The Emerging Role of Artificial Intelligence in Higher Education

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Abstract

Artificial intelligence is playing a significant role in all sectors of the economy, including the higher education sector. This study focused on the rising roles of artificial intelligence in higher education through a methodical evaluation of the literature. Data were gathered via a systematic review of scholarly articles on artificial intelligence published in higher education institutions from 2011 to 2021 from the Web of Science, ERIC, and Scopus. The review used a systematic qualitative research methodology. Based on the date, language, reported outcomes, setting, and type of publications, a rigorous inclusion and exclusion process was followed. The following themes were used to screen and code the articles that were chosen: future careers, course/program assessments, learning and teaching, and education quality. The findings demonstrate the enormous contribution artificial intelligence makes to improved quality educational services, hands-on learning and teaching, and teaching assessment methods for a better future job. All of this helps universities evolve digitally to meet shifting global needs. According to the study, artificial intelligence will likely have an impact on employment in the future. As a result, higher education institutions should integrate AI into every aspect of their operations to produce graduates who are well-equipped to meet future market demands and who are in step with the fourth industrial revolution. The report also suggests further research on effect evaluations of artificial intelligence.

Keywords: Artificial intelligence • Digital transformation • Higher education • Universities • Future of education • Change management

Introduction

There is a global competition forming to determine which nations, societies, and cultures will govern the future of commerce, education, entertainment, and other fields since artificial intelligence is becoming so ingrained in society throughout the world. This study highlights the significance of AI in higher education because it is a topic of intense debate and experimentation. AI is changing higher education, so it's important to provide students with a clear definition of the skills they need to learn to be prepared for a career in AI. Novel teaching and learning approaches made possible by artificial intelligence have been tried and tested in a variety of contexts. AI has a substantial impact on the labor market, industrial services, agricultural processes, value chains, and the workplace in addition to education [1]. No matter where a person lives in the globe, access to higher education is made possible by the usage of AI at universities. Location and time become obsolete while encouraging and fostering curiosity, creativity, and collaboration; students become global students, and universities become non-linear. The rising role of AI in higher education was the study's main topic [2].

Literature Review

The concept of artificial intelligence

The definition of artificial intelligence is the creation of computer systems

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that can carry out tasks that would typically need human intelligence by using reasoning, logic, and decision-making. It is a set of computational approaches that are inspired by how people use their nervous system and bodies to feel, learn, and act. It is often defined as the simulation of human cognitive processes by machines, particularly computer systems. AI in this study is defined as "computing systems that can engage in human-like activities such as learning, adapting, synthesizing, self-correction, and usage of data for complicated processing tasks" as defined by Popenici & Kerr (2017).

Role of artificial intelligence in higher education

There is a lot of potential for AI to significantly extend and improve teaching and learning in higher education because it is a fast developing sector within education. AI is one of six technologies with a strong potential for influence in higher education that are mentioned in the Horizon Study 2020 report. It was indicated that AI in the Horizon report is one of the key developments in educational technology that are influencing higher education around the world [3,4]. According to Fernández, Fernández, and Aburto (2019), the use of artificial intelligence and modern technologies help teachers and students gain more educational experience and provide information for teachers and management about the practices and scope of artificial intelligence in education that are necessary to achieve excellence. Additionally, AI manages the integration of various human interactions and information and communication technology, provides students with feedback on their learning that is tailored to their needs, and improves the standard of the educational process, all of which contribute to the improvement of education at all levels. Artificial intelligence is used to develop learning environments and promote collaborative learning, which benefits both students and teachers.

According to Chaudhary (2017), the usage of AI apps in the classroom is advantageous for both teachers and students since they enable collaborative learning and the creation of learning environments. By utilizing artificial intelligence and modern technology, teachers and students may learn more. It will inform administrators and teachers about the applications of artificial intelligence in the classroom that are necessary for excellence. The power of artificial intelligence contributes to giving elements of speed and precision, and this necessitates providing training chances for students to better their skills. According to Chaudhary (2017), the usage of AI apps in the classroom is advantageous for both teachers and students since they enable collaborative learning and the creation of learning environments. By utilizing artificial

intelligence and modern technology, teachers and students may learn more. It will inform administrators and teachers about the applications of artificial intelligence in the classroom that are necessary for excellence. Additionally, the power of artificial intelligence contributes to giving elements of speed and precision, and this necessitates providing training chances for students to better their skills [5-7].

Artificial intelligence is important in higher education for teachers and students because application of such technologies encourages more flexible learning solutions for students without any limitation. With the help of artificial intelligence universities around the world are enrolling increased number of students due to increased flexibility and speed. However, its implementation in teaching has also proven relatively expensive but when compared with the other manual work related costs it comes out as economical. Developed countries have implemented the process of artificial intelligence successfully, while developing countries are still at a preliminary stage compared to developed countries in artificial intelligence implementation. Hence this calls for this study to bridge the gap on the usefulness of AI in higher education. Weak infrastructure, poor information access, lack of support from institutes, insufficient necessary resources, poor technological skills, these are various obstacles for developing countries wanting to implement artificial intelligence as a tool in higher education.

AI is used in education system in grading, in this process teachers can mechanize grading of students for certain fixed set of questions. Furthermore, AI can also be applied in adaptive and individualized learning to fulfill student's requirements and it also assists the teachers to access the understanding capacity of the students on their lectures and empower them to give the appropriate clues for students. It works as a teacher for the students and makes them learn concepts easily. Moreover, AI driven projects provide supportive input for the both students and educators. It causes the instructors to screen the performance of the students and empower them improve the guidance that they give for the students. AI frameworks in schools have changed the manner in which students find and cooperate with coordinated innovation. This has an impact to change educators as facilitators by giving students intuitive learning knowledge. Students can learn by the experimentation strategy without fear as AI bolsters in their learning and give help to their improvement. AI frameworks procured information will change the manner, in which the schools discover, instruct and bolster understudies. In fact at some places it may even supplant educators in certain situations. It has turned into a learning buddy the helps students in their learning procedure (Sharma c.).

AI creates an encouraging environment that can provide a favorable context for students learning characteristics and process since it consists of all forms of electronically reinforced learning, processing and teaching. The easy and flexible structure of these AI influenced environments empowers learners to accommodate their personal needs in their own time learning. Thus AI is a well-designed tool that offers a flexible arrangement, collaboration opportunities, and options and control over learning process that can provide learners and teachers with the opportunity to pursue learning process effectively [8].

The use of AI by lecturers in institutions of higher learning can create a learning environment that permits the students to develop a better understanding of content and build associations with instructors and students. Entire globe has completely digitalized. Education has definitely been influenced by the digital world. The fast paced technology provides individuals in the area to training and learning with unlimited possibilities. With the global interest in computers, artificial intelligence has been focused in learning environment. This AI presents different functions for academic surroundings. Computers have potential advantages to both the instructors and the students. With the arrival of the computer, AI is playing an important role in the higher education institutes. Plenty of programs have been created for various fields or professional classes. The conventional teaching and learning methods usually lack efficient methods of explaining an intuitional and clear material, while AI can make up through the use of new software and hardware methods. From the viewpoint of AI program, there is more scope in teaching in the classroom compared to other mere learning methods. Thus, the emphasis is given on adopting AI in the classroom as well as outside classroom.

Methods

This review was a rigorous approach were most recent papers on AI on higher education were synthesised and amalgamated. The research question was formulated based on PICOT (population; indicator, compare; outcome; and time/type of study) focusing on prediction statement: The role of AI in higher education. To refine the search process, the search equation was defined using the Boolean connector "AND", and the combinations of key words were made giving an opportunity for one keyword for each search category (Artificial intelligence, role, higher education). The review followed the PRISMA checklist for a systematic review, ensuring transparency and entirely reporting meta-analysis and systematic review. The review also used a systematic qualitative method to systematically search for evidence from primary qualitative studies and draw the findings. The data was collected through desk research focusing only on relevant and appropriate academic articles in line with the abovementioned topic and processed via the Microsoft word application. The study limited the analysis to the Web of Science, Scopus, and ERIC across various disciplines so as to ensure reliability and validity. The researcher screened articles via Rayyan Software and the protocol was to minimise bias, ensure transparency, replicability, and as an indicator of feasibility.

Research Findings and Discussion

AI helps to achieve efficiency and course assessment in higher education

AI offers universities and institution of higher learning the ability to streamline processes through automation. Automation brings efficiency. In coursework delivery, assessment is a frequent task that is done every semester and is a high-volume function that can be computerized, hence AI can help in reducing workload for the teaching staff in higher education. This finding is well supported by other authors who argued that the grading, assessing and provision of feedback presents a key opportunity to take advantage of AI technology. Further, AI is efficient in validating academic credits by a level of 89.4%. Other studies indicate that AI has proven its efficiency in analysing assessments variables and reinforcing intervention for better graduate attributes. The use of AI in teaching and assessment creates more time for other productive issues in higher education. When lecturers embrace AI for repetitive tasks that can be computerised, their time can be re-prioritised for activities like enhancing coursework delivery and interacting with students.

AI promotes easy interaction between lecturers and students through the use of teacher-bots

AI is useful in higher education as it promotes easy interaction. In most institutions of higher learning, AI-powered chat-bots are on the rise for academic support as well as attending to stakeholder queries. Dubbed the 'teacher-bot', this type of AI could receive student questions and respond with explanations or clarify course content, thereby promoting easy communication and interaction between the stakeholders. It emerged from the study that staff members at institutions of higher learning are making use of AI to facilitate easy collaboration. University staff spend a lot of time organizing students into collaboration groups and ways to instigate discussion and it is evidenced that AI is being used for adaptive group formation to use great speed and accuracy to group students.

AI provides an opportunity for personalization of education in higher education

It emerged from the study that AI helps to ascertain a student's level of knowledge on a given topic and personalize the learning content, tailoring a study programme that suits a student's knowledge gaps and learning style and this significantly expanded the possibilities in teaching, learning and research thus improving the quality of education. It is important for learning to be fit to the needs of the learner, not the learner fit to the needs of the system. One way that AI provides bespoke learning to students is in presenting content fitting for that specific learner. By observing a student's behavior in a course,

AI systems are able to provide specific recommendations for reading material and activities.

It emerged from the study that AI have brought in intelligent tutoring systems and these are student, teacher, domain and diagnosis model. Adaptive AI systems, intelligent agents, intelligent e-learning systems, and intelligent teaching systems are all systems that suggest or provide learning materials based on what they have "learned" from the student as they gather information on the behaviors. It could be a level of questioning based on prior answering, or suggested reading material based on what the student has searched for before. These results are supported by Huang & Chen (2016) who described the different aspects of intelligent tutoring systems in higher education as Student model that focuses on information on the student's knowledge, cognitive level, learning motivation and style; Teacher model that focuses on analysis of students, strategies, and methods; Domain model that focuses on the knowledge representation of teachers and students collectively and diagnosis model where the AI system evaluates mistakes and defects of the intelligent model.

By establishing some assessment components within AI functionality, academics will free up their time for quality evaluations of assessment types that could never be entrusted to AI. This is also supported by Wiley (2021) who indicated that technology and academics can work together to provide an overarching quality assessment process. In addition, interactive machine tutors can be matched to students for a more focused and personalized learning experience. There is no doubt that AI is changing the way institutions of higher learning conduct recruitment, admissions and retention of students [9].

Automated grading

One of the most familiar uses of AI is in automated grading. This is going beyond multiple-choice tests to really harness the use of AI for grading more complex student text submissions. Essay scoring is a great benefit to faculty who can spend hours grading lengthy papers. The time saved can then be used for more one-to-one faculty and student interactions. AI Automated Essay Scoring Systems, such as WriteToLearn, and Research Writing Tutor, can be used to provide in-depth feedback and most importantly it can be used by students to examine ways they can revise a paper before handing it in for grading [10].

Conclusion

AI has a vast potential to support teaching and learning in higher education. This paper provides a few examples of that potential, such as bespoke learning, intelligent tutoring systems, facilitating collaboration, and automated grading. Faculty members are encouraged to explore these new tools that will provide accurate, timely, support and content for students, as well as free time for faculty members to focus on students. Future studies should focus on artificial intelligence impact assessments.

Conflicts of Interest

None

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