An Overview of Artificial Intelligence In Education Sector

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ABSTRACT: ***Innovative educational technology have transformed teaching and learning techniques. Higher education has recently started to embrace new technology as artificial intelligence advances. The purpose of this conceptual review article is to look at the rise of artificial intelligence in education teaching and learning. It investigates the educational implications of emerging technology on how schools educate and how students learn. The goal of this research is to forecast the role of artificial intelligence in the future of education in the globe. Artificial intelligence techniques that are used effectively are seen as a way to improve the quality of teaching and learning. The difficulties of incorporating artificial intelligence in educational institutions, on the other hand, are addressed. Furthermore, the difficulties students experience in embracing artificial intelligence in terms of assistance, teaching, learning, and administration are addressed. This article provides a brief summary of the most current research that demonstrate artificial intelligence's use in educational settings. The consequences and future research areas are discussed.***

KEYWORDS: ***Artificial Intelligence, Education Sector, Learning, Teaching.***

1. INTRODUCTION

Higher education is inextricably linked to advancements in new technologies and the intelligent machines' great computing capabilities. As a result, advances in artificial intelligence provide new possibilities and problems for teaching and learning in the classroom. Artificial intelligence has the potential to make higher education more efficient; additionally, artificial intelligence has the potential to make higher education more efficient. Successful modifications in the fundamental design of higher education institutions There is no absolute truth. Since Aristotle, philosophers have debated the definition of artificial intelligence. Scientists began looking into artificial intelligence solutions in the 1950s. The first method is to Turing proposed the problem of determining when a system is considered "intelligent" (Russell & Turing). He proposed the simulated game to assess a human listener's ability to understand. Distinguish between a conversation with a machine and a conversation with another human; if the system fails to do so, We would admit that we have artificial intelligence because of this difference (AI). Later that year, in 1956, John McCarthy's definitions of artificial intelligence were the most comprehensive: AI is the foundation. “Of the belief that every element of learning or any other characteristic of intelligence can be quantified defined clearly a machine or program's feature; the intelligence that the system has demonstrates [1]. When it comes to defining and using artificial intelligence, the majority of methods only go so far. They place a premium on intellect while ignoring other political, philosophical, and ethical issues. Elements of psychology The modification of is the basis for the fundamental concept of artificial intelligence. previous research in the literature [2].

AI stands for artificial intelligence (AI) Computing systems that participate in human-like activities such as learning are referred to as. For complicated processing tasks, adapting, synthesizing, self-correction, and the utilization of data are all important. Artificial intelligence is presently advancing at a breakneck speed, and it is already having an effect. On the significance of services in higher education Deakin University, for example, is located in Melbourne, Australia. As an emerging type of artificial intelligence, Australia has previously used IBM's supercomputer Watson .Intellect and a way to offer advice to pupils[3]. This Innovation has had a major impact on the quality of services and personnel. Within the university, there is a dynamic time. As a result, it is necessary to emphasize the term "machine learning." In the realm of artificial intelligence, is a rapidly expanding study topic. Artificial intelligence (AI) Some of these solutions are heavily reliant on programming, while others are completely self-contained. ability to learn patterns and

generate forecasts 'Machine learning' is defined in this research as a Artificial intelligence is subcategory of artificial intelligence. Machine learning is a kind of software that automates the process of learning [2]. Make predictions, recognize patterns, and apply newly found patterns to new situations Something their main design did not cover. The goal of this review research is to look at how artificial intelligence may be used in the classroom as well as education. This conceptual review paper organizes articles into categories based on ideas and topics. Incorporating artificial intelligence into schooling It pinpoints the present 'understanding' of AI's use in the workplace. Existing educational systems, not only addresses the benefits of AI applications, but also the drawbacks. The difficulties of incorporating AI into teaching. It gives an overview of AI's potential involvement in the future. system of education [4].

1.1 The Development of Artificial Intelligence in Education:

Artificial intelligence (AI) is a term that refers to tools or instruments that are widely used in various cities or campuses around the world. Smartphones, the internet, search engines, various apps, and household appliances are examples of these technologies. The complicated set of software in the iPhone's Siri is an example of artificial intelligence that everyone encounters in everyday life [4]. Although it can be classified as low-complexity AI, it has been classified as an artificial intelligence project in the United States since 2001. This application was first used in the iPhone operating system in 2007 [5]. Google is now able to use AI in its search engines. Furthermore, AI is used in all new cars' engines, brakes, and navigation systems. Some well-known companies, such as Volvo, Google, and Mercedes-Benz, have made self-driving technology a top priority for development. In 2015, this technology was put to the test for the first time in Australia. Self-driving technology are prominently used in the mining industry. Furthermore, self-driving trucks are utilized in Australia for a variety of purposes. Students are currently at the center of learning and teaching challenges in higher education.

Human-AI contact is seen as a kind of solution or cooperation that may help individuals with disabilities all around the globe. As a result, these technologies may encourage people to use AI in higher education. It has the potential to encourage students and teachers to become more involved in the learning and teaching process. Defines a cyborg as "a crossbreed of a person and a machine" in his Encyclopedia of Science, Technology, and Ethics. Complex computer systems that utilize machine learning algorithms may assist people with a variety of skills, according to. Furthermore, they are engaged in certain human-like processes and are capable of performing some complex jobs in the realm of teaching and learning. As a result, higher education institutions have entered a new age. This kind of human-machine interaction is a game-changer in terms of assisting humans in learning and remembering knowledge. However, the issue of how long it takes for this kind of interface (AI) to improve the degree of memory and cognition in humans remains unanswered [6]. According to MIT researchers, there will be some changes in the way technology is used in education, particularly after 2007, when the first iPhone models hit the market. Not only is the iPhone a new technology that allows us to access and utilize information that was previously unavailable, but it also represents a significant cultural change that has an impact on people's social life [7]. However, if the focus of "cyborgs" changes from science fiction to computer applications for both instructors and students, "cross-breeds" or cyborgs of humans and machines may appear in the educational sector in the near future. The impact of artificial intelligence on the economy can be seen, which has piqued the interest of many experts. Google made the biggest investment ($400 million) in the purchase of Deep Mind technology in the European Union in 2014. DeepMind Technologies, now known as Google DeepMind, is a London-based artificial intelligence company that may be utilized in machine learning.

Surprisingly, Google made another Artificial Intelligence investment in the German Research Centre. This research center, according to its website, was the world's top research center in Artificial Intelligence and its applications [8]. Artificial intelligence is a sector in which some of the world's most powerful companies, like Apple, Google, Microsoft, and Facebook, compete and spend heavily in new applications and research. According to a study published by Google in December 2015, a new computer model known as the D-Wave 2X is capable of performing sophisticated AI tasks. This computer model is much quicker than

contemporary computers. According to Google experts, it represents a major step forward in the field of AI. Essayed, Thomas, Marriott, Piantadosi, and Smith (2015) said, "We hope it helps researchers build more efficient and accurate models for anything from voice recognition to online search and protein folding." Investing in AI has the potential to impact academic environments. Perhaps the financial difficulties faced by students in higher education are compelling reasons to explore AI solutions[9]. As seen in the preceding instances, combining a machine and a human brain is possible, and this problem presents a challenge for instructors to find new dimensions, functions, and pedagogies in a variety of learning and teaching settings. For example, the brain-computer interface has piqued the interest of researchers all around the globe. Professionals in the area of computer have offered various ways for managing software with a brain-computer interface by combining analytical techniques and brain signals with certain approaches in modern computing system. The brain-computer interface is capable of capturing and decoding brain activity.

Furthermore, it may facilitate communication among people who have motor function impairments. The rapid advancement of technology, which allows us to utilize AI functions, has improved our talents and capacities. “Innovation in education is not simply about putting more technology in more classrooms; it is about altering teaching methods so that students gain the skills they need to succeed in competitive global economies,” Schleicher said. Artificial Intelligence (AI) methods have the capability of developing and imitating human decision-making processes. In adaptive educational systems, several AI methods have been used. Fuzzy Logic, Neural Networks, Decision Trees, Bayesian Networks, Hidden Markov Models, and Genetic Algorithms are examples of these methods. However, there has been no agreement on the development of a standard method to determining which technique has the most appropriate AI learning theory to use for a certain learning environment. Furthermore, scientists have yet to create a software tool to assist in identifying a student's learning style based on their learning behavior. In learning and teaching, a tool that is readily customizable and available in a variety of learning settings, such as conventional or eLearning, is needed. Artificial intelligence can help accomplish and manage educational objectives in the educational system (AI). Instructors may use AI to evaluate students in a class and identify who is a slow learner in order to grasp the subjects. If a student has certain deficiencies in some areas or does not grasp a few subjects, AI analysis will provide this report to the lecturer or parents, and the lecturer will take appropriate action to scaffold learning. Furthermore, Artificial Intelligence has the ability to highlight which issues need to be addressed [7].

1.2 Application of AI in Education:

- *Artificial intelligence may be used to automate fundamental educational tasks such as grading*: Grading homework and exams for big lecture courses in college may be tiresome labor, even when TAs share it. Even in lower grades, instructors often find that grading consumes a considerable amount of time, time that might be spent interacting with students, planning lessons, or working on professional development. While artificial intelligence may never be able to completely replace human grading, it is getting close. Teachers can already grade almost all types of multiple choice and fill-in-the-blank tests automatically, and automated grading of student work may not be far behind. Today, essay-grading software is still in its infancy and far from perfect, but it can (and will) improve in the future years, enabling instructors to devote more time to in-class activities and student engagement rather than grading.
- *Educational software may be customized to meet the requirements of students*: One of the most significant ways artificial intelligence will influence education is via the use of higher degrees of personalized learning from kindergarten through graduate school. Some of this is already taking place as a result of the increasing amount of adaptive learning programs, games, and software available. These systems adjust to the student's requirements, placing more focus on particular subjects, repeating items that students haven't learned, and overall assisting students in working at their own speed, whatever that may be. This kind of custom-tailored education may be a machine-assisted approach to allowing students of all abilities to collaborate in one classroom, with instructors guiding the learning and providing assistance and support as required. Adaptive learning has already

had a significant effect on education throughout the country (particularly via programs like Khan Academy), and as AI develops in the next decades, adaptive systems like these will likely improve and spread much more.

- *It may highlight areas where courses can be improved*: Teachers may be unaware of gaps in their lectures and instructional materials that cause pupils to be confused about particular topics. Artificial intelligence provides a solution to this issue. This is something that Coursera, a large open online course provider, is already doing. When a significant number of students submit incorrect answers to a homework assignment, the system notifies the instructor and sends future students a personalized message with suggestions on how to solve the problem. This kind of approach fills in the gaps in explanation that may arise in classes and ensures that all students are working on the same conceptual basis. Students get instant feedback rather than waiting for a response from the professor, which helps them grasp a topic and remember how to do it properly the next time.
- *AI tutors may provide extra assistance to students*: While there are clearly benefits that human tutors can provide that computers cannot, at least for the time being, the future may see more pupils being taught by tutors who only exist in binary. Artificial intelligence-based tutoring systems currently exist and may assist kids with basic arithmetic, writing, and other disciplines. These programs may teach kids the basics, but they aren't designed to assist students acquire higher-order thinking and creativity, which real-world instructors must still encourage. However, this does not rule out the potential that AI instructors may be able to do these tasks in the future. Advanced teaching systems may not be a pipe dream with the fast rate of technology development that has characterized the last several decades.
- *AI-driven applications can provide useful feedback to students and instructors*: AI can not only assist instructors and students in creating courses that are tailored to their specific requirements, but it can also give feedback on the course's overall performance. AI systems are being used by certain institutions, particularly those with online courses, to track student progress and notify instructors when there is a problem with a student's performance. These AI systems enable students to get the assistance they need, as well as instructors to identify areas where they may enhance teaching for students who are struggling with the topic. These institutions' AI programs, on the other hand, aren't simply for giving recommendations on certain courses. Some are working to create systems that will allow students to choose majors based on their strengths and weaknesses. While students are under no obligation to follow the advice, it may usher in a brave new world of college major selection for future students [10].
- *It's changing the way we discover and engage with data*: The AI algorithms that influence the information we view and discover on a daily basis go unnoticed. Google tailors search results to users depending on their location, Amazon tailor's suggestions based on past purchases, Siri adjusts to your wants and instructions, and virtually all online advertising are tailored to your interests and purchasing habits. Intelligent systems like this play an important part in how we engage with information in our personal and professional lives, and they may soon alter how we discover and utilize information in schools and academics. AI-based systems have already drastically altered how humans engage with information over the last several decades, and with newer, more integrated technologies, students in the future may have vastly different research and fact-checking experiences than students today.
- *It has the potential to alter the function of instructors*: Teachers will always have a part in education, but the nature of that job and what it involves may alter as a result of new technology, such as intelligent computer systems. As previously said, AI may do duties like as grading, assist students in improving their learning, and even serve as a replacement for in-person tutoring. However, AI may be used to a variety of other areas of education. For extremely basic course materials, AI systems may be designed to offer expertise, acting as a location for students to ask questions and discover knowledge, or even taking the role of instructors. In most instances, though, AI will replace the teacher's function with that of a facilitator. Teachers will complement AI courses, help difficult

students, and offer students with human contact and hands-on experiences. Many of these changes in the classroom are already being driven by technology, particularly in schools that are online or use the flipped classroom approach.

2. DISCUSSION

Teaching and learning may face a wide variety of difficulties as artificial intelligence technologies have the ability to alter university administrative functions. AI solutions, according to Perez (2016), can perform automated jobs. However, it is impossible to believe that they will be able to complete the more difficult duties associated with higher education (Soto et al., 2012). The current article presents some proof of AI application technologies in educational systems to improve teaching and learning. However, there are certain limits to the use of technology; AI cannot be a substitute for instructors. Computing algorithms now have an impact on every area of people's life, from credit ratings to employment. To far, higher education has been at the center of this massive change, and it has the potential to provide both benefits and dangers. From a scholarly standpoint, this crucial topic requires attention and study. As a result, we should seek for answers in the field of education, and technological development will be a common solution (Bengio et al., 2013). The use of technology in higher education is appropriate when it expands research, teaching, and learning possibilities and capabilities. The goals of this study are consistent with the goals of previous research in this field, such as the "National Artificial Intelligence Research and Development Strategic Plan." According to the report, AI enhanced human skills and the barriers between people and artificial intelligence were being dismantled (National Research Council, 2016). The use of technology in higher education is appropriate when it expands research, teaching, and learning possibilities and capabilities. The goals of this study are consistent with the goals of previous research in this field, such as the "National Artificial Intelligence Research and Development Strategic Plan." According to the report, AI enhanced human skills and the barriers between people and artificial intelligence were being dismantled. Indeed, the advancement of machine learning and AI in higher education has created both opportunities and problems. However, it is critical to remember that education is a human-centered endeavor rather than a technological answer. Despite rapid advancements in AI, relying entirely on technology is incorrect. As a result, it is critical to concentrate on the notion that human beings must identify issues and dangers for themselves. They should also inquire about privacy and control when it comes to the need of nurturing creativity. Furthermore, they should allow room in the learning and teaching process for serendipitous pathways. The goal of AI is to be a cure for higher education, leaving those who are in its path beneath the wheels of reality. However, sustaining intellectual skepticism is a critical problem in education. In general, we must consider this goal of developing responsible citizens and well-educated brains.

3. CONCLUSION

The increased use of AI in education does not negate the ongoing debate regarding the role of teaching and learning in education. Although the development of technology and job displacement are widely acknowledged, it suggests that teachers' role should be expanded. Using artificial intelligence (AI) or information technology (IT) to detect plagiarism raises the issue of who is accountable for teaching and learning. Furthermore, AI software has the potential to replace a variety of activities that are at the heart of instructional practice in higher education, thanks to sophisticated algorithms that may transmit their own biases in operating systems (Rajasingham, 2009). Universities are now rethinking pedagogy paradigms and their connections to AI. Furthermore, higher education institutions may foresee the opportunities and difficulties that will arise as a result of the use of artificial intelligence in teaching and learning (Drigas & Ioannidou, 2013). These solutions provide possibilities for teaching and learning, while also ensuring that fundamental values and the goal of higher education are maintained. Finally, there is a need for study into the uses and advancements of artificial intelligence, as well as the potential of expanding human understanding. Finally, it is critical to focus on the new role that instructors play in modern student learning, emphasizing characteristics such as creativity, imagination, invention, and abilities that are difficult to duplicate by computers.

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