

ARTIFICIAL INTELLIGENCE IN THE SPHERE OF UNIVERSITY EDUCATION

Steliana Yordanova, PhD

National Security Department

Institute of Informing Science, Knowledge Management and Security

University of Library Studies and Information Technologies

Sofia, Bulgaria

Abstract: *A fragmentary analysis of classical and smart (intelligent) universities has been made, as well as the change in attitudes, approaches and methods of application of a modern educational paradigm as a result of the application of artificial intelligence in current university practice. The role of classical universities is emphasized not only as a powerful tool for storing and transmitting knowledge, but also for educating young people. We believe that the development of higher education has a huge impact on the total invasion of smart technologies into current social practice. Questions related to the synthesis, accumulation and preservation of knowledge and skills through the educational paradigm "learning by doing" (John Dewey) in the university educational environment is placed in the focus of the global and sustainable development of society. The impact of the mass distribution of artificial intelligence in various social groups, through the implementation of innovative and practice-related university education, is examined. Axiomatic changes in attitudes towards conducting R&D are defined, and the moral constraints faced by scientists and university professors are discussed when doing their research related to the development and implementation of artificial intelligence systems, both virtual and in real work environment.*

Keywords: *Artificial intelligence, learning by doing, educational paradigm, universities, information, knowledge, R&D.*

Introduction

The changing conditions of life in the last ten years have led to the intensification of industrial production, the decline of some already obsolete and the emergence of new professions and a total reorganization of the daily life of people all over the world. These undeniable facts show that computerization has become a basic prerequisite for an even faster transition to the essence of modern information civilization. However, all this is accompanied by many negative factors, such as: job insecurity, crises and mistrust. We have witnessed how

a radical change in the human foundations leads to a radical change in human behavior and adaptability to the environment¹.

The human dimensions of change related to the advent of artificial intelligence into people's daily lives are no less important than the technological, economic and political ones.² The social disintegration of the individual or of groups of people has led to serious consequences in the development of social relations throughout the world. These consequences have not overseen the sphere of education.

2. Artificial intelligence. Traditional and smart universities

Artificial intelligence is a natural part of computer science that deals with scientific and technological research and their applications in social practice related to the conceptual models, philosophical foundations, technologies, methods and means of creating intelligent computer programs to assist (and in some cases replace) the natural intelligence of people.

Artificial intelligence is based on the reasonable assumption that the basic human quality – intelligence - can be simulated by a computer (for now). Hypotheses and theories related to artificial intelligence and the nature of human reason can be traced back to ancient times. In the 20th century, Turing's research³ (Turing's thesis) was of interest, which from a mathematical and philosophical point of view tried to justify the so-called "artificial intelligence". Even then, Turing's contemporary literati disputed his conclusions and demonstrated their unreliability through specially designed and created computer programs based on the so-called "formal dialogue". Later, at the end of 20th century and at the beginning of the 21st century, artificial intelligence gradually and aggressively became the subject of both optimistic and pessimistic theories. Currently, artificial intelligence is a key element of the modern revolutionary development of information technologies. In all cases, however, we must bear "one thing in mind", based on a thought by the great Einstein that "if something cannot be measured, it does not exist". ...

Concerning the total application of innovative information technologies (including artificial intelligence) in the educational processes of modern universities, our analyses have shown that the university programs used in the education of young people have remained almost

¹ D. Stoyanova, I. Peteva, S. Denchev. The role of universities in the formation of modern R&D space through creating new educational patterns. INTED2016 Proceedings of 10th International Technology, Education and Development Conference. Valencia, Spain, 2016, 314-318

² Denchev, S. Informatsia i sigurnost. Sofia, Za bukвите – O'pismenehy, 2019. ISBN:978-619-185-369-4-pdf

³ Turing, A. M., Computing machinery and intelligence, M I N D, A quarterly review of psychology and philosophy, Vol. LIX. No. 236., October, 1950

the same. A visible change is noticed only in the approaches and methods of training. As an example of bad practice can be pointed out the fact that the so-called “smart” universities have tried to gain an advantage over other educational institutions by declaring that their approaches and teaching methods perfectly “fit” the current situation in the world. This has caused some indignation among the representatives of traditional universities, which for centuries have preserved and transmitted knowledge in the established classical way supported and in harmony with new technological solutions. It is true that e-learning systems and educational platforms based on them have their place in the modern educational process, but this cannot serve as a justification for neglecting traditional education.

Try as they might, smart universities cannot and should not replace the natural community learning process of traditional universities. One must take into account the fact that, by definition, a university is a community of teachers and students, which definitely has its social commitments. We should not forget that the word “university” is derived from the Latin term “universitas magistrorum et scholarium”, which means (community of) teachers and students in general”⁴. We firmly believe that the fundamental social mission of universities is to create and transmit human knowledge, and to develop human capacity to create, transmit and apply their knowledge..

3. “Learning by doing” in the university educational environment

As is notoriously known, theory and practice should be the basis of university education for young people. Not only some European universities, but also universities from various other continents have developed various methods and approaches that have been successfully incorporated into the modern educational process. Thus, in the middle of the 20th century, the teaching methodology of the American scientist, philosopher and educator John Dewey, known as “Learning by Doing”⁵, is successfully applied in teaching students and PhD students all over the world. By basing their educational policy on this principle, higher schools prepare modern personnel in the field of natural sciences and humanities, thereby creating a favorable educational environment in which knowledge and skills play a key role. This is made possible by organizing summer universities, internships and hands-on experience, which engage young

⁴ S. Denchev, D. Stoyanova. The Value of European University Education in the Context of COVID-19. (Scientific Study. Sofia: Za bukвите – O pismeneh, 2020).

⁵ John Dewey. Experience and Education, The Educational Forum, New York: Macmillan, Vol 50 (3), 1986, 241-252

people to experiment in a real environment, participating in research activities of different types and objectives.⁶

The formation and construction of knowledge, values and skills, the establishment of useful connections and contacts between different educational and cultural institutions, etc. are among the main goals and tasks in organizing and conducting field observations, research and studies or a specific type of research work. Extra-curricular activities in the field of humanities also contributes to providing opportunities for young people to work with well-known and proven scientists and specialists from various fields of scientific knowledge and business, which improves the process of acquiring useful communication skills, leads to better orientation in the mechanisms of work and control in state and business structures and is a real opportunity to acquire valuable knowledge from practice.

There are many examples of the benefits of applying the learning-by-doing educational paradigm. Even in the short retrospect of John Dewey's research, there is a clear tendency to change the established way of teaching in different cultural communities, but who would have guessed that a new technology, such as artificial intelligence, could radically change the attitude towards the educational process as a whole. Good researchers and university professors are strong in the fact that, due to the knowledge and experience they have, they are able to construct a new educational model based on the latest technological achievements of society. However, a leading factor in this model is a research approach that is essential to obtain the end result – new knowledge.

Artificial intelligence has led to a change in the attitudes towards implementing educational policy in universities, providing opportunities for scientists, teachers, researchers, PhD students and students to conduct their research both in a real working environment and in a virtual one.⁷ The introduction of learning based on the achievements of artificial intelligence has led to a change in the approaches to presenting information and generating knowledge. It is true that the virtual environment has somewhat preserved the form of communication, but it cannot replace the direct contact on the basis of which young people are trained. We should not forget that the University is the center of education, science, culture, economy, industry, art, etc. Although faced with the problems and responsibilities of the “new time” - this type of educational institutions are called to contribute to the preservation of “knowledge”, the

⁶ D. Stoyanova, E. Savova, I. Peteva, R. Yotova. Academic research projects for students support and motivation in university information environment. ICERI2018 Proceedings of 11th annual International Conference of Education, Research and Innovation. Seville, Spain, 2018, 9706-9709

⁷ Yotova, R. Otkriti iztochnitsi na informatsia. Sabirane, klasifikatsia i obrabotka. Sofia, Za bukвите – O pismenehy 2023. 224 s. ISBN: ISBN 978-619-185-605-3

educational system, and in particular the one on which higher education is based, fulfills the main task of both creating new knowledge, and distribute it. The mission of universities is to provoke and encourage society towards knowledge, creativity and innovation through direct communication between trainer and trainee. In this case, “learning by doing” or more precisely just the “**learning**” part suffers serious modifications, because even though cutting-edge technologies are part of the learning, they also have many disadvantages. For example, hardware devices often fail without warning, sometimes, quite unexpectedly, the Internet connection breaks, and platform blocking can cause serious problems when conducting training processes based on artificial intelligence or seminars, especially when the trainer is providing important information or when students are at a crucial point in the training course. Insufficient knowledge of the used applications or training programs based on artificial intelligence platforms can lead to unnecessary delays, which negatively affects the learning process. It is a two-way process because the teacher is also prevented from understanding the degree of acquisition of the material by the students and supporting them where necessary.

The “**doing**” part suffers serious distortions as well, since almost every practically orientated action is subject to prohibitions or restrictions. For example, field research, especially in the humanities, cannot be carried out entirely on AI-based platforms alone. This also affects the processes of generating new knowledge. Leading in this type of research is the imaginative interpretation of symbols and signs, rather than their study and objectification in a real and unadulterated environment. The problem in this case is that “learning” is not complemented by “doing”, which affects the process of generating new knowledge. No matter how well the researcher is theoretically prepared, he or she cannot fully test his/her knowledge and verify it only in an artificial intelligence environment. The lack of contact with the real environment changes the views and understandings of both teachers and students about the studied object. In this case, the research will not lead to the generation of new knowledge, but rather to the emergence of hypotheses, so the results will not be objective, but rather incomplete and subjective.

4. Conclusion

The conclusions synthesized by us in the course of this scientific research show that with the emergence and advent of artificial intelligence into university educational and scientific programs, opportunities have been created for the total implementation of the educational paradigm “learning by doing” in the educational policy of higher schools. With the help of innovative software technologies, some of the university communication practices have

been preserved, but the process of acquiring knowledge through the direct use of the “learning by doing” method has led to some subjectivity. Regardless of the economic, social and cultural crisis that the world is experiencing, we can definitely say that universities remain the places where social criticism is concentrated – criticism of general concepts, conceptual scientific criticism, criticism of knowledge, societies and all past and present social institutions and practices. Higher education is not only associated with building an understanding and criticism of theories and empiricism for the specialist, because it also realizes the high ideal of a comprehensive education that expands the general culture of students through the humanities, enriches and develops skills and competencies, and creates a positive attitude to cultural diversity. Where, when and how artificial intelligence will fit into the educational practice of universities is a matter of increased difficulty. In our opinion, the threat of dehumanization of university education is real, but this threat could be controlled and directed towards its minimization.⁸

A research project that is the subject of our R&D activity is related to modern humanities university education and clearly proves that even today, in the era of artificial intelligence, the philosophical interpretation of education according to the American educator John Dewey has a current meaning and application in the field of university education. In this regard, we have proved that the educational paradigm “learning by doing” provides in-depth knowledge in any scientific field and prepares students to correctly perceive and apply various theoretical models and methods and builds critical thinking skills in them.

ACKNOWLEDGEMENTS

This work was supported by the NSP DS program, which has received funding from the Ministry of Education and Science of the Republic of Bulgaria under the grant agreement no. Д01-74/19.05.2022.

⁸ Yotova, Ralitsa, Boyanov, Stoyan. Research of Forced Information Deviations and Their Impact on Public Attitudes in Conditions of Crisis. In: Ethical determinants of information literacy in higher education. Proceedings with Papers of the Round Table “Ethical Determination of Information Literacy in Higher Education” 19th-21th September 2023 Geneva, Switzerland, p. 58-62 ISBN:978-619-185-628-2

REFERENCES

1. **D. Stoyanova, I. Peteva, S. Denchev.** The role of universities in the formation of modern R&D space through creating new educational patterns. INTED2016 Proceedings of 10th International Technology, Education and Development Conference. Valencia, Spain, 2016, 314-318.
2. **Denchev, S.** Informatsia i sigurnost. Sofia, Za bukвите – O’pismenehy, 2019. ISBN:978-619-185-369-4-pdf
[**Денчев, С.** Информация и сигурност. София, За буквите – O’писменехъ, 2019. ISBN:978-619-185-369-4-pdf.]
3. **Turing, A. M.,** Computing machinery and intelligence, M I N D, A quarterly review of psychology and philosophy, Vol. LIX. No. 236., October, 1950
4. **S. Denchev, D. Stoyanova.** The Value of European University Education in the Context of COVID-19. (Scientific Study. Sofia: Za bukвите – O pismeneh, 2020).
5. **John Dewey.** Experience and Education, The Educational Forum, New York: Macmillan, Vol 50 (3), 1986, 241-252.
6. **D. Stoyanova, E. Savova, I. Peteva, R. Yotova.** Academic research projects for students support and motivation in university information environment. ICERI2018 Proceedings of 11th annual International Conference of Education, Research and Innovation. Seville, Spain, 2018, 9706-9709
7. **Yotova, R.** Otkriti iztochnitsi na informatsia. Sabirane, klasifikatsia i obrabotka. Sofia, Za bukвите – O pismenehy 2023. 224 s. ISBN: ISBN 978-619-185-605-3
[**Йотова, Р.** ОТКРИТИ ИЗТОЧНИЦИ НА ИНФОРМАЦИЯ. Събиране, класификация и обработка. София, За буквите – O ПИСМЕНЕХЪ 2023. 224 с. ISBN: ISBN 978-619-185-605-3]
8. **Yotova, Ralitsa, Boyanov, Stoyan.** Research of Forced Information Deviations and Their Impact on Public Attitudes in Conditions of Crisis. In: Ethical determinants of information literacy in higher education. Proceedings with Papers of the Round Table “Ethical Determination of Information Literacy in Higher Education” 19th-21th September 2023 Geneva, Switzerland, p. 58-62 ISBN:978-619-185-628-2