

From the Editors-in-Chief

HOW ARTIFICIAL INTELLIGENCE AFFECTS EDUCATION?

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Abstract: *Acquiring specific knowledge that can be tested by means of a test is a very common scenario present in the education system, which determines the passing of successive levels of education. The simultaneous development of technology, in particular artificial intelligence models available through publicized large language models, makes this scheme vulnerable to abuse and pitfalls. Updating knowledge and awareness of the advantages and risks of the use of artificial intelligence in education (AIED) is the responsibility of the research community and global policy. This text is a voice that attempts to redress the balance between the enthusiasm for the use of AI in education and the dangers that come with it. Public awareness develops more slowly in this case than the technology itself, and the regulations created are no substitute for ethics and decency, at the initial stage of their introduction, before certain patterns and rules have become established.*

Keywords: *artificial intelligence, education, AIED, human-technology.*



AIED socio-technological background

The rapid development of artificial intelligence (AI) tools and techniques has been the cause of vigorous debate in recent times. Headlines on the one hand report that AI will be depriving people of jobs while other headlines promise that thanks to artificial intelligence we will no longer have to work. Whether and how the development of artificial intelligence will affect the process of education (AIED – Artificial Intelligence in Education) and skill acquisition is still under consideration. While one gets the impression that the revolution has already begun, as academic articles cite numerous examples of AI-based learning platforms (Cukrova et al., 2023) or student text assessment tools (Cochran et al., 2023) the public does not seem to control either the direction or pace of change.

New technologies are indirectly revolutionizing the teaching system. Scholars and students are eager to use large language models to acquire information or edit texts through publicly available generative tools, like exemplary ChatGPT, which they unreflectively share with teachers. Teachers who focus on non-interactive checking of student-delivered content are checking the results of artificial intelligence, not their proteges. Meanwhile, CEO of OpenAI, Sam Altman, described ChatGPT as "incredibly limited, but good enough at some things to create a misleading impression of greatness. It's a mistake to be relying on it for anything important right now. It's a preview of progress; we have lots of work to do on robustness and truthfulness." (Tweet on December 11, 2022).

This is particularly painful in those countries where centralized education does not focus on critical and analytical thinking, does not stimulate entrepreneurship, innovation and creativity, and does not teach teamwork and empathy (e.g., the Prussian model, which has persisted in some European countries). At the same time, teachers' dubious authority leads them to act in a schematic and uninvolved manner, based on reproductive verification of knowledge.

Thus, since AI is not reliable enough and has no so-called "moral compass" in itself, the very idea of using AI should be ethical. We should monitor and supervise the use of AI, so as to teach people to use modern technologies in this way. We should take care that the context and manner of AI use and the result of the action does not violate our/society's "moral spine."

In anticipation of the regulations that various countries around the world are working on, including the European Union (EU AI Act), we should make teachers rethink the way they assess students and raise awareness of technological advances among teachers themselves. Extant literature has demonstrated that teachers have limited capacity and skills to engage in high quality assessment practices that move learning forward, but they may have to change how assessment is currently done to more innovative assessments. The present voice is therefore an appeal to supplement the discussion affirming the use of various elements of AI in education with skeptical voices addressing the risks and dangers.

Perspectives and examples

According to numerous literature studies, artificial intelligence has great potential for use in several areas of education. The first potential noted lies in the personalization of education. This is because few teachers are able to adapt to the requirements and expectations of individual students in the classroom. Another benefit lies in the tutoring capabilities through

which AI systems are able to adapt to individual students' learning styles and individual knowledge levels. AI systems can also be used for grading. They can do this according to an accepted key, but can evaluate more abstract papers such as essays. Modern chatbots can also be an excellent source of feedback on courses taught. Evaluating student responses allows gaps in the learning process and the course itself to be identified and necessary improvements to be made. Chat communication also allows pupils and students to verify their own knowledge in a more anonymous and direct way. Verifying one's own mistakes is an essential part of the process.

Contemporary literature reports many practical examples of the use of AI in learning (Beck et al. 1996, Chen et al. 2020, Zhang et al. 2021). Examples can be found in several branches of AIED systems. Among others these are student-centered systems and teacher-dedicated systems (Holmes 2022).

Among the historically most popular solutions dedicated to students are Intelligent Tutoring Systems (ITS), which aim to provide automated, tailored instructions (Polya 1945, Domisico 2023). Students can use AI-assisted apps to learn languages (SayHi 2023) or learn mathematics (Photomath 2023). With AI-assisted simulations, they can learn chemistry (Behmke 2018), write an essay (GPT-3 2020) or, as in the case of IBM Watson, hold a discussion (Hussain 2017). A very interesting functionality of the Automatic Formative Assessment is provided by the Grammarly environment (Grammarly 2023).

From an educators' point of view, in addition to dedicated interfaces for monitoring student progress in ITS-type systems, quite functional applications of AI are plagiarism detection (Turnitin 2023), validation and selection of teaching materials (X5GON 2023, Clever Owl 2023) and tools for Automatic Summative Assessment (Ramesh 2021, ETS 2023).

It is impossible to list all the examples of the use of AI in education, but it can be firmly admitted that we are not still discovering new layers of possibilities that artificial intelligence brings to education.

A skeptical outlook

A sound analysis of the impact of artificial intelligence on education should also take consider skeptical voices alarming about possible dangers. It should be noted that relatively few voices touch on the risks and drawbacks of introducing AI systems into education.

One aspect that is often overlooked is cost. In addition to the sheer cost of creating LLMs, access to them is increasingly monetized and thus becomes available only to the more wealthy. In some cases, there are extreme situations where teachers cannot afford access to AI technology while students are freely using it. Another issue is the addiction to technology, which, through its use in everyday tasks, results in the disappearance of the natural ability to overcome challenges among its users. This, in turn, raises the black vision of the irretrievable loss of knowledge/skills when the AI system needs to be fixed (temporarily) or simply ceases to exist. Another casualty of the widespread use of AI technology is the weakening of interpersonal relationships. The average person, especially one who is addicted to modern technology, is unable to build relationships with other people properly. Contact with another person becomes less attractive than interacting with a seamlessly adaptable digital environment.

It is also worth noting the immanent characteristics of artificial intelligence systems are habitually characterized by bias caused by unbalanced learning data. As an example, some studies profile LLMs against political preferences (Santurkar et al. 2023, Tornberg 2023). AI systems condition their actions on context, which, imprecisely expressed, can suggest unsatisfactory or even wrong solutions. Another noteworthy feature of systems is their tendency to build their power on patterns, which may stand in opposition to creativity and innovation.

The use of AI in education, especially at the stage of enthusiasm around emerging technology, can lead to the teaching profession being depreciated as uncompetitive with AI tools. This is overlaid by the widespread belief that AI will put many people out of work. All of this, however, ignores the invaluable role of humans in understanding the subject matter being studied and in the selection of materials, which we know modern tools select moderately effectively. The elimination of the humans from the learning process can result in reduced effectiveness in making critical decisions in new situations. In such a context, intuition, which is developed in classrooms based on discussion and inference, is often useful.

An in-depth analysis of the advantages, of which there are more, and the risks, of using AI leads us to reflect that a balance is needed between the use of technologies that make our lives easier and the people who use these benefits. The aim of using AI is not to replace educators but to make their job easier. AI tools can be integrated into the digital classroom environment, where students can contextually benefit from different forms of communication, consultation and knowledge acquisition. At the same time, the technological awareness of teachers needs to be worked on very hard so that they can develop useful solutions in the educational process together with their students.

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