Promise, Threats, And Personalization In Higher Education With Artificial Intelligence

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Abstract: This paper investigates the emergence of artificial intelligence in education, including higher education and alternative learning environments. It researches the educational implications of emerging technologies, such as virtual and augmented reality, on students' learning processes and how education institutions advance and evolve. The present state of the art in artificial intelligence (AI) is also discussed here and how this innovation might affect learning, teaching, and education. Scholarly work, research, and future-focused activities based on recent developments in AI are provided by it. This research paper emphasis on promises and threats of AI in higher education. Artificial intelligence's applications to education are continually increasing, although it has yet to be generalized. While AI presents incredible opportunities for supporting teaching and learning, the further development of applications has the following implications: It brings about many new problems and concerns over ethics. We have already allowed digital technologies to become an integral part of our life. Today, information is presented; differently, people interact in different ways, and behavior changes. In many ways, it has spread throughout society, including the education system. the primary goal of this article is to identify future changes in the study process caused by artificial technologies and predict their impact on the educational landscape.

Keywords: Artificial Intelligence, Education, Higher Education, Technology Enhanced Learning

Introduction:

As the future of higher education relies on intelligent machines to be developed, the future of education depends on them. There are great new possibilities, as well as many other teaching and learning challenges to be presented by artificial intelligence. In turn, it could have a significant impact on how higher education institutions are governed. In the last decade, AI has been one of the most important new developments [1]. The impact it has on education, however, is the most significant. Artificial intelligence is broadly defined as the attempt to create machines capable of doing tasks that, before AI development, were only achievable by human intelligence. Computer scientists over the years have tried many different mechanisms.

During the latest wave of enthusiasm for artificial intelligence, engineers implemented extensive rules into computers to emulate human knowledge, an approach known as expert systems[2]. Machine learning is currently the basis of most of today's artificial intelligence. Data correlations may not be immediately understandable to humans, but it is possible to find patterns within the data sets and use them to make decisions. The antiquated education system has long proven faulty and ineffectual[3]. It's more challenging to keep students' attention because of digital technologies, which degrades their awareness level. More and more children these days are used to receiving information from multimedia sources, such as the internet, and do not respond to traditional teaching methods. Artificial intelligence (AI) promises to bring numerous benefits to education, such as personalized learning that helps students acquire the topic more efficiently, allowing them to adjust the pace and strategy while improving their ability to understand and remember it. The introduction of AI has enabled companies to completely redesign their business models to provide personalized services to their customers. Using AI as a solution to complex learning processes is currently considered the best option for all educational institutions. Artificial intelligence techniques can revolutionize the way students handle new information, allowing for significant improvements to the academic environment[2].

Research Methodology

More than 100 papers addressing the importance and threats of AI in higher education publishd between 2010 to 2020 have been analysed. The purpose of writing this paper is to address the promises and threats of AI in higher education. A systematic review answers specific questions using a systematic, replicable search strategy. The search terms and criteria for this systematic review focused on peer-reviewed English language journal articles published over the past decade that reported on artificial intelligence and Education in India at the college level.

Benefits of AI in Higher Education

As we illustreate in (figure 1) the main benifts of AI in Higher Education.

Figure 1. Benefits of AI in Higher Education.

a) **More frequent interaction between students and teachers**: Using AI-based tools and educational software, educators can foster a positive student-teacher relationship. Although AI-powered applications often serve as effective communication channels, enabling students to stay in touch and clarify any issues as they arise, these apps also allow students to consult with their instructors and ask any questions that come to mind. One of the major attractions of AI apps is that they enable students to connect with relevant support and assistance instantly. This approach thus boosts educational productivity while at the same time enhancing student satisfaction with their academic results [4].

b) **Robot Assistant**: An AI system capable of assisting with several tasks includes chatbots that serve as personal assistants. Educational institutions using assistive technology find intelligent assistants to be very beneficial. To help students who are unable to be present, educators must use smart AI-powered assistants. They are often created to respond to the most basic student inquiries and guide them inadequately completing and submitting assignments. The same AI bots can assist new students in understanding the university's rules. For the most part, these smart assistants operate through voice recognition and help direct a learner to information pertinent to the request within seconds [7].

c) **Precise assessment:** When teachers are assigned thousands of students, every educator knows that grading is time-consuming. An AI application is used to expedite learning assessment and, thus, increases the number of time teachers devote to other equally essential education initiatives. The main advantage of AI in the classroom is that it prevents teachers from making a calculation error, resulting in a more objective and accurate assessment. Another benefit of AI systems is that

they're typically paired with analytics tools that enable educators to monitor student progress. It increases the teacher's success rate as they can easily see which students are weaker on all counts. Thus, it is easier to incentivize students to believe in their potential and put in more effort when studying. Artificial intelligence-powered assessment is a reliable way to ensure against unfair grading that could result in students dropping out if it is not addressed in time [5].

d) **Lesson planning Assistance:** To effectively utilize artificial intelligence in higher education, professors and professors' administrators should have the ability to plan and distribute lessons promptly rapidly. Students will have their lectures automatically delivered to them and created using a system that automatically selects learning activities, such as tests, webinars, and presentations. Teachers now have greater consistency when conducting their classes, checking homework, and distributing new assignments because of this advantage [6].

e) **Automated administration:** The effectiveness of the learning depends on the performance of the administrative staff. They help set up a learning space that empowers educators to deliver higher education services while students benefit from an improved study environment. There is a possibility that application season could necessitate smart resource allocation. In these cases, AI systems are utilized to carry out everyday functions, such as sending useful emails and reminder notifications. Students can now use AI tools to quickly check their selection results or self-monitor their academic performance, thanks to the AI's help. With this new AI form, students can be guided and controlled remotely rather than handled on a case-by-case basis[8].

f) **Quality of Education:** An AI application is needed when a single platform can be accessed by learners of all levels and represents a university community's collective intelligence. Everybody can benefit from a vast knowledge pool that encompasses numerous fields and disciplines. Cheaper learning options, greater engagement, and an increased population of learners are significant benefits of AI in higher education [9].

g) **Personalized learning with AI:** Personalized learning services are available to students with AI-based devices. AI-enabled education systems use machine learning algorithms to generate customized educational materials based on the user's knowledge, experience, and learning style [10].

h) **The emergence of voice assistants**: Voice digital assistants could very well be your next tutor in the years to come. Today's educators use voice assistants in situations where no internet connection is available. In a sense, for example, Alexa doesn't need to open a personal computer to look up study resources. It enables students to learn like a teacher supporting their learning [11]

i) **Smart open content**: Today's learning system has little use for big textbooks. Publishers are distributing small study guides to students to help them read better. Changes are taking place in the education sector due to personalized learning and the availability of digital content. The use of digital content is gradually increasing the overall demand for smart textbooks. Providing relevant and engaging

information can help learners obtain paperless materials and in-depth knowledge of the subject[12].

j) **Feedback and scoring system**: As a result of AI and ML, the education industries are benefitting. As well as more advanced feedback and scoring systems, AI also introduced new inventions like that. Writers can get assistance from teachers and professionals to hone their writing skills.

k) **Innovative test preparation applications**: Artificial intelligence has enabled developers to create novel innovations in the education industry. This application development uses advanced technological systems to help design and construct mobile and web-based study and test preparation applications [13].

l) **Professional learning**: This ensures that educators use personalized intelligent learning strategies and learning platforms. Personalized recommendations will be provided shortly by these AI platforms.

Benefits of AI to the students

As we illusterate in (figure 2), AI is better suited to the well-known students who go on to further their education. According to these expectations, the AI will be able to meet both these requirements by;

a) **Adjusting the pace of learning**: Teachers who have to manage 30 to 60 students in each class have their work made more difficult because there isn't enough differentiation to handle all of their students. It includes all possible learning styles in the lessons, bringing the appropriate level of difficulty for students who learn quickly. As long as those who lag are not excluded, it doesn't discriminate against those who know more slowly. Therefore, AI achieves the seemingly impossible goal of finding the elusive concept of perfect pace to accommodate many students. Each student has an individualized program that enables them to explore postsecondary education at their own pace[14].

b) **Tailoring learning objectives & approaches:** Sophisticated AI systems examine how students interact with each other and the class, not just a snapshot of their static data. The AI algorithm identifies factors that affect focus in students. Teachers' teaching strategy to target their instruction to a student's response is called "personalization." Using test scores to track patterns can help shift how concept delivery methods are implemented by utilizing different paradigms [15].

c) **Driving learning by learner interests:** Attracting students with customizable AI spurs their interest in the curriculum. An example is that some students may need extra attention or tutoring because of learning disabilities or other issues. Using algorithms, students can get the additional learning materials they need to reach their full potential. If they remain in school, they will be less likely to drop out. When deployed appropriately, AI technology can enable teachers to devote less time to confusing subject areas or mixed messaging, allowing for an accelerated learning rate[16].

d) **Virtual Assistant:** Because of its capability to take on a role similar to a teacher's virtual assistant, AI could be employed as a virtual assistant. It takes an immense

amount of time for teachers to grade homework and tests. Artificial intelligence (AI) can perform these tasks more efficiently and offer suggestions on closing any learning gaps [17].

e) **Choice of learning as per convenience:** For effective education, students should embrace technology, choosing whatever interests them. Therefore, an AI curriculum is ideal for students because they can select lessons that match their aptitude and interests. Analytical test scores identify students' strengths and weaknesses so that they can choose an almost perfect option.
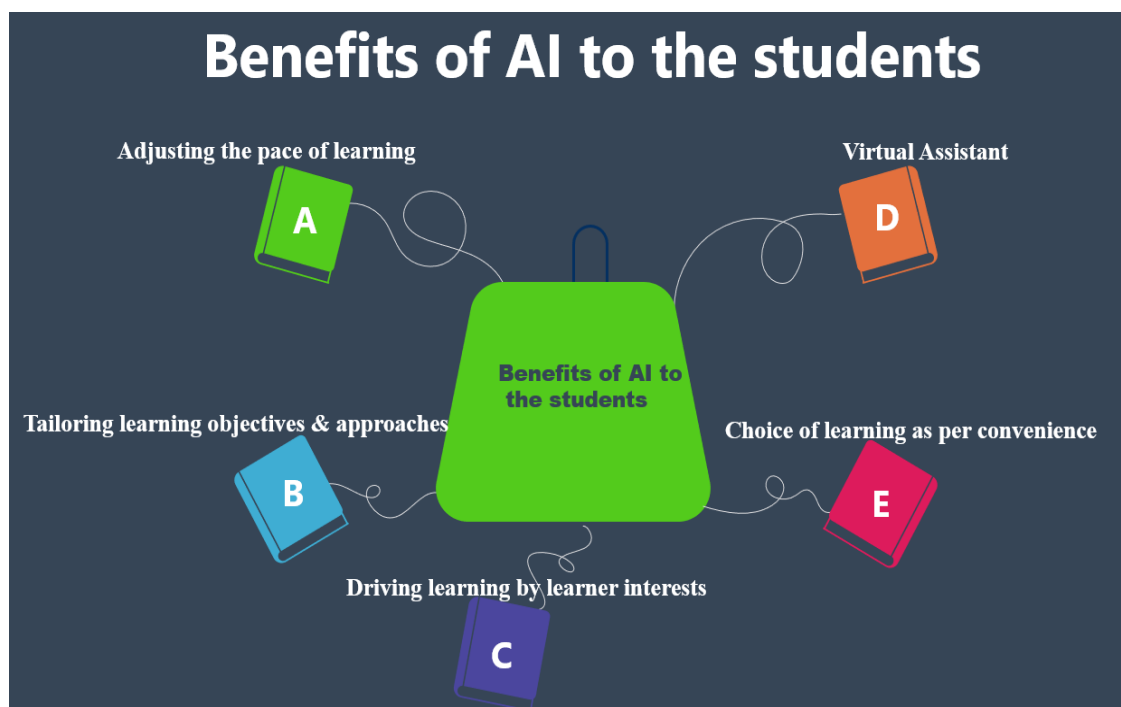

Figure 2. Benefits of AI to the students

Applications of Artificial Intelligence in Education:

Here are some important applications of AI;

a) **Automated Grader:** However, the way grading has developed so far has been an uphill battle, as numerous standardized tests have begun to use grading systems that are on autopilot. To identify strong and weak essays, teachers initially submit graded papers to teachers as a test. Knowledge is collected as essays are graded, and feedback is provided instantaneously [18].

b) Adaptive Learning: Students will benefit significantly from it. The use of AI in schools helps students who have learning difficulties because it tracks their academic progress, changes the class's pace, notifies the teacher of the problem in understanding, and much more.

c) **Chatbot:** Students' evaluation is essential because it provides valuable information and needs improvement compared to the current system. It seems that AI-driven chatbots can improve the quality of feedback. A chatbot takes comments from students using a

question-and-answer conversation interface as if it were an actual interviewer and looked into various perspectives. The system is free of prejudice [19].

d) **Data Accumulation**: Artificial intelligence in education can use previous search queries to find related content for students. As an example, if you are curious about preposition phrases in English grammar, you might want to explore some of the links that talk about complete parts of speech, as well as other concepts, like Noun, Adjective, and so on.

e) **Proctoring:** Supporting technologies are necessary for the future of learning. With AI, it is now impossible to cheat on the exam, as the AI ensures the student's legitimacy to take the exam and prevents them from doing so. You can use it to take competitive exams, attend school or college, get promoted, and for many other applications [20].

f) **Innovative Content:** Current schooling, college, and corporate settings already provide for intelligent content creation. We'll use AI to make the textbooks smaller, more digestible chunks of information that are simple to comprehend.

g) **Personalized Learning:** When viewed from each learner's perspective, it is evident that the rate and capacity for learning differ. The instructional approach and learning instructions should vary and be tailored to the individual student to optimize personal benefits. While artificial intelligence helps learn management systems, the systems can quickly respond to each learner's specific needs and customize learning strategies and activities based on what the learner is interested in. And, it is made to handle complicated activities with minimal effort while accelerating the learning process at the same time.

h) **Virtual Facilitator:** Despite virtual humans' advent, humans remain an asset to be utilized rather than a liability to be shunned in educational and therapeutic settings. It can be the reason, act, and respond to students' queries while also working as a teacher's aid [21].

Promise and Threats

A significant part of AI's promise is found in its efficiency and efficacy. AIs can gather far more data at higher levels of detail than humans. And these systems can carry out these tasks in real-time. Many students may be assessed in various places, such as classrooms, student bodies, and applicants' pools. Additional to this, AI systems can make excellent observations and inferences while providing quick and cheap results. More effective teaching, learning, institutional decisions, and guidance should be possible due to these efficiencies. AI promises to show us things we cannot foresee because of human cognitive limitations. Because of these difficulties, there are many variables to consider and an enormous variety of students. Even if artificial intelligence has these advantages, some say it could also be a boon to equality. A more significant number of students will have easier access to high-quality educational opportunities, which will enable them to interact with others and possibly bridge the achievement gap. Lastly, the promise of using artificial intelligence in higher education on a more macro level to make gains in pedagogy and evaluate learning itself lies ahead. Artificial intelligence (AI) is also a growing concern in higher education, of course. The primary risk is the quality of students' learning outcomes. Although these systems were created with good intentions, there may be unforeseen consequences or issues that would be bad. By taking into account several different

factors, we can avoid the products above. Of the data sources that these tools have, one of the first to consider is the data itself. Data can be of variable quality. It is most likely quite outdated [22].

Additionally, the design might target and draw inspiration from a subset of the population that does not match the targeted students. A great example of this would be artificial intelligence (AI) algorithms that have been trained on university students in the state of California. It, therefore, might not yield the same results or be as accurate for students in another part of the country.

AI-based Companies to Enhancing Education

a) **Nuance**: Students and faculty use Nuance speech recognition software to help students struggling with writing or mobility issues; the technology can transcribe up to 160 words per minute. While using the software, the spelling ability and word recognition are also improved. The software can be used to script lectures that can be replayed later or used to prompt tedious activities like creating documents and emails.

b) **Century Tech**: Century Tech platform is built around cognitive neuroscience and data analytics, making it possible to design custom learning plans for students and help instructors manage their work. AI tracks student progress, identifies knowledge gaps, and then suggests personalized study guides and coaching to fill this knowledge gap. The century gives teachers access to resources, which frees them up to teach more effectively, plan their lessons more efficiently, and grade their students' assignments in a more streamlined manner [21].

c) **KidSense**: A team of young researchers at KidSense develops learning-optimized artificial intelligence tools specifically designed for kids. To help take notes, practice vocabulary, or take tests, the company developed a speech-to-text tool that uses artificial intelligence to transcribe a child's speech. The AI in the KidSense uses specific algorithms to accurately and privately translate kid's speech.

d) **Carnegie Learning**: The use of artificial intelligence and machine learning is used by Carnegie Learning to help students to increase their math understanding Suitable applications that can identify and adjust to students' study habits to increase comprehension of mathematics [24].

e) **Kidaptive**: AI algorithms make data collection easy for educational institutions because of Kidapt's Adaptive Learning Platform (ALP) Alignment uses AI to identify and adjust for each student's perceived strengths and weaknesses to introduce and challenge individuals at the perfect moment. with the platform uses patterns and relationships[25]..

f) **Blippar**: Teachers will be able to use computer vision and augmented reality to help students succeed in the classroom. Geographic, biological, and physical activities are represented through pictures. The volcano depicted is only one particular; thus, the educational system employs a virtual 3D graphics to illustrate the process [21].

g) **Thinkster Math**: Thinkster Math is a laptop, tablet, and desktop-friendly math tutoring tool. By incorporating artificial intelligence (AI) with human interaction, K-8 students

can have custom programs. Artificial intelligence technology follows students as they work step-by-step, providing them with valuable insights into their progress and the reasoning behind their errors [21]..

h) **Volley**: You donThere is no law which requires the use of technology in the classroom. Using artificial intelligence (AI), Volley monitors lecture and quiz results to continually identify knowledge gaps within the company. It gives organisations like Volition and around the world the capacity to quickly and effectively identify and neutralise threats [23].

i) **Quizlet**: The internet's go-to destination for study and learning tools is Quizlet. They recently launched a study resource called Quizlet Learn, which helps create adaptive study plans and removes the guessing involved in figuring out what to study. By combining machine learning and millions of study sessions' data, the platform identifies study material relevant to students[26]..

Future of Artificial Intelligence in Education

Teaching will remain an interpersonal art, and there will be a lot of interaction with people in the future. Nonetheless, artificial intelligence (AI) is getting more pervasive, but it does not result in attributes such as thoughtfulness and responsiveness. While student data, strategic content partners, and customised methodologies make it easier to create an effective initiative for both students and teachers.

Result and Discussion

AI solutions could change university administrative services, making things very different for higher education teaching and learning. Many applications involve artificial intelligence, including simple tasks that can be automated, but complex jobs beyond that capability have not yet been imagined. In higher education, technology is used to boost the overall educational experience and empower students' thinking, not restrict it to delivering material, monitoring, and assessing. The importance of institutions paying attention to hidden algorithms that control them has increased with the emergence of AI-based solutions.

Conclusion

In education, artificial intelligence remains a giant slumbering. The creation of 'breakthrough' artificial intelligence (AI) applications for teaching and learning is unlikely to originate within the mainstream higher education system. AI will have an increasingly important role in higher education in the future. According to the Microsoft Education Transformation Framework (ETF), AI is integrated into all four pillars of the framework, enabling universities worldwide to utilize it. Leading AI research has resulted in Microsoft Research having a robust cognitive services framework that turns on intelligent bots that answer student questions, transcribing and indexing lectures. Microsoft Research has also established a foundation for natural language processing, which provides context for papers written on new topics. AI-powered applications will not replace teachers; they will instead be augmented and empowered by these applications. Teachers will spend more time teaching and researching because of these applications, which can significantly reduce the time required for routine tasks.

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