

Artificial Intelligence in K-12 Education

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PHIL301: Professional Ethics

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June 1, 2023

Artificial Intelligence (AI) is a growing branch of computer science that has people both equally excited and concerned with the future. Artificial intelligence has been a booming topic for years— whether it relates to chatbots, speech recognition, facial recognition, virtual assisting, and even self-driving cars—AI has become an important topic for development, innovation, progress, privacy, and jobs. AI can be found in both our personal and professional lives, and now more than ever before, in our education system. There are positives and some encouraging aspects as we look at the development and progression for AI in our education system, but there are also some ethical issues that need to be addressed and considered. When it comes to privacy, learning, and teaching abilities, there are some issues and concerns that should be addressed. I plan to explore some of the pros and cons of AI in our education system for K-12 learning, and address some of the important ethical concerns that arise when we consider AI.

For the purpose of this paper, I will be referring to Artificial Intelligence as AI. So, what exactly is AI? “1. The capacity of a computer, robot, or other programmed mechanical device to perform operations and tasks analogous to learning and decision making in humans, as speech recognition or question answering. 2. A computer, robot, or other programmed mechanical device having this humanlike capacity: teaching human values to artificial intelligences. 3. The branch of computer science involved with the design of computers or other programmed mechanical devices having the capacity to imitate human intelligence and thought.”

(Dictionary.com, 2023)

As you have read, there are a few different variations of what AI is—but when we look at our education system, how is AI involved? What could AI mean when it comes to educating students? AI is incredibly important—the students that are in the education system are the people of the future—these are going to be future leaders, workers, community members, mothers,

fathers, etc. How students are being educated does not just affect the student or the parent, but everyone in the world, as we all interact together and grow and enhance the society that we live in. It is important looking at AI and the pros and potential downfalls of this system, as this affects everyone in the world.

AI was introduced into the classroom setting as early as the late 1960s-early 1970s. “From 1964 to 1966, Eliza, an early natural language processing (NLP) programme was built by Joseph Weizenbaum (1966) in MIT. Eliza was then incorporated by various programmes as the machine and human interface. Then Jaime Carbonell coded a student facing instructional programme called SCHOLAR, which posed or answered questions regarding South American geography and gave instant feedback about the quality of a learner’s responses in natural language.” (Guan, Jiang, Mou, 2020) AI is not a brand-new concept for education, as it was introduced about 50 years ago—however it has only advanced and grown since its early years of production and discovery.

There is a rather extensive list of all the ways that AI has been implemented into education now, but some of the main ways are through: “adaptive learning—used to teach students basic and advanced skills by assessing their present skill level and creating a guided instructional experience that helps them become proficient. Assistive Technology: AI can help special needs students access a more equitable education, for example by reading passages to a visually impaired student. Early Childhood Education: AI is currently being used to power interactive games that teach children basic academic skills and more. Data and Learning Analytics: AI is currently being used by teachers and education administrators to analyze and interpret data, enabling them to make better-informed decisions. Scheduling: Helping administrators to schedule courses and individuals to manage their daily, weekly, monthly, or

yearly schedules.” (Senior College and University Commission, 2022) AI has been implemented into the education system and has been far reaching to each individual student and also the teachers and faculty that work at schools and in the education system.

AI has some major benefits to the students in our education system, “one of the main advantages I see of AI in the classroom is personalized learning. AI-powered educational tools can analyze data on student performance and provide tailored support to improve their grades. AI can also provide instant feedback. For example, AI-powered educational tools can provide students with immediate feedback on their work, allowing them to identify and correct mistakes quickly. Another advantage of AI is its ability to automate repetitive tasks. It can grade assignments and quizzes, which can free up teachers' time for other tasks, such as lesson planning and providing more one-on-one attention to students.” (Shonubi, 2023) There are many examples of different AI powered learning tools, some of those being “Ahura is an AI-powered learning assistant that tracks learning habits by observing attention and engagement. Knewton offers an adaptive learning platform that provides personalized learning experiences for students. Querium is an AI-powered tutor that provides students with step-by-step tutoring on math problems and builds personalized lesson plans. ALEKS is an AI-powered learning platform that provides individualized learning paths based on students' strengths and weaknesses.” Shonubi, 2023)

AI may even help students better their education by the type of feedback they receive. “Some students may be shy about taking risks or receiving critical feedback in the classroom, but with AI, students can feel comfortable to make the mistakes necessary for learning and receive the feedback they need for improvement. Much of the potential envisioned for AI in education centers on reducing time spent by teachers on tedious tasks to free up time for more meaningful

ones. Automating administrative tasks is also one of five potential benefits spotlighted by Bernard Marr, an author, futurist, and technology advisor who cites figures forecasting 47.5% growth from 2017-2021 in the use of artificial intelligence in education in the U.S.” (Senior College and University Commission, 2022) I know when I was in high school, there were assignments that I did not do as well on as I could have because I was too nervous to talk to the teacher about clarification and was afraid to express not understanding—so I didn’t ask. This resulted in lower grades and kept me from understanding material that I should have understood.

Another area of AI that I mentioned above was its impact on teachers. Some teachers view AI as being a helpful tool, while others view it as potentially dangerous. It was recommended that “best practices for incorporating AI into the classroom can help teachers effectively integrate this technology into their teaching practices and provide students with a more personalized and engaging learning experience.” (Melo, 2023) AI could also help teachers with tracking student progress, “AI systems can also help students get back on track faster by alerting teachers to problems the naked eye cannot see.” (Cusick, Shepherd, Lofgren, Modaffari, Wong, Jarsulic, & Custer, 2023) AI has many benefits to both teachers and students, but there are also ethical and other potential issues that arise in the development and implementation of AI in education. I am going to look at some of those concerns and risks and why they matter.

One of the issues with AI could be the social/emotional impact on students. “There is also the lack of human interaction and emotional support that students receive when using AI-powered educational tools. While AI can provide personalized learning and instant feedback, it cannot replace the human and emotional support that students need to succeed, and relying too heavily on AI-powered educational tools may impact students negatively.” (Shonubi, 2023) This point makes it clear that it is important to ensure that with the use of AI, we need teachers and

other students for the social and emotional support of continued learning. It is not healthy for students to be on a screen all day without human-to-human interaction.

Regarding teachers, many have their own ethical issues when it comes to AI. There have been concerns that AI will take over the jobs of teachers as robots and AI systems have in other industries (such as mechanical, or self-checkout). “There are some who believe that teachers will be completely replace by robots by the year 2027. One reason for this is that there is a demand for teachers today that is not being met.” (Lynch, 2021) However, as much as this may be a concern for some, it is strongly argued that teachers could never fully be replaced by AI, as teachers are an important part of a student’s education. “AI cannot replace teachers. They cannot give a child what they need. Students need the love, transaction, student-teacher rapport, and collaboration that an AI cannot provide.” (Lynch, 2021) There are many questions that students may have that a teacher is needed for, and AI cannot provide help with. Different students have a variety of different needs and learn in different ways—an adaptable teacher is needed to ensure each student is being taken care of in the way they need.

One of the biggest concerns when we look at AI and education is privacy. “One of these major risks is privacy or the lack of it. AI technology based on algorithm applications intentionally collects human data from its users and they do not specifically know what kind of data and what quantities of them are collected. Although legislatively (in many countries or geographical/political regions, such as the European Union) user consent is required before using any AI technology, the user actually does not know what is happening with his/her data in the system. Therefore, AI technology companies should minimize this data and aim to include on the information that can enhance student learning.” (Klimova, Pikhart, & Kacetl, 2022) Many parents are concerned with what information about their child is being shared in this big pool of

data. Even if parents and children give their consent, most people do not know where this information goes, how it's used, or who has access to it. There's also the issue of data and information being stolen or hacked into.

An example of a privacy concern was one that effected the Chicago Public School system in 2022. "The software that many school districts use to track students' progress can record extremely confidential information on children: "Intellectual disability." "Emotional Disturbance. 'Homeless.' 'Disruptive. Defiance. Perpetrator. Excessive Talking. Should attend tutoring.'" Now these systems are coming under heightened scrutiny after a recent cyberattack on Illuminate Education, a leading provider of student-tracking software, which affected the personal information of more than a million current and former students across dozens of districts — including in New York City and Los Angeles, the nation's largest public-school systems. Officials said in some districts the data included the names, dates of birth, races or ethnicities and test scores of students. At least one district said the data included more intimate information like student tardiness rates, migrant status, behavior incidents and descriptions of disabilities." (Singer, 2022)

This example above is a major concern—if you are a student who has had disciplinary issues, this could affect their future college education or even jobs. If companies have access to this type of information, it could drastically affect the students' lives whose privacy was hacked. This is a major ethical concern— should companies be able to have this type of access to underage students if it affects their hiring process? It will not account for the student's individual growth or changes that they make throughout their lives and could hinder great employees from being hired because of mistakes they made in their adolescent years.

I think that there are many benefits to implementing AI into the classroom, but as technology furthers, we need to approach this situation with caution. If we could use AI to learn better about how each student engages in the best way, we could really individualize learning, while students are still getting the social benefits of school. I know from personal experience; my 1st grade son is always complaining about how certain subjects are much too easy for him (like math and reading) and his school uses tablets and apps to engage him in certain activities for learning. However, these activities still don't stimulate him in the way he wants, so if there were AI technologies that could test where a student's level of engagement was, how much knowledge they had in a certain subject, and came up with a learning plan for them, that may help teachers with knowing how far to push different students in different areas.

Something that would be important for the education system to implement would be implementing an effective ethics program. Now, for this specific issue, this ethics standard would be geared more toward the students using the AI. Section 9-3b in our text talks about compliance and variable orientation—it would be important that both of these control systems are used. We want students to use AI as a helpful tool for their education, while also understanding the rules and laws that follow using this type of technology. There is potential for AI to be used in a manner for other than what it was originally intended—so having an understood, simple control system would be highly beneficial. (Ferrel, 2022) Students may be put in ethical dilemmas to which the students may not know how to react. An ethical dilemma is “A problem, situation, or opportunity that requires an individual, group, or organization to choose among several actions that have negative outcomes”(Ferrel, 2022) Say a student catches another student using AI in a way that was not intended for school (such as looking up answers, using social media, etc.) and if that student tells on the other, that choice will have social

ramifications. But ethically, what is the correct choice? Having a plan in place will not eliminate all potential problems, but if students have a base to follow, that will help with ethical decision making.

Overall, AI in student education has a very promising outlook, as long as we keep in mind what the concerns and potential risks are. There is risk in everything—including not implementing AI. There could be a lot of student growth missed out on and it may make it harder on teachers for accessing student needs and adapting new plans for each individual student to suit their best learning outcome. If AI is going to continue to be implemented in the education system, there needs to be strict laws and protection over student information and also a plan if those regulations fail. Protecting students should be the biggest factor here, so ensuring student privacy, continued growth, further learning, and enhancing skills are all things to think about when deciding what sort of AI should be used and to what extent.

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