

Effects and Benefits of Implementing Artificial Intelligence in Higher Education

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Abstract

In the modern digital era, educational institutions are creating development strategies for their digital transformation by implementing new digital teaching methods based on artificial intelligence (AI), such as online teaching and machine learning systems. The aim of the paper is to analyze the attitudes towards implementing AI in higher education. For this purpose, empirical research was conducted through a questionnaire distributed online to both students and employees of Belgrade Metropolitan University, as part of the university's internal research project. Research results presented in the paper show that both students and university staff have a generally positive attitude towards applying AI in education (average grades over 3,5 on the Likert scale), viewing AI as a way of providing high quality education to students. The findings of the research conducted in the paper reveal the main benefits of applying AI technologies in education to be improved work efficiency, administrative work, as well as student evaluation and monitoring system. The contribution of the paper suggests that organizing trainings and workshops to emphasize and demonstrate the benefits of implementing AI in education can improve both students and professors' perception, attitudes and intention to use modern learning and teaching technologies such as AI tools in education. Even though the awareness of AI benefits is constantly rising, the ethical issue still remains of whether AI should totally replace or merely contribute to the education process.

Keywords

artificial intelligence, higher education, effects, benefits

1. Introduction

The term Artificial Intelligence (hereinafter: AI) can be defined as a complex set of systems which show intelligent behavior in the way of analyzing their environment and taking action in order to achieve specific goals with a certain level of autonomy [1]. The goal of AI is to develop a software which can simulate human intelligence by learning (extracting information and rules from data), concluding (using gained knowledge in making decisions), and improving itself [2].

As part of their digital transformation strategies aimed at gaining new digital skills, educational institutions are encouraged to implement modern digital teaching methods based on AI, such as online teaching and learning systems, machine learning and ChatGPT [2]. The use of AI tools in education enables personalized learning and provides quality educational opportunities to all students equally, thus contributing to lifelong learning and education as main sustainable development goals [3].

2. Application of Artificial Intelligence in Education

According to the EU European Parliament's global report, the largest private investments in implementing AI in education in 2023 were recorded in the USA (62.5 billion EUR), followed by China (7.3 billion EUR) and the UK (3.5 billion EUR) [4].

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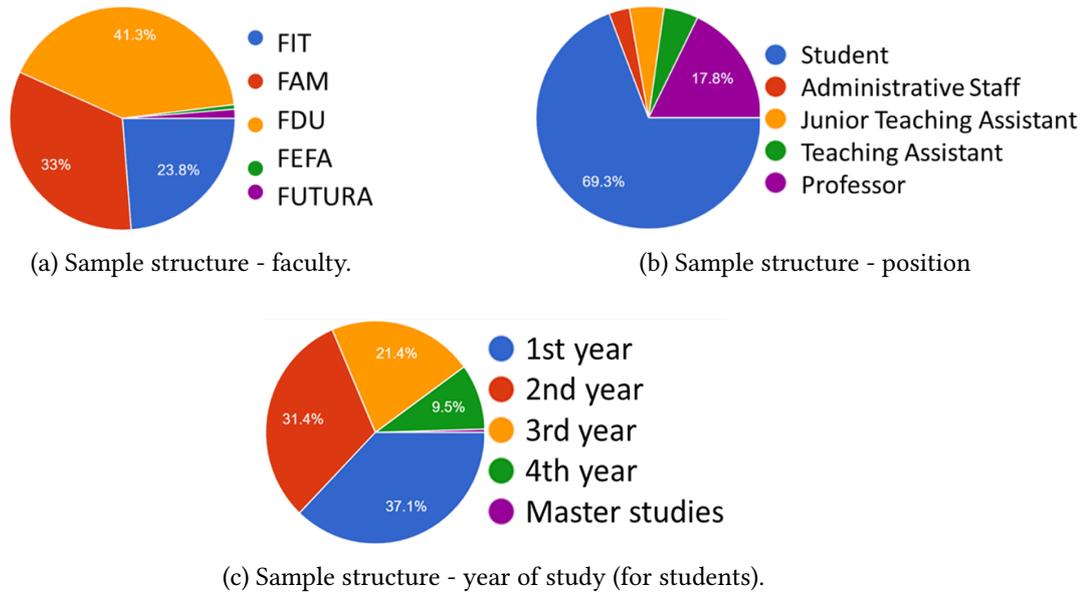


Figure 1: Collected sample structure.

Global KPMG study on attitudes towards AI of 17,000 respondents from 17 countries worldwide has shown the highest level of trust (80%) regarding AI application at universities and research institutions [5].

The AI curriculum was created in China to adapt the traditional studying material to high school students, and evaluate the effectiveness of formal AI education based on students' knowledge perception [6].

European research results show that students in Sweden widely use ChatGPT [7], whereas learning experience and results of using AI tools in Slovenia vary depending on the field and level of academic studies [3].

Research on attitudes towards AI in Serbia has shown that universities and research organizations are most trusted to implement AI by the public [8].

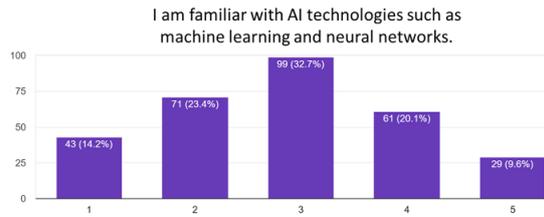
3. Research on Artificial Intelligence Application in Higher Education in Serbia

For the purpose of this paper an internal survey was conducted in June 2024. The survey questionnaire was distributed via e-mail to all students and employees of Belgrade Metropolitan University, including faculties FAM, FIT, FDU, FEFA, and FUTURA. The questionnaire consisted of 2 parts. The first part of the questionnaire collected general data on the respondents - faculty, position (student, professor, teaching assistant, or administrative staff), and year of study (for students).

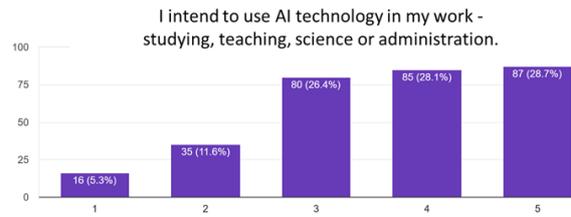
The survey collected a sample of 303 respondents from Belgrade Metropolitan University, with the majority representing Faculty of Digital Arts - FDU (41.3%), followed by Faculty of Management - FAM (33%) and Faculty of Information Technology - FIT (23.8%), as well as FUTURA (1.3%) and FEFA (0.7%).

4. Research Results

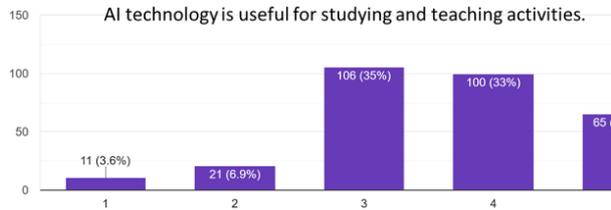
The second part of the questionnaire contained 9 statements related to respondents' attitudes towards the application of artificial intelligence in higher education. The statements were evaluated using the Likert scale, with grades varying from 1 - I completely disagree to 5 - I completely agree. A third of the respondents (32.7%) is neither familiar of unfamiliar with AI technologies such as machine learning and



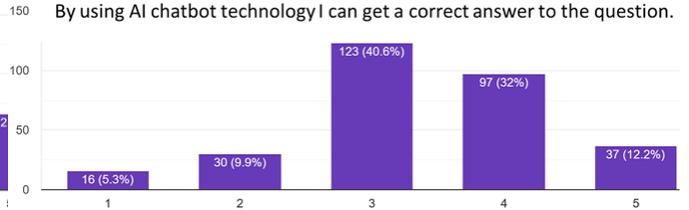
(a) Statistical analysis - questionnaire statement 1.



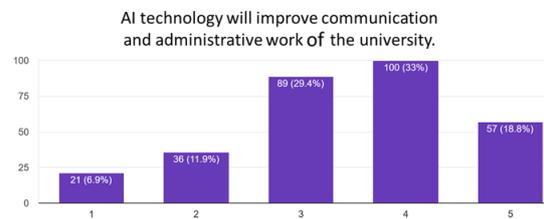
(b) Statistical analysis - questionnaire statement 2.



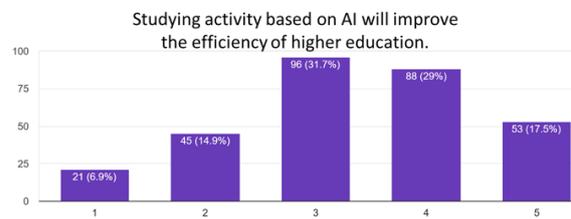
(c) Statistical analysis - questionnaire statement 3.



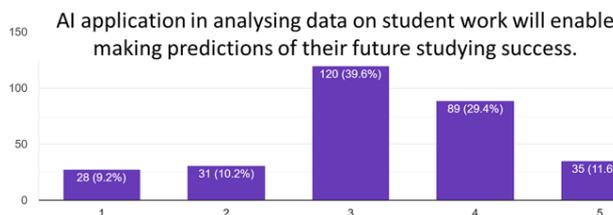
(d) Statistical analysis - questionnaire statement 4.



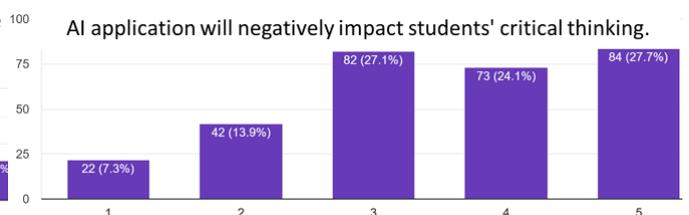
(e) Statistical analysis - questionnaire statement 5.



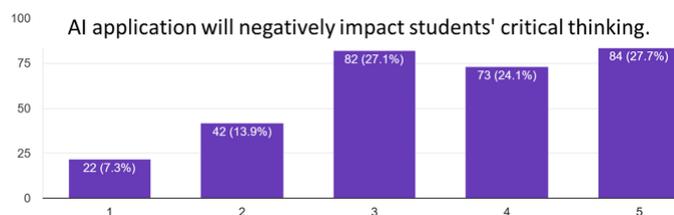
(f) Statistical analysis - questionnaire statement 6.



(g) Statistical analysis - questionnaire statement 7.



(h) Statistical analysis - questionnaire statement 8.



(i) Statistical analysis - questionnaire statement 9.

Figure 2: Statistical analysis for all statements.

neural networks, with two other thirds varying between higher (29.7%) and lower levels of familiarity (37.6%).

Over a half of the respondents (56.8%) intends to use AI technology in their work (studying, teaching, science or administration), with the other half varying between neutral (26.4%) and lower levels of intention (16.9%).

Over a half of the respondents (54.5%) agrees that AI technology is useful for studying and teaching activities, a third of the respondents is neutral (35%), and the rest mostly does not agree (10.5%).

Almost a half of the respondents (44.2%) agrees that by using AI chatbot technology they can get a

Table 1
Questionnaire statements and average grades

Questionnaire Statement	Average Grade
I am familiar with AI technologies such as machine learning and neural networks.	2.87
I intend to use AI technology in my work - studying, teaching, science or administration.	3.63
AI technology is useful for studying and teaching activities.	3.62
By using AI chatbot technology I can get a correct answer to the question.	3.36
AI technology will improve communication and administrative work of the university.	3.45
Studying activity based on AI will improve the efficiency of higher education.	3.35
AI application in analyzing data on student work will enable making predictions of their future studying success.	3.24
AI application will negatively impact students' critical thinking.	3.51
AI application will negatively impact students' creativity.	3.46

correct answer to the question, 40.6% of the respondents are neutral, and the rest mostly does not agree (15.2%).

A half of the respondents (51.8%) agrees that AI technology will improve communication and administrative work of the university, almost a third of the respondents is neutral (29.4%), and the rest mostly does not agree (18.8%).

Almost a half of the respondents (46.5%) agrees that studying activity based on AI will improve the efficiency of higher education, almost a third of the respondents is neutral (31.7%), and the rest mostly does not agree (21.8%).

Almost a half of the respondents (41%) agrees that AI application in analysing data on student work will enable making predictions of their future studying success, 39.6% of the respondents are neutral, and the rest mostly does not agree (19.4%).

A half of the respondents (51.8%) agrees that AI application will negatively impact students' critical thinking, almost a third of the respondents is neutral (27.1%), and the rest mostly does not agree (21.2%).

A half of the respondents (51.2%) agrees that AI application will negatively impact students' creativity, almost a third of the respondents is neutral (26.1%), and the rest mostly does not agree (22,8%).

5. Discussion

By analyzing the 9 questionnaire statements and their average grades, it can be concluded that the respondents gave the highest average grades to statement 2 regarding the intention to use AI technology in their work - studying, teaching, science or administration (average grade 3,63), as well as statement 3 regarding the usefulness of AI technology for studying and teaching activities (average grade 3.62).

On the other hand, the respondents gave the lowest average grade to statement 1 regarding the familiarity with AI technologies such as machine learning and neural networks (average grade 2.87).

Based on these research results, the main benefits of implementing AI in higher education include:

- improving higher education efficiency
- predicting students' success in studying by data analysis using AI
- getting a correct answer to the question
- improving administrative work

On the other hand, implementing AI in higher education can have a negative effect on students' critical thinking and creativity during studying activity. Gradual and responsible AI implementation in higher education could be the solution to this ethical challenge [9] since AI should contribute to improving the studying and teaching experience, and not completely replace it [2].

6. Conclusion

Based on the research conducted at Belgrade Metropolitan University, it can be concluded that both students and university staff have recognized the benefits of using AI in studying and teaching activities, and that they have a generally positive attitude towards applying AI at the university.

Furthermore, the conducted research contributes to better understanding the effects and benefits of implementing AI in higher education, such as improving student evaluation and monitoring system, work efficiency, as well as administrative work.

Although both students and professors have shown high levels of intention to use AI, they are still lacking knowledge and personal experience with AI [10]. It is therefore recommended to organize trainings and workshops in order to improve students and professors' digital skills [11].

Acknowledgment

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Declaration on Generative AI

The authors have not employed any Generative AI tools.

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