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The role and collision of Artificial Intelligence (AI) in modern higher education: Problems and Prospects

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Abstract
The main premise of the paper is that the use on elements in Artificial Intelligence (AI) can have a positive effect on the quality of the educational process in meticulous higher education institutions, provided that three main circumstances are 1) access to the necessary data, 2) training of future teachers to work with artificial intelligence and 3) the creation of a special educational course. Within this study, the subsequent tasks were lay down to analyze scientific and methodological research aimed at studying the current state, prospects and possibilities of using artificial intelligence in the training of future teachers of professional education; to analyze how intelligent expert systems are distributed in the educational field; consider the necessary pedagogical conditions for the successful implementation and use of a system with elements of artificial intelligence in the educational process of higher educational institutions.

Keywords: Artificial intelligence, education, educational activity, innovation, intellectual information technology

Introductions
The foundation of today's technological advances generated and promoted in particular by the ever faster development of modern technology, hardware and software and the computer and information business models are based on previous inventions such as the steam machine, the typewriter, the telephone, electricity. If Europe is to take full advantage of emerging innovation, it must take into account a number of strategic factors. It needs to focus on the future, not the past. European policy makers should also take into account certain components of the foundations of reducing the attractiveness of the European Union as a destination for foreign investment in information communication technology (Atkinson and Ezell, 2019). The consequences of a small handful of countries controlling top-notch AI in the future can be huge. In fact, technologically advanced countries could become careers of AI and ensure that important resources are allocated in the long term.

Status of AI in Global Level
All countries welcome AI trends. AI is present everywhere, focusing on developed and underdeveloped countries and competing for supremacy in this area. China has ambitions to become a global superpower in the field of AI. China has announced that it will become a leader in AI by 2030, investing 150 billion USD. The goal is perfectly achievable, as it is already a leader because they already lead in research in this area, and the United States is competing fiercely with them. The future of AI in the US has become unclear and declining due to state involvement, funding cuts, increased education costs and strict immigration restrictions for international research experts. The UK is a leader with more than 121 AI companies as the country extensively funds and supports robotics and research in AI. Russia invests about $12.5 million a year in AI. Germany is technically efficient, having the appropriate skills to implement and promote technological innovation and play a leading role in robotics. Norway launched accelerated investments in 2017 with $11 million to develop technology hubs. The Swedish population shows 80% satisfaction with AI and robotics. In general, Sweden is very much in favour of AI, believing it will improve human skills and achieve a competitive advantage in the global market. France will invest 1.8 billion USD alone and in partnership with Germany in the AI research

India is a fast-growing country that has undergone many changes in its digital space and invested 8% of its GDP in 2017 in promoting the development of AI. Slovenia is also highly ambitious in the field of AI. In March 2020, the Government of the Republic of Slovenia signed an agreement with the United Nations Organization for Education and Culture (UNESCO) to establish the first international research centre for AI under the auspices of UNESCO, based in Ljubljana (Zorc, Lozej, and Blaznik, 2020, p. 7-8) [21].

The use of modern intelligent information technologies, in particular artificial intelligence (AI), allows changing the approach to the individualization of education. AI aims to create software and hardware tools that allow non-programmer users to solve complex intellectual tasks by communicating with computers in natural language.

The use of expert systems, which are part of AI, promotes student-centered learning, individualization of learning and increases the quality of education, promoting the development of individual abilities of students. One of the promising directions of introduction of intelligent information technologies in education is the use of applied systems, such as expert systems, intelligent learning systems, and expert learning systems. The development of these systems requires scientifically based methods of teaching the basics of artificial intelligence, which will become the basis for the training of future teachers in vocational training (Alekseev NG, 1994) [3]. So here are the main technologies that will shape our future in the next century. In the near future, a number of significant changes in the world are expected, caused by the development of modern technologies and scientific achievements.

Trends and Issues on AI

Some forecasts point to the following key trends: The development of global telecommunications and the Internet in the coming years. This network, known as a "communication skin", will allow you to receive information about the state of the weather, the stock of food in the refrigerator and much more. People will use hand-held devices that will be controlled by voice and can replace people in many daily tasks.

- Robotization of various spheres of activity, including the construction of large structures. The robots will be able to perform tasks that are considered difficult or impossible for Nano robots.
- The development of genetic engineering and mass space travel. This will open up new opportunities for humanity. The consequences of these technological changes may be as follows:
- The use of nanotechnology to solve the problem of hunger, the ability to obtain food from various sources
- The disappearance of the traditional economy due to a new approach to the distribution of material goods
- Solving the problem of poverty.
- The possibility of achieving immortality thanks to molecular robots that will prevent aging and regenerate the body
- Changing the psychology of people and reducing the need for fuss. People will have more free time.
- A reduction in crime due to a reduction in the motivation to commit a crime. The gradual disappearance of traditional industry due to the use of nanotechnology and robots.
- The advancement of democracy through global telecommunications that will allow everyone to participate in social decisions.
- Freeing people from physical and mental labor thanks to artificial intelligence and robots. Overall, these technological changes promise many opportunities and challenges for humanity, and they can significantly change our lives in the 21st century. In connection with these circumstances and the growth of the use of artificial intelligence in the educational sphere, it becomes relevant to develop a model for the use of artificial intelligence in the training of future teachers of professional education. This relevance is due to the following factors.
- Society's need for highly qualified teachers of vocational training has increased, but the current methods of education and training do not always meet these requirements.
- The importance and application of artificial intelligence in education is growing, but its implementation in university education has not yet reached the appropriate level.
- Therefore, there was a need to develop a model that would allow to effectively introducing elements of artificial intelligence into the training of future teachers of professional education

Conceptual Framework

The term "artificial intelligence" can have different interpretations, from computers solving computational tasks to systems solving various tasks similar to those performed by a human to define the concept of "artificial intelligence", which is most consistent with modern research in this field, it is necessary to take into account that the system must solve tasks that a person usually solves with the help of his intelligence (Coombs PH, 1968) [7].

However, this definition is inadequate. The creation of ordinary computer programs, which are developed by programmers, cannot be considered the creation of artificial intelligence. To determine the tasks that are solved by technical systems and can be considered by artificial intelligence, it is necessary to find out what the task is. From a psychological point of view, tasks are tasks of a mental nature that require thinking for their solution. These are tasks in which there is a goal but the means to that goal are unclear and must be found through thinking. If a person has a clear way to achieve a goal, then this task is not considered, since there is already a means to achieve this goal. Thus, tasks that are solved by thinking and do not have an obvious solution can be considered tasks of artificial intelligence.

Approaches and Methods

The study of artificial intelligence (AI) is a complex process that includes various methods and approaches from different scientific fields. Below are some of the methods and approaches used in the study of AI.

- **Machine knowledge:** Involves the development of algorithms and models that allow computers to learn from data and make predictions or make decisions.
- **Neural Networks:** The study of artificial neural networks that simulate neural activity in the brain and

are used in many AI tasks, including visual information processing and natural language processing.

- **Natural Language Processing:** The study of methods and algorithms for understanding and generating human language by computers, including translation, speech recognition, and text analysis.
- **Computer Vision:** The study of algorithms for processing visual information by computers, including object recognition, faces recognition, video analysis, and more.
- **Robotics:** Research and development of robots and autonomous systems that can interact with their environment and perform tasks.
- **Ethics and Social Aspects:** Study of ethical issues related to the use of AI, as well as study of the impact of AI on society and people.
- **Automated Planning and Decision Making:** The study of algorithms that enable AI systems to make decisions under uncertainty and limited resources.
- **Self-learning:** Researching methods that allow AI systems to learn from their own experiences and improve their skills.
- **Signal Processing:** A study of sound and sensor signal processing techniques to understand the environment.

Analyzing the problem of artificial intelligence from an epistemological point of view highlights the importance of various cognitive tools such as categories, semiotic systems, and logical structures and accumulated knowledge. These tools are not learned through physiological or psychological aspects of cognition, but are revealed in knowledge and in its linguistic expression.

The means of cognition, which are ultimately formed on the basis of practical activity, are necessary for any system that carries out abstract thinking, regardless of its material substrate and structure. Thus, to create a system that performs abstract thinking and forms adequate patterns of action in changing environments, it is necessary to provide it with these tools. In recent decades, the development of artificial intelligence systems in this direction has been uneven, and overall progress remains limited. First, to solve some problems, it is important to bring computer semiotic systems closer to natural language, in particular to the use of certain parts of it. Attempts are made here to extend computer languages with linguistic universals such as polysemy (this is corrected by language processor processing). Fragments of natural languages suitable for solving practical tasks by artificial intelligence systems have been created. An important achievement is the development of semantic languages and their formalization, where symbolic words have a certain meaning (Anheier HK & Juergensmeyer M, (Eds.) 2012 [4].

However, many natural language universals required for cognitive functions are still poorly implemented in artificial intelligence languages or are of limited use. More and more artificial intelligence systems are aimed at implementing natural language universals, thanks to their cognitive function, especially in situations where the problem area is not rigidly defined in advance. Modern artificial intelligence systems are capable of translating from monolingual languages into languages with many possible meanings. They can build charts, graphs, images, and other visuals. However, modern systems are not yet capable of directly using images or scenes without converting them into a symbolic language for "smart" operations (Botkin, J., Elmanjra M & Malitza M, 1979) [6]. Finding ways of global information processing is one of the key tasks for the future development of artificial intelligence.

Implementation of analogies of categories in information arrays and programs of artificial intelligence systems is still at the initial stage. Some analogues of categories, such as "whole", "part", "general", "single", are already used in some knowledge representation systems, especially when it is necessary for specific tasks or problem areas.

Results and Discussion

Modern artificial intelligence systems do not reproduce the complex hierarchical structure of images, cannot reconstruct complex situations, combine parts of knowledge into large blocks, and also do not interact optimally with new information that arrives. They also have little influence on the external environment and cannot learn and improve their activities on their own.

So, although there are some steps in the direction of introducing epistemological characteristics of human thinking into artificial intelligence systems, in general, these systems are far from reproducing the full range of characteristics necessary for abstract thinking. By converging the characteristics of artificial intelligence with the epistemological characteristics of human thinking, we increase their ability to process symbolic structures and understand them as solutions to problems.

In general, it is possible that the mechanisms that are required to realize the intelligent functions of a system may not be available to digital machines or any technical systems consisting only of inorganic components. In other words, it is possible that although we understand all the patterns of cognition necessary for human cognitive tasks, they can only be implemented by systems that are properly human.

It is important to take into account the meaning of "bodily organization" for understanding the peculiarities of mental processes, in particular perception. The difference in the ability of specific systems to reflect the world is related to their structure, which is limited by the material that created it. In the process of biological evolution, the improvement of display properties occurred due to the complication of the nervous system, which serves as the basis for perception. It is also possible that the difference between computer and human substrates may lead to fundamental differences in their ability to display, rendering certain functions of human intelligence inaccessible to such machines (Coombs, P.H., 1985) [8].

Sometimes in the philosophical literature it is argued that the assumption of the possibility of a technical system to perform human intellectual functions can lead to the reduction of the higher (biological and social) to the lower (systems of inorganic components) and, therefore, contradicts the materialist approach.

However, this reasoning does not take into account the ability of society to create complex systems from inorganic components that can display information that is more complex than biological intelligence. Such systems can become an integral part of society and a social form of movement (Barratt J, 2013) [5]. Therefore, the question of the possibility of transferring intellectual functions to technical systems, in particular, the possibility of endowing them with epistemological tools, should be resolved on the

basis of scientific research, and not only philosophical reflections.

Systems that have intelligence differ from computers, first of all, in that they have biological needs that are determined by their physical, chemical substrate (Iasechko S, Kuryliuk Y, Nikiforenko V, *et al*., 2021) [10]. They perceive the outside world through the prism of these needs, and this affects their activity and way of functioning. Computers do not have such physical needs, information for them is only data, without significance. Genetically determined human needs have two main consequences. First, they simplify the process of finding and solving problems. Secondly, these needs form a specific orientation of the mental system. Computers have no such biological needs and, therefore, no such orientation. They don't care about the significance of the information, and they can process any data in the same way. In the case of the "Martian" on Earth, if he had a different biology, his orientation and ability to understand "human aspirations" would be difficult, unless there was a coincidence of interests.

Only through training and adaptation could he understand another culture and needs. Therefore, the potential intellectual capabilities of computers are greater than those of animals, since they can be programmed for different purposes. A person has social needs, which, in addition to biological needs, determine the activity of the mental system. Information for a person has not only biological significance, but also social weight. A person is universal both in terms of needs and the possibilities of their satisfaction. However, this universality is inherent in her as a social being that creates tools and systems of artificial intelligence, and not as a biological being. The body organization of a person gives him certain advantages and limitations. Therefore, it is important to have artificial intelligence systems that are free from biological limitations and can function without psycho physiological limitations and dependencies.

Systems with intelligence differ from computers, first of all, in that they have biological needs, which are produced by their physical and chemical composition.

These needs affect their orientation and way of perceiving the world around them. In the case of abandoning computers that do not have such physical needs, information is more important to people because it is related to their needs and goals. Genetically determined human needs facilitate the process of decision-making and problem solving. They also form a specific way of functioning of the mental system. On the contrary, computers do not have such biological needs and can process information without specific purposefulness. If Martians had arrived on Earth with a different biology, it would have been difficult for them to understand and navigate "human aspirations" unless they had been given the opportunity to learn and adapt to their new environment. Thus, the capabilities of computers in the field of intelligence are wider, so they can be programmed for various tasks. A person also has social needs that affect his intellectual activity. She is able to distinguish information both by its biological significance and by its social influence. A person is universal, both in terms of needs and the ability to satisfy them. However, this universality is inherent in humans as social beings who create tools and artificial intelligence systems to perform tasks. The human body gives it certain advantages and limitations, and therefore it is important to develop artificial intelligence systems that are free from biological limitations and dependencies.

Conclusion

The development of information technologies has opened up unlimited possibilities for humanity in overcoming psycho physiological limitations and in understanding complex phenomena. The "external nervous system," created by humans, expanded the horizons of knowledge and cognition, which allowed developing new theories and using them to control complex systems.

Thanks to artificial intelligence, we are turning limitations that were once insurmountable into regularly expanding possibilities. In today's world, effective management of complex systems has become critically important for the development of society. The development of artificial intelligence plays a key role in this process, helping us to understand the patterns of the surrounding and internal world and use them for the benefit of society. It helps to increase the level of freedom and self-realization of a person, which is one of the most important achievements of modern science and technology.

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