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Student Perspectives on the Role of Artificial Intelligence in Education: A Survey-Based Analysis

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Abstract

Artificial intelligence (AI) has emerged as a powerful technology that has the potential to transform education. This study aims to comprehensively understand students' perspectives on using AI within educational settings to gain insights about the role of AI in education and investigate their perceptions regarding the advantages, challenges, and expectations associated with integrating AI into the learning process. We analyzed the student responses from a survey that targeted students from diverse academic backgrounds and educational levels. The results show that, in general, students have a positive perception of AI and believe AI is beneficial for education. However, they are still concerned about some of the drawbacks of using AI. Therefore, it is necessary to take steps to minimize the negative impact while continuing to take advantage of the advantages of AI in education.

1. Introduction

Artificial Intelligence (AI) has rapidly advanced over the past few decades, enabling computers to perform tasks that were previously exclusive to humans [1, 2]. These advancements involve using complex algorithms and technologies to recognize patterns, make decisions, and learn from experience.

In recent years, AI has witnessed important breakthroughs, particularly in machine learning [3, 4] and natural language processing [5, 6]. The remarkable

success of AI in addressing complex tasks like image recognition [7–9], language translation [10], and predictive modeling [11, 12] has sparked the development of even more sophisticated applications across various sectors of life.

One of the notable breakthroughs in AI is the development of advanced language models like ChatGPT [13, 14]. These models are designed to understand and generate human-like content in conversations. ChatGPT is a prime example of how AI can engage in dialogue, answer questions, and provide helpful information to users [15]. Another breakthrough is the creation of image models like DALL-E. These models can generate highly realistic images based on textual descriptions. They have been trained on vast datasets, allowing them to understand the relationships between words and visual representations [16]. Furthermore, AI has also made progress in audio processing with models like Whisper. These models have been trained to analyze and generate human-like speech, enabling applications such as voice assistants and text-to-speech systems [17].

In the educational setting, AI's influence is indisputable, offering modern ways of teaching and learning that address various challenges, like making educational content accessible and dealing with teacher shortages. Using AI technologies, such as innovative learning tools, tutoring systems, and virtual facilitators, has proven very valuable. However, more research is needed to fully explore and understand other ways AI can be used in education to benefit students and teachers [18, 19].

While AI development has undeniably captured numerous individuals' attention and generating various perspectives [20], views on AI vary significantly because some people perceive it as a threat to human labor and personal privacy, expressing concerns regarding the potential displacement of jobs on a massive scale, heightened unemployment rates, and deepening economic inequalities [21]. Moreover, worries persist regarding irresponsible entities' utilization and potential misuse of AI-collected data [22]. However, contrasting these concerns, many perceive AI as an exceptional opportunity to attain remarkable progress and foster innovation. They firmly believe that AI can assist humans in overcoming intricate challenges and expedite advancements across various domains, including education, healthcare, transportation, and scientific research [23]. AI holds the potential to deliver more efficient and precise solutions in data analysis [24], medical diagnoses [25], resource management [26], and complex decision-making processes [27]. Furthermore, AI can also catalyze enhanced human creativity, driving discoveries and expanding the frontiers of human knowledge.

Therefore, this study aims to comprehensively understand students' perspectives on utilizing AI within educational settings. This study will delve into students' viewpoints concerning the role of AI in education. A survey methodology employed to gather data of students from diverse academic backgrounds and educational levels. From this data, we want to comprehend students' perceptions of the advantages, challenges, and expectations of integrating AI into the learning process. The findings from this study offer invaluable insights for educators, technology developers, and policymakers involved in the development and implementation of AI in educational contexts.

2. Materials and Methods

2.1. Dataset

The data for this study was sourced from Kaggle [28], and it comprises the outcomes of a survey conducted on undergraduate students who were in their 2nd and 3rd year of study at the Faculty of Cybernetics, Statistics, and Economic Informatics in Romania. There are 15 questions in this survey and was administered online and shared through social media groups. A total of 91 participants took part in the survey. The survey's primary objective was to gather valuable insights into students' perceptions regarding the role of AI in education.

2.2. Data Analysis

We analyzed the survey data using descriptive statistical methods. The purpose was to gain a deeper understanding of the relationships and patterns within the collected data. Through this rigorous analysis, we aimed to extract valuable insights and draw meaningful conclusions regarding the topics at hand. The data analysis focused on various aspects, including Demographic Information of the students, Attitudes, and Beliefs about AI, Emotional Responses to AI, Perceived Impact of AI in Various Fields, Usefulness of AI in Education, and the Advantages and Disadvantages of AI in Education.

3. Results and Discussions

3.1. Demographic Information

To understand the demographic information of our survey participants, we analyzed survey questions on gender, year of study, major, academic performance, and GPA to gather demographic information and identify correlations with perceptions of AI in education. We also assessed participants' self-reported knowledge of AI and

Table 1. Demographic information of respondents

		Frequency	Proportion (%)
Gender	Female	59	64.38
	Male	32	35.16
Year of Study	Year 2	34	37.36
	Year 3	57	62.64
Major	Economic Cybernetics	30	32.97
	Statistics and Economic Forecasting	38	41.76
	Economic Informatics	23	25.27
Passed All Exams	Yes	68	74.73
	No	23	25.27
GPA	5.0-5.4	1	1.10
	5.5.-5.9	3	3.30
	6.0-6.4	5	5.49
	6.5-6.9	5	5.49
	7.0-7.4	14	15.38
	7.5-7.9	30	32.96
	8.0-8.4	8	8.79
	8.5-8.9	12	13.19
	9.0-9.4	10	10.99
	9.5-10	3	3.30

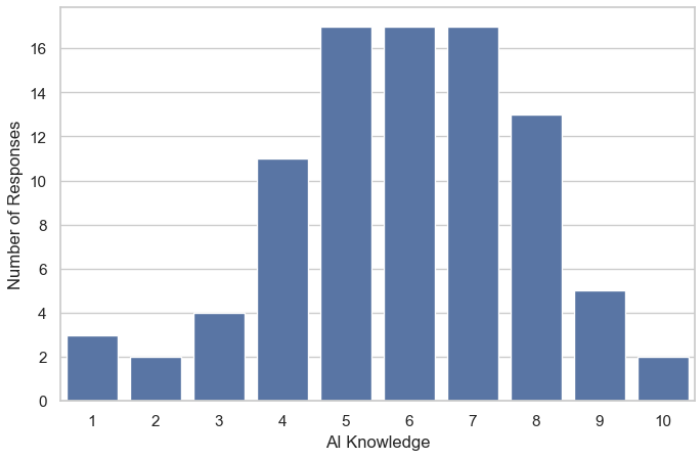

Figure 1. Student's AI knowledge.

their sources of AI knowledge. This information help to understand the influence of demographic factors on students' perceptions of the role of AI in education.

The demographic factors related to respondents, such as gender, year of study, major, passing exams, and GPA presented in Table 1. It was found that 64.38% of the respondents were female, while 35.16% were male. Most of the respondents (62.64%) were in the second year, while 37.36% were in the third year. The most common majors of our respondents are Statistics and Economic Forecasting (41.76%), Economic Cybernetics (32.97%), and Economic Informatics (25.27%). For the information regarding passing exams, 74.73% of respondents passed all exams, while 25.27% did not pass all exams. Respondents' GPA varied widely, with scores ranging from 5.0 to 10.0, reflecting the grading system used in Romania. The lowest representation was in the 5.0 to 5.4 range (1.10%) and the highest in the 7.5 to 7.9 range (32.96%).

Participants were asked to rate their perceived level of familiarity with AI on a scale ranging from 1 (not informed at all) to 10 (extremely informed). The self-reported students' AI knowledge is presented in Figure 1. Most respondents feel quite knowledgeable about the concept of AI, which is reflected in the high scores of 5, 6, and 7. Many respondents also rate themselves as more informed (8) or less informed (4) at a slightly higher level. The number of respondents who rated themselves as highly informed (10) or not at all informed (1) was relatively low, indicating that most participants had a good understanding of AI but did not consider themselves experts.

For information sources regarding AI, Figure 2 presents the results obtained from the question, "What sources do you use to learn about the concept of artificial

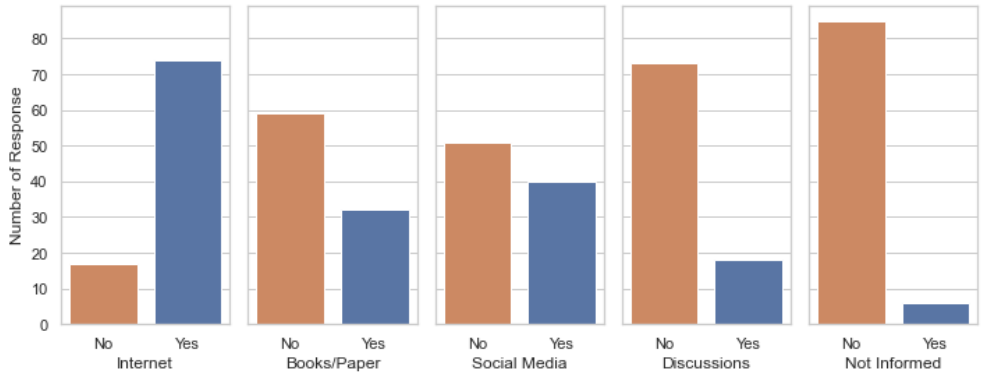

Figure 2. Students' source of AI knowledge.

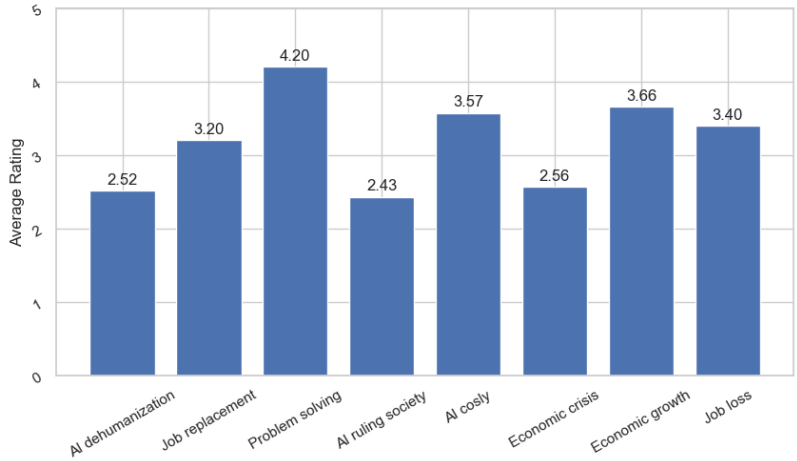

Figure 3. Students' attitudes and beliefs about AI.

intelligence?" The respondents were able to choose multiple sources from the following options: internet, books/scientific papers, social media, discussions with family/friends, and "I don't inform myself about AI." It can be seen that the internet is the primary source for students, with 74 respondents selecting it. This is predictable, considering that the internet is the primary source of information that people get today. On the other hand, only a few students indicated that they do not inform themselves about AI, suggesting that the majority of participants are actively seeking knowledge on the topic.

3.2. Attitudes and Beliefs about Artificial Intelligence

To gain insights into the participants' attitudes and beliefs about AI, we analyzed their responses to questions that assessed their agreement or disagreement with a series of statements. These statements covered various aspects of AI and its potential impact on society, work, and the economy. The participants were asked to indicate their level of agreement or disagreement on a scale ranging from "Strongly Disagree (1)" to "Fully Agree (5)" with the following statements:

- AI encourages dehumanization.
- Robots will replace people at work.
- AI helps solve many societal problems, including education, agriculture, and medicine and improves efficiency in managing time and dangerous situations.
- AI will rule society.
- Machinery using AI is very expensive and resource-intensive to build and maintain.
- AI will lead to a global economic crisis.
- AI will help global economic growth.
- AI leads to job losses.

The average rating of the respondent's answer can be seen in Figure 3. The data indicates that most students believe AI is crucial in addressing various societal challenges, including education, agriculture, and medicine. Furthermore, they perceive AI as a means to enhance efficiency in time management and handling dangerous situations, reflected in the average rating of 4.20. Students also express confidence in AI's ability to positively impact global economic growth, as reflected in the average rating of 3.66. This suggests that most participants have a positive outlook on the potential of AI to make significant contributions across diverse domains.

Despite recognizing the potential benefits of AI in various domains, students also assigned a relatively high average rating of 3.40 to the belief that AI leads to job losses. This indicates that while they acknowledge the positive impact of AI, they also have reservations about its potential implications on employment opportunities. This concern makes sense because AI is already finding its way into various fields and industries. As AI technology continues to advance, there is a valid worry that people who have developed exceptional skills in their professions might find themselves replaced by others who may have lower skills but possess a good grasp of how to utilize AI effectively. This scenario can potentially disrupt the job market, as automation and AI-driven solutions redefine the requirements for certain roles. However, it is essential to recognize that AI has the potential to complement human abilities and enhance productivity when utilized responsibly and ethically. This means that in the future, we might witness a collaboration between humans and machines, working together harmoniously to achieve better outcomes across diverse sectors. The dual perspective showcased in the survey results suggests the importance of addressing these concerns to ensure a balanced and sustainable integration of AI in different industries.

3.3. Emotional Responses to AI

To assess the participants' emotional responses toward AI we analyzed their responses to the question, "When you think about AI, do you feel Curiosity, Fear, Indifference, or Trust?". These insights into students' emotional responses toward AI influence their willingness to embrace and adopt AI technologies in educational and other contexts.

The participants were asked to select the emotion that best represented their feelings toward AI. The result presented in Figure 4 shows that most respondents (68.1%) feeling curiosity when thinking about AI. On the other hand, only a smaller proportion of respondents (7.7%) feeling trust towards AI. This suggests that while many students possess a sense of intrigue and interest in exploring the capabilities and potential of AI technologies, students also have a relatively low level of trust in AI systems, underscoring their possible worries or reservations regarding AI technologies' dependability and ethical consequences.

The fact that some students feel fear towards AI (13.2%), suggests that there is a need to address their misconceptions or anxieties about it. These fears may stem from concerns that AI will displace them in the workforce, privacy, or the impact of AI on society. It is important to engage in open dialogues with students,

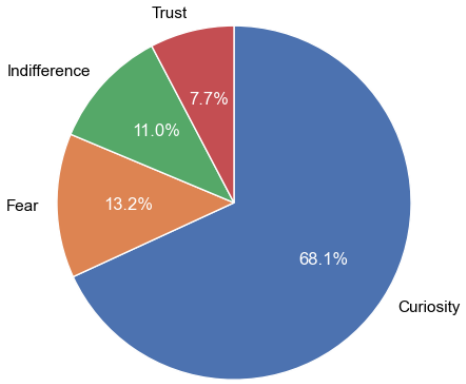

Figure 4. Students' emotional responses to AI.

provide them with accurate information, and create a supportive environment to help them overcome their fears and develop a more positive perception of AI.

3.4. Perceived Impact of AI in Various Fields

To understand the participants' perceptions regarding the impact of AI in different fields, we analyzed their responses to the question, "In which fields do you think AI will have the most significant impact?" Participants were asked to select multiple options from a list of fields. The available fields for selection were education, medicine, agriculture, constructions, marketing, public administration, and art. The analysis of the survey data as showed in Figure 5 revealed that among the options provided, the field that received the highest percentage of responses was Medicine, with 80.2% of participants acknowledging AI's potential for significant impact in healthcare. This finding highlights the widespread recognition of AI's transformative potential in revolutionizing medical diagnostics, treatment advancements, and healthcare delivery systems. The perception of AI's potential to improve medical outcomes and enhance patient care aligns with the current trend of AI-driven innovations in the healthcare industry.

The field of art received the lowest percentage of responses (13.2%) when participants were asked to rate the impact of AI in different domains. This suggests that students may not be aware of the many ways in which AI is being used in art-related fields, such as creative content generation, virtual reality, or interactive installations. It also indicates that there is a potential area for further exploration and education on the intersection of AI and artistic endeavors.

3.5. Usefulness of AI in Education

Participants were asked to rate the usefulness of AI in education on a scale of 1 to 10, with 1 being "not useful at all" and 10 being "extremely useful." The results presented Figure 6 showed that no participants rated AI

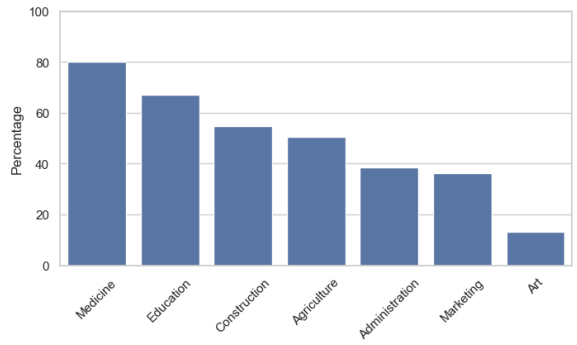

Figure 5. Students' perceived impact of AI in various fields.

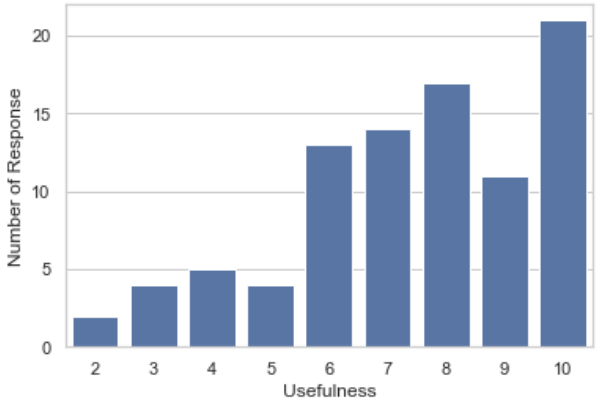

Figure 6. Students' perceived usefulness of AI in education.

as "not useful at all," and the majority of participants, namely 21, answered that using AI in education was "extremely useful." The number of respondents who answered the benefits of AI in education with a value of 6, 7, and 8 was 13, 14, and 17, respectively.

This result shows a generally positive perception of the usefulness of AI in the educational process among the surveyed students. Many students think AI has potential and will have a very positive impact when used in education. Also, the absence of students who answered "not useful at all" shows that, in general, students acknowledge the potential for using AI in education, even though not all students agree that AI is beneficial in education

3.6. Advantages and Disadvantages of AI in Education

To examine the perceived advantages and disadvantages of AI in the educational process, participants were asked four specific questions to gather insights into the participants' perspectives on the advantages and disadvantages of AI in teaching, learning, and evaluation. The result of analysis can be seen in Figure 7.

For the main advantage of AI in the teaching process, most respondents (42.9%) identified the main advantage as teachers being assisted by a virtual assistant for teaching lessons and answering students' questions immediately. This suggests that participants recognized the potential for AI to support educators in delivering lessons and providing real-time assistance, thereby enhancing the teaching process. Other advantages, such as more efficient time management for teachers and more interactive and engaging lessons, also received notable mentions.

Regarding the benefits of AI in the learning process, a majority of the respondents (52.7%) emphasized its most significant advantage as universal access for all students, including those with special needs who are eager to learn. The participants also acknowledged other advantages, such as personalized lessons and more interactive and engaging learning experiences.

When considering the primary benefit of AI in the evaluation process, nearly half of the respondents (49.5%) highlighted constant feedback from virtual assistants for each student. Other advantages, such as automation of exam grading and minimizing grading errors, were also acknowledged.

When asked about the drawbacks of AI, the most substantial proportion of respondents (37.4%) identified the lack of a relationship between students and teachers as the main disadvantage. Students concerned that AI implementation may diminish the interpersonal connection between students and teachers, potentially affecting the quality of education. Other disadvantages included the possibility of internet addiction, rarer interactions between students and teachers, and the potential loss of information due to system failures.

The responses to these particular questions reveal that AI offers numerous advantages in education, as highlighted by the respondents, namely virtual assistants, universal access, and constant feedback. However, students are also concerned that AI may reduce interpersonal relationships between students and teachers. Therefore, educators need to address students' concerns about these drawbacks so that all the advantages of AI can be utilized in education and the negative impacts of AI can be minimized.

3.7. Limitation of This Study

Regardless of the results we obtained, this study should be interpreted considering the following limitations. The respondents' affiliation with the Faculty of Cybernetics, Statistics, and Economic Informatics in Romania may have influenced their exposure to AI-related topics, potentially leading to a higher level of familiarity with AI concepts than students from other faculties or

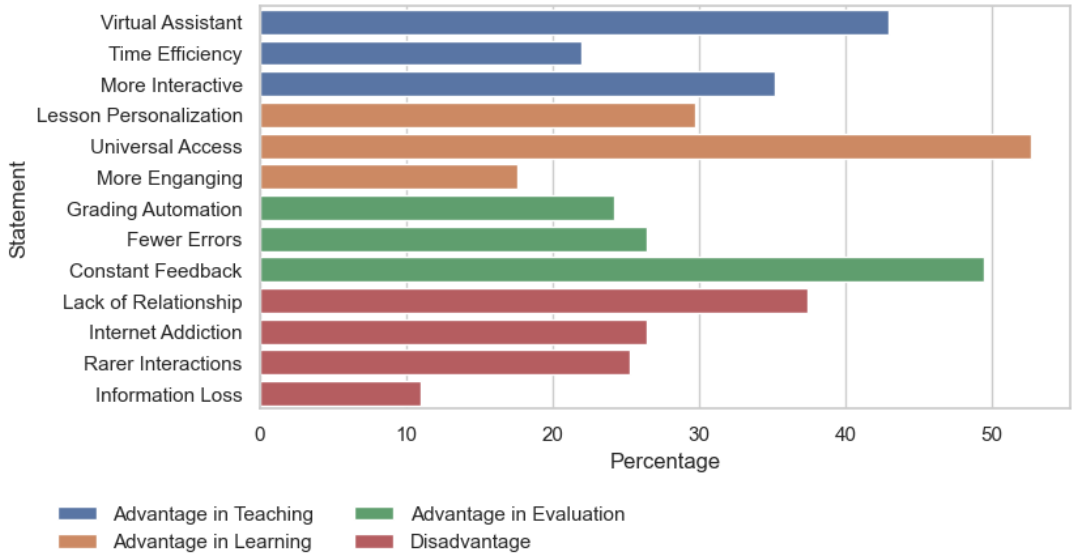

Figure 7. Students' perceived advantages and disadvantages of AI in education.

institutions. This prior knowledge and exposure influenced their responses to the survey questions.

Furthermore, due to the online survey format and recruitment through social media groups, there is a possibility that participants with a particular interest in technology and AI were more likely to be attracted. As a result, this potential self-selection bias could have led to a sample that predominantly consisted of more tech-savvy individuals. Acknowledging that this could limit the generalizability of the study's findings beyond the surveyed population is essential.

4. Conclusions

This study aims to determine students' perceptions of using AI in education. Based on the analysis of the survey results, it was found that, in general, students had a positive perception of the use of AI in education because it provides many benefits, such as improving the quality of learning and providing more learning experiences. Some of the advantages of AI that student expressed include virtual assistant support, universal access, and constant feedback. However, this advantage is inseparable from the weakness of AI, where students are worried that AI will reduce the relationship between students and teachers. Future studies should include a more diverse sample and incorporate multiple perspectives to provide a more comprehensive understanding of the role of AI in education. Additionally, longitudinal studies, qualitative research methods, and exploration of ethical considerations contribute to a deeper understanding of AI's impact in educational contexts, guiding responsible and sustainable integration of AI in education.

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Data Availability Statement: The data used in this study is available from the Graduate Admission dataset on Kaggle, accessible at https://www.kaggle.com/datasets/gianinamaria petrascu/survey-on-students-perceptions-of-ai-in-education. The dataset was accessed on 2 May 2023.

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