The Problem with A.I. in Education

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Although Artificial Intelligence (AI) has been around for nearly two centuries, the discussion of its ethical implementations is relatively new. This may be due to how advanced AI has gotten in recent years. With breakthroughs in machine learning and language models, AI has the capability to duplicate human speech and can even write code for other programs. The impact of AI can be either good or bad depending on how they are implemented and by what safeguards they have been designed with.

AI is built through a process called Machine Learning. Microsoft defines machine learning as "the process of using mathematical models of data to help a computer learn without direct instruction. This enables a computer system to continue learning and improving on its own, based on experience." This means that a computer can mimic human reasoning by using a series of algorithms that help the systems achieve AI through deep learning. Through these processes, the AI system is trained on data sets provided by the developers. The data sets that are used, combined with limitations pre-programmed by the developers, essentially determine how well, or poorly, an AI system will perform.

What data an AI system is trained on, and the implications of that data, are at the core of debates on the ethical implications of AI systems ranging from biases to misinformation. For example, an article by Jisu Huh, Michelle Nelson, and Cristel Antonia Russell goes into detail about how AI is affecting academic research. "As we encourage future research in this area, we cannot ignore the disruptive impacts and emerging problems we face as academic researchers stemming from the new generative AI tools. ChatGPT and other recent generative AI tools are prompting academic associations to update their policies to deal with potential research-ethics issues, such as potential plagiarism, false information, and authorship issues." AI software such as ChatGPT will often fabricate information in order to satisfy a query prompt provided by the

user. This information can be misleading, and the system is unable to provide references to its source. As such, works using prompts from AI are prohibited from academic publications to prevent the spread of misinformation and plagiarism.

As this technology becomes more widely used and available, educators are concerned about how AI will impact the daily lives of students. With a few clever prompts, students are able to find answers to tests and even have AI generate essays on countless subjects. In an article published by Gifted Child Today, Del Siegle wrote, “Many educators worry that recent AI products have opened the door to unfettered plagiarism and misinformation. ChatGPT and Bing AI can generate entire essays on a given topic, which raises concerns about students using the tool to plagiarize work. It may be difficult to determine whether the student wrote the content or whether it was generated by the AI model. It can also be difficult to determine how much of a written product is the student's and how much came from AI. Students may also become overly reliant on AI for completing assignments, rather than developing a full set of research and critical thinking skills.”

Despite all the potential risks, there are also potential benefits. In the same article, Del Siegle discussed how AI can be used to help gifted students get more out of their education. Teachers can use AI to improve their curriculum and use it to provide students with additional challenges beyond the regular classroom material and design more individualized learning plans based on a student’s advanced knowledge, interests, and learning preferences.

AI and education advocates, Marc Natanagara and Sal Khan are also very optimistic when it comes to the implementation of AI in the classroom.

Marc Natanagara suggests that “the real threat to our children’s education is not machine learning and artificial intelligence, it is how we have come to measure and value human learning and human intelligence.” Instead of avoiding the use of AI or fighting against the use of AI, educators should adapt and find new creative ways to use AI to improve the learning quality of students. He suggests using AI to improve lesson planning and fact-checking. But, more importantly, he also suggests educators redefine and revalue what we consider intelligence and teach lessons that are more human in nature. Some characteristics of these lessons could include hands-on experiences, identifying meaning, creating connections, awareness of other people’s feelings, and applying what they know to new situations. “Only humans can think divergently, outside the box. Computers are the box; artificial intelligence can only follow the rules they have been given. AI cannot experience, generalize, reason, reflect, think abstractly, or understand relevance. We future-proof our classrooms [by making] AI a co-teacher, work with the technology’s strengths and weaknesses, and most importantly value human intelligence as more than just computer-like processing. Get students to use parts of their brain AI does not have and ask questions AI cannot answer.” Marc Natanagara concludes by emphasizing the importance of challenging students to use the creativity of their human minds.

Sal Khan, the founder of Khan Academy, is not only optimistic about the implementation of AI in education but has also started a project for Khan Academy to build its own AI system (called Khanmigo) and integrate it with its online courses. Khan argues that there are not only ways to mitigate the proposed issues of students using AI, but that we are at the cusp of the biggest positive transformation that education has ever seen. He intends to support this new revolution by giving every student access to an artificially intelligent personal tutor, and every teacher an AI teaching assistant.

During a Ted Talk presentation, Sal Khan showed some research data from Benjamin Blooms' 1964 study called "The 2 Sigma Problem". This research showed that with 1-1 tutoring students can learn more at a faster rate than through standard methods. Khan points out that with a tutor an average student can become an exceptional student and improve the performance of below-average students. The real problem with this model is: "How do you actually give [tutoring] to everyone in an economic way?" Sal Khan's solution to this problem is the AI system Khanmigo. What makes this AI different than ChatGPT and Bing AI is that it was built from the ground up with educational use in mind. The developers added safeguards to prevent the AI from giving the students answers. Instead, it does as a tutor would and guides the student to find the answer themselves. It cannot manipulate the work directly but can give explanations for things such as mathematical equations and why code is not working as expected. Alternatively, this AI system can also be used by teachers to improve lesson plans, dive deeper into topics they want to teach, and even grade assignments.

What sets Khanmigo apart from other large language model AI is how it functions on the backend. GPT-4 has amazing capabilities, but the context it is given matters a lot to what kind of responses the AI generates and sends back to the user. However, an idea from an undisclosed OpenAI researcher suggests that developers can dramatically improve an AI's ability in math and tutoring by programming the AI to "think before it speaks". This means that the AI will construct "thoughts" (or prompts for itself that it does not share with the user), work on those thoughts, and validate the information before sending it back to the user. This method reduces the potential risk of an AI system spreading misinformation.

Sal Khan concludes his presentation by saying, "We should not just relax and hope for the best. I think all of us, together, have to fight to make sure that we put the guardrails, we put in

reasonable regulations. [And] fight for the positive use cases. … Because the most powerful use case, and perhaps the most poetic use case, is if Artificial Intelligence can be used to enhance human intelligence, human potential, and human purpose."

After conducting this research, I am more optimistic about the implications of AI in education. Marc Natanagara raises a very valid point that we should re-evaluate what we consider to be intelligence. In a modern world with all kinds of tools, such as scientific calculators, thesauruses, search engines, Grammarly, and other helpful tools, simply remembering facts and finding answers to get good grades are no longer enough; true intelligence comes from critical thinking, adaption, and implementing skills into new situations. A computer can find facts and solve equations faster and more accurately than any human, but machines cannot effectively implement creativity and make reasonable decisions.

I, also, think that what Sal Kahn is doing at Khan Academy with the development of Khanmigo is a step in the right direction. Taking the initiative to build an AI system designed for education will yield a much better outcome than trying to adapt a generic AI into the educational space. How they are implementing safeguards into the system, and their "think before speaking" approach will dramatically mitigate issues such as cheating and misinformation. On top of that, the system also records chats and a secondary AI will inform the teacher of any misuse or concerns the teacher may address. Also providing the same system as a teaching assistant will go a long way to helping teachers manage an already difficult job.

My experience working in the Technology department of a public school system has taught me that students will go to great lengths to get around safeguards and avoid doing assignments. Providing them with an AI tutor from the beginning could prevent a lot of the issues that would arise if educators tried to ban AI entirely. In this post-pandemic world,

schooling has become even harder to manage than ever before. Students are being pushed ahead in grades without meeting the proposed standards, and teachers are having to juggle more tasks than ever before. Implementing the suggested AI systems could not only improve student performance but also release teachers from a lot of pressure trying to upon these standards. Some of the potential drawbacks I see, however, are the increased dependency on technology to complete assignments, the potential of standards getting raised to keep pushing for performance, and the potential of budget cuts to meet the financial demand of said technologies.

However, this technology will also improve the performance of homeschool and private academies making them a strong alternative to public schooling. If public school systems do not adapt and make the improvements teachers desperately need, we could see a shift from public to private institutes.

Regarding education, the public release of generative artificial intelligence, designed with deep language models, has raised a lot of concerns ranging from privacy to misinformation, plagiarism, and whether or not students can use the tools to cheat on assignments. It all depends on how the AI is programmed and what safeguards it follows to meet the request. Advocates like Marc Natanagara and Sal Khan are optimistic about the implementation of AI for education. Marc suggests that the real problem with AI is not the machines themselves, but how we use them and how we measure human intelligence. Khan has gone a step further by actively developing an AI system designed for education and the tutoring of students. I agree with both of these experts: AI should not be used to do the work for us but should be used to enhance our work and used to improve our own Human Intelligence.

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