



(REVIEW ARTICLE)



## Review on different challenges of artificial intelligence in higher education

Varinder Kaur Attri <sup>1</sup>, Teena Jaiswal <sup>2,\*</sup>, Ramnarayan Jaiswal <sup>3</sup> and Vidhu Baggan <sup>4</sup>

<sup>1</sup> Guru Nanak Dev University Regional Campus, Jalandhar, India.

<sup>2</sup> Guru Nanak Dev University Amritsar, India.

<sup>3</sup> Bundelkhand University Jhansi, India.

<sup>4</sup> Chitkara University Himachal Pradesh, India.

World Journal of Advanced Engineering Technology and Sciences, 2025, 14(02), 026–029

Publication history: Received on 23 December 2024; revised on 04 February 2025; accepted on 07 February 2025

Article DOI: <https://doi.org/10.30574/wjaets.2025.14.2.0048>

### Abstract

Introduction of Artificial Intelligence (AI) in education provides drastic change in education system. AI can transform teaching and learning methodologies with the help of personalized learning, refining administrative efficiency, and improving decision making. On the other side there are many challenges which are faced that require careful consideration This paper explores the different challenges, to integrate AI in education to take care of, efficient, and ethical use of technology.

**Keywords:** Lawful; Profiling and prediction; Intelligent tutoring systems; Assessment and evaluation; Adaptive systems and personalization.

### Introduction

AI has the ability to transform the education with the help of personalized learning, organizing administrative tasks and providing data driven decision making. It is a booming technology domain which significantly alters the landscape of education system [1]. AI tool Chat generative pre-trained transformer (GhatGPT), intelligent tutoring system fascinate many users and makes the learning process easy. For instance, [2] outline many key goals for higher education as follows

- Increasing outcomes
- Expanding access
- Enhancing retention
- Reducing cost

Reducing time of completion despite the fact that these goals are on the verge of becoming a reality, the actual impact of AI in education has yet to fully materialize. Since the 2020s, however, the conversation around the possibilities and limitations of AI in education has remained relatively underdeveloped, particularly when considering the extreme challenges faced by least developed countries. In 2018, Europe took the global lead in establishing a strategy for AI based on ethical principles, appropriate legal safeguards, and responsible innovation. The following year, in 2019, the High-Level Expert Group on AI (HLEG) developed the *Ethics Guidelines for Trustworthy AI* (European Commission, 2019), which defined three essential components that must be met throughout an AI system's lifecycle. According to these guidelines, trustworthy AI should be:

- **Lawful** – Respecting all applicable laws and regulations.

\* Corresponding author: Teena Jaiswal.

- **Ethical** – Upholding ethical principles and values.
- **Robust** – Both technically robust and resilient, while also taking into account its social environment

In light of this, this paper aims to bridge this gap by exploring various AI technologies that education systems around the world have begun to adopt, highlighting the hurdles that still need to be overcome.

---

## 1. Literature Review

Zuboff (2019) [3] gives an excellent impression of the various sections in which AI is being utilized in higher education and suggest which section researchers have pay attention. Author finds four major applications of AI in teaching and learning:

- Profiling and prediction
- Intelligent tutoring systems
- Assessment and evaluation
- Adaptive systems and personalisation.

In current years, there has been renaissance in the advancement of machine intelligence, deep learning and cognitive architectures and numerous reviewers forecast a brilliant future for AI in every parts of society [4]. For example, Tegmark (2018) reasons that we have yet to achieve the level of ‘Artificial General Intelligence’, where the processing capabilities of machines match the cognitive capabilities of human beings, while Bostrom (2017)[1] suggests that we have endured an ‘AI Winter’ in which proponents of AI have suffered loss of credibility. Students now find themselves at the forefront of a vast array of possibilities and challenges for learning and teaching in higher education. Resolution in human AI interface and collaboration are previously accessible to help persons with impairments [5]. They can motivate counsellors to apply them to educational contexts to create a more engaging process for both learners and teachers. It is represented as “a amalgam of a human and a machine” [6]. Integration of human abilities with new technologies are revolutionary in various fields including education [7]. This creates a wealth of opportunities for higher education institutions.

the root of AI is indeed a trace back to the mid of 20th century, John McCarthy gave basic definitions of AI, that even update researchers now: “The study of artificial intelligence is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it”[8].

AI is already making a significant impact on higher education services. As Deakin University in Australia experiences IBM’s AI supercomputer, Watson, to provide students with advice at any time of the day, all year round (Deakin University, 2014). Experts reviewed that use of AI in education will increase by 43% between 2018 and 2022. Moreover, the **Horizon Report: 2019 Higher Education Edition** [9] suggests that AI tools for teaching and learning are expected to grow even more rapidly.

widespread research illustrates that learning is intrinsically a social process, with interaction and collaboration at its core [10]. However, as Salmon (2000) points out, successful online collaboration demands facilitation and moderation. Artificial Intelligence in Education (AIEd) can enhance collaborative learning by enabling adaptive group formation based on learner models, facilitating online group interactions, and summarizing discussions. These AI-generated summaries can support human tutors in guiding students toward achieving the goals and objectives of a course.

---

## 2. Challenges of AI

### 2.1. Adverse Outcomes

Integration of AI in higher education comes along with risk specifically the probability of unintended negative outcomes. Regardless of the best efforts of the developers and users these systems provide outcomes that were not anticipated or have adverse effects. To overcome these unfavorable results, it is important to consider some key points. The most important is the data set on these tool relay on. Data may be redundant, outdated and inconsistent, or derived from a subset of the population that does not match with the target student group. For instance, AI learning systems tested on students from a specific type of college or university in California may not yield similar outcomes for students in other regions or institutions. Likewise, systems built on data from Generation X students may not perform as effectively for

digital-native learners. By addressing these issues, institutions can work toward minimizing the risks associated with AI and ensuring its responsible and effective use in higher education.

## 2.2. Comprehensiveness

Other critical aspect is the comprehensiveness of the data. It refers that whether the data set contain information which characterizes diverse range of students. This aspect mainly focused on facial recognition. Studies shows the use of facial recognition by companies like Google, IBM, Microsoft, and Face++ reveal that many of these tools have been developed using proprietary or internal datasets, often based on their own employees [11]. This lack of assortment in training data results in considerable inconsistency in performance across demographic groups. As, facial recognition tools have proposed almost 100% accuracy for light-skinned men, but their accuracy go down dramatically for other groups, such as light-skinned women or individuals with darker skin tones. In one study, the tools achieved only 65% accuracy for dark-skinned women compared to near-perfect results for light-skinned men [11].

## 2.3. Accuracy

Again, accuracy is the major issue. AI models are built on correlation; rather than causation. In other words they recognize relationship and patterns not precisely elucidate why results are produced The focus of AI tools and models is to prove less sensitive, more complex correlations and patterns. Identifying meaningful patterns from mere noise can be challenging, which raises concerns about the reliability of AI insights.

## 2.4. Ethical Concerns

Privacy is the main concerns. AI models uses large amount of personal and sensitive data which showing privacy concerns. AI tools can carry on or augment societal biases, potentially create inconvenience for certain groups of students. That shows algorithmic bias Many AI models function as “black boxes,” making it difficult for educators to understand how decisions are made or to hold the system accountable

---

## 3. Conclusion

AI have great potential in education but remains mostly untapped—a sleeping giant. Significant advancements in AI for teaching and learning are unlikely to emerge directly from traditional higher education institutions. Instead, the central debate is whether technology should replace educators through automation or act as a tool to empower both teachers and students. While AI may drastically reduce the costs of education, we must also consider the potential human impact of such changes.

Some countries are already utilizing the vast amount of educational data available today to create more personalized learning experiences. However, issues like data accuracy and challenges in implementing AI effectively remain critical. At the same time, education systems are evolving to prepare learners for the demands of an AI-driven workforce. This focus on lifelong learning is vital as AI technologies advance at an unprecedented pace, requiring continuous updates and redesigns of educational programs to keep them relevant.

AI fuels innovation and enhances global competitiveness, with countries striving for leadership in this rapidly changing field. Yet, when it comes to education, there is a unique opportunity for collaboration. By sharing knowledge and strategies, nations can collectively navigate the complexities of AI in education. To move forward, it's essential to encourage dialogue and embrace comprehensive approaches that balance technological progress with the broader goals of education and humanity.

---

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

---

## References

- [1] Bostrom, N. (2017). *Superintelligence: Paths, dangers, strategies*. Oxford University Press, Cop. Contact North. (2018, September 28). Welcome to teachonline.ca | contact north | teachonline.ca. Teachonline.ca. <https://teachonline.ca/>

- [2] Bates, T. (2018, December 3). Another perspective on AI in higher education | Tony Bates. Wwww.tonybates.ca. <https://www.tonybates.ca/2018/12/02/another-perspective-on-ai-in-higher-education/>
- [3] Whitcomb, C.G. Review of Shoshana Zuboff (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. *Postdigit Sci Educ* 2, 484–488 (2020). <https://doi.org/10.1007/s42438-019-00086-3>
- [4] Kaku, M. (2012). *Physics of the future: the inventions that will transform our lives*. Penguin. Kelly, K. (2017). *The inevitable: understanding the 12 technological forces that will shape our future*. Penguin Books.
- [5] Kübler, A., Holz, E. M., Sellers, E. W., & Vaughan, T. M. (2015). Toward independent home use of braincomputer interfaces: A Decision Algorithm for Selection of Potential End-Users. *Archives of Physical Medicine and Rehabilitation*, 96(3), S27–S32. <https://doi.org/10.1016/j.apmr.2014.03.036>
- [6] Diamandis, P. H., & Kotler, S. (2020). *The future is faster than you think: How converging technologies are transforming business, industries, and our lives*. Simon & Schuster. Ford, M. (2018). *Architects of intelligence: the truth about AI from the people building it*. Packt Publishing Ltd.
- [7] Andrews, S., Bare, L., Bentley, P., Goedegebuure, L., Pugsley, C., & Rance, B. (2016). *Contingent academic employment in Australian universities*. LH Martin Institute.
- [8] Russell, S. and Norvig, P. (2010) *Artificial Intelligence: A Modern Approach*. 3rd Edition, Prentice-Hall, Upper Saddle River.
- [9] Becke, S., Brown, M., Dahlstrom, E., Davis, A., DePaul, K., Diaz, V., & Pomerantz, J. (2018). *Horizon Report 2018 Higher Education Edition Brought to you by EDUCAUSE*. EDUCAUSE. <https://library.educause.edu/~media/files/library/2018/8/2018horizonreport.pdf>
- [10] Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. B. (1995). Constructivism and computer-mediated communication in distance education. *American Journal of Distance Education*, 9(2), 7–26. <https://doi.org/10.1080/08923649509526885>
- [11] Perera, M., & Aboal, D. (2020). The Impact of a Mathematics Computer-Assisted Learning Platform on Students' Mathematics Test Scores. *Digital.fundacionceibal.edu.uy*. <https://digital.fundacionceibal.edu.uy/jspui/handle/123456789/225>