide range of sophisticated tasks, such as decision-making, forecasting, object classification, natural language processing, recommendations, intelligent data retrieval, and speech and text comprehension. Following are a few AI-powered technologies that have an impact on education now and in the future

3.1 Chatbots

One type of AI educational tool that kids may use in the near future is chatbots. These are being introduced into classrooms more and more, where students use iPads or computers to communicate with bots that are meant to assist them comprehend particular subjects, like reading comprehension or maths. Chatbot instructors might be able to assist students with more than just learning new material; they might even be available whenever analysis is required. The future of all technical foundations lies with chatbots. It shortens the teachers'

duty rotation cycle. When parents gather, chatbots in the classroom might also take the place of email correspondence between educators and parents.

3.2 Virtual Reality (VR)

One new breakthrough in education is virtual reality, which is being utilised for everything from teaching history to aiding pupils with math skills. People can explore and interact with a three-dimensional computer-generated environment using virtual reality. VR instructors are finding new methods to integrate experiential learning into their classrooms, genuinely redefining what it means to be a student. VR is a fantastic tool for fostering a sense of community among students. When they in indifferent classrooms but using the same virtual reality application, they can communicate safely while still being separated by distance. Students can investigate topics using virtual reality that they might not otherwise have the chance to observe or learn about. Teachers are in the same boat. There are far more interesting ways for teachers to instruct their students. Virtual reality (VR) seems far more immersive than watching a screen or being in a computer-generated environment, as anyone who has tried it will attest. Just two advantages for both teachers and students are deeper comprehension and increased involvement.

3.3 Learning Management System (LMS)

Keeping up with educational advancements is one of the most important things in our technologically advanced society. Among these advancements is the use of learning management systems. A learning management system, which provides a centralised interface, can enable schools simply manage all of their online activities. Although there are many uses for these instruments, the following are the common ones that they are used for:

1. Assign homework

2. Converse to parents and students.

3. Monitor student development

4. Generate reports on student performance

These systems enable the centralization of all course materials, including lessons, assignments, examinations, and grading. This suggests that teachers are always welcome to provide feedback on any assignment or assessment. Students have the ability to examine their grades instantly, without having to wait until the end of the semester.

Using these LMSs with AI software, a wide range of topics can be learned. An intelligent digital teacher driven by artificial intelligence (AI) can assist students by solving their difficulties and giving them the right solution. It is even possible to create a learning management system with artificial intelligence that can comprehend students' thought processes and improve their learning. These days, LMS systems can assist educators in content creation, assist parents in tracking their child's progress within the system, and administer assessments using artificial intelligence. This has reduced the amount of time instructors spend managing the classroom, helping parents better understand their child's development, and lightening the workload of teachers. LMSs are a very useful resource for educators as well as learners.

3.4 Robotics

Over the past few years, the use of robotics and artificial intelligence in education has grown. It is currently being utilised to support education by instructors as well as students, which appears to increase student engagement and safety. Given the current state of AI

development, robotics will inevitably be used in the classroom. For both teachers and pupils, robots may be a great learning tool that allows them to delve deeply into a subject without getting bored. This implies that teachers can spend more one-on-one time with kids who require more assistance, thanks to robots. Additionally, it enables them to test out novel teaching strategies, which is crucial when attempting to engage a variety of learners. For students, robotics is essential because it can show them that engineering is more than just sketching on a mat or solving problems on paper. They are able to observe the fruits of their labour and the finished product.

Additionally, educators can use robotics as a teaching tool to impart knowledge on current affairs or even mathematical ideas like fractions. Technology will surely become more and more important in people's lives as it develops.

4 APPLICATIONS AND BENEFITS OF ARTIFICIAL INTELLIGENCE IN EDUCATION

4.1 Personalized Learning: Every student responds differently to information. While some absorb things fast, others take time. The idea of personalised instruction for each individual student was absent from the traditional educational system. AI in online learning can help in this situation.

In the field of education, artificial intelligence guarantees that educational software is customised for each user. Additionally, the system supports the way students understand different lectures and adjusts to that process to reduce load by utilising supporting technologies like machine learning in education.

This fusion of AI and education is tailored to each person's needs via AI-integrated games, personalised applications, and other elements that support efficient learning.

4.2 Task Automation: AI takes up the majority of value-added jobs in virtual classrooms and school education. AI solutions for education can also be used to create a customised teaching process, grade tests, check homework, organise research papers, keep track of reports, create presentations and notes, and handle other administrative duties.

4.3 Smart Content Creation: Educators and researchers can also generate creative content for easy preaching and learning with the use of AI and ML in education. Here are some instances of intelligent content production using AI:

4.3.1 Data visualisation: Artificial Intelligence (AI) smart content production increases the real-life experience of visualised web-based study environments, when traditional education approaches can only present lab try-outs as visual elements. With 2D and 3D visualisation, where kids might perceive information differently, technology helps.

4.3.2 Digital creation of lessons: AI in education can facilitate bit-size learning by providing digital classes and study materials with reduced storage requirements. In this manner, the complete study material can be utilised by specialists and students without occupying much system space. You don't need to worry about distant learning either because these resources are available on any device.

4.3.3 Frequent updates of the content: With AI, users may easily produce and update content on a regular basis, keeping the lessons current over time. Additionally, the users receive notifications whenever new content is posted, which aids in work preparation.

4.4 Flexible Availability: Users may now take use of AI's benefits in education because they have total access to information. More than 60% of education-related enterprises, according to a recent poll, depend on AI/ML-based education app development that is bolstered by contemporary tools and features. Features such as multilingual support facilitate the translation of content into multiple languages, hence making it easier for native speakers to teach and learn.

4.5 Assessing the Vulnerabilities in the Classroom: One of the numerous educational advantages of AI technology is the use of remote learning to maintain a positive environmental impact. Nonetheless, a lot of experts think AI will eventually take the place of human interaction in education. While the education sector may not be affected, other industries may. AI and education combine to improve online learning as well as traditional classroom training. Artificial Intelligence only assists the professionals by personalising the learning process for each learner.

4.6 Bridging the Skill Gap: Developing students' skills further is an important way for companies to close the digital divide. Software and application development solutions driven by AI and ML provide broadly accessible and reasonably priced upskilling options for students. This is not just for students: retraining and upskilling the current personnel in business may raise spirits and inspire a company-wide dedication to innovation and progress. Furthermore, by examining how individuals learn new skills, the application of AI in the education industry has an impact on the L&D (Learning and Development) field. The system automatically adjusts the learning process to human study and learning styles as soon as it detects them.

4.7 Personalised Feedback Based on Data: When it comes to creating learning experiences, whether in a classroom or the workplace, feedback is an essential component. Effective teaching incorporates ongoing feedback, which is the primary distinction between it and content delivery alone. A data-driven feedback system reduces bias in learning, increases student happiness, and makes it easier to identify areas in which a student's skills are deficient.

4.8 Round-the-clock Support using Conversational AI: An increasingly common example of AI being used in education to gather data and deliver relevant information and support are chatbots. Talkative By closely monitoring the pattern of information consumption and adapting to meet the demands of the learner, artificial intelligence in education provides intelligent tutoring. Globally, people choose corporate training programmes and distance learning since they don't need to take time off from their jobs, families, or classrooms. Here, AI chatbots can answer enrolment-related questions, offer prompt assistance, give users access to necessary study materials, and offer round-the-clock support.

4.9 Decentralised and Secure Learning Systems: AI is enabling the education sector to innovate quickly, but it is frequently hampered by problems with data security, accessible data that may be altered, antiquated certification procedures, etc. Notwithstanding all of these difficulties, decentralised AI-based solutions have the potential to positively transform education technology. For example, Appinventiv's blockchain-based learning management system, Nova, solves the common authentication problems in the education sector. This learning management system, supported by blockchain and artificial intelligence, provides data and information security solutions to millions of educators and learners.

4.10 Artificial Intelligence in Examinations: Artificial intelligence (AI) software solutions can be actively utilised to identify suspicious behaviour during exams and interviews and notify the supervisor. Using webcams, microphones, and web browsers, the AI programmes monitor each person and analyse their keystrokes, alerting the system to any movement. There are more advantages to using AI-based software and applications than one may think. It is therefore officially time to incorporate AI technologies into your educational enterprise if you work in the professional education sector.

5 CHALLENGES

While AI is very important in the sphere of education, there are still a couple of obstacles in its way. Three categories could possibly be used to group the difficulties this review points out: social ethics, teachers and students, and technique.

Researchers and educators both find the ethical problems raised by AI to be difficult. The abundance of data and less expensive processing have made AI popular; yet, personal student information may be accessed, shared, or misused. The way that educators and AI engineers acquire, assess, and disseminate big data and data analysis outcomes will always be a thoughtful problem. (Zhai X. et. al., 2021)

Both teachers and students find learning how to use technology challenging. The majority of the time, the issue stems from a lack of training for educators on how to integrate new technologies into the classroom. They are therefore forced to solve it on their own or locate an existing acquaintance. To give students an interesting learning experience, teachers need assistance in knowing how to use these tools.

Despite the fact that AI techniques have demonstrated and anticipated intelligent computation in the field of education, large-scale students typically do not benefit from "added-value" due to cost concerns, and "basic value" continues to dominate the market. In instance, several researchers discovered that a lot of AI techniques were created with a broad context in mind, making them unsuitable for addressing the demands of a specific domain, set of learning objectives, or learning activities. This would impede the realization of customized educational opportunities.

6 CONCLUSION

The advantages of incorporating artificial intelligence into education have been investigated in this study, along with the aim of doing so. Its benefits and drawbacks have also been frequently highlighted. Additionally, a review and investigation of artificial intelligence applications and usage sectors was conducted.

There is a lot of potential for artificial intelligence in education. It is employed everywhere to assist both formal education and lifetime learning. Artificial intelligence-based instructional solutions that are adaptable, inclusive, personalised, engaging, and efficient increase accessibility and enjoyment of learning. With AI automation, students may complete their difficult and time-consuming coursework and multiple-choice exams. Students can communicate live with teachers and group leaders through chatbots. Students can study foreign languages with the help of chatbots that are driven by AI. This demonstrated once again how urgently technology and artificial intelligence development are needed.

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