Reflections of Artificial Intelligence on Education

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Abstract

One of the most commonly discussed areas of research in many fields, artificial intelligence appears to have generated a significant amount of debate in the field of education. In addition to being a component of technical and digital change and transformation, artificial intelligence in education also refers to the processing of the most intricate human factor components inside educational contexts. In order to enhance students' capacity for autonomous learning inside the educational system, artificial intelligence is essential. Artificial intelligence has begun to control how we engage in our social spaces as technology takes over every aspect of our lives, particularly our interpersonal connections. While artificial intelligence in education is becoming more obvious with various applications, it can be said that artificial intelligence is intended to yield effective learning and teaching outcomes and is attempting to be evaluated as soon as possible. The advancement of artificial intelligence will have a immediate impact on the future of education and with no question education is going to be one of the areas that benefits the most from this relatively recent wave of digital evolution. Because of this, this article aims to engage in discussions about the potential implications of artificial intelligence in the context of education in order to fully comprehend the reflections of this technological advancement that will have a significant influence on educational institutions going forward. The combination of computer-based creation of new technologies with educational methods and programs will lead to deeper improvements in education.

Key Words: Artificial Intelligence, The Future of AI, Education

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Introduction

Artificial intelligence has been one of the most talked topics of our time. It is at the intersection of different fields of science and occupies the specialized area of each science branch. This situation has also initiated a field of discussion such as "the philosophy of artificial intelligence". In the digital world, artificial intelligence is a combination of many fields such as machine, computer, software, which is a separate breakthrough in itself. As a factor affecting the social and cultural formation of societies, it makes its presence felt in every aspect of social life.

Artificial intelligence, which is one of the main subjects of study in different disciplines, seems to have created an important area of discussion in the field of education. Artificial intelligence in education is not only about technological and digital change and transformation, but also a part of educational environments where the most complex aspects of the human factor are processed. It can be said that it is in a much more debatable

situation than other disciplines, especially when its impact on the subjectivity of student behaviors is taken as a basis.

In this context, firstly, it is necessary to understand what artificial intelligence is. It can be said that artificial intelligence, which has many definitions, reflects different perspectives. The difficulty in defining AI stems from its interdisciplinarity. According to Luckin, Holmes, Griffiths, and Forcier (2016), fields of science such as anthropology, biology, and psychology have all entered the field of artificial intelligence together, thus diversifying the terminology of artificial intelligence. This strengthens the definition of artificial intelligence.

Artificial Intelligence

According to Jiang, vd. (2022), artificial intelligence is a set of actions and impacts to enable humans and machines to communicate, to enable machines to do things that require human intelligence, and to simulate human intelligence. It is possible to constantly add new elements to this definition. Because the content of artificial intelligence is constantly changing with the involvement of different disciplines in the field.

What it means to be "intelligent" about AI needs to be defined. Webster's New World Dictionary (1988) defines "intelligence" as: "a) the ability to learn or understand from experience; the ability to acquire and retain knowledge; mental ability; b) the ability to respond quickly and successfully to a new situation (Fetzer, 1990). The origins of artificial intelligence are assumed to be parallel to the beginning of the use of the machine world in the field of production. In fact, the concept of artificial intelligence and intelligent machines dates back to the 14th century.

Artificial intelligence, has played an important role in our daily lives with advanced digital technology and AI's immense power to change the way we think, act and behave. Since its emergence, AI has evolved, especially with the advent of Artificial Neural Networks (ANN) and Deep Learning (DL) (Chen, Xie, Zou, & Hwang, 2020; Hwang, Xie, Benjamin, Wah, & Gašević, 2020).

Some of the definitions quoted in Stuart J. Russell and Peter Norvig in their book "Artificial Intelligence: A Modern Approach (2010) are given below (Unesco, 2019).

> The exciting new effort to make computers think… machines with minds, in the full and literal sense.' (Haugeland, 1985)
>
> The automation of] activities that we associate with human thinking, activities such as decision-making, problem-solving, learning…' (Bellman, 1978)
>
> The study of mental faculties through the use of computational models.' (Charniak & McDermott, 1985)
>
> The study of the computations that make it possible to perceive, reason, and act.' (Winston, 1992)
>
> The art of creating machines that perform functions that require intelligence when performed by people.' (Kurzweil, 1990)
>
> The study of how to make computers do things at which, at the moment, people are better.' (Rich & Knight, 1991)
>
> Computational Intelligence is the study of the design of intelligent agents.' (Poole, et al., 1998)
>
> 'AI… is concerned with intelligent behavior in artifacts.' (Nilsson, 1998)

After the Second World War, many people started working on artificial intelligence independently. Intelligent machines. British mathematician Alan Turing may have been the first. He gave a lecture on this in 1947. He may also have been the first to decide that AI could best be researched by programming computers rather than building machines. By the late 1950s, there were many researchers working on artificial intelligence, and most of them based their work on computer programming. Alan Turing's work in 1950 in his essay "Computing Machinery and Intelligence" discussed the conditions for considering a machine to be intelligent. He argued that if a machine can successfully behave like a human being to an informed observer, then you should definitely consider it intelligent (McCarthy, 2004).

AI is about simulating human intelligence, but on the other hand, it teaches us something about how machines can solve problems by observing other humans or just by observing our methods. Instead of studying humans or animals, most work in AI involves studying the problems the world presents to intelligence. AI researchers are free to use methods that are not observed in humans or that involve much more computing than humans can do (McCarthy, 2004).

One of the fascinating aspects of the field of artificial intelligence is that it is surprisingly difficult to define the precise nature of its subject. What is supposed to be "artificial" about AI is undoubtedly related to its origins and the way it was created, not as a result of intelligence but as a product of human skill and creativity (Fetzer, 1990). Artificial intelligence is a multidisciplinary field that encompasses various approaches, methodologies and techniques to create intelligent machines by simulating human cognitive abilities (Mahadevaiah, et al., 2020; Anugerah and Hidayanto, 2023; Barodi and Lalaoui, 2023). Artificial Intelligence has already reached an expert level in diagnosing diseases and synthesizing speech by reading the neural activity of the cerebral cortex. It is also possible with AI to draw pictures so good that they are indistinguishable from the original (Kushmar, 2022).

Artificial Intelligence in Education

Before the widespread availability of computers and other related technologies, teachers and students engaged in instruction and learning through the pure application of natural human effort. However, with the introduction of microcomputers and, consequently, personal computers, more computing power was provided and a significant transition to the electronic environment was made (Chen, Chen and Lin, 2020).

For much of the last 25 years, Artificial Intelligence in Education has largely focused on creating systems that are as effective as human one-to-one training. Many interactive learning environment articles try to find out how to achieve improvements in productivity by demonstrating similar learning gains in a shorter period of time (Roll and Wylie, 2016).

Artificial intelligence is critical for improving students' independent learning abilities in the learning system. With technology becoming more and more dominant in every part of our lives, especially in our social relationships, artificial intelligence has started to manage the way we interact in our social spaces. According to Chen, Xie, Zou, and Hwang (2020), artificial intelligence in education refers to the development of computers that perform cognitive tasks usually associated with the human mind, especially learning and problem solving.

Interest in artificial intelligence is increasing day by day. For example, it is possible for machines to replace manual assessments in exams, for machines to give feedback to the student, and even to set up and monitor exams according to the student's progress. Sometimes it can serve as a smart teacher, good learner, a learning tool for transferring learning outcomes or a policy-making expert advisor. The role of AI in education is diagrammed by Hwang, Xie, Benjamin, Wah, and Gašević (2020).

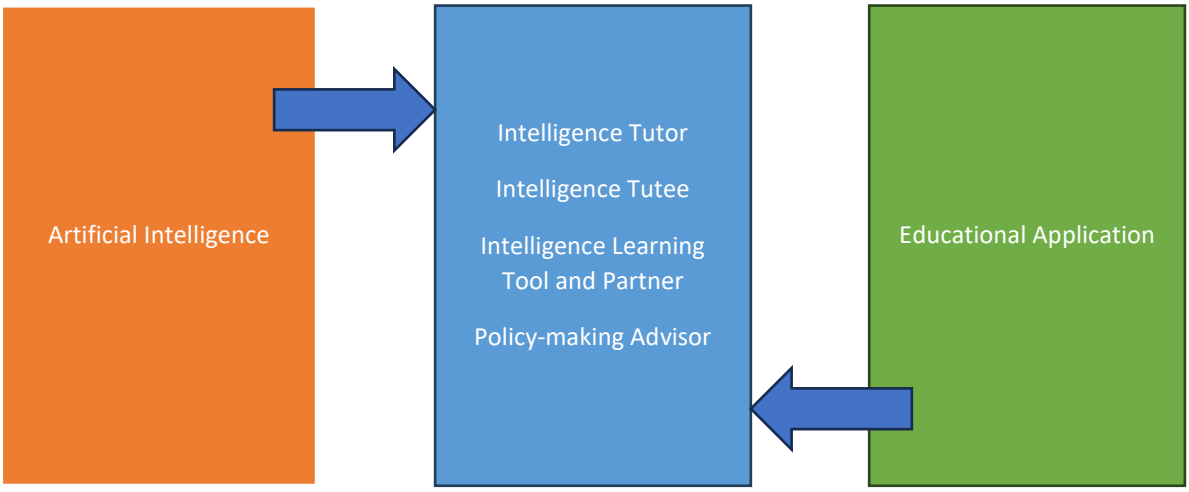

Fig 1. Framework for the roles of AIED

Although artificial intelligence in education is becoming more visible with different applications, it is possible to say that it is designed to produce effective results in learning and teaching and it is trying to be tested quickly. Will it be possible to establish social justice or eliminate inequalities in educational opportunities with artificial

intelligence? These are the questions that need to be tested. At the same time, knowledge-based and machine learning in different areas such as learning, reasoning, problem solving, perception and the use of language are among the topics of study of artificial intelligence in education. On the one hand, artificial intelligence is related to educational practices, and on the other hand, it is also concerned with the creation of projections for the future in the context of educational management and policies.

The Future of Artificial Intelligence in Education

Today's educational environments have been influenced by different theories, making it imperative to review the redesign of learning and teaching environments with artificial intelligence. The presence of artificial intelligence in every aspect of education provides opportunities to offer different options for both learners and teachers to individualize education.

How AI can be transferred to educational settings, enabling high-quality adaptive education at scale. The answer to this question is also related to the sustainability of education. In the report prepared by UNESCO (2019) within the framework of Education2030 goals; It aims to examine the political consequences of artificial intelligence under four main headings by examining four main topics.

1. Ensuring inclusive and equitable use of artificial intelligence in education
2. Using artificial intelligence to improve teaching and learning
3. Promoting skills development for jobs and life in the age of AI
4. To secure transparent and auditable use of education data

As can be seen, there is a focus on the development of artificial intelligence in an important framework, ranging from equal opportunities to skills development and transparency. In this work, UNESCO reveals how artificial intelligence should be used in education within the framework of the 2030 vision and what is expected from artificial intelligence in the future. In this sense, it will help those dealing with education policies to organize the place of artificial intelligence in the future of education. How to develop education and training with artificial intelligence, what the curricula will be, and how to benefit from artificial intelligence in developing students' learning skills in this process are seen as fundamental questions.

With the development of computing and information processing, artificial intelligence (AI) has been widely applied in educational applications such as intelligent tutoring systems, teaching robots, learning analytics, dashboards, adaptive learning systems, human-computer interactions, etc. as reflections of artificial intelligence in education. Artificial intelligence is now seen as a tool to facilitate new paradigms in education. For example, the shift towards personalized learning, the challenge of the instructor's role and the development of complex education systems, and the application of various AI techniques (e.g., natural language processing, artificial neural networks, machine learning, deep learning, and genetic algorithms) to create intelligent learning environments provide a broad framework for the use of AI in education (Ouyang, & Jiao, 2021).

Conclusion

Finally, we reflect on historical trends and current trajectories to speculate on what the field can achieve in the next 25 years and offer a more apt metaphor than the human educator (Roll and Wylie, 2016). Today, sustainability is a conceptual analysis that is emphasized in many fields of social and scientific sciences, and each field of science is trying to understand and shape the real world according to itself. Sustainability in education also requires an appropriate and qualified integration with different disciplines. In this sense, artificial intelligence will continue to have an important place in the future of education as an advanced necessity of technological transformation.

AI techniques have the potential to significantly stimulate and advanced teaching and learning sciences will provide evidence-based opportunities for the development of AI technologies. Ultimately, the combination of social and cultural factors in the educational field will enable the generation of new ideas in education. In the

future, the path to student-centered, data-driven and personalized learning will be paved faster (Ouyang, & Jiao, 2021).

By linking AI and learning theories in education, new paradigms will be created to strengthen the personalized learning of students as learners. The presence of artificial intelligence in educational environments will draw learners as well as teachers and school administrators as instructional leaders who will lead them into this process.

AI looks beyond traditional 'educational' concerns such as 'curriculum and pedagogy, teaching and learning' to examine the geopolitics of technology development in which education plays an important and constitutive role. It can therefore be argued that: first, the relationships between AI and education are shaped by a wide network of actors, not just technology designers or educators; second, these relationships are defined by contestation rather than consensus; and third, AI technologies are being developed within already established educational and technological contexts, rather than emerging spontaneously (Knox, 2020). The future path of education will be directly related to the development of artificial intelligence. Greater progress will be made in education as a result of the integration of computer-based development of new technologies with educational programs and practices.

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