Academic Guru

NATIONAL EDUCATION POLICY 2020: THE KEY TO DEVELOPMENT IN INDIA

Volume 1
Year: 2024

AG PH Books

Artificial Intelligence in Education: Opportunities and Ethical Considerations

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Abstract

The implementation and progression of Artificial Intelligence (AI) technologies within the realm of education have generated substantial discourse and prompted ethical deliberations. Although there is considerable discourse surrounding the potential benefits of AI in education, the ethical ramifications that stem from its conception and advancement have received comparatively less attention. The principle purpose of this paper is to investigate AI in field of education in order to identify its various opportunities/benefits and ethical implications. Additionally, an effort has been made to examine AI through the lens of NEP 2020.

Keywords: AI, Education, NEP 2020, Ethics, Opportunities, Higher Education.

1 Introduction

NEP-2020's critical analysis suggests that the trajectory of the Indian educational system towards the future is generational. In light of the critical factors influencing the success of education systems in developed nations, policymakers are compelled to reconfigure educational systems in order to prepare individuals to adopt artificial intelligence (AI). This pressure ultimately leads to a restructuring of the education system. When required, the entire instructional mechanism can be incentivized and serve as a guide for progress. Recognising this fact, AI has been accorded greater weight than the conventional methods of the past that were employed in education. Furthermore, NEP-2020 incorporates code

* ISBN No. - 978-81-973048-8-0

languages, three-dimensional imagery, and artificial intelligence (AI) to ensure that the fundamentals of education are perceived as forward-thinking in the future.

It is widely acknowledged that education enabled by the current generation has the potential to revolutionise the entire educational system in accordance with the demand for hours. Online recorded academic applications, similar to Massive Open Online Courses (MOOCs), have become progressively more challenging for the education system in recent years, particularly during the COVID-19 pandemic when instructors and students are prohibited from attending offline instructional programmes. Completing the wants of hundreds of thousands of pupils is another area in which AI may be quite helpful. While educational infrastructures are equipped to integrate or utilise AI for instructional purposes, including the processes of teaching and learning. Globally, AI is regarded as a highly prospective and undeniably potent educational tool that has the potential to be applied to a wide range of educational purposes.(Jadhav, 2023)

1.1 State of AI in higher education

The prospective impact of artificial intelligence (AI) on educational activities is substantially substantial. Very rapidly, the implementation of AI technologies is emerging as a feasible strategy for organisations to optimise operations, reduce costs, and accelerate workflows. The capacity of artificial intelligence to handle increasingly complex and significant tasks is growing. The use of AI has the potential to greatly facilitate the process of curriculum building by producing a wide range of resources, including but not limited to study materials, instances, lesson plans, assignments, presentations, assessment rubrics, and more. In response to the advent of artificial intelligence, academic establishments have begun to shift away from traditional assessment methods and adopt comprehensive evaluation strategies that promote genuineness and continuous education. While this transition undeniably improves assessment quality, it also places an additional burden on faculty within terms of coordinating with students and staff, implementing a variety of assessment techniques, and maintaining records of assessment outcomes, among other associated obligations. The capacity of AI-enabled applications to enable a transition from a standardised technological approach to the scalable deployment of customised and adaptable learning experiences represents their true potential.

Diverse educational institutions have recognised inclusion, equity, and diversity as critical goals in their quest to provide high-quality instruction. Therefore, it is the responsibility of educators to guarantee that pupils who possess varied educational backgrounds, needs, and preferences are provided with equitable and substantive learning opportunities, in addition to prompt support and assistance. Nevertheless, the implementation of artificial intelligence (AI) could potentially surmount economic and geographical obstacles, thereby providing underprivileged or remote students with the same extraordinary educational opportunities as their wealthier counterparts. When instructors are confronted with a significant number of students from diverse geographic locations and a substantial student body, they are entrusted with a time-consuming workload that includes grading assignments, providing feedback, and coordinating collaborative project groups. As a result, instructors have little opportunity to individualise the learning experiences of their pupils. Artificial intelligence (AI) technology has the capacity to compile and

examine vast quantities of institutional data, producing comprehensive conclusions from these diverse data points.

Consistent with the discourse, the advent of artificial intelligence in academic environments presents unparalleled prospects for enhancing efficiency, optimising processes, and cultivating individualised learning encounters. Although the potential of AI to transform assessment methods is encouraging in terms of fostering authenticity and inclusiveness, it also imposes increased responsibilities on academic institutions. Furthermore, the significance of inclusion, equity, and diversity (DEI) is emphasised in relation to the necessity for fair and equal access to educational opportunities propelled by AI, specifically in geographically isolated or underserved regions. Notwithstanding the obstacles pertaining to burden and personalisation, the capacity of AI to analyse substantial volumes of data presents prospects for enhancing pedagogical approaches and bolstering student achievements. Hence, it is imperative to incorporate AI in education in a responsible manner, which necessitates meticulous preparation and execution to guarantee ethical implications and fair availability of educational opportunities. Through judicious and inclusive utilisation of AI's capabilities, educators have the capacity to foster vibrant learning environments that accommodate the varied requirements of each student, thus propelling the standards and availability of education forward.

1.2 Ways AI is Transforming Education in India

1. Personalised learning

By means of personalised learning, pupils have the opportunity to not only gain in-depth knowledge of their areas of weakness but also to receive specialised assistance in those areas. We can instill in students a passion for lifelong learning and enable them to assume responsibility for their education by creating an atmosphere that allows for self-paced learning. In addition, the implementation of AI in classrooms fosters the development of critical thinking and creativity through the promotion of diverse viewpoints and the identification of original problem-solving approaches. These are skills that are particularly crucial in the context of our contemporary, ever-changing society. Personalised learning transforms educators into facilitators who assist each student in reaching their utmost capabilities.

2. Intelligent Tutoring Systems

Intelligent tutoring systems possess the capability to discern areas of deficiency, deliver focused feedback, and furnish individualised suggestions for enhancement through the analysis of student data. These systems maintain an ongoing assessment of the learner's progress and make necessary modifications to the instructional approaches and level of difficulty of the material. Moreover, it has been demonstrated that intelligent tutoring systems significantly improve student outcomes. Through the provision of personalised instruction and prompt evaluation, these systems enable students to assume responsibility for their own education, thereby enhancing their self-assurance and fostering a feeling of achievement.

3. Adaptive Assessments

Through the implementation of algorithms, adaptive assessments optimise the learning experience for every individual student. Consider a situation in which a pupil is participating in a mathematics evaluation. The system promptly assesses the responses, determines levels of expertise, and identifies specific domains that require enhancement. Adaptive assessments serve to empower students and enable educators to collect accurate data regarding their comprehension. Additionally, they empower learners to effectively monitor their own progress. The integration of artificial intelligence (AI) into the educational system in India presents a prospective scenario in which each student can achieve personal growth and fulfilment while progressing at an individualised rate.

4. Virtual Classrooms

Virtual classrooms, furnished with sophisticated interactive functionalities, facilitate instantaneous video conferencing, messaging capabilities, file-sharing capabilities, as well as interactive whiteboards. Furthermore, the implementation of AI in the education sector enables the smooth incorporation of multimedia materials, online evaluations, and immediate feedback systems. Students are afforded the opportunity to investigate historical sites or venture into depths of outer space via visually captivating simulations. Students can also establish connections with instructors and educators from around the globe. This approach affords pupils distinct viewpoints and an expanded comprehension of the topic at hand.

5. AI-powered Content Creation

This novel methodology employs sophisticated algorithms as well as machine learning strategies to produce educational materials of exceptional quality, encompassing interactive multimedia resources and textbooks. Through the automation of content creation, artificial intelligence (AI) in the education sector grants educators access to a vast collection of current and customised resources for their students/ learners. A notable characteristic of content generation propelled by AI is its capacity to modify content in accordance with the unique requirements and learning preferences of each student. AI in the education sector has the capability to identify knowledge deficits and tailor educational materials to address them through data analysis. This ensures that students are provided with specific information that is tailored to their individual needs.

6. Predictive Analytics for Student Success

By analysing enormous quantities of data, this technology is capable of forecasting the future performance of students and customising interventions to maximise their success. Predictive analytics enables educators to acquire significant insights into the learning patterns of students, facilitating the identification of trends and determinants that influence academic achievement. Furthermore, predictive analytics provides individualised suggestions to support the educational progress of every student. Educators are able to accommodate the unique requirements of each student by comprehending their areas of proficiency and areas for development. By adjusting instructional approaches, one can guarantee that every student obtains the necessary assistance to achieve success.

1.3 The benefits and opportunities offered by AI

There are numerous opportunities and benefits associated with the incorporation of Artificial Intelligence (AI) into education, including the potential to increase student engagement, teaching and learning practices, and administrative efficiency. Here are several significant advantages and prospects:

Personalized Learning: Personalised learning experiences are made possible by AI, which adapts instruction to the specific requirements of each student. With the assistance of intelligent tutoring systems propelled by AI, customised content, adaptive feedback, and individualised learning trajectories can be generated, resulting in enhanced student achievements.

Enhanced Student Engagement: By providing immersive and interactive learning environments, AI-powered educational tools have the potential to inspire greater student participation. Augmented reality (AR) and virtual reality (VR) offer learners immersive and experiential learning environments that encourage inquisitiveness, innovation, and active engagement.

Adaptive Content Delivery: Student data can be analysed by AI algorithms in order to provide individualised content. Adaptive learning systems possess the capability to modify the tempo, level of difficulty, and order of learning materials. This guarantees that students are provided with material that corresponds to their individual learning preferences and level of proficiency.

Data-Driven Decision Making: Using predictive modelling and AI analytics, one can gain insight into student performance, learning patterns, as well as intervention requirements. These data-driven insights can be utilised by educators to optimise instructional strategies, implement targeted interventions, and make informed decisions.

Administrative Efficiency: Administrative duties are streamlined by AI, conserving both time and resources. AI systems can effectively oversee automated procedures including student registration, grading, and scheduling. This enables educators to allocate their time and attention to instructional activities and student support.

Personalized Support for Teachers: Instruments enabled by AI can offer instructors individualised assistance and resources. By reducing their burden and increasing their efficacy, Natural Language Processing (NLP) chatbots as well as virtual assistants can aid educators in lesson planning, resource curation, and responding to frequent student inquiries.

1.4 Ethical Consideration

1. Data Management And Biases

To commence, akin to general artificial intelligence, apprehensions exist concerning the enormous quantities of data collected to support AIED. The collection of data is benevolently undertaken to enable student learning. An instance of this can be observed in a Chinese educational institution where facial recognition technology has been integrated to monitor students' levels of attentiveness in the classroom. In the event that the system detects a student preoccupied with extraneous thoughts, the instructor will

be duly informed so that appropriate intervention can be implemented. Significant questions remain, however, regarding ownership and accessibility of this information, its privacy concerns, appropriate methods of data interpretation, sharing, and analysis, and the allocation of liability in the event of an error. Intelligent analytics empowers educators and material providers to obtain crucial insights regarding the progress of learners, thereby facilitating the enhancement of the provided content. The ethical dilemma that arises is thus linked to the management of student information (1). Undoubtedly, in light of the vulnerability of AI algorithms to infiltration and manipulation, it is imperative to develop strategies that effectively mitigate these risks. Furthermore, in cases where the objective of AIED interventions is to promote alterations in behaviour, the entire AIED-enhanced pedagogical process must be morally sound.

2. Explainability And Transparency

Specific elements concerning the ethical assessment of AI within education. Clarity and openness regarding the process by which AI-powered tools make decisions and the underlying reasoning for those decisions constitute explainability and transparency. The considerable expansion of explainable AI in recent years has been substantiated by a prior study. The increased recognition as well as prominence of Explainable AI may be ascribed to its depiction as a prospective solution to the difficulties that emerge from the swift advancement of AI technology. In recent times, ensemble techniques and deep neural networks have become synonymous with opaque models, which are distinguished by their multitude of layers and millions of parameters. In light of the growing prevalence of such models in crucial industries like medicine and law, it is crucial to comprehend the rationale behind AI-powered decisions before putting them into practice. Further research has been initiated to examine the discrepancies in performance between trained AI models and diverse subjects. This investigation has brought attention to the significance of model fact sheets, which are alternatively referred to as model cards and contain extensive information regarding the models. By consulting these fact documents, professionals are able to evaluate models not solely on the basis of performance metrics and analyses, but also with regard to ethical considerations, guidance, and limitations.

3. Accountability

An additional element to consider is accountability, which pertains to the duty-behavior of AI developers as well as software architects concerning their AI initiatives. Put simply, it is the duty of corporations and their programmers to proactively promote the ethical advancement and implementation of artificial intelligence (AI), in accordance with universally acknowledged human rights principles that impact all fields of study, including education. The developer of AI model is presently obligated to adhere to the ethical code that regulates AI in education. Additionally, technological determinism emphasises the responsibility of developers for their works. Over the course of the last 150 years, two predominant approaches have emerged and vied for prominence in the field of philosophy of technology: technological instrumentalism and technological determinism.

Technological instrumentalism posits that technologies are inherently neutral and function merely as

instruments, subject to human control and influence, regardless of the technology's design. It primarily centres on the behaviours and circumstances of individuals. In contrast, technological determinism posits that unanticipated ways in which technological device components can influence human behaviour are possible. In recent times, scholars have begun to scrutinise the sufficiency of the conventional instrumentalist philosophy, contending that it neglects to confront the intricate complexities that emerge from rapid technological progress. Nonetheless, the implementation of ethical directives presents difficulties for developers on account of their conceptual nature. The necessity consequently arises to shift from merely delineating ethical principles to actively implementing them. This requires a transition in emphasis from code to individuals, who will ultimately be held accountable for AI ethics. Through this process, ethics are transformed from abstract concepts to concrete realities.

4. Authorship

ChatGPT is an AI model that generates language that resembles that of humans. A substantial volume of textual data was utilised to train the model utilising machine learning algorithms. However, in the process of obtaining responses, especially when knowledge is being sought, the sources from which the response was derived are not cited. By neglecting to attribute the authorship of the conversation output, which we assume to be accurate and pertinent, we are in violation of copyright. Those who rely on obtained responses are also subjected to substantial deficiencies in their educational experience. Digital curricula employing a variety of mediums, personalised learning interfaces, and digitised manuals are all capable of generating intelligent content. Concerns of a legal and ethical nature arise in relation to intellectual property rights. ChatGPT demonstrates several notable intrinsic deficiencies, such as the production of erroneous responses and the creation of articles that do not exist. As an illustration, when ChatGPT was tasked by an author to produce scholastic content for their research paper, it generated a non-existent fictional article. Furthermore, it furnished exhaustive bibliographic information, including URL that fails to redirect to any operational material.

2 Literature Review

(Reiss, 2021) Diverse perspectives exist regarding the potential of artificial intelligence (AI), spanning from exaggerated assertions of its imminent life-altering nature to dire prognostications of its capacity to bring about the apocalypse and widespread unemployment to the extinction of life as we know it. I examine the practical applications of AI in education as well as the ethical concerns it engenders in this article. In the near to medium term, AI has potential to augment student learning and supplement the efforts of (human) educators without replacing them. This is my primary conclusion. Furthermore, AI should facilitate the crossing of traditional learning divides such as "school versus home" to a greater extent. While AI presents the potential for enhanced personalisation in education, it also carries the danger of learning devoid of social interaction.

(Krstić et al., 2022) Presently, virtually every endeavour is intertwined with the application of computer technology. In the realm of education, the implementation of cutting-edge technologies like artificial intelligence (AI) introduces novel prospects, challenges, and opportunities. Artificial intelligence (AI),

which emulates human intellect in its ability to draw conclusions or make predictions, enables computer systems to furnish students and instructors with individualised guidance, assistance, or feedback throughout the educational process. This paper's goals are to (1) determine how AI has altered the educational landscape,(2) describe many AI-based educational applications, and(3) emphasise the advantages that these applications are thought to provide.

(Venkat Iyer Associate Professor & Kalyandurgmath, 2022) Education is fundamental to achieving one's utmost capabilities, fostering an equitable and just society, and propelling the advancement of the nation. Every nation must have a clearly defined, forward-thinking, and futuristic education policy, given that education is the primary catalyst for both economic and social development. Education policies vary across countries in accordance with their respective traditions and cultures. The most effective way to develop and utilise a nation's enormous resources and capabilities for benefit of individuals, society, the nation, and the world is to provide universal, high-quality education. The Union Cabinet of India granted approval to National Education Policy 2020 (NEP 2020), which establishes the objectives for India's forthcoming education system, on July 29, 2020. By substituting the National Policy upon Education from 1986. NEP 2020 aims to establish an all-encompassing structure encompassing primary education, higher education, vocational training, and more.

(Jadhav, 2023) Consistent with multiple international assessments, artificial intelligence in education (AIED) is a burgeoning academic discipline at Gift. Despite its thirty-year existence, educators remain uncertain about its pedagogical implications, how it can influence significant teaching and learning, and its potential impact on learning in higher education. The objective of this paper is to delineate research on AI products in higher education by conducting a scientific evaluation of NEP-2020.

(Bahadur & Karki, 2023) The global adoption of artificial intelligence (AI) in higher education is expanding at a rapid rate. In light of the growing importance of AIHEd and the lack of a thorough evaluation of the topic, this study explores the current state of AIHEd, its impact on academic honesty, and the ethical considerations surrounding it. In order to accomplish the purpose of the research, a literature review was utilised as both the research design and methodology for this qualitative study. AI has the potential to significantly contribute to nurturing inclusivity and accessibility, enhancing educational and educational experiences, and increasing productivity and efficiency, according to the analysis of the paper.

(Abdulmunem, 2023) Artificial Intelligence (AI) pertains to the capacity of computer systems and technology as a whole to emulate the processes of human intelligence. AI is an area of technology that is undergoing accelerated development and has the capacity to profoundly alter all social interactions. In numerous educational settings, artificial intelligence is presently being utilised to facilitate the development of novel instruction and learning strategies. In order to help shape future educational policies and programmes, AI is sifting through massive amounts of data in search of patterns and insights. The primary objective of this paper is to investigate the necessity of AI in the education sector and identify the various obstacles that lie within. Additionally, an effort has been made to examine AI through

the lens of NEP 2020. By examining numerous articles on artificial intelligence, the research is conducted qualitatively.

(Karagkouni & Sotiropoulou, 2023) The implementation and progression of Artificial Intelligence technologies within the realm of education have generated substantial discourse and prompted ethical deliberations. Although there is extensive discourse surrounding the potential advantages of AI in education, the ethical ramifications linked to its conception and advancement have received comparatively less attention. The objective of this study is to fill this void through an exhaustive examination of the current body of literature concerning the ethical implications of Artificial Intelligence within Education. By capitalising on prior investigations, this research endeavours to examine fundamental ethical considerations such as data management, authorship, biases, transparency, and inclusivity.

(Imam Karya Bakti et al., 2023) Using the PRISMA framework and a systematic literature review, this study examines the impact of artificial intelligence (AI) on the education sector in India. The study presents its findings in three clusters: the evolution and definitions of artificial intelligence, technological advances in AI, and the function of AI in Indian education, based on an analysis of 111 publications. The results indicate that the utilisation of AI tools improves the efficacy of assessment and cultivates students' critical thinking as well as analytical abilities.

(Pierrès et al., 2023) Numerous literature reviews pertaining to artificial intelligence (AI) within higher education or education at large have examined the various AI applications, techniques, and benefits/risks associated with AI implementation in this domain. Providing timely feedback and tailoring higher education to meet the specific requirements of each pupil is one of the vastest applications of AI. If the requirements of students with disabilities are taken into account during the advancement of novel AI educational technologies (Edtech), this could yield substantial advantages. Nevertheless, existing evaluations neglect to consider the viewpoints of students who have disabilities. This viewpoint is crucial due to the fact that AI will almost certainly raise a number of ethical concerns for individuals with disabilities. AI may, for instance, discriminate against individuals with disabilities on the basis of the data treating them as outliers.

(Lim et al., 2023) Artificial intelligence in education refers to the application of technological advancements that enable digital systems to execute tasks typically associated with intelligent entities, with the intention of creating an educational environment where machines mimic human-like consciousness and behaviour. Assessment is a significant constituent among the three fundamental pillars of education, which also include curriculum and pedagogy. In their comprehensive examination of the AIED domain, Chaudhry as well as Kazim (2022) identified assessment as one of four critical sub-domains, joining intelligent learning environments, learning personalisation, and automated learning systems.

(Chima Abimbola Eden et al., 2024) The incorporation of Artificial Intelligence (AI) into the field of education is a highly auspicious area that offers innumerable prospects; however, it also introduces

substantial obstacles and requires ethical deliberation. This review examines the complex terrain of artificial intelligence (AI) incorporation in the field of education, emphasising its capacity to transform conventional pedagogical methods, customise learning experiences, and optimise administrative duties. Nevertheless, it also confronts the obstacles associated with execution, such as concerns regarding accessibility, confidentiality of data, and the disparity in access to digital resources. The educational possibilities presented by AI are extensive and paradigm-shifting. With the ability to tailor instruction for different learning styles, AI-powered technologies can significantly increase student engagement as well as academic achievement. Moreover, the implementation of AI-driven tools can streamline administrative duties, enabling instructors to devote more time to substantive engagements with pupils.

(Tang & Su, 2024) The expanding implementation of artificial intelligence (AI) approaches in educational settings not only yields numerous advantages but also presents a myriad of ethical ramifications. It is now essential for the provision of effective education to comprehend the ethical ramifications associated with the implementation of AI models in the classroom, as well as the guiding principles for preventing and mitigating these ramifications. However, there is a dearth of comprehensive research on ethical ramifications associated with the implementation of AI models in educational settings. Thus, by conducting a systematic literature review, this study aims to provide a comprehensive overview of research pertaining to the ethical implications, principles, future research orientations, and practices associated with the implementation of AI models in educational settings.

3 Conclusion

In conclusion, it is critical that education stakeholders utilise the potential of AI in a responsible and ethical manner. Addressing ethical concerns such as accessibility, data privacy and security, the digital divide, as well as bias in AI algorithms necessitates a collective endeavour. Simultaneously, this endeavour should capitalise on prospects for innovation and enhancement in the realm of education.

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