# THE DOUBLE-EDGED SWORD OF ARTIFICIAL INTELLIGENCE (AI) IN EDUCATION: MAXIMIZING BENEFITS WHILE MITIGATING RISKS

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***Abstract***

***Objective****: The purpose of this paper is to conduct a thorough review and investigation on the function and importance of AI in education. The development of technology in the sector, and the emergence of raising interest to apply this AI technologies with a view to enable disruptive efficiencies across all aspects of education.*

***Methodology****: The study uses a systematic review of literature for exploring the existing literatures and research findings about AI implementation in Education. For learning it tells you good & bad about AI of bunchy resources, And changes because of the whether educational practices.*

***Results:*** *The results suggest that AI can greatly improve the personalization of learning, being able to provide tailored activities beyond traditional strategies. But the review also highlights worries over inequalities that may arise if only a specialist few can call upon top-notch AI tools possibly deepening of the achievement gap. Furthermore, a sanguine reliance on automated solutions could compromise the core human element in education and stymie social-emotional development for our students.*

***Originality/value****: Given the tendency for increased transparency, accountability and potential bias of AI systems in this critical domain leading to possible discrimination practices (e.g. admissions, grading etc) it is felt that the paper has great value contribution. There needs to be a spirit among policymakers, educators and developers working together to ensure that AI in education is implemented following certain principles.*

***Key words:*** *Artificial Intelligence, Benefits, Education, Risks*

## Introduction

The current decade has seen a spectacular rise in the advancement and use of artificial intelligence (AI) technologies (Dwivedi, et al., 2021). They used to say that such advanced performances will only be available in some space mission in a fictional movie; however, according to Joksimovic and Pearson (2024), AI systems have already implemented incredible performances in a widespread field. From imitating people's cognition and responding in natural language to the establishment of astonishingly superior learning rates for outstanding strategic games, people have felt amazed about the progresses made by artificial intelligence (Wu, 2022).

Among these emerging approaches, education seems to be one of the most promising sectors related to the possible usage of AI (Bahroun et al., 2023). The development of Artificial Intelligence has been monitored keenly by educators and policymakers expecting yet untapped opportunities to reformulate learning and learning models (Zimmerman, 2018).

The possibility of creating learning platforms based on artificial intelligence can be considered one of the most promising trends in the development of AI in education (Pratama, et al., 2023). These AI-based systems can identify the specific needs of a student or group of students, where the machine learning of the system makes the educational material, the rate of dissemination and delivery more suitable for individuals (Srinivasa et al., 2022). Such a high degree of individualization is capable to enhance students' interest, increase their learning achievements, and make learning more open and equal (Farley, & Burbules, 2022).

In addition, AI application is not only confined to classroom learning (Chen et al., 2020). Online grading and evaluation solutions with indicators of facial recognition and NLP can reduce loads and enable educators to devote more attention to teaching and communication with learners (Javaid et al., 2023). Which in turn can have a ripple effect and improve the general quality of education, leaves more time and focus on the meaningful human factors that make up the learning process (Srinivasa et al., 2022).

The enthusiasm about ideas on what AI can do in education is high, and educators, researchers, and technologists alike are testing out all sorts of promising ideas (Mukherjee, 2023). From intelligent and self-paced learning solutions that adapt to the students 'needs to artificially intelligent virtual mentors that track student's progress and deliver requisite support, the solutions are numerous, interesting and promising (Srinivasa et al., 2022).

Nevertheless, like any new innovative technology that revolutionized processes across industries, the incorporation of AI in education comes with a set back and risks. (Pedro et al., 2019). Other matters like equity, possible prejudice, the absence of opacity impediments and the indefeasible vocation of the human educator must be discussed cautiously (Pedro et al., 2019). As we are going to further discuss the possibility of AI in education and what the future could look, it is now significant to contemplate how representatives of different levels and types of education to integrate this invention in their process wisely (Mohammed, & 'Nell'Watson, 2019).

The latest developments in AI have attracted much interest and expectations of using this revolutionizing technology, especially in education (Bozkurt et al., 2023). It is compelling to dream of a learning model made and driven by artificial intelligence, from intelligent learning environments to automated grading systems (Kamalov, 2023). Nevertheless, as we proceed towards a deeper understanding of this topic, features that are quite evident show that incorporation of AI as a teaching/learning tool has both its advantages and pitfalls (Massaro et al., 2016).

At first, the incorporation of an AI system in learning appears to be the ultimate solution to the problem. By using intelligent adaptive learning applications, it becomes possible to design an individual approach for students, taking into consideration their preferences and performance (Dutta, et al., 2024). This will lead to increased student participation, better results as well as the general quality of education being offered by schools (Yugandhar, & Rao, 2024). Furthermore, grading and assessment could also be facilitated through AI hence reducing teacher's workload and allow them to engage more in teaching and student individual Merlin (Shah, 2023).

However, the use of AI in education, has its advantages and disadvantages as discussed in this paper. This is especially true in education where privatization has been realized in such a way that there are fears that the AI technology may worsen the existing tendencies in implementation of education by increasing the inequalities that are already existing. There is potential for the availability of high-quality AI aids and references to be relatively scarce, and students who come from poor families or areas with poor students will miss education (Bulathwela, et al., 2021). This could also increase the gap between learners and hence continue to reinvent injustice in education, which goes against the culture of equity (Yu, 2020).

The other contentious matter is the ability of AI to remove human trainers from the process of teaching as well as learning. Although, utilization of artificial intelligence based on system and top contaminant is more proficient and efficient and provide individual learning, but it somehow reduces social and emotional aspect of education (Pedro, et al., 2019). The aspect of human interaction, human care, and human understanding of social settings, which teachers exemplify in their work, remain impossible to encode in the most sophisticated AI algorithms (Shah, 2023).

Besides, using technology in particular, and AI in particular in education have several limitations such as lack of transparency, accountability, and biasness. AI systems are created and engineered by human beings and, consequentially, artificial systems recreate and enact human bigoted prejudice and discrimination (Marin, et al., 2023) It may result in impartial or prejudicial decision-making, which allocates students to categories of academic performance, assesses their performances or assigns them facilities and resources in ways that extend illegitimate differentiation (Krupiy, 2020).

Thus, it is imperative to emphasize a complex approach to the use of AI in the context of learning (Abulibdeh, et al., 2024). On the one hand, the opportunities approaching automation offers are clear, on the other hand, the pitfalls that AI tools bring remain obscure (Nagaty, 2023). Education stakeholders, policy-makers, and technology innovators must strike a balance to make the integration of AI in learning a gift rather than a mask and that they must do this while paying utmost attention to the subject of equity, humans and acknowledging the irreplaceable asset that teachers are to the learning process (Chisom, et al., 2023).

**Research questions**

Here are three basic research questions that guided the article:

*1. What are the benefits and opportunities as AI solution is implemented into education to improve the learning of students?*

*2. In what ways does AI pose the greatest risks and threats for education and in this area, how does it endanger the notion of educational equity and the job of educators?*

*3. How can stakeholders work together to guarantee a human-centered, fair, and considerate approach to integrating AI in education?*

**General Objective**

It is the authors' intention in this article to outline the significant potential that AI holds in improving the experience and results for students while also highlighting its risks to equitable education and the profession of teaching. Finally, the article aims at providing possible solutions

on how best to approach and address the challenges posed by AI in education with respect to learner's interest.

## Methodology

To explore the dual aspects of AI in education, the researcher conducted a systematic review of the literature, aiming to maximize the benefits and mitigate the risks associated with AI technologies in educational settings. This methodology was structured to ensure a rigorous and comprehensive examination of existing research, allowing for a nuanced understanding of AI's implications in this rapidly evolving field.

### *1. Literature Search Strategy*

The systematic review commenced with a comprehensive search across multiple academic databases to ensure a diverse and representative selection of literature. The researcher focused on prominent databases including Google Scholar, ERIC (Education Resources Information Center), JSTOR, and IEEE Xplore. These databases were chosen for their extensive repositories of peer-reviewed educational and technological research, which are critical for understanding the multifaceted role of AI in education.

The search strategy was designed to capture a broad spectrum of studies, encompassing a variety of perspectives on how AI is utilized within educational contexts. This foundational step was essential to ensure a wide-ranging examination of both the potential advantages and the challenges posed by AI.

### *2. Keyword Selection*

To refine the search process, the researcher employed specific keywords and phrases that reflect key themes within the discourse on AI in education. These included:

- "Artificial Intelligence in Education"

- "AI benefits in education"

- "AI risks in education"

- "educational technology"

The researcher utilized Boolean operators (AND, OR) to enhance the precision of our search strategy. For instance, combining terms such as "AI benefits in education" AND "implementation challenges" allowed us to retrieve more targeted results. This strategic keyword selection was crucial in ensuring that my analysis would be comprehensive and directly relevant to the research questions we aimed to address.

### *3. Inclusion and Exclusion Criteria*

To maintain the rigor of our review, the researcher established clear inclusion and exclusion criteria. Publications were included in the review if they met the following criteria:

- They were peer-reviewed articles published between 2016 and 2024.

- They directly addressed the implications of AI technologies in educational contexts.

- They provided empirical evidence or practical applications rather than solely theoretical discussions.

Conversely, the researcher excluded studies that did not focus on empirical data, those that were not available in English, and any publications that did not specifically address the topic of AI in education. This meticulous approach ensured that the literature reviewed was both relevant and of high quality.

### *4. Initial Search Results and Screening Process*

The initial search yielded a total of 120 publications. Following the application of our inclusion and exclusion criteria, this number was narrowed down to 46 relevant articles. The screening process involved a thorough review of abstracts and full texts to confirm each publication's applicability to my research objectives. This step was critical in ensuring that only the most pertinent studies were included in the final analysis.

### *5. Data Extraction and Thematic Analysis*

Once the final selection of 46 publications was established, the researcher employed a thematic analysis approach to systematically analyze the literature. This involved a detailed coding process where the researcher identified and categorized recurring themes related to the benefits and risks of AI in education. Key themes that emerged from the analysis included:

- *Enhanced Learning Outcomes*: Studies highlighting how AI can improve student engagement and academic performance.

- *Personalized Learning*: Research focusing on AI's ability to tailor educational experiences to individual learner needs.

- *Data Privacy Concerns:* Literature discussing the ethical implications and potential risks associated with data collection and usage in AI applications.

- *Equity Issues*: Analyses of how AI technologies can either bridge or widen the educational equity gap.

Each identified theme was further developed into broader categories that encapsulated the diverse perspectives found across the literature. This qualitative analysis provided a structured framework for synthesizing findings from various studies, facilitating a deeper understanding of the complex interactions between AI technologies and educational practices.

### *6. Synthesis of Findings*

The thematic analysis allowed me to synthesize the findings across the selected publications, creating a comprehensive overview of the current state of research on AI in

education. By rigorously categorizing the literature, the researcher was able to highlight both the potential benefits and the inherent risks associated with AI integration in educational contexts. This balanced approach not only contributes to the ongoing discourse on AI in education but also serves as a foundational framework for educators, researchers, and policymakers. By understanding the dual aspects of AI, stakeholders can navigate the challenges and opportunities presented by this transformative technology, ultimately enhancing educational outcomes while addressing ethical concerns.

## Results

***RQ1.*** *What are the benefits and opportunities as AI solution is implemented into education to improve the learning of students?*

### The Promise of AI in Education

#### A. Personalized learning platforms

##### 1. Tailoring the educational experience to individual needs and learning styles

The study also shows one of the most viable forms of AI in education is through intelligent and adaptive learning systems (Pratama, et al., 2023). These kinds of AI applications can be used in order to transform student education based on certain features of each student (Rane, et al., 2023).

The principle of personalized learning systems is based on the use of high-level machine learning models that, on the basis of the processing of a large amount of information, such as student performance and activity, as well as their cognitive and behavioral characteristics (Rivers, & Holland, 2022). The student data collected through AI makes it easier for these systems to discover the unique abilities, opportunities and choices that make up the student, along with the content, its presentation and duration that caters to the students (Faresta, 2024).

For instance, a student with visual-spatial learning will be provided with, simulated manipulative and multimedia based educative contents, whereas an auditory learning type of student will be provided with personalized audio teachings and virtual group discussions (Francis, 2018). Such a level of personalization can greatly improve student experiences because learning can then be done in the style that comes naturally to learners (Bedolla, 2024).

In addition, the applications used in personalized learning can be responsive, meaning they make modifications as the student learns and performs in class (Kem, 2022). When a student of Mathematics, for instance, faces difficulty in understanding what is taught, the AI system can diagnose the cause and recommend exactly the materials or exercises that will help overcome this particular deficiency (Murtaza, et al., 2022). On the other hand, if a student performs well in a particular topic, the platform is equally capable of offering further tough or differentiated material to deepen a student's understanding and keep them interested (Kem, 2022).

However, this dynamic, personalized approach to education does carry the potential to dramatically increase the effectiveness of student achievement (Maghsudi, et al., 2021). These revolutionary AI-based learning environments can enhance effectiveness of the learning process with a focus on the particular learner, increase students' self-confidence and motivation, and eventually, help every learner reach his or her potential (Rickabaugh, 2016).

But one must not forget that the idea applied by using highly developed personalized learning platforms has its flaws (Ellikkal, & Rajamohan, 2024). The stakeholders' equity, accessibility, and human factor that is an important component of education cannot be overlooked to warrant deployment of this technology since it will reach the intended learners by covering all the social statuses and learning needs by the intended end users (Ayeni, et al., 2024). As we proceed further with finding the role of AI in learning, it will be important to maintain harmony between artificial technology and the basic human factors involved in the process (Holmes, et al., 2022).

**2. Potential to improve student engagement and academic performance**

With AI continuing to evolve in a multiple number domains, the possibilities of utilizing IT in education have set the stage for extremely exciting and fruitful future (Fazil, et al., 2024). Possibly one of the most attractive uses of AI in education include the increasing student participation and profit, as well as increasing learning achievement rates (Chen, et al., 2020).

At the center of this opportunity is what is known as the Personalized Learning Platforms that harnesses the Advanced Intelligent Technologies in the delivery of lessons that best suits the ability and preferences of learner (Ayeni, et al., 2024). These AI enabled systems have the ability to generate a wide range of data from performance and behavior of the students to cognition and preference, which can be used to create learning paths that is likely to be appealing to the learner (Colchester, et al., 2017).

When students are provided with content and learning activities that are congruent with their preferences and abilities, it is likely to transform students' learning engagement and motivation (Maghsudi, et al., 2021). For instance, a visual learner may perform well in conditions where materials are presented in the form of animated learners embracing complicated concepts indicated by multimedia learning while an auditory learners will may perform better in terms of personalized audio lessons and virtual discussions ( Pesovski, et al., 2024).

Likewise, AI-powered platforms come as adaptive where they can also track the progress of the students and bring changes to the overall educational experience based on the observation (Chen, et al., 2020). In this case, if a student is weak somewhere, the system can correct the knowledge deficit by pointing to the student the area that needs extra teaching or other learning materials that may be required to teach that aspect (Ayeni, et al., 2024). On the other hand, if a student has shown performance at a particular level, the platform a can easily switch to content of a higher level or even supplementary material to enhance the student's learning (Colchester, et al., 2017).

This dynamic, personalized attitude in education introduces very real possibilities of raising student achievement to a level never realized before (Abulibdeh , et al., 2024).By bringing the dynamics, which improve the thorough understanding of the material, build confidence and motivation, and unveiling the inherent potential of every learner these AI-powered platforms may cause a dramatic shift in approaches to learning (Ayeni, et al., 2024).

Additionally, AI in education has also some benefits on students' performance (Bahroun et al., 2023). Some examples of administrative process augmentation include grading and assessment so that AI driven systems can provide more time to teachers so that they can engage individual students (Colchester, et al., 2017). The consequences of these improvements that results in greater focus toward human factors involved in the educational process could directly improve the

educational outcomes thus improving the general quality of the educational provision (Ellikkal, & Rajamohan, 2024).

This paper will also argue that this introduction and advancement in the use of AI in education should be embraced with a critical understanding perspective as we continue to embrace the use of AI in our educational systems (Yugandhar, & Rao, 2024). Of course, there are also advantages to such an approach, however, it is equally important to recognize the obstacles, difficulties, and possible downsides which include questions of equity and accessibility of such approach, and, in general, to discuss the indispensable role of the live teacher as a factor in the learning process. If a balance is achieved, it will be possible to advance the applicability of AI within education, to ensure new opportunities for student learning and development (Zimmerman, 2018).

## B. Automated grading and assessment systems

### 1. Streamlining administrative tasks for teachers

In the ever-evolving landscape of education, the integration of AI has the potential to significantly alleviate the administrative burden shouldered by teachers, allowing them to focus more on the core aspects of their role: teaching, guiding, as well as shaping the development of their students (Vargas, 2023).

AI could therefore transform the educational sector by handling many administrative roles that have ordinarily taken much time and effort from the teachers (Papa, et al., 2021). All of these tasks include grading and assessment, record keeping, data analysis and as suggested in the literature AI enabled systems can alleviate time that is necessary to complete these tasks thus allowing teachers to focus on other important activities (Yiyao et al., 2023).

automated grading and assessment software and applications for instance can greatly minimize the time and much effort needed by teachers to have the students' work evaluated (Nazaretsky, et al., 2022). These designs can harness NLP and ML methods to review and give precise and uniform feedback on various types of tasks: from essays to quantitative questions (Nazaretsky, et al., 2022). This automation not only makes sure that students get quick and constructive feedback but also makes sure that teachers get time to focus more on individual student interactions, and creating methods of teaching, that have not been previously successful (Abulibdeh et al., 2024).

Furthermore, automated systems of data acquisition and data analysis can transform teacher practice related to the data collection, data organization, and data interpretation regarding the performance and progress of students (Dutta, et al., 2024). Due to the integration of the procedures of collecting data and making visualizations, such tools may offer teachers effective solutions for immediate decision-making processes regarding how to modify the learning process to address the requirements and interests of specific learners (Fazil, et al., 2024).

An essential contribution to the sphere can be assigned AI solutions which expedited discharge of administrative tasks and thus facilitated transformation of teacher's work, freeing configuring human ideals in pedagogy (Kamalov, et al., 2023). By freeing teachers from the burden of administrative, time-consuming work they can diligently focus on developing rich relationships with their students and personalizing teaching experiences according to a learner's

unique style as well as creating an open environment that every individual learns what is needed by them (Rane et al., 2023).

But it is important to realize that this blending AI in the education system has consequences and two sides of every coin. Aside from the potential benefits of such transformation, there are also some challenges to be considered: (1) teacher caseloads and autonomy; (2) resisting over-reliance on technology; and integrating digital tools into an environment that values human interactions in the teaching/learning process (Yugandhar & Rao, 2024).

In the furthering development of AI in education, finding this beautiful but precarious balance between technical innovation and good ol' human TLC is crucial. In doing so, we will be able to fully harness the potential of AI in education for teachers and students alike which helps them lead more productive life as well as make learning a fulfilling journey (Madaio et.al., 2013).

**2. Freeing up time for more one-on-one interactions with students**

One of them is around the integration of AI that can potentially create space for teachers to have 'time and resources' not only focusing on personalized, one-to-one interactions (Ayeni, et al, 2024).

Historically, teachers have been responsible for more than grading tests and handing out assignments. Although essential, these are usually time-consuming tasks that have sometimes detracted from the priceless one-on-one student and teacher experience reflective of quality individualized learning (Bozkurt et al., 2023);

But AI powered educational technologies have the potential to change this outlook. Furthermore, by way of automation as well streamlining different administrative processes, AI can help to save a great deal of time and effort from teachers who would otherwise be conducting such activities manually saving them valuable resources that could ultimately be utilized in more focused student researched interactions (Chen et al., 2020).

For instance, AI-aided grading and assessment systems with the help of natural language processing and machine learning algorithms can evaluate a variety of student work — from essays to problem sets— providing in-depth feedback (Chisom et al., 2023). This automation also leads to timely feedback for students without teacher bias and more time from teachers spent on one-to-one communication, personalized instruction, or creating personal learning plans (Javaid et al., 2023). Likewise, AI-based data collection tools can also help the teachers to get high level insights about his students' better performance and progress (Mohammed, & 'Nell'Watson, 2019).

These systems automate the collection and visualization of data for teachers, providing them with real-time insights that could help better-informed decisions on how to support each student's individual needs and learning styles (Nazaretsky et al., 2022).

Without the weight of such an administrative burden, teachers can direct attention back to what is perhaps most important: building relationships with students—an imperative for understanding their unique strengths and challenges in order to design personalized solutions that will enable them to thrive (Yiyao, et al., 2023).

And with this personalized attention, the teachers can know more of what cognitive and emotional needs their students have so they give them an appropriate method based on how each student learn to really build a learning environment made just for it (Vargas, 2023). Such a manner of engaging students and enhancing their motivation not only achieves better academic success as learners are guided, encouraged, valued; they feel empowered in an educational path (Srinivasa et al., 2022).

Nonetheless, as we examine AI in education integration, the over moralistic view must be resisted. The promise of creating more time for interpersonal interactions is tempered by the pitfalls associated with an over-reliance on technology and maintaining the human dimension so central to educational values (Rane, et al., 2023).

Through finding the optimal level of technological innovation and human compassion from teachers, we could use AI to transform how students learn in a way that is ubiquitous across virtually every student demographic or learning preference ( Pratama, et al., 2023).

***RQ2.*** *In what ways does AI pose the greatest risks and threats for education and in this area, how does it endanger the notion of educational equity and the job of educators?*

## The Risks and Challenges of AI in Education

### A. Exacerbating educational inequalities

#### 1. Unequal Access to High-Quality AI-Powered Tools and Resources

The integration of AI in education is changing, and the trend raises an issue that sheds light on high-quality AI-driven resources coinciding with endeavors for equal access to such tools by global stakeholders (Abulibdeh et al., 2024). Of particular necessity is the further proactive design for equity in educational systems, when these technological solutions become more widely adopted and have a potential narrowing or widening effect on existing gaps (Ayeni et al., 2024).

Aforementioned development and deployment cost for AI-based educational technologies add up to one of the main hurdles, mainly addressing this is a financial and technology infrastructure challenge (Bahroun, et al., 2023). As might be predicted, this reality has the potential to further exacerbate — or form new — gaps between well-resourced schools and districts that are able to afford these next-generation solutions vs. their less-effective analogs on one side, with others left vulnerable due to cost considerations.

This difference in access to AI-based tools can create a ripple effect and reinforce some disparities, which may lead to worsening inequalities in education even more (Bulathwela et al., 2024). Thus, students from underserved communities may be deprived of personalized learning, adaptive assessment and data-informed decision-making capabilities that are enjoyed by their more privileged counterparts which in turn constrains possibilities for academic excellence along with personal development as well (Chen et al., 2020).

Additionally, the lack of geographic neutrality in the access and use of AI-based educational technologies can have consequences for the quality of the instruction and support provided to teachers (Chisom., 2023). In this regard, well off / well-resourced schools can offer their teachers more advanced Ai tools and professional development Promoting models of learning

that are more interesting, individualized, and effective (Colchester et al 2017). On the other hand, teachers in these less affluent districts or areas may have little or no access to the resources and support and are therefore not able to maximize the AI transformation potential in the classroom (Dutta et al, 2024).

There is therefore an urgent need for policy makers, education stakeholders and technology leaders to get together to resolve this critical issue and to find the best possible solutions in which everybody would have an equitable access to these powerful AI-based educational tools and resources irrespective of their geographical location, economic and social class or any other factor (Zimmerman, 2018).

This may include introducing specific targeted funding schemes as well as developing broad based AI solutions that are economically viable and practical. Also, the development of PD programs that are comprehensive and teachers-focused on integrating AI technologies (Srinivasa et al., 2022).

**Widening the Achievement Gap and Perpetuating Educational Disparities**

Because of the integration of AI in the present educational system, it is believed that this does not only offer some challenges but contributes to the deepening of the existing achievement gap due to the uneven adoption and implementation of these technologies (Rivers, & Holland, 2022). However, one of the significant dangers is that they may be misused in such a way that AI-based means and materials will be primarily geared towards the students from the wealthier and higher status groups, leaving out other students from the disadvantaged and marginalized groups (Pratama, et al., 2023). The previous section already noted such a sketchy access to effective AI solutions controlled by several sectors of society. This may result in greater varies not only in academic performance but also on the educational level and after school results (Papa, & Jackson, 2021).

In well-resourced schools and school districts, students may have an added advantage of platforms for personalized learning, adaptive assessment systems, and data-driven interventions that can propel them to high academic performance (Ellikkal, & Rajamohan, 2024). The students, on the other hand, residing in the low-resourced areas may not afford such disruptive technologies thereby placing them at a high risk of the widening achievement gaps (Dutta, et al., 2024).

In addition, adopting AI in the educational sector can enable the provision of instruction and support to teachers, which was not the case before (Zimmerman, 2018). However, if the use of AI cutting-edge tools and training sessions extends to teachers in rich schools only, then it will lead to differences in teaching methods and materials, thereby increasing the educational gaps (Yugandhar, & Rao, 2024).

This is an issue of even greater concern in the context of already disenfranchised groups, where their access to education has been or is being hampered by systemic obstacles and historical injustices (Bozkurt, et al., 2023). When it comes to the role of AI in education, there exists a threat of entrenching existing unfairness, even extending the deprivation gap for the most at-risk groups (Kem, 2022).

Tackling this crucial problem will necessitate effective collaboration from policy makers, education experts, and technology relevant authorities to ensure that the application of AI in education adheres to the values of social equity, inclusivity, and access (Yiyao, et al., 2023). This

includes possibly creating focused budgetary cuts, building cheap and easily replicable AI tools, and offering extensive training and refresher courses for teachers (Rane, et al., 2023).

Moreover, understanding the importance of digital literacy and enhancing the learning of applied AI skills in all students, especially those in marginalized groups, will help foster the next generation and arm them with the right assets to cope with the ever-changing technological environment (Bahroun, et al., 2023).

**B. Replacing human teachers and diminishing the role of human interaction**

**1. The importance of the human touch, empathy, and nuanced understanding in education**

Supporting the claim that technology will ultimately replace all human aspects of education, however, is impossible. A teacher, for example, has an understanding of their students, can so to speak get into the head of every student and assess the best interpersonal approach that will spark determination and zeal in each one. (Dei, et al., 2021). This foresight and quite phenomenal aspect of a tutor or a teacher is what, in fact, enhances the whole process of learning that is fluid and available. Without a thoughtful teacher who knows the students well enough to understand what they need at any given moment and is ready to assist them, the learning experience will never be great (Chisom, et al., 2023).

The human aspect, understanding the underlying emotional dynamics of a situation and being able to control them are the spheres in which AI enhanced systems, as advanced as they may be, would still find it very difficult to perform (Abulibdeh , et al., 2024). The capability of an educator sensing the emotional temperature of a student, modifying their delivery style depending on the clientele's feedback, and encouraging the student during difficult situation are significant factors that cannot be easily substituted by means of technology (Madaio, et al., 2022).

The importance of people's interaction in creating a sense of belonging, community, and presence of purpose in the classroom is equally important (Holmes, et al., 2022). Students flourish in a dynamic atmosphere where they are recognized and appreciated as different people and so are their experiences and therefore, can have meaningful conversations and learn from each other (Mohammed, & ‘Nell’Watson,2019).

On the one hand, the role of AI tools is certainly important to make the teaching and learning process more advanced and effective; however, the ability of human being is something that should never be replaced or exchanged (Murtaza, et al., 2022). But here also it is suggested that these kinds of technologies should be used in such a way that a certain kind of equilibrium exists, which does not let down the appropriateness of human involvement in education (Vargas, 2023).

Effective strategies that implement AI as a tool to reduce administrative duties, personalize learning experiences, and understand teaching/learning processes in a better way, help alleviate the burden of teachers from worrying about roles and responsibilities that do not relate with students’ relations, instruction, and establishing community relationships in the classroom.

In this fashion, educational AI apps can also drive the development of a more intelligence-based incorporation of the humanitarian approaches within schooling whereby the enhancement

of their productive capacities in every student transcend all segregation of human and machine intelligence.

### 2. Limitations of AI in Fostering the Social and Emotional Aspects of Learning

The advancements witnessed in the field of education by the incorporation of AI are still limited in addressing some of the social emotional learning profiles (Zimmerman, 2018). Although it is becoming widely acknowledged that AI tools and systems can improve different aspects of education and teaching and learning, they may not be very effective in creating the meaningful human relations and emotional approach required for proper transformational learning process (Abulibdeh, et al., 2024).

At the heart of this limitation is the fact that AI is not the same as 'implanted' AI – one's inherent ability to connect with individuals emotionally and intuitively (Yugandhar, & Rao, 2024). Even the most advanced AI systems have been developed to give solutions to problems in accordance with a program and set of predetermined rules and regulatory frameworks (Ayeni, et al., 2024). They are bereft of the profound comprehension, observing and interpreting mimics in addition to having a true emotional interaction feature that is dominant in interpersonal relations (Yu, 2020).

This is founded in the social relations and psychosocial processes and appropriately responding to what a student may be going through, positive reinforcement and creating a welcoming classroom climate (Bahroun, et al., 2023; Yiyao, et al., 2023).

AI features, sophisticated as they are in terms of ability to deliver feedback customized for the identified learner, personalized learning and data analysis, may lack what is most crucial for students: the appreciation, patience, understanding, and support that have to come from a genuine human concern towards the individual (Bozkurt, et al., 2023). Lack of such vital social and emotional factors may hamper the learning of the fundamental aspects of life success and may include aspects like emotional intelligence, implementing solutions as well as teamwork and cooperation skills (Srinivasa, et al., 2022).

However, the overdependence o AI solutions in educational setting may lead to the process of dehumanization that results in limited contact between the students and the teachers /educational community(Chen, et al., 2020). These result in disinterest, demotivation and most of all dis-satisfaction as far as learning is concerned.

To overcome this challenge, the adoption of AI in education should be done with equal and appropriate measures, equal stressed together with the reinforcement of interpersonal interaction (Shah, 2023). Teachers' needs to be enabled to help enhance their roles utilizing the available artificial intelligence items based on how they can foster interpersonal relations with learners, promote the learners' sense of belonging as well as their social and emotional well-being (Dutta, et al., 2024).

By accepting the fact that AI does not affect the social and emotional aspect of students' learning, and using technology in the correct balance where 'teaching' meets human touch we can successfully build environments that enable satisfied, productive, and successful learners.

## C. Concerns about transparency, accountability, and bias

### 1. Inheriting and amplifying the biases of AI system developers

However, entering the education system gradually as a solution, AI technologies raise concerns regarding the sincerity, responsibility, and predisposition to bias of the process (Rivers, & Holland, 2022). Another of the presuppositions is the danger of reproducing biases of AI system developers and, as a result, harm students and educational achievements (Ellikkal, & Rajamohan, 2024).

This particular issue stems from an understanding that AI is as good as the developers and trainers who build it, meaning that the AI systems will only be as perfect as the input data fed to it (Rane, et al., 2023). The data used to put together these algorithms, the choices of design for the technology, and the overall goals of the tech can all be impacted by the biases and limitations of the AI system developers (Fazil, et al., 2024).

This is especially true in the learning context since the incorporation of AI-based applications and decision support systems influences major educational milestones, resources, and experiences of students (Pratama, et al., 2023) directly. The actual algorithms underlying these technologies can themselves have biases against particular racially, ethnically, or socioeconomically groups, or learning styles, and thus deepen and reinforce existing education inequality (p. 144).

In addition, the observation of the fact that the functions of many AI systems are often opaque makes it challenging to discover such biases within an algorithm (Pedro, et al., 2019). The aggregate opaque structure of some AI models makes it difficult for educators, policymakers, and community members to comprehend how such technologies are reaching these conclusions and recommendations (Murtaza, 2022).

This lack of transparency can put the possibility of justice for harm caused by AI system developers in a tight bind for arguments as well as the ability of the affected communities to input, contest biased result, and co-design better working technologies (Chisom, et al., 2023).

To address these issues, there is a need to ensure that AI integration in education will prominently feature the principles of the following principles: transparency, accountability and the desire to tackle biases inherent to the systems (Nazaretsky, et al., 2022). There may be the appearance of functional auditing and testing procedures, functional governance structures, as well as involving various stakeholders in the design and implementation of interventions (Fazil, et al., 2024).

Furthermore, a refocused effort to train educators and students and the public and to engage in critical analyses of artificial intelligence systems can help equip people with the necessary knowledge to prevent the misuse of those systems in education (Maghsudi, et al., 2021).

Thus, considering the issues which have been raised regarding the unjustified focus on transparency, accountability, and undesired bias, we will be able to set up, implement, and promote the AI-tech, which will be more beneficial for all the learners and contribute to the growth of the inclusive system in educational environments.

### 2. Potential for unfair or discriminatory decision-making in areas such as admissions, grading, and resource allocation

As more AI is incorporated into the educational process, there is increasing realization that fairness, and therefore, lack of discrimination in major decisions like admissions, grading, and

allocations for resources is at risk (Fazil, et al., 2024). The adoption of the AI technologies and techniques in these areas brings the problem of biased results that intensifies the existing impediments of education equality (Javaid, et al., 2023).

First of them is the concept of bias by construction; the systems would learn and internalize biases of their designers as well as the data used to train them (Holmes, et al., 2023). When such a prejudice exists in the algorithms that drive these technologies, this implies that the device may be negatively dispositioned towards other groups of people, classes or ways of learning Thus see Simons, 2023 for the impact that these technologies may have on the education of the learners.

For instance, the automated approaches of using artificial intelligence in assessing applicants and making offers for enrollment may again have the effect of excluding given applicants on grounds that are not related to their academic capability or prospect, as noted by Dwivedi, et al., 2021). This can close off specific availabilities for students from the minority and '//'society'\) communities and reduce their opportunities of moulding their future through education (Joksimovic and Pearson 2024).

Likewise, in the area of grading and assessment, use of artificial intelligence tools for grading performance would only entail bias continuation and unfair treatment of individuals or group (Wu, 2022). The algorithms beneath these tools may not capture the natural way human learn, the different forms of assessment common among students, and various difficulties faced by learners (Bahroun et al., 2023).

Decision making in the Allocation of resources like funding, staffing and course offerings is another domain that could be impacted significantly and possibly institutionally racist when Washington and others (2017) apply their AI techniques. If the algorithm that determines those allocations is not well-developed or if there is no mechanism for bias detection and reduction, then resources may be diverted to the undeserving schools, communities, or students (Pratama, et al., 2023).

These issues are compounded by opacity of operation of most AI systems such that when discriminations and biases embedded in the systems are identified it is hard to address them (Srinivasa et al., 2022). The usage of these mechanisms is challenging to analyze and may not be easily comprehensible to educators, policymakers, and community stakeholders on how these systems came up with their recommendations and conclusions due to their opaqueness and complexity; this makes it hard to make the system developers accountable when the systems make wrong decisions (Farley & Burbules, 2022).

To address these issues and to make sure that AI is integrated properly and in fair way in the context of education, there is a need to have proper and strict protective measures and accountability strategies in place (Chen et al., 2020). This might require the creation of easily readable and traceable algorithms, adding ethnically sensitive angles into the creation of these inventions, or setting up supra-legal guidelines for the utilization of those technologies (Javaid et al., 2023).

To this effect when tackling the possibilities of unfair, biased or just plain prejudicial decision making in such rolls as admission, grading, resource allocation and so on, we can actively begin the journey towards designing a learning environment that is fair, equal and liberating for all the students out there regardless of their station in life.

***RQ3.*** *How can stakeholders work together to guarantee a human-centered, fair, and considerate approach to integrating AI in education?*

## Striking a Balance: Towards a Thoughtful Integration of AI in Education

### A. The need for collaborative efforts between policymakers, educators, and technology developers

With the growth in the concept of applying AI as an innovation enabling agent in the educational system, it is equally important that the process is carried out in a properly and fairly balanced manner (Srinivasa et al., 2022). Striking this fine balance becomes the work of policymakers, educators, and Technology developers working in tandem to fashion out the future use of these systems and tools to support human endeavours while remaining responsible and equitable in their approach (Mukherjee, 2023).

It is now the duty of policymakers to set adequate principles and rules that control AI in teaching and learning processes (Srinivasa et al., 2022). Such policies have to answer for important questions, which include for example the question of how transparent and accountable these systems need to be, and how biases that are inherent in AI systems can be addressed (Pedro et al., 2019). It will allow policy makers to make certain that the implementation of AI within the educational environment as well as class meets the requirements of equity, inclusion & welfare of children framed by Ministry of Education (Mohammed, & 'Nell'Watson, 2019).

While, educators are the architects of learning context who directly know the requirement and issues of learners (Bozkurt, et al., 2023). Their Engagement in Design, Implementation, and Evaluation of AI Supports the Idea that These Technologies Should Empower Rather Than Limit Diverse Interpersonal Interactions and the Development of the Social-Emotional Skills That Underpin Learning (Kamalov, 2023).

In their turn, technology developers must operate within a 'we' mentality and look for the perspectives of policymakers and educators (Massaro et al., 2016). It also postures this as a collective effort to influence the construction of AI systems to address the complexity of the learners' needs while addressing the various ethical and equity-related issues that have been raised within the education fraternity (Dutta, et al., 2024).

Through such collaborations we can start the process of creating an ethically sound integration of AI into the learning process – one that respects the position of the teacher as a knowledge facilitator and a mentor while leveraging the power that the digital tools and technologies offer to augment the process (Yugandhar, & Rao, 2024). Such a partnership model is also beneficial to guarantee that the introduction of Artificial Intelligence in learning will be open, responsible, and adaptive on a continuous basis with the leading stakeholders of education (Shah, 2023).

However, involving students, families, and other community entities can also make this collaborative process even richer and guarantee that AI integration in education is completely aligned with the communities' visions and values (Bulathwela, et al., 2021).

By inviting this collaboration, we can see the positive effects of AI integration in education retention while keeping the core principles of a human centric education intact. Thus, we can define the principles of a new model of learning environment creating aimed at the continual

movement in the right direction to define the educational landscape as significantly technologically driven, while remain highly human-centered and capable both to support the learners and help them prepare for the world that has already started in the 21st century.

### B. Prioritizing equity, human-centered design, and the preservation of the role of human teachers

With the approaches to incorporate AI systems into education advancing, it is high time to pay attention to such values as equality, the focus on people's needs, and non-replaceable position of teachers (Yu, 2020). Only through putting such elements into focus we can guarantee that the positive impact of AI innovations will be enhanced and developed in the way that would not decrease the value of education, but rather amplify it (Pedro, et al., 2019).

AI has to be equally inclusive as a principle of implementation of the tools and systems within the sphere of education (Shah, 2023). This means, tackling head-on the biases that these technologies inherit and can perpetuate, some of which can simply be escalated versions of the educational inequalities faced by and more broadly, the lack of opportunities available to, the marginalized communities (Madaio, et al., 2023). Robust testing, overt design methodologies, and paying thought to the varieties of techniques for considering the divergent clients can help make AI reliable and fair (Abulibdeh, et al., 2024).

And just as crucial to the dispensation of AI in learning is the DC approach, which seeks to put humanism in the designing and practice of AI. Although these systems can possess marvelous technological experience, it is important to incorporate these systems to support the exceptional work that teachers do (Nagaty, 2023). AI should complement teaching by improving the process so that tutors can become more attuned to the necessary social, emotional, and cognition elements that are crucial to learning (Chisom, et al., 2023).

Human teachers have the best feel for their wards, the manner in which they learn, and the environment as they implement the educational processes (Pratama, et al., 2023). The personal interaction and effective student-staff communication that such experts come with – including their capacity to show concern for their students, inform them and converse with them in equal or better terms – defines teaching and learning as relevant and transformational (Rane, et al., 2023). AI integration into education should be done based on sound practices that support and sustain the work and the unique functions of human educators (Rivers, & Holland, 2022).

As we focus on equity, human- centered design, and the stewardship of human teachers, there is a way forward towards a good integration of AI in education (Faresta, 2024). This approach will ensure that the advantage of these technologies are shared; that the talents of humans and AI are harnessed, bringing into fore the basic tenets of education which is development of the total human person (Francis, 2018).

While heading confidently into this new and fascinating future there is one principle that we should never deviate from our compliance with. On that basis, and by approaching AI not as a threat but as an opportunity, it becomes possible to harness the power of AI and make it positively enhance the education for all learners, and simultaneously to protect and enhance the central role that teachers play to provide a high-quality education for all, foundational to a just, thriving, future-ready education system.

**C. Developing a nuanced approach to the integration of AI in education**

With the growing implementation of artificial intelligence technology in our learning institutions, this implies that a universal way of adopting AI is insufficient (Bedolla, 2024). Rather, we need to admit it is possible to accept a more holistic and situational view of how those change-oriented technologies may be used for supporting learning and teaching and how certain deficits may be avoided or minimized (Kem, 2022).

The use of AI in learning experiences must fit within the general contingencies of an individual school, district, and even classrooms (Murtaza, et al., 2022). It is important that we do not go for a one size fits all approach in implementing learning solutions where the situation and the educational ecosystem itself is highly dynamic (Rickabaugh 2016).

This informed perspective starts with a clear appreciation of the affordances and developmental needs of each learning community (Holmes et al., 2022). Through ideation involving the different players such as teachers, students, administrators and other stakeholders, we can learn and understand their main challenges, dreams and learning contexts that define learning (Ayeni, et al., 2024). With this knowledge in your possession it is then possible to proceed cautiously and pick and choose the appropriate AI tools and systems that are in fact, catering to the learner or educator that they were developed for (Ellikkal, & Rajamohan, 2024).

Further, this suggests that this level of development must appreciate the fact that teachers and learners have different levels of digital literacy (Chen, et al., 2020). All learners may be quick to accept AI in their learning processes, but there are those who will take time and may require more training and assistance in technological development (Fazil, et al., 2024). Generalisability poses a danger that alienation and marginalisation of people who may otherwise struggle to engage with the multiplicity of AI platforms and the systems that underpin them could all too easily be created, which would directly contradict the core aims of social justice that should underpin and drive any educational technology provision and/or delivery (Colchester, et al., 2017).

When we thus encourage an appreciation of the more specific aspects of the community contexts and learning requirements necessary for effective learning within particular educational systems, it may be possible to embark upon an appropriately nuanced implementation of the AI into teaching situations (Pesovski, et al., 2024). Such enactment may require approaching everyone's professional learning through custom-designed professional development training, sequenced implementation plans, and education stakeholders' - teacher and learner – direct involvement in the design and evaluation of educational solutions (Kaplan et al., 2021; Maghsudi, et al., 2021).

However, it needs to form a more complex approach also addressing the social, ethical and cultural effects of employing AI in education (Abulibdeh , et al., 2024). We also need to talk about data privacy, algorithmic bias and the effects on social-emotional development of learners as these technologies continue to unfold (Ayeni, et al., 2024). A sensitive implementation of these concepts with due regard to the context will ensure perception and mitigation of these concerns before the revelation negates the educational experience as a wholistic student experience (Bahroun et al., 2023).

This means insisting on a blend of humane approach towards using AI in education as a solution while at the same time recognizing the fact that education is dynamism and complexity in form, therefore adapting to the use of these technologies can be sensitive to the specificity of the

education system (Colchester, et al., 2017). This will not only enrich the learning process, but will also develop trust, empowering feeling, and ownership among the heterogenic audience of learners, who creates and influences future developments in the sphere of education (Ellikkal, & Rajamohan, 2024).

## Conclusion

Throughout our exploration of the varied terrain around AI in education, it has been evident that this deeply transformative technology represents both vast opportunities and significant barriers. It is difficult to ignore this AI duality, and we must ultimately negotiate through these inspiring fields of (negative) implications in order that the most fundamental human elements which have always characterized itself educationally-sanctioned human elementalisms continue its preservation, or else improvement.

One the one hand, if done right, incorporating AI tools and systems into education could completely change how we structure teaching/learning. AI has an amazing potential to improve all sorts of aspects of education, whether that´s personalized learning pathways; intelligent tutoring systems; automated grading or administrative tasks. Used judiciously, these technologies may return time and effort to educators, enabling them to devote attention where it belongs — on the richer but subtle human interactions in which they daily navigate their shifting professional practice.

At the same time, is “fools rush in” any less apparent than ever as it pertains toward integrating AI implementation into education at large? If unchecked, the built-in biases and constraints of these systems can amplify pre-existing inequities and contradict whole objectives for accessible education that is equitable. Further, the excess dependence on AI-induced solutions ONLY may end up squashing what human teachers/mentors are indispensable in doing for education and its close relationship with student's social-emotional as well cognitive development.

This very duality requires a measured and deliberate approach to AI integration in education. If we prioritize principles of equity, human-centered design and the human teacher to do our legwork for us, it is possible to leverage these technologies in ways that realize their transformative potential while leaving intact the essential humanity which has always defined education.

As we plan for the future, our goal should be that AI never replaces human educators, but instead enriches what they do and makes it more feasible to teach all children. So we need for a world in which AI-infused tools and systems are seamlessly integrated into education, enhancing the knowledge, skill-building power of teachers; strengthening teacher-learner bonds; opening pathways to more personalized learning adventures.

But this future will not be achieved by happenstance. It will need to be a collective effort engaging all stakeholders including policymakers, educators, technology developers and the wider education community determined together what AI in this essential field has been. Such a promise will be realised not in the mere deployment of these transformative technologies but rather through this shared commitment to an intelligent and ethical AI integration which serves k-12 students, their teachers & the system.

A very comprehensive article that investigates ways AI can be included in education, for good and bad Nevertheless, it has two minor (by itself debatably trivial) limitations. This article could strengthen itself by including specific case studies or real-world examples to demonstrate the key points made. Second, the article presents no data or a single view from those involved in educational policy and practice (e.g., educators, developers of technology-based learning initiatives, students' families or communities). Incorporating additional perspectives and corresponding concerns may have added complexity to the discussion that better reflects multiple dimensions of a complex issue.

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