



Artificial Intelligence Innovation in Higher Education

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ABSTRACT

This article examines the phenomenon of the rise of artificial intelligence in higher education's educational process. It examines how new technologies are affecting the teaching and learning. Recent technological advancements and the increasing use of new technologies are researched in order to foresee the future of advanced education in a climate where artificial intelligence is pervasive in our universities. We demonstrate how some study fields appear to have withstood the test of time as advanced educational technology advance over time, while others have seen peaks and troughs by analysing the major research themes and historical trends from 2017 to 2022. More significantly, our analysis sheds light on emerging trends and paradigm shifts that are becoming more prominent in the field of educational research. For instance, the findings point to a reduction in traditional tech-enabled instructional design research and a rise in learning analytics and student profiling models. This research also serves to open a discussion about the advantages and disadvantages of using AI and DL for educational customization. We identify several issues that higher education institutions and students may face when implementing these technologies for instruction, learning, student support, and administration, and we consider potential future study areas.

Key Words: Artificial intelligence, Teaching, Learning, Students, Education

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INTRODUCTION

Artificial intelligence (AI) has the ability to address some of the most significant issues facing education today, innovate teaching and learning methods, and eventually quicken the realisation of SDG 4. However, these quick technological advancements necessarily carry with them a number of risks and difficulties that have thus far surpassed regulatory structures and policy discussions. The Education 2030 Agenda can be achieved with the help of AI technologies, and UNESCO is committed to assisting Member States in doing so while ensuring that the use of AI in educational settings is governed by the fundamental values of equity and inclusion.[1] Higher education's future is inextricably related to advancements in new technologies and the computing power of emerging intelligent machines. Higher education's teaching and learning are faced with new opportunities and problems as a result of these developments in artificial intelligence, which also have the potential to significantly change these institutions' internal governance and structure. There is little consensus on a final definition of artificial intelligence because solutions have been influenced by philosophical perspectives held since Aristotle.[2]

There will be strong financial incentives to employ AI to solve issues that policy- and decision-makers in the field of education currently consider being major issues. This poses problems for policy selling that address present issues for educational technology suppliers, but selling technologies that call for alterations to institutions, organisations, and accepted procedures is highly challenging. It would be crucial to situate AI within the context of the next generation of acquiring knowledge in order to prevent hardwiring the past. To guide AI development in ways that address the problems, opportunities, and requirements of the future, policy may be required. As AI becomes more widespread, it has the potential to routinize outdated institutional structures and practises that might not be applicable in the future. [3,4]

There are a series of straightforward questions to demonstrate the applicability of AI to educational practises and policy. Which professions and jobs will be rendered obsolete soon? In the current where AI is widely deployed, what are the 21st Century skills? How will AI impact education? Should schools be able to track students' feelings in real time? Can AI evaluate pupils fairly? Does AI mean that we need fewer classrooms? Does AI lessen the effects of learning disabilities like dyslexia, dyscalculia, or other conditions? These are straightforward and pertinent questions to comprehend how learning, teaching, and education will develop in the future. Of course, the solutions are more intricate. [5,6] It is crucial for

the law makers to comprehend AI in the perspective of the future of learning in the field of educational policy. The continuing informationalization, digitalization, and computer-mediated globalisation are major topics in the current AI discussion. Current projections of the effects of artificial intelligence and other digital technologies on the labour market underscore the need for the educational system to adapt, particularly when education attempts to develop skills for the workforce. Many productive jobs that have traditionally been carried out by people can now be automated thanks to AI. We might need to re-imagine the way that education is currently provided since AI will be utilised to automate productive operations. [7, 8, 9]

In 2021, Gwo-Jen Hwang and Yun-Fang Tu conducted a study in Taiwan titled "Roles and current Research developments of Artificial Intelligence in Maths curriculum: A Bibliometric Mapping Analysis and Systematic Review." This study intends to explore the function and research trends of AI in mathematics curriculum by bibliometric review. This will be done by doing a search in the WOS database for applicable publications published in reputable journals that are included in the SSCI. By utilising the technology-based model, additional aspects of AI in maths curricular research are also taken into account, such as the application domains, samples, research, adopted technologies, research issues, the roles of AI, as well as the citation and co-citation relationships. As a result, the development of AI in the field of maths curricular research is discussed, and possible research areas are suggested. [10]

Andreja Istenicet, Morris Siu Yung Jong, Xuesong Zhao, Xiaoyan Chu, Ching Sing Chai, and Between 2010 and 2020, a study on artificial intelligence (AI) in education was carried out within China. They got a content analysis of studies that looked into potential research trends and challenges in the field while attempting to brief how AI has been employed in the field of education. 100 papers were chosen from the education research item of the Social Sciences Citation Index database between 2011 and 2021, containing 63 empirical pieces (74 studies) and 37 analytical papers. The text analysis revealed that the study issues could be divided into three categories: integration layer, application layer, and development layer (classification, matching, recommendation, and deep learning). In addition, 4 research ideas were identified for further study, including Internet of Things, swarm intelligence, deep learning, neuroscience, and an evaluation of AI in education. The obstacles in education, however, may also be brought on by AI due to its incorrect application, the alteration of the roles of educators and pupils, as well as social and moral concerns. The findings offer an overview of the field of artificial intelligence (AI) utilised in education, strengthening the field's theoretical underpinnings and opening up a promising avenue for future research collaborations between educators and AI engineers. [11]

An investigation into the use of artificial intelligence in education: In 2020, Chong Guan, Jian Mou, and Zhiying Jiang conducted a 20-year data-driven analysis in China. After looking over twenty one years of curricular research, we discovered about 401 research articles on the application of AI and DL techniques in the process of teaching and learning. A computerised content analysis was done to look at the development of AI and DL research themes in the top scholarly journals. They show that as new technologies in education develop through time, some study topics appear to have withstood the test of time while others have suffered peaks and troughs by analysing the key research themes and historical trends from 2000 to 2019. The analysis also identifies emerging trends and paradigm shifts that are becoming more prominent in the field of educational research. For instance, the findings point to a reduction in traditional tech-enabled instructional design research and a rise in learning analytics and student profiling models.[12]

In 2020, Lijia Chen, Pingping Chen, and Zhijian Lin conducted research on artificial intelligence in Chinese education. This study's objective was to evaluate how artificial intelligence (AI) is affecting schooling. The implementation of a qualitative research technique that utilised the literature review as a methodology resulted in the effective completion of the study's objectives. Now, computers, machines, and other artefacts display intelligence resembling that of humans, as evidenced by cognitive abilities, learning, adaptability, and decision-making skills, thanks to the field of research known as artificial intelligence and the inventions and developments that have followed. According to the study; AI has been widely taken and acknowledged in education in a variety of ways. In the beginning, artificial intelligence (AI) was represented by computers and computer-related technologies. After that, it developed into online and web-based cognitive education systems, and finally, with the aid of embedded computer systems and other advancements, humanoid robots and web-based chat bots were employed to carry out the necessary tasks of instructors either alone or in collaboration with instructors. These platforms have allowed teachers to carry out many administrative tasks, such as evaluating students' assignments, more quickly and effectively, and to improve the quality of their instructional areas. It has promoted retention and uptake, enhancing the learning process for students as a whole. [13]

Can artificial intelligence transform higher education? This was the focus of research by Tony Bates, Cristobal Cobo, Olga Marino, and Steve Wheeler (2020) in Toronto, Canada. They demonstrated that AI is

still a sleeping giant in the field of education. It is unlikely that "breakthrough" AI applications for teaching and learning will come from traditional higher education. Through companies that have permission to the vast data sets that make the applications of AI scalable and lucrative, they were more likely to come from outside the official post-secondary system. [14]

In the United Kingdom, a study on artificial intelligence in education was carried out by Jagadeesh Kengam in 2020. The researcher discusses the potential and current applications of artificial intelligence in the field of education. According to the 21st global Conclave on AI in Education, which was held in 2020, AIED is one of the educational technology disciplines that is now undergoing development. Educational process in advanced education could be impacted by AI, but educators are still unsure about how to use it successfully for pedagogy on a bigger scale. Here are some positives and cons of AI in education as well as its impact. Finally, it discusses the effects of AI in education. It also outlines a specific method for creating AI-enabled educational platforms. [15]

A study on the effects of AI on the process of education in advanced education was done by Stefan A. D. Popenici and Sharon Kerr in 2017 at Deakin University in Northern Australia. They looked into how new technology might affect how institutions teach and develop as well as how students learn in the classroom. In order to forecast the future of advanced education in a setting where AI is ingrained in universities, recent technical developments and the accelerating use of new technologies are examined. The implementation of these advancements for educational process and administration presents certain issues for institutions of higher education and student learning. The researchers explored additional study areas. Artificial intelligence (AI) is defined as computer systems that have the ability to conduct human-like functions like acquitting knowledge, adapting, synthesising, self-correcting, and using data for intricate processing the work. The rapid advancement of artificial intelligence has already had a profound impact on the nature of services provided by advanced education. Universities already make use of Watson, a supercomputer from IBM, which represents an early type of artificial intelligence. This service offers Deakin University in Australia students counsel at any period of time, 364 days a year. Due to this, the university's labour structure, time dynamics, and service quality structures are all altering. [16]

The European Commission commissioned a report by Tuomi, Ilkka (2018) titled "The Impact of AI on the Education process: Policies for the Future," The current state of AI is discussed in this paper, along with any prospective effects it may have on education, learning, and teaching. It offers conceptual support for informed policy-oriented work, research, and thinking ahead initiatives that point s to the chances and difficulties brought on through current advancements in AI. The paper is intended for policymakers, but it also offers insights for those working on AI technology and academics researching how AI is affecting the economy, society, and the future of education and learning. [17]

In their 2019 study, Where are the educators? When it comes to systematic evaluation of research on AI applications in advanced education. Where are the instructors, questioned Olaf Zawacki-Richter, Victoria I. Marn, Melissa Bond, and Franziska Gouverneur ? According to various globally acclaimed studies, AI in education (AIED) is one of the more recent fields of educational technique. Although it has been available for almost 25 years, educators are still unsure about how to use it pedagogically on a larger area and how it may genuinely have a significant effect in higher education process. Using clear inclusion and exclusion criteria, 146 articles out of 2156 discovered publications for the years between 2008 and 2017 were included in the last synthesis. The descriptive findings reveal that the majority of the fields represented in AIED publications are STEM and computer science-related, and that empirical investigations most frequently used quantitative methodologies. Three areas of AIED applications in educational support services, as well as institutional and administrative services, are highlighted in the results synthesis: 1. prediction, 2. evaluation, and 3. adaptive systems and personalization. The conclusions highlight the near total lack of important thought on the difficulties and dangers of AIED, the disconnect from theory of pedagogical ways, and the necessity for additional research on ethical and instructional strategies for using AIED in higher education.[18]

2019 saw Ken Masters do research on AI in clinical education. AI is a developing phenomenon that will soon make significant improvements possible in a variety of fields, including medical education. Medical educators need a fundamental grasp of AI in connection to education process, as well as how much it will affect medical education, in order to be appropriately prepared for AI. This Guide begins by outlining the fundamental ideas of AI and illustrating how they apply to education through the use of highly similar examples. The impact of AI on clinical based education is then taken into account, along with any consequences for educators trying to train future medical professionals. It then uses these threads to pinpoint how AI directly affects the structure and subject matter of clinical education in an effort to get clinical / nursing educators ready for the new challenges and chances that AI will present to them. [19]

Shefaly Shorey, Esperanza, John Yap, and Emily Ang Development of a Virtual Counselling Application Using AI for talking Skills Training in clinical Researchers Debby Ng, Siew Tang Lau, et al (2020). In order

to better prepare students for speaking with actual patients, their families, and other medical professionals during clinical scenarios, this study developed and tested a virtual reality (VR) application. Preparation, design, and development were the stages of VP creation, followed by assessment phase before final implementation. A starting voice chat bot was checked using Google Cloud's Dialog flow, a natural language processing engine, and was later visualised as a 3D avatar form using Unity 3D. The VPs included 4 case situations that corresponded to the learning aims of the nursing undergraduates' semesters: (1) assessing a pregnant woman's pain, (2) taking a depressed patient's history, (3) Showing compassion to a stressed nursing student. (4) Reporting a postoperative patient's bleeding incident to a doctor. The creation of VPs to aid in teaching communication skills to nursing students may offer real-world learning environments that boost students' perceptions of their own efficacy and confidence in their ability to communicate effectively. [20]

CONCLUSION

The goal of using AI in education is not to remove the role of teachers, but to help them in acknowledging each student's potential and shortcomings. Artificial intelligence's impact as a powerful technology can be seen in a variety of industry verticals. The education industry around the world is no exception. Various schools across the country are implementing artificial intelligence in education. The use of AI in education has provided teachers, students, parents, and educational institutions with a completely new perspective on education. Determine the role of artificial intelligence in education. Before implementing AI in education sectors the following factors should be thought about:

- Key processes that will be automated by the use of AI
- The difficulties of teaching AI and how to overcome them.
- Alignment of artificial intelligence with the existing teaching environment.
- Making the transition from chalkboards and whiteboards to AI in classrooms as easy as possible for teachers and students.
- How to use artificial intelligence (AI) to provide actionable insights for effective decision-making.

The use of AI in education is still not universally accepted by all. However, in the future, AI and education will be inseparable. The use of AI in education has transformed the industry, but it has yet to reach its full potential.

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