



ARTIFICIAL INTELLIGENCE: CHALLENGES OF IMPLEMENTATION IN INDIAN HIGHER EDUCATION

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ABSTRACT

Artificial intelligence (AI) offers creative tools and techniques for administrative, educational, and learning activities. It has emerged as a vital instrument in modern education, changing both how students learn and how an institution operates. AI has improved education's accessibility, effectiveness, and efficiency through the development of personalized learning experiences, intelligent tutoring programs, and automated administrative duties. However, there are hindrances to incorporating AI into higher education, including the digital divide, data privacy and accessibility issues, and ethical considerations. In order to deliver individualized learning experiences, AI-based platforms assist in analyzing student behaviour, learning preferences, and performance statistics. AI programs such as Civitas Learning assist educational institutions in prompt identification of at-risk students and in taking remedial measures to surge retention rates. Teachers' ability to effectively employ AI in the classroom may also be strengthened by AI literacy workshops, certificates, and courses. Higher education institutions can fully exploit this innovation by implementing ethical AI practices, investing in data protection, promoting digital inclusiveness, and arranging AI training for the faculty.

Keywords: *Artificial Intelligence (AI); Indian Higher Education*

INTRODUCTION

Artificial Intelligence (AI) is reinventing higher education as it brings along innovative methods and devices for teaching, learning and administrative activities. With the introduction of customized learning experiences to smart tutoring systems and robotic administrative tasks, AI has increased the accessibility, efficiency and effectiveness of education. Nevertheless, integrating AI into higher education also faced with challenges such as ethical concerns, data privacy problem, and the digital divide. The importance of AI in higher education, its relevance intoday's academic backdrop, main challenges, potentialsolutions, andthe prospectofAI-based education are few of the areas that this article will try to explore.

LITERATURE REVIEW

Sizeable number of scholars has contributed to the literature on AI in Indian Higher Education.

AI has become a critical tool in Indian Higher Education, transforming the way students learn and institutions function. Its unique features, such as augmenting learning experiences, rationalizing administrative procedures, and offering decision-making based on data, have compelled the Academic Institutions throughout the World to recognize the potential of AI (Brown et al., 2020). AI based machines have the potential of tailoring the syllabus depending upon the ability of a student to comprehend a subject (UNESCO, 2019). AI can tailor content and

structures for students and it makes personalized learning possible through Intelligent Tutoring Systems and adaptive learning systems (Baker & Siemens, 2014). AI applications like Intelligent Tutoring System, Machine Translation software etc. may make language teaching much easier (Pokrivcakova, 2019). AI based grading tools like Gradescope save teachers time by assisting in efficient assignment assessment. AI can also provide feedback to students and teachers (Chen L. et al., 2020). As AI may allow teachers to get rid of tasks such as doing homework, taking attendance, and performance evaluation, they may focus on student participation and teaching. Grading-free systems and quick feedback to the students are possible because of AI (Fletcher M. et al., 2023). Artificial Intelligence aids education system to utilise data so that fairness and quality in Higher Education can be improved (Akinwalere & Ivanov, 2022).

Recent years have seen a surge in concerns over the use of AI in higher education, with some pointing to problems such as the drop in students' critical thinking abilities (Kalniņa et al., 2024) or the upswing in academic integrity or cheating and plagiarism (Chan, 2023). In their research, Crowe et al. (2017) also revealed that AI applications could encourage dishonesty and jeopardize academic work reliability. The data that AI algorithms are educated on often governs how they behave. Their results will similarly lean in that manner if they are trained on a biased dataset. When companies like IBM, Google, Microsoft, and others tested the facial recognition capability, it was learnt that these systems were typically developed using confidential or internal employee data (Perera and Aboal, 2020). Light-skinned men are more accurate with the systems than are women or men with darker complexion tones. For example, one study found that the facial recognition software was nearly 100% accurate for males with light complexion, but only 65% accurate for women with dark skin. (Perera and Aboal, 2020). Many teachers oppose the use of AI because they lack technological know-how or are concerned about losing their jobs. Because they are more familiar with the traditional study methods and because they lack the essential capabilities to use AI-enabled technologies, many students also resist AI and have negative impressions of it (Keleş & Aydın, 2021).

Besides establishing ethical standards for the use of AI applications, Universities and colleges must conduct audits to find and fix biases in AI-based technologies. To cut bias, AI algorithms should be developed using a variety of datasets that are representative of a varied range of populations. Students of higher education institution should be assigned with tasks and projects that need in depth learning instead of imitating knowledge. This will allow students to participate in class-specific tasks and to evaluate their own work that can only be accomplished by humans (Overono and Ditta, 2023).

THE IMPORTANCE OF AI IN HIGHER EDUCATION

AI has turned out to be a critical instrument in present education, rewriting the way of learning by students and also the way an institution functions. Its unique features such as the capability to augment learning experiences, to rationalize administrative procedures, and to offer decision-making based on data makes it more important. Academic Institutions across the globe has acknowledged the potential AI possesses (Brown et al., 2020).

1. Learning can be personalized

AI-based platforms help in examining behavior of the students, their styles of learning, and data related to their performance so as to provide personalized learning experiences. Systems like Coursera's AI-enabled suggestions, recommend courses to the learners that are based on the past performance and concerns of the learners, so that customized educational experiences can be provided. With increasing sophistication, there exists possibility of a machine reading the expression on the face of a student that indicates the struggle of the students to grasp a subject and accordingly machines may revise a lesson. The thought of tailoring the syllabus as per individual needs of a student is not feasible today, but for AI based machines it might be possible (UNESCO, 2019).

2. Implementation of Intelligent Tutoring Systems (ITS) is possible

Difficult concepts can be made easy for the students through AI-enabled tutors such as Carnegie Learning's MATHia or IBM's Watson Tutor that have the capability to offer instantaneous feedback and assistance. These tools replicate human tutors through activities such as doubt clarification, practice exercises, and designing lessons based on the development of the student. In language teaching, AI tools such as Intelligent Tutoring System; Machine Translation software etc. can be used for better results (Pokrivcakova, 2019).

3. Administrative activities can be automated

Administrative activities like grading, enrollment etc. can be rationalized with the help of AI. To address queries of the students, help can be taken from AI based chatbots such as Ivy.ai and Mainstay. As a result, the workload on faculty and administrative staff is decreased. Moreover, grading tools based on AI such as Gradescope saves a lot of time of the teachers by assisting in efficient assessment of the assignments. AI can be applied for providing feedback to the students as well as teachers and for grading and assessing students (Chen L. et al., 2020)

4. Better Student Support Services can be provided

Through services like virtual counseling, mental health support, and guidance for right career selection AI is advancing student support. Applications such as CareerExplorer and Existential offer AI-based career counseling and students get advice on employment opportunities and skill improvement that are based on recent developments in the market.

5. Decision Making based on data is possible

Universities and Colleges can evaluate student data to forecast their academic performance, chances of discontinuation of studies and efficiency of the Academic Institution. AI applications like Civitas Learning help Academic Institutions to recognize at-risk students early and also enable the institutions to take corrective actions so that retention rates can be improved.

EXAMPLES OF AI APPLICATION IN INDIA

Various platforms in India are utilizing AI in innovative and significant methods. Here are a few instances where artificial intelligence is applied in the education sector nationwide:

1. Assisting in Teaching

AI chatbots are used by platforms such as Vedantu and Byju's to answer student inquiries around-the-clock. These bots support students with topic revision and provide immediate answers to questions.

2. Flexible Teaching Platforms

AI is used by apps like Toppr and Embibe to comprehend student progress. They offer classes tailored to the needs and skills of each student.

3. Smart Campuses & Related Usage

AI is being utilised by colleges and Universities for campus security, administration, and research. AI technologies help with academic planning, data management, and campus activity monitoring.

RELEVANCE OF AI IN PRESENT HIGHER EDUCATION SYSTEM

In post Covid era, the contribution of AI in the higher education has increased manifold. As more and more people are moving towards digital learning and online-offline combined education models, AI's relevance is only expanding with every passing day.

1. Growth of Online Learning

AI based online learning platforms such as Udacity, edX, Udemy, MOOC etc. have increased the interest of the learners and the usefulness of the courses has also enhanced greatly.

2. Addressing Skill Gaps in the Workforce

Academic Institutions may modify their syllabus based on the requirements of the industry with the help of AI as AI assist in evaluating trends of the job market and necessary expertise. AI-based applications such as LinkedIn Learning's Skills; Insights are used for this purpose.

3. Supporting Diverse and Inclusive Education

Through AI tools such as Google's AI-enabled speech-to-text services, students of different backgrounds may study in the language they prefer.

4. Enhancing Research and Innovation

Research activities such as, literature reviews, analysis of data, hypothesis testing etc. can be assisted by AI. AI applications such as IBM Watson and Semantic Scholar have the capability to scrutinize enormous amounts of research papers, which is of great help to the Scholars as they are able to get the appropriate information swiftly.

KEY CHALLENGES OF AI IN HIGHER EDUCATION

Regardless of its advantages, several challenges are faced by AI in higher education that must be addressed to implement AI effectively and ethically.

1. Ethical Concerns

Concerns about the use of AI in higher education have grown recently, citing issues like the rise in academic integrity or cheating and plagiarism (Chan, 2023) or the decline in students' critical thinking skills (Kalniņa et al., 2024), to mention a few. Crowe et al. (2017) also found in their work that AI applications may promote dishonesty and endanger reliability on academic works.

2. Bias in AI Algorithms

AI algorithms tend to act based on the data on which they are trained. If they are trained on a dataset that is biased, their outcome will also be inclined towards that direction. While testing the feature of facial recognition by organizations like IBM, Google, Microsoft etc., it has been found that, in most cases, proprietary data or internal data on the basis of employees have been used in developing these tools (Perera and Aboal, 2020). Accuracy of the tools is more for light-skinned men compared to light-skinned women or darker-skinned men. For instance, one of the studies had concluded that the facial recognition tools had close to 100 per cent accuracy for light-skinned men but only 65 per cent accuracy for dark-skinned women (Perera and Aboal, 2020).

3. Data Privacy and Security Concerns

As AI applications gather a huge quantity of data, concerns are raised regarding data privacy and security. If data of the students are violated, this may result in grave danger that includes stealing the identity and unlawful tracking of academic details of the students.

4. Digital Divide and Accessibility Issues

Access to internet and basic knowledge of functioning of digital devices and technology are prerequisites to education using AI applications. But due to the absence of identical access to technology, a digital divide is being created. Deprived students, particularly in developing countries, may find it extremely difficult to take advantage of the learning platforms powered by AI.

5. Pedagogical Challenges

Successful incorporation of AI is possible only when the teachers enjoy a definite level of AI literacy. Numerous faculty members may not have the essential expertise or confidence to integrate AI tools into their teaching practices, thwarting the technology's potential benefits.

6. Resistance to Change

Many educators resist AI implementation due to a lack of technical knowledge or fear of job displacement. A lot of students also oppose AI and have negative perceptions about AI (Keleş & Aydın, 2021) as they feel more comfortable with the traditional methods of studies and also due to dearth of skills required to handle AI-enabled tools.

7. Cost & Infrastructure Limitations

Considerable investments are needed in software, infrastructural set-up and training of teachers and students for implementing AI applications in an Academic Institution. Therefore the Universities and Colleges with inadequate funds may find it difficult to take up AI. As a result the gap between the Institutions getting enormous funding and the Institutions lacking enough funding is only broadened.

PROBABLE SOLUTIONS

Academic institutions should put into practice such kind of policies that can tackle the challenges posed by AI so that it can be made accountable and used effectively in higher education.

1. Applying Ethical AI and Minimizing Bias

Universities and Colleges have to set up ethical guidelines for using AI applications and also audits must be performed for identification and correction of biases in AI-based tools. AI algorithms should be created on the basis of varied datasets that is represented by diverse population so that bias can be minimized. Tasks given to the students of Higher Education Institutions have to be altered. Rather than giving tasks that require them to replicate knowledge, tasks requiring in-depth learning should be given so that students can get involved in class-specific, guided self-reflections to review their own work that can be achieved only by humans (Overono and Ditta, 2023)

2. Data Privacy and Security Measures to be strengthened

Stringent data security measures, for example encryption and multi-factor authentication should be implemented by the Higher Education Institutions so that student information can be protected. Compliance with legal frameworks such as The General Data Protection Regulation (GDPR) of European Union or Digital Personal Data Protection Act, 2023 (DPDP Act) of India should be made mandatory for AI applications to ensure data transparency and consent of the users.

3. Digital Divide to be bridged

Universities and Colleges may grant financial assistance, free internet service and inexpensive digital devices to deprived students so that the problems related to accessibility can be properly addressed. There has to be facility in the AI-based applications so that students are able to learn offline as many students have to face the issue of limited connectivity.

4. Organizing frequent programs for Faculty training and AI literacy

To impart knowledge on AI, Higher Education Institutions have to arrange training programs frequently for faculty members so that they may understand and incorporate AI applications into their instruction methods. Apart from that, AI literacy courses, certifications and workshops may also strengthen the ability of the teachers to use AI efficiently in their classrooms.

5. Economical ways of implementing AI

Implementation of open-source AI applications and partnership with tech providers for economical AI based solutions may help Higher Education Institution in achieving maximum utilization of Artificial Intelligence. Universities and Colleges with restricted budgets may also consider cloud-based AI services, such as Google AI and Microsoft Azure AI as cost-efficient alternatives.

CONCLUSION

With the introduction of personalized, competent, and accessible learning, AI is transforming higher education. Its presence is not limited to classroom only, rather has reached areas such as administration, research and student support. Though it is facing challenges like ethical concerns, data privacy and digital accessibility issues, their proper handling may ensure maximum benefit of AI in higher education.

With implementation of ethical AI practices, investment in data security, encouraging digital inclusion, and imparting training on AI to its faculty members, higher education institutions can exploit full potential of this invention. In the days to come, an even bigger role is expected to be played by AI in determining academic experience, nurturing innovation, and getting students prepared for a workforce that is powered by AI.

For getting the best of AI, higher education institutions have to accept AI not as a substitute for faculty members but instead as an influential instrument that boosts teaching and learning, so that relevance and impact of higher education remain intact in the digital era.

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