Artificial Intelligence is Transforming Modern Education

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Abstract

Artificial Intelligence (AI) has a pivotal role in many K-12 educational systems, providing benefits for both students and teachers. We analyze different viewpoints on whether AI in education is socially responsible. To best utilize AI's potential and ensure responsible use, it is key for governments to implement policies conducive to AI's adoption within classrooms. In this position paper, we discuss the benefits and limitations AI provides to education as well as the steps needed to responsibly use AI in education in the future.

Keywords

Education, Policy Recommendation, Social AI

1. Introduction

AI has contributed massively to making the educational landscape much stronger and more stable. With the COVID-19 pandemic devastating the global economy and forcing many schools to move to remote learning, teachers needed to utilize technology, and school districts explored the use of expanding their technological capabilities post-pandemic. This increased use of technology expanded the usage of AI within classrooms. This expansion has increased educational access, but educational technology (Edtech) companies have the opportunity to abuse this power. A sustainable future for AI in education is only possible with a responsible implementation of AI that can be trusted by schools. In this paper, we discuss the current usage of AI in education along with limitations and concerns that need to be addressed. We ultimately formulate policy recommendations for governments to implement.

2. Current AI Usage in Education

AI can offer many benefits for both students and teachers, making it an important tool in modern education. Thus, AI techniques are being used extensively within classrooms today [1]. For students, AI can mean more personalized learning. Personalized learning is tailored towards a specific student's needs, and it would allow students to learn the exact content most relevant for them. AI systems can help scale and improve personalized learning. For example, the popular studying tool Quizlet uses AI to help users study more efficiently by creating personalized study paths that best address a student's weak points, thus helping a student learn content faster [2].

Additionally, natural language processing (NLP) techniques have been effective for both students and teachers. Grammarly is known to help improve students' writing through the use of NLP powered technology. Their systems can analyze text and provide valuable feedback to students, making the quality of their work higher when submitted to teachers. Similarly, the Quizlet system uses NLP to conduct smart grading by checking if a student's answer matches the correct concept rather than checking if the answers are exactly the same. For teachers, NLP can help reduce workload which is key since teacher workload has increased tremendously during COVID-19, resulting in teachers risking burnout [3]. Administrative tasks, such as grading assignments or filling out paper, have become burdensome for teachers as they take up a significant amount of time and are largely repetitive. Such tasks can be often automated through NLP systems that process large amounts of text and give teachers summarizations or complete the task itself [4].

Similarly, computer vision (CV) techniques, such as object detection or image classification, also have important applications within education. Within schools, safety is an important concern. Beyond directly saving lives, a safer school environment is more conducive to learning. For example, one school district in the United States implemented an AI-based camera system to detect guns [5]. This system can help prevent school shootings, and similar systems can be used to detect unauthorized individuals.

CV can also greatly benefit teachers. Along with NLP, CV can be used to aid in test grading. For multiple choice tests, CV can automate the grading process by detecting where students have bubbled in their answers [6]. Such technologies have already been implemented within many schools. Additionally, through the use of classification, hand-written characters can be identified, and the resulting text can then be graded. NLP systems can also be integrated in order to parse the text and grade

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it. These tools, such as NLP and CV, are commonly used within education.

3. Concerns of AI in Education

The implementation of AI in education also carries many concerns that need to be addressed. In a world with rapidly advancing technology, data privacy is a problem that is becoming increasingly harder to solve, especially in education. Students use various different technologies in an online or hybrid learning setting that leads to an increase in data collection/usage. While this data is important for the functionality of AI-based applications, it can also result in an invasion of the student's privacy. In fact, one-third of undergraduate students expressed concern about their privacy when AI technology was used in their classrooms [7]. AI models are trained using user-collected data to create trends and improve the accuracy of the model. Since education technologies are created by large corporations, they strive to collect more data to improve their product. Eventually, these data collection methods seem ordinary, analogous to security cameras, information forms, or usage tracking. Many technologies implemented in schools are pertinent to learning the content of the course, often leaving students no choice to opt-out and remain private. Invasion of privacy can be a major concern for many who wish to remain private and not share much personal data. Moreover, technology like ChatGPT have raised many concerns over academic integrity with education, but data on this issue is limited.

Another concern of AI is the expanded inequity between wealthy and underprivileged schools. Due to greater resources, funding, and accessibility, wealthier schools are able to expand AI-based learning faster than underprivileged schools, thus allowing their students to be more technologically proficient. However, underprivileged students may lack technological proficiency, creating a disadvantage for these students if AI is implemented into the school system.

AI can also lack self-correction, which is important to improve accuracy. Edtech could aid towards accurate student placement in a certain subject. These technologies work off the limited data collected while the student uses the application, which could lead to improper outcomes. Generalized algorithms found in AI fail to correctly use small nuances in data, such that they could either inflate the effect of the nuance or completely overlook it. For example, a student could lack vocabulary in a specific topic, and this data could be used to determine the reading level of the student [8]. In a situation where a teacher would be able to identify a student's strengths and weaknesses effectively, AI lacks the same quality of analysis. These concerns need to be effectively addressed through better, more equitable AI to ensure more widespread adoption.

4. Policy Recommendations

Although AI has proved to be beneficial to the educational landscape, it is still in its early stages and much more should be done by the governments in their AI policy-making. When creating AI-related policies, they should consult experts in AI given the newness and rapidly evolving nature of the technology. Countries like the US should work towards creating global standards for AI usage, and specifically to establish data-protection policies that would make the school district's data collection fully public to all parties. By adopting laws that clearly distinguish between which data can be publicly or privately collected, the government would allow for greater trust to occur which is key for further adoption of AI-technologies in the educational sphere.

Additionally, school districts would benefit from policies that provide funding towards specific AI-based technologies, such as automated grading systems or school-safety measures. Doing so would benefit teacher resources and allow schools to become more safe for students and teachers. Since many of these AI-based solutions are software-only, they can be implemented and integrated within the pre-existing pipelines within school districts for safety and education. Thus, we believe that implementing such policy to increase funding for AI-based technologies would greatly improve the quality of education across the board.

5. Conclusion

As AI becomes more prevalent within the educational realm, it is important to consider the trustworthiness of AI usage. The responsible use of AI will allow for maximum benefits for both students and teachers. In the future, AI researchers should consider addressing some of the concerns that exist within today's models. A move towards privacy-preserving models and less intrusive AI would allow for greater trustworthiness and adoption of such systems within classrooms across the world. At the same time, it is important to increase AI literacy among educational administration to allow for greater usage of AI. Thus, socially responsible AI and machine learning technologies will create a lasting impact on the quality and access of education.

These examples of AI are crucial to the understanding and discussion of the effectiveness of the current implementation of trustworthy AI in education. We find that in successful implementations of AI in education, both teachers and students trust the predictions and ability for the AI to perform its task. Instead of a focus on learning how an AI makes decisions, we believe there should be greater emphasis on showing the success of AI and its broader implications. When humans see the AI success-

ful, they are more likely to implement and use the AI in their own tasks. Thus, we believe that further development and experimentation with AI and education can greatly transform the educational landscape.

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