Artificial Intelligence in Indian Education: Navigating Challenges and Embracing Opportunities

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Abstract

This research paper explores the varied role of Artificial Intelligence in the teaching-learning process in the Indian context, focusing on its potential as an empowering tool in the hands of both teachers as well as students. AI can alleviate administrative and repetitive burden for teachers, allowing them to focus on face-to-face interactions with students. It can be used by a teacher in a variety of ways including personalised learning pathways, curriculum delivery, managing classroom dynamics and assessment design. Policymakers can gain data-driven decision-making capabilities. Students can also benefit from this new technology by experiencing a more individualised and interactive learning. Besides, there is a need for a comprehensive approach to address social and ethical aspects associated with AI. Controversies surrounding AI are discussed and optimum ways for the integration of AI into education are suggested. Instead of viewing it as a threat, the paper advocates for its responsible use and recognises it as a collaborative teaching and learning tool. AI can thus be used as a transformative catalyst to facilitate pedagogy and learning in India.

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Everyone nowadays is in awe of the human-like creative and intellectual abilities of AI chatbots to produce essays, art, poetry, translation, coding, painting, and so on. Generative AI (GAI), Virtual reality (VR) and augmented reality (AR) have become the latest buzzwords. Simultaneously, concerns have been raised about ethical issues such as the possibility of plagiarism with the help of this new technology. What we should realise is that AI in education is akin to the invention of the printing press, holding a revolutionary potential, enhancing the teaching and learning experience which cannot be done away with. Several studies have demonstrated that the use of AI in education has huge potential as it can provide personalised help to students with impressive levels of accuracy, while improving students' test scores and reducing their anxiety (Verma).

India, being one the largest education systems in the world, cannot afford to miss the AI revolution happening across the world in diverse sectors and should work at full steam in order to incorporate AI in the pedagogical and learning process, evolving new paradigms to address its own specific challenges. The Indian education system is marred by the "..inadequate infrastructure, and a poorly qualified and demotivated teacher force." Besides, "Teachers see their role as completing the syllabus, ensuring textbook contents are memorised by students" (Kasinathan 27). Moreover, the student to teacher ratio is so high that the teacher is unable to give attention to the individual student and help him. "One size fits all" is the approach followed in the delivery of content and assessment.

Quite recently, however, the Indian education system is undergoing unprecedented and transformative changes after the introduction of the New Education Policy (NEP 2020). A greater focus on digitisation and democratisation as also making education engaging has been envisaged under it. It aims to undertake "Concerted curricular and pedagogical initiatives, including the introduction of contemporary subjects, such as Artificial Intelligence, Design Thinking, Holistic Health, Organic Living, etc. at relevant stages" (Ministry of Human Resource 15). NEP 2020 addresses disparate needs of students as they have diverse backgrounds and learning styles. This can be achieved with AI which offers personalised learning solutions.

Recognising the importance of AI in the modern world, The Niti Ayog in its 2018 discussion paper "National Strategy for Artificial Intelligence: #AIforAll" acknowledged technology, especially AI to be a game changer: "India, being the fastest growing economy with the second largest population in the world, has a significant stake in the AI revolution" (Niti Ayog 5). However, AI in education in India is currently in a nascent stage. ICT classrooms are still a distant possibility in

the majority of schools. One major bottleneck that the adoption of AI faces in Indian education is the low penetration of the Internet in India. Another issue is the unwillingness of the stakeholders to adopt new technology. The NITI Aayog observes that "adoption of new technologies is still lacking, however, (this is) often attributed to unwillingness of teachers and students to adopt technology" (Niti Ayog 35).

In the same vein, Oxfam India's "India Inequality Report 2022: Digital Divide" laments the dismal state of digital Divide in India and low levels of digital literacy. It observes that "70 percent of the population has poor or no connectivity to digital services." Even more concerning is the fact that "only a little over 15 per cent of rural households had access to internet services in 2017-18, which grew to 31 per cent by 2022" (Oxfam India 19). However, with cheaper devices and increasing accessibility to 5G, the future is not bleak. NEP 2020 also seeks to change this situation by increasing the number of smart classrooms, that too with AI (Damodaran).

Challenges notwithstanding, AI is being integrated into education in India. It is noteworthy that the Central Board of Secondary Education (CBSE) and other education boards have introduced AI as a subject in school curriculum. Similarly, AICTE approved engineering colleges have begun to introduce BTech in AI and related fields such as data science. Several states such as Andhra Pradesh and Madhya Pradesh are also incorporating AI in education. In Uttar Pradesh, "the Nipun Assessment Test (NAT) is leveraging AI to assess the skills of 1.6 crore students across grades 1 to 8" (Gupta). Rather than replacing teachers, AI is supposed to aid them in delivering an improved educational experience. The combination of the teacher's experience and the AI technology will change the way education has been conceptualized for centuries.

It is imperative to keep in mind the challenges associated with the Indian education system. For example, there has been a huge shortage of teachers in India. Consequently, the class strength has kept increasing besides the burden of all sorts of administrative work, such as marking attendance. In this scenario, AI can assist teachers in non-teaching work, leaving them free to focus on teaching work. This is borne out by research which suggests that "existing technology can help teachers reallocate 20 to 40 percent of their time to activities that support student learning" (Bryant).

For gaining insights into the implementation of AI in education, platforms offered by several organisations such as UNESCO, EdTech Hub, AI4K12, and the AI in Education podcast, are some of the resources. These platforms discuss valuable information about the challenges and possibilities along with guidance and tools for teaching and policymaking.

AI can be used by teachers to generate content such as lesson plans, diagrams, question banks, assignments, notes, etc. However, accuracy of such AI generated content would need to be vetted by the teacher before it can be used. Curriculum can be customised according to the needs of the individual or a group of individuals. Classes can be made more stimulating and engaging with the help of AI simulation and gamification. AI will also facilitate easier access to education and will also enable life-long learning. Tests can also be created by considering the skill gap for the individual. Even invigilation of examinations can be assigned to AI remote proctoring. Bias and irregularity often tend to creep into assessment and evaluation done by a human examiner whereas that done by AI is instant and objective, improving the efficacy.

Teachers under training can also be benefited by making AI act as a practice student. The AI models are getting efficient by leaps and bounds and can pose as a student of a certain educational level, mimicking confusion and posing follow-up inquiries. These can make real-time comments and recommendations and can suggest questions to teachers for giving to the class.

Advanced types of AI tools can read the expressions of students in a class using facial recognition techniques and can diagnose whether they are struggling to understand a concept. Another advantage of AI for educators is the post-lesson feedback provided by it. AI can gather data on the total time spent by the individual student for speaking or may be used for identifying the topics which were challenging for the students.

Increasing adoption of AI in education is also an alarm bell for substandard teaching since AI has upped the ante. Insights in this regard can be gained from Stanford University's AI+Education Summit where the participants discussed the implications of the application of AI in education. Ways in which AI can be utilised in education were explored, including real-time feedback and post-lesson summaries, through which adaptive learning and student simulation can be enhanced. In his opening remarks in the summit, Daniel Schwartz said, "Technology offers the prospect of universal access to increase fundamentally new ways of teaching," and emphasised that "a lot of AI is also going to automate really bad ways of teaching. So [we need to] think about it as a way of creating new types of teaching" (Chen).

Personalised and adaptive pathways greatly assist the students in their education. AI can recognise the personal learning style of each student and can tailor teaching-learning approaches accordingly. Such an approach is more engaging and the learning process can take place without the apprehension of criticism. With the help of AI, students have more say in their education. It can help students in

selecting the curriculum, resources and learning approaches suited to their own individual needs, preferences and skill levels. Interactive learning environment can foster critical skills in students while engaging them in a sustained manner. Communication skills and problem solving skills can easily be learnt with the help of AI as it can detect and correct grammatical errors, providing instant feedback. Disabled students can also utilise AI to access improved education. For example, AI can hear and make notes for the deaf and can read text for the blind.

Policymakers can utilise AI to make data-driven decisions and evaluate the efficacy of their educational policies. Machine learning and natural language processing (NLP) can assist policymakers in addressing trends and predict future demands. AI can also be used to recognise and address biases in education. Using such AI technologies policymakers can augment fair and inclusive policies.

AI certainly has the potential to transform pedagogy and learning. However, the adoption of AI in education by itself does not ensure better outcomes (Selwyn). It may make the student rely on it unnecessarily for seeking solutions and preparing assignments, thus hampering the learning of critical thinking skills and creativity. AI chatbots may also sometimes produce wrong but confidently sounding answers. The user must take its output with a pinch of salt. It is advisable that the use of AI be restricted when it comes to the learning of very basic skills and knowledge. Such issues of ethical and social significance impacting security, accessibility and accountability have been discussed in UNESCO's "Guidance for Generative AI in education and research" (UNESCO). Originality and critical skills are not sought to be replaced and the role of the teacher still remains crucial as a facilitator and guide. It is important to understand that a comprehensive approach involving educators, academics and students is a must to benefit from this technology while minimising its adverse effects. So adopting and adhering to the best practices is crucial.

Plagiarism with the help of AI is one of the chief concerns of academicians. It is presumed that students using AI for submitting their assignments are cheating. However, such concerns arise mainly due to the traditional thinking which considers knowledge as property and claiming the labour put in by someone else, in this case a machine, to be one's own. JT Torres and Claude E. P. Mayo rue the mindset that we have about teacher being the "sage on the stage" and purveyor and controller of knowledge. The Student has mostly been treated as a passive entity with his mind as a receptacle to be filled in by the authority figure. Modern technology, especially AI, is all set to transform this into a student-centric approach (Torres and Mayo).

The use of AI in a responsible way has the potential of enhancing the educational experience. It also democratises the educational system. Interaction and

creative engagement is to be valued over the concept of knowledge ownership. Using AI in learning need not mean supporting plagiarism. It is to be adopted as a collaborative instrument to promote and improve the learning experience, retaining academic integrity.

Professor Steven Lubar's use of AI in teaching has sparked controversy about the ethical issues of AI generated content since the Brown University's academic code stresses the importance of independent work by students, raising concerns about AI - assisted writing. Professor Lubar states, "In my Methods in Public Humanities (PHUM2020) course, I am, with some trepidation, encouraging students to use ChatGPT and similar tools. These new tools will be useful to them in their work after Brown, and we should help them learn to use them wisely" (Morton-Aiken).

The current apprehensions regarding the adoption and integration of AI in education echo past debates about the use of books, calculators, and computers in teaching and learning. Instead of viewing AI as a threat, it would be much more fruitful to recognise it as a collaborative learning tool, while addressing the ethical concerns. In this way, learning experience be enhanced without compromising academic integrity.

Throwing the baby out with the bathwater is certainly not desirable. A judicious and balanced approach is the need of the hour. The Cornell University Committee Report suggests : "To address the risks of GAI while maximizing its benefit, we propose a flexible framework in which instructors can choose to prohibit, to allow with attribution, or to encourage GAI use. We discuss this framework, taking into consideration academic integrity, accessibility, and privacy concerns" (CU Committee Report: Generative Artificial).

Another issue is that AI may have imbibed the biases of its trainers. This may result in the indoctrination of the young minds into a certain hegemonic perspective. In the Indian context, the problem becomes severer as the Indian society is structured on the basis of the identities of caste, language, religion, region and so on. Therefore, ample caution needs to be exercised while using AI tools.

Data privacy is another ethical concern which must be adequately addressed. Providing personal information to the AI platforms is not advisable as it may be misused. The data collected from teachers and students must be in safe hands and its ownership rights should be clearly defined.

A holistic approach is the need of the hour. Challenges before the integration of AI in education include cultural and ideological bias, plagiarism, generation of

seemingly coherent but false information and data privacy. However, there are potential benefits such as adaptive pathways, life-long learning, cost-effectiveness, having access to an inordinate amount of data and improved learner engagement.

Conclusion

Education is undergoing inevitable transformative changes around the world after the advent of AI which cannot simply be wished away. AI can be embraced as a catalyst for educational betterment in India as well. A balanced and inclusive approach is advisable as AI inevitably continues to change the face of the educational landscape. There is a need to recognise AI as a collaborative learning tool, navigating challenges using an ethical approach. Only such an innovative and inclusive approach can address the needs of a rapidly evolving world. AI can be used by educators in the development of new pedagogies, ecosystems and platforms. Collaboration can be boosted, curriculum delivery can be improved, and feedback can be improved. India in particular as a developing economy has the potential to reap the benefits offered by AI.

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