

## THE ERA OF ARTIFICIAL INTELLIGENCE: THE FUTURE OF TEACHING AND LEARNING

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### ABSTRACT

Today, many priorities for improving teaching and learning remain unfulfilled. Educators want technology enhanced approaches to addressing these priorities that are safe, effective, and scalable. They are further exploring how AI can enable them to write or improve lessons, as well as their process of finding, selecting and customizing content for use in their lessons. Teachers are also aware of the new risks. Useful, powerful functionality may also come with new data privacy and security risks. Educators believe that AI may automatically produce inappropriate or incorrect outputs. They are cautious that engagement created by AI or automation could increase unwanted biases. He has seen new ways in which students can present the work of others as their own. They are well aware of teachable moments and pedagogical strategies that a human teacher could address but that are not detected or misunderstood by the AI model. Teachers' concerns are diverse. Everyone involved in education has a responsibility to harness the benefits to meet educational priorities while also protecting against the risks that may arise as a result of integrating AI into educational technology. Based on the needs of teachers (as well as students and their families/caregivers), we add another layer to our criteria. Some AI models can recognize patterns in the world and take the correct action, but they cannot explain why (for example, how they arrived at the relationship between the pattern and the action). This lack of ability to explain will not suffice for teaching; teachers will need to know how the AI model analysed their students' work and why the AI model recommended a particular tutorial, resource, or next step to the student. This paper discusses examples of AI assisting teachers and teaching, including these concepts: AI assistants to reduce routine teaching burden; AI that provides teachers with recommendations tailored to the needs of their students and expands their work with students; and AI that helps teachers reflect, plan and improve their practice. The presented article is throwing light on the future advantages and disadvantages of AI in relation to teaching and learning in the future scenario and its importance and use in the future.

**Keywords:** Artificial Intelligence, Education, Teaching, Learning, Technology.

### I. INTRODUCTION

Artificial intelligence refers to computer systems that can perform tasks typically associated with human cognitive functions such as interpreting speech, playing games, and recognizing patterns. In many cases, humans will monitor the AI's learning process, reinforcing good decisions and discouraging bad decisions. But some AI systems are designed to learn unsupervised; for example, playing a game over and over until they finally figure out the rules and how to win. Intelligent learning systems emerged based on computer-assisted learning. It is an open human-computer interaction system created by student-centered, computer-based, and computer-simulated thinking processes of teaching experts. At present, intelligent learning systems have become the main form of artificial intelligence application in education. Intelligent learning systems mainly apply artificial intelligence principles in knowledge representation, reasoning methods, and natural language understanding. Because it integrates the activities of knowledge experts, teachers, and students, accordingly, intelligent learning systems are generally divided into three basic modules: knowledge base, teaching strategy, and student model, as well as a natural language intelligent interface. Specifically, the functions of the intelligent learning system are as follows: understanding each student's learning ability, cognitive characteristics, and current knowledge level; Selecting appropriate teaching materials and teaching methods according to the different characteristics of students, and providing targeted individual guidance to students; allowing students to use natural language to conduct human-machine dialogue with a computer tutor. The

design of intelligent learning systems requires not only knowledge of computer science but also theoretical guidance of educational science. The goal of artificial intelligence is to provide machines with processing and analysis capabilities similar to humans, making AI a useful counterpart to people in everyday life. AI serves as the foundation of computer learning and is used in nearly every industry – from healthcare to manufacturing and education to make data-driven business decisions and complete repetitive or computationally intensive tasks. Many existing technologies use artificial intelligence to improve user experience. We see this in smartphones with AI assistants, online platforms with recommendation systems, and vehicles with autonomous driving capabilities.

### Application of artificial intelligence in education

It is difficult for teachers to accurately understand the actual learning situation of each student, making it difficult to start the teaching design and teaching process, focusing on the actual learning needs of each student, resulting in a waste of energy, time and there is wastage of educational resources. But artificial intelligence systems can provide each learner with a personalized teaching style, so that each student can learn in the most appropriate way, accurately record each student's learning status, help teachers achieve hierarchical teaching and precise teaching can help and solve effectively. Main problems of teaching and learning. At present, the application of artificial intelligence in our field of education mainly includes image recognition, speech recognition, and human-computer interaction, etc. The apps mainly focus on tutoring, online teaching, classroom teaching and other aspects. The application of artificial intelligence in the field of teaching is mainly manifested in the application of intelligent tutoring systems. Intelligent teaching system is set intelligent classroom, intelligent marking, intelligent diagnosis and intelligent treatment, intelligent preview, intelligent operation. Intelligent sentiment analysis for the integration of intelligent learning system is designed to create a good learning environment for students, so that all can accept a full range of learning services, in order to achieve student learning success. By establishing teachers, students and the subject of teaching management, corresponding teaching strategies can be formulated and implemented according to the characteristics of different students and personalized teaching services can be provided for students. Network-based distributed intelligent learning system is the latest development direction of intelligent learning system. It can basically enable students living separately in different areas to learn together in the virtual environment, make full use of network resources, promote learners' initiative, and bring better learning effect. In recent years, artificial intelligence technology has always maintained a rapid development pace, and its application in the field of education plays a greater role in education and teaching, and promotes the development of humanized and personalized teaching, and makes teaching activities Integrates. Closely linked to the development of science and technology, it is a major innovation activity in the field of education. To have an intelligent conversation about AI in education, we first need to leave behind hypothetical science-fiction scenarios of computers and robots teaching our children, replacing teachers, and fundamentally reducing the human element from human activity. Matthew Lynch, one of the leading authors on the benefits of artificial intelligence in education (My vision for the future of artificial intelligence in education), is careful to explore the benefits as well as the potential pitfalls, writing that AI use education is valuable in some ways, but we must be extremely vigilant in monitoring its development and its overall role in our world.

### Benefits of AI in Education

Ideally, writes Lynch in The Advocate, "AI does not diminish classroom instruction but rather enhances it in many ways." He summarized five interesting potential benefits of integrating AI into education:

- **Individualization:** "It can be extremely difficult for a teacher to figure out how to meet the needs of each student in his or her classroom. ...AI systems can easily adapt to each student's individual learning needs and target instruction based on their strengths and weaknesses.
- **Tutoring:** AI systems can "assess a student's learning style and pre-existing knowledge to deliver customized support and instruction."
- **Grading:** Sure, AI can help grade exams by using answer keys; but it can also "compile data about how students performed and even grade more abstract assessments like essays."
- **Meaningful and immediate feedback for students:** Some students may shy away from taking risks or receiving critical feedback in the classroom, but "with AI, students can feel comfortable making the mistakes

needed to learn and get the feedback needed to improve." Can get it." Much of the potential envisioned for AI in education centres is to free up time for more meaningful tasks by reducing the time teachers spend on tedious tasks.

### AI in Education

Adaptive learning: Used to teach basic and advanced skills to students by assessing their current skill level and creating a guided instructional experience that helps them become proficient.

- **Assistive technology:** AI can help students with special needs access more equitable education, for example by reading a paragraph to a visually impaired student.
- **Early childhood education:** AI is currently being used to power interactive games that teach children basic academic skills and more.
- **Holistic school management:** AI is currently being used to manage entire schools, empowering student record systems, transportation, IT, maintenance, scheduling, budgeting, etc.
- **Writing:** Lynch not only emphasizes that AI is already helping students improve their writing skills, he confesses, I am currently hiring a grammarian to help me write this article. And using the use app. Etc.

### Lynch also cited current uses of AI in education in his list which included:

- Classroom/behavior management
- lesson planning
- Classroom Audio-Visual
- Parent-teacher communication
- Language learning
- Test Preparation
- Assessment
- Learning Management System
- Simplification for better student engagement
- Staff scheduling and replacement management
- Professional development
- Transportation
- Maintenance
- Finance
- Cyber security
- Safety and security

### Examples of artificial intelligence is currently being used in higher education:

- Plagiarism detection
- Exam integrity
- Chatbot for enrollment and retention
- Learning Management System
- Transcription of faculty lectures
- Advanced online discussion boards
- Analysis of student success metrics
- Educational Research
- Connected campus

In terms of specific AI-infused technologies now being used in education, the list is getting longer every day. Here are just a few:

- **Thinkster Math:** Described by its creators as a math tutoring program that leverages human interaction and groundbreaking artificial intelligence to create personalized learning programs.

- **Jill Watson:** an AI-enabled virtual learning assistant introduced by the Georgia Institute of Technology in 2016.
- **Brainly:** A social media site for classroom questions.
- **Nuances:** Speech recognition software used by students and faculty; able to write up to 160 words per minute; particularly useful for students who struggle with writing or who need access.
- **Cogni:** AI-based products including virtual learning assistants for K-12 and higher education institutions as well as corporate training organizations.
- **KidSense:** An AI educational solution designed for kids, featuring a voice-to-text tool with algorithms built to recognize the sometimes difficult-to-translate speech of young learners.
- **Content Technologies:** Instructional design and content application solutions powered by artificial intelligence research engines.

### AI in Education [Inclusion and Universal Access]

Bernard Marr explains that AI tools can increase inclusion and universal access in education in several ways, including:

- Helping to make global classrooms available to everyone, including people who speak different languages or may have visual or hearing impairments.
- To create accessibility for students who may not be able to attend school due to illness.
- Better serve students who need to learn at a different level or on a particular subject that is not available in their own school.

Overall, it is hoped that AI will ultimately help teachers make continued progress in addressing the wide range of physical, cognitive, pedagogical, social, and emotional factors that can impact student learning and ensure that all students should get equal opportunities in education, irrespective of their social status.

### AI in Education [Individualized Learning]

According to an article in The Atlantic, ("Artificial Intelligence Promises Personalized Education for All"), Artificial Intelligence has the potential to enhance the abilities of human teachers to tailor their learning to each student without impacting their class schedules can prepare lessons, which will eliminate the need for teachers.

**Rose Lakin**, professor of learning-centered design at University College London, has been quoted as saying, "The real power of artificial intelligence for education is in the way we can use it to process large amounts of data about learners, teachers and can do, about the interaction of teaching and learning."

### The Future of AI in Education

Although there continues to be extensive debate over the advantages and disadvantages of deploying AI technology in education, including concerns about replication and the ethical considerations cited above, there is an emerging consensus that the benefits will be extraordinary today and in the future.

#### ▪ Smart Assessment

Under the traditional education model, teachers' work content focuses on two aspects, one is classroom teaching, and the other is correcting homework. However, inspired by big data technology, text recognition technology, and semantic analysis technology, the automatic correction of homework has been realized in reality. Intelligent evaluation can simplify the improvement process to a great extent. This is also a major change in the traditional evaluation method. It is faster, more efficient and very accurate. This frees teachers from burdensome homework corrections. Make it more energetic in classroom teaching, effectively promote the improvement of teaching efficiency.

#### ▪ Smart Tutor System

It is because of the emergence of this system that the one-way education method of teachers to students under the traditional teaching mode has been largely changed, and better teaching results can be achieved. The system can create targeted teaching plans according to different students' mastery of learning content, and at the same time highlight students' individual learning methods, and provide students with rich learning resources to achieve specific learning goals. Medium can help to master knowledge points more quickly. Through the Intelligent Tutor system, it is also possible to analyse the expressions of the students and

understand the learning status of the students from it. Through the feedback mechanism, the teacher can be more aware of students' mastery of classroom teaching content, and use emotional perception to predict and adjust. In fact, the development of intelligent tutor system is still immature at this stage. Basically, it has more applications in self-study and quizzes, but it has relatively less applications in classroom teaching. If you want to implement it better, you still need to pay attention to improvements and optimizations at the technical level.

▪ **Educational simulation game**

Modern education concepts emphasize quality education. Therefore the classroom environment should not be lifeless but should be presented in a more entertaining manner. They are more targeted. They promote openness of education and teaching through games, and create some digital games based on simulation environments. Enthusiasm for learning may increase among students. Through intelligent simulation games, students can form a new understanding of things, and at the same time, their observation and thinking abilities can also be well exercised, which allows students to actively discover and solve problems. Promotes for. Depending on the environment of the simulation game, students can be more involved in learning by playing different roles, and participate with great interest in learning activities to acquire new knowledge. The introduction of simulation games into teaching can show some abstract knowledge in concrete forms, so that students can form more intuitive understanding and feelings, effectively enhance students' attention, and make students' professional knowledge more concrete and in-depth learning.

**Educational Robot**

Educational robots cover many topics. Application of multidisciplinary knowledge and technology, the role of educational robots developed to assist in teaching is clear. It can effectively increase interest in the class, stimulate students' innovative ability, and rely on information technology to enhance students' knowledge and ability to acquire information. In specific teaching applications, educational robots are an intelligent teaching tool that can become a powerful complement for teachers to carry out teaching activities. Students can actively seek answers to questions and promote self-learning abilities through this human-computer interaction. Educational robots can sense changes in students' emotions. Educational robots can sense changes in students' emotions. If there are more exchanges with students, they can more accurately understand the students' learning effects, which is conducive to teaching students according to their aptitude, so that students can gain knowledge from communication with intelligent robot attraction.

▪ **Feedback**

AI can be used to provide college students with comments on their paintings. This feedback will be personalized and timely, helping college students improve their studies.

▪ **Automatic liability**

AI can be used to automate duties related to grading papers and growing lesson plans. This can lead to teachers' time being wasted as a way to provide special attention to students as well as focus on more important tasks.

**Artificial Intelligence Education Technology Upgrade**

Artificial intelligence does not equal artificial intelligence education. The core technology of artificial intelligence is to simulate human thinking activities and behavior patterns in some aspects according to the amount of data collected, algorithm characteristics and computing speed. But artificial intelligence education is somehow able to collect and analyze big data and subjectively analyze students' learning ability, type, style, characteristic and various related relationships and then put forward teaching suggestions or take intervention measures. There is not a simple way. , There are essential differences between man and machine. The simulated intelligence of machines is different from the natural intelligence of humans. Machine intelligence is that the problem is formalized by humans and the computer can perform calculations.

Again, human intelligence is acquired through learning and practice, and it involves initiative. But the intelligence of a machine does not have the intelligence of human thinking style. AI is allowing the automation of administrative tasks, allowing institutions to reduce the time required to complete arduous tasks so that teachers can spend more time with students. AI can be used to automate grading tasks where multiple tests are involved with better ways of grading written answers and common essays. Furthermore, Artificial Intelligence is allowing the automation of paperwork classification and processing.

Smart content is a very hot topic today. Robots can create digital content of the same quality as various AI essay writing services. Smart content also includes virtual content like video conferencing, video lectures. AI systems are using traditional curriculum to create customized textbooks for certain subjects. As a result, textbooks are being digitized, and new learning interfaces are being created to help students of all academic grades and ages. An example of such mechanisms is using AI to make textbook content more understandable and easier to navigate with summaries of chapters, flashcards, and practical tests. On the other hand, AI interfaces that enable professors to create electronic courses and didactic information on myriad devices include online help programs, audio, and illustrative videos. When AI is introduced, teachers are not necessarily replaced, but they are in a position to perform better by giving personalized recommendations to each student. The AI optimizes class assignments as well as final exams, ensuring that students get the best possible support. Moreover, quick response is one of the keys to successful teaching. Through AI-apps, students get targeted and customized responses from their teachers. Teachers can condense lessons into smart study guides and flashcards. They can also tutor students based on the challenges they face in studying class material. College students can now access a larger window of time to interact with professors. Smart tuition systems can provide instant feedback and work directly with students. AI can facilitate learning of any course from anywhere across the world and at any time. AI- Equips students with fundamental IT skills. With more innovations, a wide range of courses will be available online and with the help of AI, students will be able to learn from wherever they are. AI helps schools determine appropriate ways to prevent students from getting lost in the crowd while running in the corridors. AI can also be used in modeling complex data to enable the operations department to make data-driven forecasts. Also, get assigned seats during school functions or order food from the local cafeteria. AI will create adaptive learning techniques with customized tools to improve learning experiences. Artificial intelligence can tell students what their career path looks like based on their goals, thus helping them beyond education. Only time can tell the ultimate impact of AI in the education industry.

## II. LIMITATIONS OF ARTIFICIAL INTELLIGENCE IN EDUCATION

Although the current AI education is not perfect, it has had a profound impact on all aspects of education. From the field of practice, people are trying to bring education in line with the requirements of the artificial intelligence era, our thinking has been changed, mode has been updated, behavior has been changed, and resource development and other aspects positive thinking and exploration have been achieved. However, since the current education is still in the early stage, the role of artificial intelligence and the development of artificial intelligence education are mainly reflected in the technology, lack of education and discipline, and some problems existing in artificial intelligence education practice.

Although artificial intelligence has been developed for more than 60 years, it currently has major limitations in applied learning. Education, to some extent education, is a means of learning by which people communicate and inspire each other according to their respective knowledge, but intelligent learning systems are far from reaching this level. Secondly, machines cannot communicate with students like humans can. Machines only assess the input information of students and the learning status of master students, causing people to receive false information due to the data generated by machine intelligence while ignoring the actual situation.

### ➤ Learning Mode Solidification

The Artificial Intelligence education system is built into a teaching module based on the data of knowledge level, cognitive ability and learning style provided by different students. Through the test results of this module, students are assessed and their learning process is evaluated. The level of each student is different, if teaching is not done according to a formal learning module then flexible teaching according to the specific situation of each student is not conducive to the personal development of students in the long run.

### ➤ The scope of Artificial Intelligence is limited

Although the introduction of artificial intelligence in education is in line with the development of the times, it does not mean that all subjects are suitable for artificial intelligence or that the current artificial intelligence education is not able to cover the education of all subjects. There are obvious differences between different disciplines, which are mainly reflected in the differences in research objects, theoretical frameworks, discipline

ideas, research methods and expression methods, etc. These differences create natural differences in teaching and learning of different subjects.

➤ **Lack of interpersonal skills**

Students need some guided assistance while learning, especially the youth who need to develop holistically. AI alone cannot meet the needs of young learners and hence teachers are needed to ensure a holistic learning experience for students.

➤ **Cost**

AI can be expensive to implement and maintain. This can be a hindrance for colleges with limited budgets.

➤ **Prejudice**

AI systems may be biased, leading to unfair treatment of college students. It is important to carefully compare AI constructs to ensure that they are no longer biased.

➤ **Privacy**

AI structures acquire numerous records about college students. These records can be used for the development of music students, however can also be used to track their non-public habits and preferences. It is important to protect students' privacy when using AI structures.

➤ **Job displacement**

AI systems can automate some responsibilities that are currently done through trainers. This should lead to activity displacement for teachers, although it may also create new jobs in the development and renovation of AI structures.

➤ **Lack of human contact**

Despite various shortcomings, artificial intelligence can be a useful educational tool. One drawback is that because they do not interact with real humans during class, students are unable to practice and acquire social skills. When they graduate from high school and they need these types of relationships for their jobs or even just for social contacts as adults, it becomes difficult for them.

➤ **Financial difficulties**

Many financial issues exist with artificial intelligence in education. Well-educated experts who have spent years improving their business are building artificial intelligence, and they want money to do more research and pay people who collaborate with them on their projects. Although artificial intelligence has some potential benefits for education, there are also some drawbacks. Financial issues are one of the major drawbacks of artificial intelligence in education.

➤ **Maintenance issues**

Artificial intelligence in education has many maintenance drawbacks. For example, authorities must always keep an eye on everything an AI does, as AI has a limited store of knowledge and may have unintended consequences if it exceeds its capabilities.

### III. CONCLUSION

AI represents a powerful tool to drive innovation and tackle complex challenges, but its development and deployment must be guided by ethical principles, regulatory frameworks, and a commitment to ensuring that AI technologies benefit society as a whole. May benefit. Continued collaboration, research, and education are necessary to realize the full potential of AI while minimizing its risks. AI has the potential to revolutionize school education. It can be used to customize mastering, introduce comments, automate tasks, and create new mastering stories. It is important to carefully consider the advantages and disadvantages of AI before implementing it in schools. Overall, the future of teaching and learning in the AI era holds great promise for enhancing educational experiences, improving learning outcomes, and preparing students for the challenges and opportunities of an increasingly AI-driven world. However, realizing its full potential will also require thoughtful implementation, ongoing research, and collaboration among educators, policy makers, technologists, and other stakeholders while addressing potential challenges and ethical considerations. The future of AI is very promising, but it also presents challenges that must be addressed thoughtfully to ensure that AI benefits

society as a whole while minimizing potential risks. Continued research, collaboration, and ethical considerations will be essential to shaping the trajectory of AI in the years to come.

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