EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE USAGE IN THE EDUCATIONAL PROCESS

Abstract. This article analyzes the changes occurring in the field of education under the influence of artificial intelligence usage. The genesis of the concept of "artificial intelligence" is examined, noting that the term was introduced by J. McCarthy in 1959 in the article "Programs with Common Sense," where artificial intelligence was considered as a computational system capable of creating subprograms. It is determined that the weak scientific connotation of the word "intelligence" led translators to somewhat distort the meaning of McCarthy's statement, resulting in significant confusion and unjustified expectations regarding artificial intelligence today. As of today, artificial intelligence remains a new scientific direction with unresolved fundamental problems, such as aspects of consciousness, thinking, system optimization, large data processing, and machine learning. The methodology of artificial intelligence is applied in various scientific fields, including sociology, mechanics, energy, economics, and ecology. The concept of "artificial intelligence" has been evolving in computer science, where its definition ranges from modeling intelligence to a specialized branch that focuses on reproducing human intellectual actions. The article proposes an author's definition of artificial intelligence in the educational process, considering it as technologies that enable the computer to develop and implement teaching methodologies, simulate speech activities, automate material mastery control, and perform analytical work. The main directions of using artificial intelligence in the educational process include education management, individualization of learning, optimization of teacher training, organization of the learning process, and optimization of specific discipline learning. Modern artificial intelligence technologies, such as machine learning, natural language processing, computer vision, data analysis, and intelligent learning systems, can be used to optimize and intensify the educational process. However, it is essential to note that artificial intelligence should not completely replace traditional teachers; instead, it should be a tool to support and enhance their work.

Keywords: artificial intelligence, educational process, information and communication technologies, learning.
Бобро Наталія Сергіївна кандидат економічних наук, директор діджітал департаменту Європейського університету, Європейський університет, бульвар академіка Вернадського, 16 В, м. Київ, 03115, тел.: (044) 334-53-04, https://orcid.org/0009-0003-5316-0809

ЕФЕКТИВНІСТЬ ВИКОРИСТАННЯ ШТУЧНОГО ІНТЕЛЕКТУ В ОСВІТНЬОМУ ПРОЦЕСІ

Анотація. У статті проводиться аналіз змін, що відбуваються у сфері освіти під впливом використання штучного інтелекту. Розглядається генезис поняття «штучний інтелект» (artificial intelligence), та встановлено, що даний термін був введений Дж. Маккарті в 1959 р. у статті «Програми зі здоровим глудзом», де штучний інтелект розглядався саме як обчислювальна система, здатна створювати підпрограми. Визначено, що слабка наукова конотація слова intelligence змусила перекладачів дещо спотворити сенс висловлювання Дж. Маккарті, й сьогодні це призвело до суттєвої плутанини та невиправданих очікувань щодо штучного інтелекту. На сьогоднішній день штучний інтелект залишається новим науковим напрямом з невирішеними фундаментальними проблемами, такими як аспекти свідомості, мислення, оптимізації систем, обробки великих даних та «машинного навчання». Методологія штучного інтелекту застосовується в різних галузях науки, включаючи соціологію, механіку, енергетику, економіку і екологію. Поняття «штучний інтелект» розвивалося в інформатиці, де його визначення варіюється від моделювання інтелекту до розділу, який спеціалізується на відтворенні інтелектуальних дій людини. У статті запропоноване авторське визначення штучного інтелекту в освітньому процесі, яке пропонується розглядати як технології, що дозволяють комп’ютеру розробляти і реалізовувати методики навчання, імітувати мовленнєву діяльність, автоматизовано контролювати оволодіння матеріалом та здійснювати аналітичну роботу. Основні напрями використання штучного інтелекту в освітньому процесі включають управління освітою, індивідуалізацію навчання, оптимізацію підготовки викладача, організацію навчального процесу та оптимізацію навчання конкретних дисциплін. Сучасні технології штучного інтелекту, такі як машинне навчання, природна мова, комп’ютерний зір, аналіз даних та інтелектуальні системи навчання, можуть бути використані для оптимізації та інтенсифікації освітнього процесу. Однак слід зауважити, що штучний інтелект не повинен повністю витісняти традиційних викладачів, він повинен бути інструментом для підтримки та покращення їхньої роботи.

Ключові слова: штучний інтелект, освітній процес, інформаційно-комунікаційні технології, навчання.
Statement of the problem. The modern world is characterized by the active integration of various information and communication technologies (ICT) and computer systems into all aspects of human life, from entertainment to healthcare and education. When discussing the application of ICT in the educational process, it is evident that school teachers and university professors have long been using information technologies to address various tasks. This ranges from the rapid and convenient dissemination of educational material through email and social networks to the use of comprehensive information and educational utilities and portals (such as Moodle, Освіта.UA., etc.) and the conduct of online lessons.

Simultaneously, there is a growing popularity in researching artificial intelligence and utilizing its functions and properties in conjunction with established methods and technologies in teaching. The implementation of computer programs with artificial intelligence in the pedagogical process, while appearing to be exclusively positive innovation at first glance, is, in fact, a contentious issue among both teachers and students. Therefore, the study of the effectiveness of artificial intelligence usage in the educational process is necessary, both to understand the impact of these technologies on learning and upbringing and to determine optimal strategies for their implementation to enhance the quality of education.

The goal of the article is to determine the effectiveness of using artificial intelligence in the educational process through an analysis of its influence on learning and upbringing. Additionally, the article aims to identify factors that influence the perception of these technologies by participants in the educational process.

Main Material Presentation. To determine the purpose and content of education when applying artificial intelligence in the educational process, it is essential to first define the essence of artificial intelligence in the modern era.

The term "artificial intelligence" was introduced by J. McCarthy in 1959 in the article "Programs with Common Sense" [1, p.403], where artificial intelligence was considered precisely as a computational system capable of creating subprograms. Later, McCarthy clarified that artificial "intelligence is the computational part of the ability to achieve goals in the world" [2].

All technical systems are goal-oriented, and this demonstrates the application of the methodology of artificial intelligence in educational activities. Here, it is necessary to note the inaccuracy of the literal translation. If the author intended to convey specifically "intellect," he would likely have used the word "intellect" rather than "intelligence." "Intelligence" means "cleverness," "understanding," "ability," "penetrating insight," "recognition," and even "information gathering" [3]. For example, the British Intelligence Service refers to the "Service for gathering information." Probably, the weak scientific connotation of the word "intelligence" led translators to somewhat distort the meaning of McCarthy's statement, resulting
in significant confusion and unjustified expectations regarding artificial intelligence today. As of today, artificial intelligence remains a relatively new scientific direction that explores important and as yet unresolved fundamental problems. These include aspects of consciousness, thinking, decision-making, system optimization, processing large data, "machine learning," fuzzy logic, and genetic algorithms.

The methodology of artificial intelligence is applied in various scientific fields: sociology, mechanics, energy, economics, ecology, etc. This breadth of penetration into different scientific domains makes artificial intelligence a kind of contemporary philosophy, especially when considering the need to address issues of consciousness, thinking, and their interaction with matter (material carriers) in the tasks solved by artificial intelligence.

Concept of "artificial intelligence" has primarily evolved in the field of computer science, where one can encounter a plethora of definitions with various didactic content. Specifically, this term is used to denote the area of "computer science (informatics) that specializes in modeling intellectual and sensory abilities of humans using computational devices" [4, p.611]; "a branch of computer science that develops methods and means of modeling and reproducing individual intellectual actions of humans (information perception, elements of reasoning, etc.) using computers" [5]. Based on these and similar conceptually related definitions, educators and methodologists have formulated narrower didactic definitions reflecting the characteristics and specificity of teaching specific academic disciplines.

Within the scope of this research, it is appropriate to propose a working definition of the concept that is general in its didactic content and applicable to the teaching of various academic disciplines. The following definition can serve this purpose: artificial intelligence in the educational process is a set of modern technologies that allow a computer, based on the collection and analysis of large volumes of data and program modeling, to develop and implement teaching methodologies for specific disciplines with an individual trajectory. It simulates human speech activities to solve educational, communicative, and professional tasks, automates the control of mastering educational material, provides feedback, and performs analytical work.

At the current stage, there are numerous artificial intelligence technologies that serve as the basis for developing software products and information and communication technologies. These can be implemented to optimize and intensify the educational process. Among the most common technologies are:

- Machine Learning – a technology, focused on acquiring information, identifying algorithms, processing data, organizing automated learning, and conducting analytical work.
Natural Language Processing – a technology, aimed at recognizing text, evaluating and processing it.

Computer Vision – a technology, directed towards the search, tracking, processing, identification, and classification of data from visual objects, extracting information from images and analyzing visual data.

Data Science – a technology, focused on extracting information, identifying patterns in data, and making predictions.

Intelligent Computer System – a computer system, designed to organize automated monitoring of students' performance, provide feedback on learning outcomes, and construct an individual learning trajectory.

In recent years, a body of research has emerged in pedagogical and methodological literature, where authors explore the didactic and methodical potential of various software products and ICT, based on artificial intelligence [9;10]. Five main directions of using artificial intelligence in the educational process can be identified:

1. Educational Management:
   ● Automation of education management processes and organization of educational activities in educational institutions.
   ● Analytical activities.

2. Individualization of Learning:

3. Optimizing Teacher Preparation:
   ● Development of educational courses and materials.
   ● Organization of automated control and assessment of students' mastery of educational material.

4. Organization of the Learning Process:
   ● Teaching students with feedback.
   ● Monitoring students' learning and cognitive activities.
   ● Checking works for plagiarism.

5. Optimizing the Teaching of Specific Disciplines:
   ● Organization of scientific research work for students.
   ● Organization of additional educational practice within the discipline.

These directions of using artificial intelligence in the educational process demonstrate significant potential for improving teaching and learning.

It should be noted that the construct "artificial intelligence in education" is not static in its didactic content; on the contrary, with the emergence of new tools of artificial intelligence, it will evolve, expand, assimilate, and replace one meaning with another. In this context, it cannot be asserted that such technologies will inevitably replace the traditional educator, just as artificial intelligence should not replace the teacher in the majority of their functions. The evolution will occur organically and gradually. One obvious aspect is that, at a certain stage, artificial intelligence should be perceived not merely as a tool but as a third subject in the
educational process alongside the student and the teacher. The degree of integration of artificial intelligence into the educational process will depend on educators' awareness of the didactic and methodical potential of such technologies, their willingness to use artificial intelligence tools in pedagogical activities, and the practices of applying artificial intelligence in teaching specific disciplines.

**Conclusions.** At the current stage, the process of using artificial intelligence tools and their integration into pedagogical practice is not at "absolute zero" but is progressing gradually and systematically. Primarily, educators employ technologies that diversify teaching methods and create additional conditions for students' professional practice. Additionally, teachers are beginning to use artificial intelligence tools that relieve them of some routine organizational tasks. The COVID-19 pandemic has played a significant role in the current pace of integrating artificial intelligence into education. As a result, digital literacy and ICT competence have become integral parts of educators' professional skills. However, it is worth noting the existence of a still significant percentage of educators with negative or neutral attitudes toward the possibilities of using artificial intelligence in the educational process.

**References.**


Література: