ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION

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ABSTRACT

These days, AI may be found almost everywhere. There is a growing belief that artificial intelligence will fundamentally alter every facet of human relationship. New methods of instruction and assessment will be developed and evaluated with the help of AI in the classroom. New educational technology allows for more efficient attainment and administration of educational objectives. This study first examines how artificial intelligence (AI) may be used to improve educational results, illuminating how AI technology is being used to assist teachers utilize data to promote educational equity and quality in low-income regions. The purpose of this research is to inquire into the views of both educators and their students towards the usefulness of AI in the classroom. A good education system and human knowledge are seen as its burden. In general, both educators and students are enthusiastic about incorporating AI into the classroom. On the other hand, every educator is more able to adapt to new technologies than their pupils. The more we learn about the effects of age and location on how educators and

students see artificial intelligence in the classroom, the better we can design and execute solutions (AIED).

Keywords; Artificial intelligence, education, AI in Education, AIED, emerging.

INTRODUCTION

Since ancient times, humans have been actively engaged in the process of acquiring knowledge and skills via formal and informal educational institutions. Numerous metrics are used to assess both students' and educators' performance. Teachers often give students grades based on a set of established criteria, such as classroom behavior, participation, learning speed, teacher-student rapport, and compliance. Most importantly, among them, is the student's focus and ability to replicate their knowledge on the test. Student performance on tests that assess subject-matter knowledge should always be prioritized. The significance of a teacher evaluating a student based on their answers to questions given over a period of time is the most crucial factor (Baker, 2016). A teacher's time is already stretched thin between their professional and personal responsibilities, so taking the time to measure other elements of their students is a significant burden. Most instructors simplify the evaluation process by drawing on already held beliefs when evaluating students' performance in areas where they are weaker. In this way, a student's real talents, knowledge, and abilities are rendered almost useless in the evaluative process. Many aspects contribute to a teacher's reputation, including their ability to connect with pupils, their expertise, the difficulty of their subject matter, the level at which they teach, and their compassion. Pupils generally want their professors to like them, and educators have traditionally been accused of

favoring some students over others. When a pupil is unable to physically seize a teacher, this often occurs. Both the instructor and the pupil's attention is diverted away from the topic at hand (Clutterbuck, 2022). Many of these variations prompt adjustments to both student learning models and instructor teaching models. At the moment, young people require an easy method to study, and they are also expected to play the role of mentors. This modified the framework of instruction and teaching materials. The application of AI in education has gained interest in the following ways:

- Automation: The simplest application of AI frequently gives the most immediate benefit: by automating basic activities such as reviewing, categorizing digital materials, or scheduling, instructors may improve time engaging with students.

- Acclimatization: In today's academic and professional settings, technology is an essential component. According to the most recent findings from Pew Research, 95% of young adults have access to a smartphone, with 45% of those individuals nearly always connected to the internet. Introducing AI to the classroom will assist students start the technological transition. The intelligent technology and controlled Internet of Things network are only two examples of IT projects that may be connected with an AI solution to improve education. AI-driven analytics in education helps discover significant patterns, draw critical markers, and aids educators in creating the most successful classroom that supports digital transformation, all while keeping up with changing student demands and curricular goals.

- Detection: Through examination of collected information, we may infer that intelligent tutoring systems would use adaptive methods to detect and highlight crucial learning targets. The formation issue may be detected and dealt with if adequate security and

access control measures are in place. This AI software, also known as an intelligent system tutor (ITS) or adaptive tutor, is designed to tailor instruction to each individual student by encouraging two-way communication between the instructor and the learner via the exchange of questions and answers.

When it comes to education, ITS and adaptive instructors tailor every aspect of the learning experience to the individual learner. The AI might help with students that have unique requirements, such as instructing young infants in the art of facial expression recognition. Teachers' efforts may have far-reaching effects. There will be a 47% growth in the usage of AI in the school system from 2017 to 2021, according to the research on the market for artificial intelligence in the US education sector. Several firms have been singled out as leaders in the application of artificial intelligence in the development of an online system for assessing and providing feedback to students. Whether a learner is in kindergarten or college, these platforms may be used to provide them with novel problems, pinpoint areas of weakness in their understanding, and guide them toward appropriate remediation. An AI application may help the classroom instructor and the community as a whole by tailoring lessons to each student's unique strengths and weaknesses. It makes it possible for pupils in far-flung areas to take part in classroom instruction. The learner may pick their preferred language and the built-in AI will translate the teacher's presentation into that language. Students who have trouble hearing or seeing may benefit significantly from this. It's useful for students who are homebound for whatever reason, whether it's sickness or other personal issues. If a kid is interested in a topic that isn't currently included in their school's curriculum, they may still learn about it via online global courses. They have access to a wide range of extracurricular training programs, many of which include both established and evolving intellectual content. It's unclear if this is indeed the

case in all classrooms at the moment. But the ability to make it happen is substantial. Investigations are being conducted to create a virtual human guide with the capacities of thought, action, response, and verbal and nonverbal communication (Steenbergen-Hu and Cooper, 2014).

BACKGROUND

AIED (artificial intelligence education) is a field that arose in the 1970s to focus on the use of cutting-edge computing and networking technologies to higher education. Automated assessment and feedback is one way AIED strives to make learning more tailored to the individual, accessible to everyone, and interesting (Schroeder and Gotch, 2015). Theoretically, AIED might aid parents in fostering their children's early language development, as well as aid instructors in making informed tool selections, coordinating class activities to maximize student involvement, and developing individualized lesson plans . Virtual reality (VR) is integrated with AIED, which is packaged as a robot or VA. It acts as sensors to record kids' and instructors' movements, sounds, and vitals. Using this data for education may provide a deeper understanding of learning in real time and guide educators toward effective pedagogical choices (Du Boulay, 2016). In order to decrease the achievement gap that exists between students as a result of individual or societal inequalities, AIED tools should be able to take action to counteract student or teacher fatigue. Despite decades of study, AIED's tools have not made optimal use of available technology, and the field is still a long way from realizing its promise. There are professors who are aware that their careers can be in danger due of sophisticated technologies. We build some robots to use in training. Although the role of the instructor may shift, most professionals believe that AIED enhances rather than replaces the educator's expertise (Porayska-Pomsta, 2016). Some people think it takes too long to use it. The use of AI allows for change and forces us to

reevaluate our place in the world in fundamental ways. Researchers can empower humans to make complex decisions and engage in abstract reasoning by using AI. Future educators should be able to employ AI to reap these advantages. Included in this is the maturation of a sensible outlook on AI's potential. To effectively manage and coordinate AIED's service offerings in analyzing data for use in reforming instructional strategies(Edwards et al., 2018) . Educators would be responsible for preparing pupils for a labor market where the skills needed in the future are uncertain and where AI is driving fast change. There is now more of a focus on unusual measures of brain and mind health. The 21st century, efficiency, creativity, originality, analytical reasoning, sound judgment, teamwork, and the list goes on and on (Frey and Osborne, 2017). The on-demand availability of online training made possible by AIED may help educators and students continue their education throughout their lives.

The Role of AI in the Classroom

Nearly 30 years have passed since the AIED academic community first began discussing the possibilities of AI in the classroom. In light of recent developments in data-complex algorithms, AI, learning, processing power, and technology usage on a global scale, the discussion has moved to the international arena of government policy. The field of artificial intelligence education and training has the potential for enormous gains, but also faces dangers and possibilities. Thus, we must move carefully and methodically towards a new learning environment, where AI is used to help students and instructors, and where we also educate students for a future in which AI plays a bigger and greater role (Popenici and Kerr, 2017).

Computer-based intelligent tutoring systems (ITS) are designed to simulate human learning in an educational setting (Frey and Osborne, 2017). The concept of human learning is widely regarded as a highly efficient perspective on training. The human guides will have in-depth, local

expertise to facilitate rich, interactive learning techniques like conversation. And, since each student's learning needs are unique, it is essential that instructors properly assess their students' motivation and prior knowledge before deciding on learning activities and objectives. Teachers may aid their students at every stage of a work by providing them with frames, tips, tactics, and immediate feedback. Studies demonstrate that students have not made full use of human guides since they seldom ask questions and the guides are not faultless, for example in correctly diagnosing students' misunderstandings or appropriately customizing their curricular duties (Gulz and Haake, 2006). Imagine, nevertheless, if human educators use it, using intelligent systems to choose pedagogical and didactic tactics, engage students in tailored learning dialogues, and become more effective over time. Computer training (CAI) existed before ITS and was able to provide students with immediate feedback after they had completed an exercise (questions). In 1970, SCHOLAR was the first ITS to advance past CAI (Heidig and Clarebout, 2011). ITS consists of the following parts: Knowledge is safely maintained in the "expert model," which is also known as a "domain model."

A method of teaching in which the methods for providing a high-quality education and a solid foundation for a career in the field are stored. The ITS student model defined what it means to be a student or what students do in ITS. Information about the student's abilities, misconceptions, feelings, and drive is gathered and analyzed by the system. Through this, ITS can diagnose, in order to compare peer models, and then provide specific assignments, tips, or feedback based on the individual's needs. Communication with the user is facilitated via an interface. Writing it in conversational natural language or without the use of ITS-representing virtual pedagogues is possible (Johnson and Lester, 2015). People in these groups are urged to take courses in a wide range of academic disciplines, including neuroscience, psychology, and educational technology.

ITS may be broken down into subcategories. It's important to recognize that not every system is AI-enabled, and that these two are fundamentally distinct. Its form might vary from the meaning it conveys. Some emphasize topics with mathematical principles, some teach reading and writing, while yet others attempt to teach broad topic abilities, such as self-paced reading methods (Kandlhofer et al., 2016). The use of technology in education is a recent phenomenon that has sparked debate about ethical issues related to the collection and use of sensitive data within the fields of computer science, machine learning, and cognitive psychology. In sum, it has the potential to be a helpful resource for teachers. What's most notable is that what was formerly often discussed in classrooms is now hardly discussed at all: what is technically conceivable. When available, they can supplement a student's education both inside and outside the classroom (Pinkwart, 2016).

Pedagogical factors

Pedagogical agents (PA) are integrated learning technologies that take the form of digital or virtual characters and are used to improve the educational process. Using natural human interaction, it expands on the social, emotional, and motivational aspects of tech-based education. Depending on the context, PA can look very differently (Kim and Baylor, 2015). Commonly, PA incarnation is used, which means that on the screen, students can see an image of virtual characters or avatars that resemble people, characters, animals, or objects. PA characters, for instance, can take on a wide variety of forms, from realistic three-dimensional solid-body people to two-dimensional cartoon animals to inanimate objects like "Clippy," Microsoft Office's virtual assistant to a paper clip. PA may use either written or spoken communication to interact with pupils. The state of PAs has been improving as of late due to technical developments (Kulik and Fletcher, 2016). Affective computing (systems that sense, understand, replicate, and

influence human emotions) has advanced to the point that pupils can recognize their own emotions and modify their behavior in response to boredom or dissatisfaction in virtual people. The PA can have brief conversations with the students thanks to the tongue. Personal assistants (PAs) can take the form of a miniature robot designed for use in the classroom setting. Every person in the future will have access to multiple personal assistants who will accompany him at all times. Thus, PAs have the potential to become technologically very potent; indeed, there is value in having a permanent PA that will remind us of times past should we ever falter. The current PA continues to make excellent use of available technological tools in order to facilitate various forms of training (Li et al., 2014). In the future, personal assistants (PAs) may be as common as calling cards, thanks to innovations like Apple's Siri. However, it is not yet clear whether PA covering a wide variety of topics or a specific subset will be more beneficial to education.

Advanced technology in the education and the learning environment

The "Internet of Things" (IoT) refers to the increasing connectivity and interoperability of everyday objects. It encompasses "smart" homes with features like automated light switches, fridges, and other appliances. Smart cities, transportation systems, and environmental monitoring systems are additional examples. Smartphones and other ubiquitous computers helped propel the development of the Internet of Things. The term "Internet of Things" (IoT) refers to the widespread implementation of sensors and related technologies for the purpose of transmitting data from commonplace objects and wearable gadgets. As such, it provides AI with robust signal inputs. Smart classrooms, learning environments, and schools all benefit greatly from Internet of Things integration (Luckin and Cukurova et al., 2022). The term "smart classroom" refers to a learning environment that makes extensive use of technological resources, such as Internet

access, mobile devices, sensors, and online resources. The notion of "intelligent learning environment" is broadened to include a variety of uses for a physical location that is designed with teaching and studying in mind. More personal data collected in classroom settings via in-class sensors like cameras, microphones, and motion detectors (Parab, 2020). Sensors worn by students and faculty can send information back to a school or other institution. Smartwatches, armbands, smart glasses, technological brain testing, and device medical monitoring are all examples of wearable electronics that contain sensors. RFID (radio frequency identification) tags are another common type of wearable sensor. Once data has been collected from a "smart" classroom, learning environment, or school, it can be analyzed by machines and possibly augmented by human experts to enhance education (Timms, 2016). Simply put, the majority of the existing intellectual classes in technology are instruments used to measure and report massive amounts of data. Few contemporary AI-based, large-scale systems make use of this kind of data to inform classroom instruction. AI-powered "smart" classrooms reportedly use student data to adjust the temperature, lighting, and ventilation of a school's physical space to maximize learning. Using AI and body postures, some researchers have proposed a system to track teachers' observations of students' nonverbal behavior and offer immediate feedback on how to enhance students' abilities in these areas (Kent and Du Boulay, 2022). These examples suggest that classroom research is sound, but that educational settings and institutions are still in their formative stages. Despite advancements in AI technology and the availability of related tools, most intelligent classroom applications are still in the early stages of development, where testing and feasibility studies are being conducted. One potential feature of the classrooms of the future is full context awareness, where each case study is named and supported by real-time adaptive assistance.

Learning analytics and adaptive learning

The development of ITS, PAs, and intelligent classes is primarily motivated by the desire to facilitate adaptive custom learning and teaching, which is a key objective in education and training. While ITS and PAs facilitate AI-supported learning through a graphical user interface (GUI) or an embodied agent (e.g., a robot), they also frequently employ an adaptive system (AS) running in the background to cater to the needs of specific teachers and students during specific lessons (Ma et al., 2014). Adaptive learning in education (also just "adaptive learning") means tailoring a course's content, difficulty level, or user interface to the specific needs of an individual learner or a small group of them. Students' actions, progress, and learning preferences are the focal points of adaptive pedagogies. An equally vital concept in computer science, algorithms are developed to ascertain when and how to adapt to the learning environment and/or tasks, making adaptive learning a central topic in this field. When it comes to helping students become more proficient in their chosen field, ITS may employ adaptive training to provide them with cues to help them independently solve more complex tasks (Mohanty and Vyas, 2018). Maintaining students in their zone of proximal development is accomplished through the use of adaptive learning, in which questions are withheld until mastery is attained and a foundation for more complex tasks is laid. Human discretion is combined with machine learning and automated data analysis in the field of learning analytics. The goal of the training table is to improve decision-making through increased knowledge and experience (Van Lehn, 2011).

RESULTS AND DISCUSSION

In order to collect both quantitative and qualitative data from participants, online open structured surveys were opted for. These unanswered queries provide researchers with additional insights.

Subject matter will determine how students and educators think of AI and how far it can be applied to classrooms. All data was gathered online from a wide variety of respondents all over the world (McArthur, 2005; Coccoli et al., 2018). The low cost and quick response time of an online survey make it more convenient to conduct the survey as a whole. Participants have come from as far as India, the United States, Greece, and Qatar thanks to the avalanche of samples. Instructors and students alike will benefit from using Google in two distinct forms, both of which have been prepared for them in advance. We import the Excel files containing the data into MAXQDA 2018 to keep track of the number of coded segments. That portion of the software responsible for facilitating questioning-related tasks (Mohamed et al., 2018). Using student and educator feedback to draw conclusions. A total of 79 people, including 41 students and 38 educators, filled out the online survey. Some of the students who have signed up for this are still in school, while others have graduated. All of the responding educators are currently employed in education. Both teacher and student respondents are referred to as TR and SR, respectively, to indicate their respective roles in the study (Welham, 2008).

AI's Potential in future education

What is the effect of artificial intelligence programs that attempt to mimic human thought on the classroom? The future of artificial intelligence in the classroom will primarily take three forms:

- Performance customization: as computing becomes more complex, artificial intelligence (AI) solutions will be able to better collect and generalize information, assisting educators in creating customized lesson plans. Solutions like Brightspace Insights have emerged to collect, aggregate, and analyze data so that educators may better understand their students' use of all learning technologies.

- Violation bias: as previously stated, human bias continues to be a barrier to education and a recently discovered issue in AI tools. To eliminate bias, the future of AI in education will rely on solutions that can grade assignments and tests according to predetermined categories and rules for automatic grading.

- Collaborative support: most educators hold the highest degree in their field, and many hold multiple degrees and focus on a narrow aspect of student growth and achievement. Unfortunately, coordinating with students to complete administrative tasks is not always easy for teachers. Here, managed AI assistants make the necessary data to aid teachers in doing what they do best: communicating with students, ushering in the future of classroom intelligence.

CONCLUSION

Multiple sources attest to the ever-increasing presence of AI in many areas of everyday life. Artificial intelligence (AI) has made inroads into the academic world, where it is used as a supplementary tool to enhance the classroom experience. The recent research demonstrated that instructors and students should learn more whether application AI might aid them in the development of their talents in education. It also discovered that the appropriate application of AI technology may deliver superior outcomes. Several platforms and trends guaranteed the future growth of AI education, which is highly enticing, and in some instances even inaccessible under certain circumstances. However, it is doubtful that computer-based learning can fully replace human teachers in classrooms.

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