Artificial Intelligence as a Supplement in the Teaching Process

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ABSTRACT

The paper emphasizes the importance of artificial intelligence as a supplement to its use in education. What influence and impact does artificial intelligence have on education? Is the use in teaching focused on teaching goals? Artificial intelligence can use methods of experiential learning, simulation learning, principles of connectivity and constructivism. The paper responds to new trends and needs of society, whose competitiveness requires readiness for the requirements of education 4.0 (5.0). The possibilities of artificial intelligence applied in the educational process can be designed for use in teaching with the implementation of the educational program as an MOOC course.

Keywords: Artificial intelligence, Digital technologies, Education, MOOC, Research

INTRODUCTION

The Czech Technical University (CTU), Masaryk Institute of Advanced Studies (MIAS), Department of Pedagogical and Psychological Studies prepares students for the profession of teachers of technical subjects in the study program Specialization in

Pedagogy. The current state of knowledge of pedagogical sciences and the dynamically developing field of digital technologies are applied to specialized areas of technical fields. The structure and content of teacher training is being systematically modernized as a result of the development of the humanities and technical sciences. Today, the demands of students' psychological resilience in the environment of the cybernetic and robotic world are changing (School Education Gateway, 2021). The paper attempts to define goals and visions for the future, the integration of artificial intelligence into the teaching process and its main advantages and disadvantages.

PRELIMINARY RESEARCH

Research is needed to identify potential successes and risks. We will focus on the synthesis and interpretation of knowledge gained through research. In our research, it was a structured interview with an expert group. Respondents were acquainted with the possibility of creating a MOOC course - an educational program for further education of teachers (Svoboda and Mynaříková, 2021). Through interviews, the opinions of experts on the educational program were examined. The effort is also to analyse the current situation in education with emphasis on research results and literature. Artificial intelligence and digital technologies are intended to support and complement the teaching process. The main obstacles to the spread of artificial intelligence in education can be the difficulty of preparing a teacher for teaching. The positive and negative aspects of artificial intelligence can be named. It is especially important to compare the views of teachers and experts.

The study is the basis for continuing research into the digital competencies of social science teachers (Svoboda et al. 2018-2021, Svoboda et al. 2020). Continuation of the research is now carried out at the Czech Technical University, Masaryk Institute of Advanced Studies in Prague within the research grant (Development of digital competencies of teachers of social sciences). The development of the topic of artificial intelligence in education is very important. There is a lot of research, but insufficient attention has been paid to examining the effectiveness of teaching using digital technologies supported by artificial intelligence (Vláda, 2018, MPO, 2021). Artificial intelligence in education has a future and can be used meaningfully. New technologies and acquired knowledge about artificial intelligence can be reflected in the international curriculum in the reforms of school education systems. Innovative methods and forms of education are important aspects of the current educational reality and constant innovation of didactic tools in teaching is a necessary condition for building a modern educational institution. The effective use of artificial intelligence through digital technologies in the educational process corresponds to the need to improve the quality of education (Svoboda et al. 2020).

IMPLEMENTATION OF PRELIMINARY RESEARCH

We carried out the preliminary research. In our preliminary research, it was a structured interview with an expert group. Respondents were selected so that the sample was representative (Lašek and Chrzová, 2003). The sample contained a total of twenty respondents (experts) from various types and levels of schools and other educational institutions in the Czech Republic. During the selection, emphasis was placed on pedagogical work in technical subjects, assumption and orientation in new technologies with a focus on artificial intelligence and higher education. The interviews took place in an individual form in the MS Teams environment. All respondents' answers were recorded. The respondents were acquainted with the possibility of creating a MOOC course - an educational program for further education of pedagogical staff. We focused on questions, answers, comments, suggestions and ideas.

In the research sample, we looked for related phenomena and key opinions. We grouped related opinions into groups and analysed the answers (Hendl, 1999). The following factors had to be determined for the analysis and grouping:
- expertise with online teaching, digital technologies and artificial intelligence,
- what hinders the diffusion of new technologies and artificial intelligence into education,
- the possibility of creating a MOOC course - educational program from the point of view of experts.

Experts' experience with online teaching, digital technologies and artificial intelligence.

The interview began with a general question: Do you think that online learning, digital technologies with the support of artificial intelligence will become a common part of education? What is your experience with this? Each of the respondents reacted positively. From the positive answers we can determine the following structuring from the position of the time horizon, see table 1.

Table 1: Distribution of respondents from the position of the time horizon

Groups	Number	%
It is spreading fast.	15	75
Time horizon of a longer character.	5	25

The table shows that most respondents stated that online education and digital technologies with the support of artificial intelligence are expanding rapidly and will become a commonly used part of education. This level of experience ranged from "large to non-existent". Respondents were divided into groups according to opinions and related answers.

Table 2: Distribution of respondents from the position of experience

Groups	Number	%
Great experience. Respondents often use and encounter online learning and digital technologies that support artificial intelligence.	12	60
Little experience. Respondents use and encounter in part online learning and digital technologies with the support of artificial intelligence.	8	40

Experience prevails. Furthermore, the analysis of the data obtained from the answers was performed.

Question: Do you think that digital technologies with the support of artificial intelligence have their place in innovative teaching or is it just a current trend that will not have a wider application?

Group 1 - great experience (12 respondents).

No one in the group said that digital technologies with the support of artificial intelligence have no place in teaching. One respondent stated that he had bad experiences. Students remember little and the educational program in this case does not fulfill its purpose (in the table marked *).

Table 3: Distribution of respondents from the position of great experience

Answers	yes	%	no	%
a) Digital technologies with AI support have a place in innovative teaching.	7	58		
b) They are looking for a place.	2	17		
c) Rather, they have no place.	2	17	0	0
d) It is only a temporary element.				
e) Digital technologies with AI support have a place in innovative teaching and can also be said to be a temporary element in teaching.	1*	8		

Group 2 - small experience (8 respondents).

Little experience does not affect the assessment of AI in teaching. In the future, respondents anticipate the use of digital technologies with the support of artificial intelligence in teaching and are interested in vocational training in this area.

Table 4: Distribution of respondents from the position of little experience (into the second group)

Answers	yes	%
a) Digital technologies with AI support have their place in innovative teaching.	5	62,5
b) They are looking for a place.	1	12,5
c) Rather, they have no place.	1	12,5
d) They are a temporary element.	1	12,5

Question: What is your opinion on the use of innovative teaching aids as motivational elements in teaching?

Table 5: Distribution of respondents from the position of opinion - motivational element

Groups	Motivational element especially for:	yes	%
Great experience.	Individual forms of study, distance learning, education, collective education, education of handicapped and gifted pupils, foreign language teaching.	12	100
Little experience.	young generation, handicapped.	6	75
	do not state.	2	25

Respondents' view of the use of new innovative teaching aids as motivational elements is positive. Innovative teaching aids are a motivating element in all types of study and in removing barriers to equal access to education.

Question: Do you agree that some fields of study with a focus on technical fields are destined for greater use of digital technologies with the support of artificial intelligence?

Table 6: Distribution of respondents from the position of opinion - fields of study

Groups	Yes, they are predestined		No, all fields		I have no opinion	
	Number	%	Number	%	Number	%
Great experience.	8	67	3	25	1	8
Little experience.	6	75	2	25	0	0

Respondents agreed that digital technologies with the support of artificial intelligence can be used in all fields of education. One did not comment. For answers with little experience, the preference is clear in favor of the fields.

Question: What interested you most in creating a MOOC course - educational program?

Table 7: Distribution of respondents from the position of opinion on the educational program

Groups	Teaching activities		Everything, the whole area of the issue		Without comment	
	number	%	number	%	number	%
Great experience.	7	58,33	4	33,33	1	9,33
Little experience.	3	37,5	5	62,5	0	0

19 respondents, i.e. 95% of the possibilities of creating an educational program, were positively interested. 1 respondent did not comment.

What hinders the diffusion of new technologies and artificial intelligence into education?
Question: Do you include digital technology with the support of artificial intelligence in your teaching?

Table 8: Distribution of respondents from the position of opinion

Answers	number	%
I incorporate digital technologies with the support of artificial intelligence into my teaching.	3	15
I do not include digital technologies with the support of artificial intelligence in my teaching.	17	85

85% of respondents do not mostly include digital technology with the support of artificial intelligence in their teaching, but believe in their motivational effect. Respondents emphasized the fact that the difficulty in preparing for lessons prevents them from doing so.

Possibility of creating a MOOC course - educational program from the point of view of experts.
Question: What interested you most about the possibilities of creating an educational program?

Table 9: Distribution of respondents from the position of opinion - educational program

Teaching activities		Everything, the whole area of the issue		Without comment	
number	%	number	%	number	%
10	50	9	45	1	5

This question has already been analysed from the perspective of respondents' experiences. We re-analysed the same question in terms of a broader assessment of the possibilities of the educational program, in order to draw conclusions from the respondents for the optimization of the educational program.

Question: What do you recommend focusing on?

Table 10: Distribution of respondents from the position of opinion - focus more

Groups	Teaching activities		Everything, the whole area of the issue		Without comment	
	number	%	number	%	number	%
Focus of the educational program.	0	0	2	22	0	0
Stimulating ideas.	5	50	2	22	0	0
Other ideas and suggestions.	3	30	5	56	1	11
Without comment.	2	20	0	0	0	0

Question: Do you think that the possibilities of the theoretical and practical part of the educational program are balanced?

Table 11: Division of respondents into groups from the position of opinion - balance of the educational program

Balance of the educational program.	Number	%
The theoretical and practical parts of the educational program are balanced.	18	90
The theoretical and practical parts of the educational program are not balanced	0	0
Without comment.	2	10

90% of respondents positively assessed the balance of the theoretical and practical part of the educational program. Two respondents without an opinion. It can be concluded that the possibilities of the educational program are purposefully, didactically and clearly designed.

Question: How do you perceive teaching activities?

Table 12: Division of respondents into groups from the position - teaching activities

Aspects	Number of respondents	%
Processing quality.	15	75
Adequacy.	3	15
Originality of processing.	2	10

100% of respondents gave a positive evaluation of teaching activities. Their answers were analysed from the position of respondents' attitudes to teaching activities. They were said to highlight comprehensibility, illustration, clarity and use in various fields. The research was enriched with interesting topics and ideas that will serve to develop the educational program. This signals the interest of experts and the need for innovation in education.

CONCLUSION

Using the method of structured interviews and answer analysis, we state that MOOC courses - educational programs focusing on digital technologies with the support of artificial intelligence will become commonly used in education. Such courses have a future and are a reality in education, especially for the young generation. Digital technologies with artificial intelligence support are intended to support and complement interactive learning (Svoboda, 2021). The main obstacles to the use and diffusion of new technologies with the support of artificial intelligence in education are the lack of information in new technologies and the difficulty of preparing for lessons (Rojek et al. 2020).

In the interview, the respondents commented on the individual possibilities of creating an educational program. The aim of the interview was to obtain evaluations, comments, suggestions and ideas that could be included in the concept of the educational program and thus optimize the educational program. Based on the evaluation of the preliminary research, it can be stated that the possibilities of the educational program had a positive response. After evaluating the interviews, the training program was modified to include acceptable comments from the expert group. The theoretical part will be extended by more practical examples with the possibility of group forms of work. The educational program will be supplemented by a motivational input on digital technologies with the support of artificial intelligence. Artificial intelligence in education has a future and can be used

meaningfully (Gartner, 2019).

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