
Transforming Education with AI: Potential Benefits and Ethical Dilemmas

ABSTRACT

Artificial intelligence (AI) is radically transforming our world, and education is no exception. It shows the potential to revolutionize and streamline pedagogical methods. This study aims to examine both the benefits and the associated challenges regarding implementation of AI in the academic sphere. After comprehensively examining a variety of sources from different perspectives, this study determined that AI can bridge several gaps in learning and teaching, but it also presents novel challenges such as misuse and logistical hurdles. This powerful tool must be implemented, but cautiously and with tempered expectations. Ultimately, artificial intelligence is a tool that can greatly enhance learning capabilities. It must not be conceived of as a replacement for traditional learning, but should supplement established learning principles while being implemented in a way that addresses issues such as abuse and access inequities.

KEYWORDS: *Education, Artificial intelligence*

INTRODUCTION:

The integration of Artificial Intelligence (AI) – technology that enables computers to simulate human learning and comprehension – in educational settings has marked a significant shift in how teaching and learning are being carried out today (Miao et al., 2021, Pantelimon et al., 2021). Ranging from new and intelligent tutoring tools (DreamBox and Smart Sparrow) to automated grading and personalized learning tools (Snowflake, Articulate, etc.), AI is radically transforming the outlook of education around the world.

The increased integration of this technology in a variety of industries has been a significant trend, and it is especially prevalent in education. In this field, AI has been beneficial to both teachers and students by improving education accessibility and quality (Valverde-Berrocso et al., 2022). There are studies which substantiate that AI can improve learning outcomes by personalized learning, streamlining task-setting, and intelligent tutoring (Holmes et al., 2019). In addition, AI has facilitated the reduction of administrative burdens on educators, allowing them to dedicate more time on instructional tasks (Lukin et al., 2016). Despite these benefits, the risks and

challenges associated with AI integration in education should be examined.

There have been many ethical implications of its utilization. Recent research has highlighted concerns of personal privacy and issues regarding the authenticity of material produced by students and faculty (Selwyn, 2022). If these risks are left unaddressed, they could inadvertently exacerbate issues of inequality, autonomy, and the erosion of foundational educational principles. The purpose of this review will be to examine the cost-benefit analysis of AI integration in educational settings, examine ethical dilemmas presented by using work developed by AI, and propose paths of implementing AI with minimal negative consequences.

Through this examination, this study aims to identify the key areas where there is crossover between education and AI. By analyzing these data points, this study aims to find a beneficial compromise between using this type of technology in the classroom while maintaining optimal and ethical learning principles.

METHODS:

This narrative review employs a thematic synthesis of sources in order to examine the potential benefits and ethical concerns that come from implementing AI in the classroom. Sources have been acquired through Google Scholar and PubMed. Potential sources were narrowed down further by specifically examining narrative and systematic reviews that have already been peer reviewed. One of the most important factors in the resource evaluation stage was selecting sources that examined themes relevant to this study such as the impact of AI on students facing special challenges, the beneficial aspects of AI as a tool for enhanced teaching methods, and the ethical dilemmas that have resulted from increased AI integration in schools.

The selection criteria included articles, journals, and sources published from 2021 to 2024. Key terms utilized in the literature search included “AI”, “education”, “ChatGPT”, “artificial intelligence in learning”, “ethical considerations”, “learning management systems”, “academic integrity”, and “classroom in learning”. Boolean operators such as AND and OR were utilized to combine search terms. Sources were analyzed based on their relevance to contemporary learning methods concerning the use and subsequent consequences of AI as a learning tool. Although selection bias was minimized to the best of our abilities, the nature of a narrative review suggests possible selection bias.

DISCUSSION:

Beneficial aspects of AI as a tool for enhanced teaching methods:

As the role of AI evolves, the question of its use in education has become more prevalent. Although the use of AI in education is still vastly unknown, there are plenty of beneficial aspects that can be gained out of the integration of AI into educational systems. Challenges in learning are no new issue. These challenges in the learning of students can create issues in the future of these individuals setting up for

a struggle in their professional careers, or even in the prevention of achieving a professional career. However, the integration of AI into educational systems can help resolve some of these major issues, and help enhance the odds of success in students. Some ways AI can benefit students include but are not limited to, the retention and uptake of material provided by instructors, creation of catered study plans and tutoring systems, and attempt to close the gap for individuals facing special challenges.

Using AI to enhance the retention and uptake of materials provided by instructions is the first stepping stone when it comes to the matter of testing the efficiency of AI in education. The attention spans of many students have become a large playmaker in the success of students. Due to the overabundance of social media, the attention spans of students has been steadily decreasing, time spent on social networks have been shown to negatively impact academic performance, as time on social networking increases, the academic performance of the students is seen to deteriorate (Paul et al., 2012). AI can be used to combat the issue of falling attention spans, while also allowing for students to grow academically based on their own individual needs. By implementing AI into the classroom, teaching approaches can be used where data from individual students is used to improve the information being conveyed to each individual (Srinivasa et al., 2022). The implementation of these systems allow for individually catered information at the pace of the students learning. It will take their strengths and weaknesses and use those to adapt a learning method that each individual can grow using (Srinivasa et al., 2022). Through these catered teaching methods, the retention and uptake of information is made easier, as students can learn the way that best suits their individual needs.

That being said, another way that AI can benefit students' individual learning is the creation of study plans as well as smart tutoring systems. A great example of AI that can create study plans is Quizlet. Students can upload documents and files into the quizlet application or website, and through the use

of AI, the application will generate a study guide on all information that was provided. However, these services are only provided in the plus subscription, which costs \$9.99 USD monthly, or \$44.99 USD annually. Additionally, smart tutoring systems such as Carnegie Learning can be used in order to efficiently provide students with personalized feedback as it incorporates their data to tailor the tutoring (Srinivasa et al., 2022). AI-powered tools such as ALEKS can also create learning pathways for the students based on how they choose to learn the information being given (Adiguzel et al., 2023). Overall, the use of these AI powered study tools and tutoring systems can successfully set students forward in their learning as they are catered to their own needs, strengths, and weaknesses.

A large benefit of the implementation of AI into educational systems is that the gap that stands for students with special needs can be bridged. AI has the ability to effectively understand the learning needs of special needs individuals and through these evaluations can facilitate customized learning experiences (Alkan, 2024). The use of AI in special needs classrooms can help increase productivity in the classroom, ensure that learning goals are being met, and that student interaction is being enriched (Alkan, 2024). By allowing these students to have catered learning platforms and catered information, an equal classroom environment can be achieved. A classroom environment where students are no longer struggling to grasp topics. A classroom where the success of students is no longer by chance, but instead a classroom where success is guaranteed. By implementing AI into classrooms for students with special needs, a noticeable reduction of inequalities will occur (Alkan, 2024). In order to provide students with the best education possible, all students need to be considered, and by implementing AI into educational systems, the gap that has been widened between special needs students, and neurotypical students can be bridged to allow for equal opportunity.

Impact on teaching roles with addition of AI:

With the continual evolution of AI and its melding into educational systems, the beneficial and harmful aspects on the roles of teachers arises. As previously mentioned, AI is still a fairly new concept when it comes to its implementation into educational systems. The reason that questions still arise on the idea of AI being implemented into educational systems is due to the fact that it is still so unknown. Artificial intelligence has the ability to benefit teachers but also negatively impact them. Some ways that AI can be beneficial is its use in reduction of teacher workload, assistance in data-driven and decision-support work. Some ways that AI can be harmful is that the labor market for teachers may become reduced, a lack of personal connection may develop, and misuse of information provided may occur.

AI's various uses can be seen impacting teachers in a positive way, and one of these ways is that the overall workload of teachers can be reduced. AI can provide tasks such as proofreading as well as course material composition which lightens by minimizing the time needed to look over information provided by students (Srinivasa et al., 2022). Teachers frequently expressed their dread when it came to excessive workloads due to work that needed to be done outside of the classroom, and the automation of certain tasks, would alleviate this extra workload, and reduce the extra hours needed outside of school hours (Srinivasa et al., 2022).

In addition to reduction of workload, AI can help support teachers with data-drive and decision-support work, also known as learning analytics. Using learning analytics, teachers can gain information and insights into students in order to reveal issues that students may be facing (Srinivasa et al., 2022). These learning analytic systems can also be used to eliminate any bias that may occur within a teacher, correcting any bias that may occur, making the students education more equitable regardless of the gender or race of the student (Srinivasa et al., 2022). Because AI has no

perception of who's work is being put into the engine, and no opinion can be formed by the AI, unbiased, and fair factoring can occur with the schooling system.

Although AI has its benefits in the role of teaching, there are also cons that arise with the implementation of AI into the classroom for administrative bodies. One of these negative factors that may occur is the reduction in the labor market for teachers. Due to the development of AI, teachers may need to develop the skills to manage and handle Artificial Intelligence in the classroom to where it best benefits the students. Since AI is still fairly new, developing the skills to effectively use it could prove to be difficult which may drive teachers to not be able to land certain positions (Srinivasa et al., 2022). Although this issue is not as prominent currently, as AI is not fully implemented into educational systems at the moment, as these programs begin implementation, this issue may become more prominent.

Another large issue at play in the implementation of AI into learning systems is the lack of personal connections that may occur. Although AI can enhance educational processes, they cannot replace the human connection that occurs between teacher and student (Srinivasa et al., 2022). By developing an overreliance on AI, individuals who may learn better from personal connection may not get what they need out of a lesson.

Cost-benefit analysis of AI integration in educational settings:

The increasing utilization of AI in the academic sphere has been accompanied by huge promises of its revolutionary capabilities - from optimizing the learning experience through unprecedented personalization to being economically prudent. While the full potential of AI remains unknown, its implementation in education has not been without its own challenges. This paper aims to examine whether this revolutionary tool can be economically and socially beneficial.

AI has proven itself to be useful in maintaining student motivation by providing immediate feedback through learning tools like Quizlet and Grammarly. Conversely, the engagement provided by AI can be seen as shallow because it enables careless students to act as consumers of content rather than encouraging them to develop foundational learning principles. This in turn can lead to diminishing critical thinking skills when it comes to navigating fresh challenges in the academic sphere. Some concerns include that instant answers and rigid learning pathways offered by AI tools may hinder critical thinking skills by reducing opportunities for actually engaging in, while others hold that AI can foster the development of said skills by being used to present students with complex problems and support them to analyze and reason from them critically (Cai, 2024).

On another note, the limitless personalization that AI provides potentially makes it an invaluable tool for students facing physical or cognitive disadvantages that impedes their ability to maintain pace with their peers. For example, students challenged with dyslexia have shown improved reading comprehension through utilization of AI-based tools tailored to their specific difficulties. Studies have demonstrated such tools have shown an increase in favorable outcomes for students diagnosed with Autism (Adiguzel et al., 2023). One concern is that students with specific limitations often already face challenges pertaining to the social aspect of the classroom environment. A lack of human interaction in the AI model could encourage isolation and potentially exacerbate these issues.

Theoretically, AI is a tool that would potentially reduce millions of dollars in spending on administrative costs. Some AI-driven tools, such as attendance trackers or automated grading systems such as Gradescope, have assisted teachers with more menial tasks, allowing them to direct more of their focus towards effectively engaging with their students (Cai, 2024). By employing tools such as automated grading, the reduction of physical equipment, and the distribution of large scale

instruction, AI integration is undoubtedly the future of cost-effective education. The issue with this theory is the massive initial capital of implementing and maintaining the infrastructure that accompanies AI. If AI continues to develop at its current rate, it could hypothetically reduce the need for large teaching staffs which could lead to many professionals losing their primary income source (Achinewhu-Nworgu, 2024).

While functioning at its optimal performance levels, AI streamlines operations, significantly increases efficiency, and tracks performance in real time. However, AI systems themselves can be complicated in nature, and they require regular maintenance and supervision (Adiguzel et al., 2023). Unregulated, poorly designed, or poorly maintained softwares can lead to significant issues. The most serious of these issues are potential data breaches. Technical issues could lead to entire educational systems coming to a standstill. Because of AI's proliferant integration despite its relative youth, the extent of great potential outages may not yet be fully understood, leading to poorer preparedness in case of such an outage; reliance must be coupled with preparedness.

While the personalization of AI is generally beneficial to students because it provides a relaxed environment at a comfortable pace, the subsequent increase of screen time has also led to persistent issues. The reduction in face to face interaction can lead to feelings of social isolation, cognitive fatigue, and diminishing of vital communication skills. Additionally, further degradation of the mentor-student dynamic could lead to less retention of special skills, and elements of support that are unique and inherent to in-person, such as clarification or feedback specific to certain learning plans (Achinewhu-Nworgu, 2024).

Supporters of AI maintain that it is a tool that increases equity and is becoming increasingly accessible by most students. This notion has significant merit because of its potential to bring powerful educational tools to underserved areas. In

a more practical sense, issues of equity and accessibility have persisted because of inequality of opportunity, which could inadvertently lead to this innovation of beneficial intent to carry an unintended consequence. Wealthy neighborhoods continue to maintain a distinct advantage because of their accessibility to modern hardware and highly trained staff. These issues are more apparent in underfunded neighborhoods, where inequality of access continues to be a major challenge. It is known that, historically, adoption of new or improved academic or scientific technologies has entailed addressing issues of unequal adoption and financial constraints (Alasadi, Baiz, 2023.).

With any revolutionary innovation, the benefits must warrant the financial and societal costs of its implementation. From catering to the individual needs of all sorts of students to decreasing menial tasks and their associated costs, AI has numerous benefits. The ability to address unforeseen consequences and prevalent inequities in its implementation is of equal importance. These represent the invisible costs of AI adoption. Only through careful and responsible counter-planning for these issues, will artificial intelligence truly be a worthwhile tool for the present and future.

Ethical dilemmas presented by AI usage:

The rising use of AI technology by students raises a large and prominent issue that threatens the core of basic student integrity: plagiarism. Although students are the primary input into generative AI software, this does not mean that they are the original source of the ideas created by said software; the presentation of AI-generated ideas, thoughts, essays, and overall knowledge as a student's own work violates the principle of integrity so integral to the educational field. The relative ease of generating a well-constructed AI response will significantly drive the issue of plagiarism as students steal ideas presented by AI and fail to produce original works reflective of students' actual skills and knowledge.

The increased use of AI may also create scenarios in which students fail to properly grasp the concepts and knowledge presented to them in the classroom (Hasanein et al., 2023). As an alternative to learning the material, students can insert assignments and online tests through AI programs, allowing them to gain valuable information and oftentimes correct answers. Students will thus be able to gain a passing score on said assessment and move on to the next topic without much effort required. While this option may be appealing to many students, it ultimately harms them the further they move down their educational journey. Students with significant content gaps will struggle in higher-level classes and subjects, resulting in increased overreliance on AI programs and further exacerbating unethical AI practices. Ultimately, students must face the deficiencies generated by said overreliance, requiring significant effort and time to reform the content background that should have been generated long ago. Students will fail, be unable to assess the reasoning behind their failure, and potentially ruin their future academic prospects.

The use of AI, especially chatbots such as ChatGPT, also raises pressing concerns over privacy and the protection of sensitive information, especially that of younger students. Recent chatbot models have the added ability to store key pieces of information in the chatbot's memory, allowing the model to recall specific user-inputted information at later times and generate a response accordingly. While this feature may be beneficial to students desiring a more personalized chatbot experience, this may lead to the input of student personal information that the system will also store and recall (Eke, 2023). While this wouldn't be as prominent of an issue if this was a feature only enabled by students, chatbots models will automatically store information as needed without any instruction or direction given by the student. Companies that own large chatbot models such as OpenAI may then use this information as they please in accordance with their systems' terms of service, although many companies strictly prohibit this activity. System breaches conducted by external parties may also allow hackers to gain

access to said information stored on the models, necessitating the creation of proper regulations and security measures surrounding AI models (Adiguzel et al., 2023).

In order to generate appropriate responses to user-inputted prompts, AI models gather information from a wide range of online databases. By doing so, AI models, particularly chatbots, put themselves at risk of presenting biased or incomplete information to students. Models and algorithms trained on historical data and sources may perpetuate systemic bias in specific user interactions, such as discussions regarding race (Cai, 2024). Since students often view responses given by AI models as completely objective, they may be more inclined to accept the opinions expressed by said models and in turn accept the biases present in the databases the model sourced from.

Perhaps the largest dilemma is the relative lack of proper policy and guidelines regarding the increased usage of AI within the educational sphere. This can partly be attributed to the idea that ethics has no single truth or approach (Hogenhout, 2021). The very concept of what we as a society deem as ethical changes throughout time and experience, thus formulating specific guidelines dictating the ethical use of AI can be challenging. In fact, many global policymakers merely deem AI as a tool to train the next generation of workers, refusing to focus on the potential impacts AI can have on future students (Schiff, 2022). This has led to the absence of proper AI guidelines, especially in education, in policy discussions globally. Even policies that do include discussions of AI usage in education fail to provide proper nuance and gloss over many of the important issues previously discussed (Miao et al., 2021). While other issues regarding AI usage may gradually appear as we gain more familiarity with the technology, the absence of effective policy guidelines further exacerbates the negative consequences of said issues as we grow increasingly unprepared to address them.

Paths of implementing AI with minimal negative consequences:

AI systems have the incredible capacity to act as both a tool and a weapon to educators and students alike, with the latter being more focused and discussed in current conversations regarding AI usage. Educators in particular share a wide range of opinions regarding AI usage by students, but nearly all understand the importance of embracing new technologies rather than banning them altogether. AI can be misused and exploited for short-term benefits of the student, but it can also be used as a fantastic supplement to student learning and further build upon traditional classroom techniques. In fact, many of the shortcomings of AI usage are the result of misguidance by educators. All technology needs to be properly understood and taught to students, but the relatively novel appearance of AI has not given enough time for educators to effectively teach students the proper way to harness AI as a learning tool rather than a crutch. As such, clear expectations and guidelines on proper AI usage need to be directly outlined by educators to allow students to understand when and how to use AI effectively (Hasanein et al., 2023). Although this may not completely deter plagiarism and overreliance on AI technology, it can allow students to have a better understanding of the role AI should play within education and how to adapt AI to their own personal learning strategies. AI models, whether educators like it or not, are here to stay. It is simply more valuable to guide students on the proper usage of AI, a tool that they will harness and master for the rest of their lives, rather than strip them of this technology altogether.

While generating strict guidelines for student usage of AI may be the first step, the next should be the adoption of AI by educators themselves. The implementation of AI into school curriculums is a novel concept, but it may prove significant in the role of shaping the presence of AI in education (Cai, 2024). Students are more likely to grasp a proper understanding of AI for aid in the classroom if they are directly exposed to its use following the guidance

of educators. By integrating AI as a learning tool and a supplement to traditional learning, educators can harness the overwhelmingly positive benefits of a personalized and adaptive tool while enabling students to gain familiarity with AI and the proper uses of said technology. Introducing the capabilities of AI firsthand to students, such as the clarification through AI-generated explanations and discussion of AI-generated questions, opens the avenue for numerous different creative uses of AI while maintaining proper usage via educator example and direct guidance (Alasadi et al., 2023).

As stated previously, AI is here to stay, especially in the realm of education. Thus, the integration of AI into education should not only be monitored and guided but also introduced to students starting from a young age. Educators should strive to integrate AI technology into their curriculums for the earlier grades and in turn develop clear expectations of AI use for students as they mature and advance past primary and secondary education. By introducing not only this technology but its proper use to students at a young age, educators can ensure students view AI first and foremost as an educational supplement rather than a tool to bypass critical thinking and effort.

CONCLUSION:

The proliferation of AI in the academic sphere represents a radical shift from traditional pedagogical methods. The full implications of the growth of AI are still unknown. However, as this review has demonstrated, AI holds immense potential to enhance the learning experience. One of the primary benefits is the financial aspect, the high levels of personalization, and the ability to accommodate students who struggle with traditional learning methods. It must also be stressed that, alongside these benefits, there are significant challenges that must be examined and resolved. Issues of overreliance, the erosion of interpersonal skills, and privacy concerns all represent fresh challenges that have developed as a result of the rise of AI.

The responsibility of policy makers, institutions, and students are all important in whether the implementation of AI will ultimately be beneficial or harmful. AI is a tool and should be used as such. It cannot fully replace traditional teaching methods and nor is it meant to. Institutions and policy makers particularly must be cautious in its implementation. The role of AI in education has not yet fully been determined, its impact will be evaluated by how it is used. If guided by ethical practices, the potential benefits are tremendous. Failure to address the shortcomings could lead to an exacerbation of existing disparities between different communities. AI is a tool that could empower educators and students across the world, and that must be the ultimate goal in this age of educational policy.

To that end, institutions should invest heavily in AI literacy for both educators and students so that neither group can unintentionally misuse the tool. Simply educating them on how to use AI ethically is not enough, there should also be a focus on the ability to analyze its outputs critically. It must be made clear to all people in the academic sphere that the role of AI is to augment, not detract, from human interactions. Another highly relevant issue to AI policy is client data and privacy. At the legislative level, there should be a concerted effort from lawmakers to enforce privacy laws by regulating the technology companies responsible for AI development. Ultimately, the safe and optimal integration of AI will only be possible by maintaining cross disciplinary collaboration. From the legislative level to the educators and students, everyone is responsible for maintaining responsible use of this tool. AI has the potential to be a huge catalyst for educational reform and therefore must be integrated thoughtfully and constantly reassessed to ensure its optimal integration.

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