
Student knowledge and perceptions of AI usefulness: An exploratory study of Romanian students

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Abstract

Artificial intelligence (AI) is driving massive changes in education, with uses growing for educators and students. A significant portion of students embrace AI, but little is known about how narrow or wide-ranging their view of the benefits and disadvantages of AI is, especially in international settings. We report a survey of 91 Romanian computer science students, showing that knowledge of AI is associated with reporting the usefulness of AI. Those with higher AI knowledge were more likely to read books and papers on AI, report that AI will impact art, and actively seek information on AI. The most frequently mentioned source for learning about AI was the internet (81%), and the feeling about AI was mostly curious (68%). The most frequently cited advantage of AI was its ability to solve problems, and the most frequent disadvantage was the cost. Less than a third cited strong disadvantages of AI in education. These findings highlight student openness to using AI, especially as they know more about it. These findings also indicate that students may need coaching about the disadvantages of AI in educational settings.

Keywords: AI in education, AI student perceptions, AI student knowledge, AI student usefulness.

Introduction

Artificial intelligence (AI) is a broad term, typically referring to technology that can mimic or replicate something typically done by humans (Wang, 2019). In this paper, we will be referring to a more specific application of artificial intelligence called large language models (LLMs). LLMs are a subset of generative AI, meaning that it can generate human-like responses and interact conversationally with the user through complex algorithms. LLM algorithms are taught through machine learning using a massive amount of text-based data that the AI uses to prepare detailed and coherent responses to some sort of prompt created by a user (Yan et al., 2023).

The release of ChatGPT in 2022 was a major milestone in the field of artificial intelligence. It has since become one of the most popular and sophisticated tools. ChatGPT is a free-to-use tool that has a paid version with more advanced features, but even the free-to-use version has become exceedingly popular and has already gained millions of users. ChatGPT is one of the LLMs mentioned that can respond to any prompt, given it is appropriate. The technology is being continually improved and updated by OpenAI at an astounding rate (Wu et al., 2023).

AI, specifically large language models (LLMs) such as ChatGPT, have triggered a major shift in the educational industry (Acosta-Enriquez et al., 2024), with market size tripling in the past two years and expected to grow as much as tenfold over the next decade (Miszczak, 2023). For educators, AI has greatly improved routine tasks and allowed individualized support at scale. For instance, AI has been used to predict at-risk students to intervene early and improve student retention, offer digital library services, automate administrative tasks, and personalize academic support (Bates et al., 2020; Rawas, 2024). Student engagement with AI has been less clear, perhaps due to prohibitions imposed by worried educators to avoid misuse or just a general lack of awareness of how AI might improve motivation and learning efficiency (Surugiu et al., 2024). That is, students may be less likely to reveal their use of these tools in educational settings.

ChatGPT and similar technologies have become popular among students. One study found that around 60% of students have used them, and this number is expected to rise (Anthology, 2023). With this massive rise in students using generative AI and LLMs, it is only natural that concerns would arise along with it. While some worry that AI could pose a threat to the quality of education, AI is a tool that will become a regular part of our lives, and we must integrate it properly and effectively into higher education. Saying that banning AI tools would be like trying to ban calculators or the internet in education (Grassini, 2023).

Educators and students need to have clear ideas about the productive uses and potential drawbacks of the use of AI. Little work has been done in this area. A recent study found that United States (U.S.) students using AI more frequently had stronger comprehension of the benefits of AI (Koohang et al., 2024), yet little is known about the link between use of AI and understanding productive use of AI in education outside the U.S., Hasanein and Sobaih (2023) found that students believe using AI in coursework reduced anxiety, increased confidence and efficiency in completing work, and helped with language skills. We add to the literature by investigating student understanding of the disadvantages of AI in education, not just the advantages. Our study also expands this field of inquiry by extending the work to an international student body. Both positive and negative perceptions matter, as AI adoption and continued use, with or without permission of educators, will impact the educational landscape in this accelerated AI trajectory.

The students in this study rated their knowledge of AI as moderately strong (mean of 5.91 out of 10), and their perception was that AI was quite useful (mean of 7.44 out of 10). We found that knowledge about AI was significantly related to their perception of AI's usefulness. The most frequently mentioned source for learning about AI was the internet (81%), and the feeling about AI was mostly curious (68%). The most frequently cited advantage of AI was its ability to solve problems, and the most frequent disadvantage was the cost. Less than a third cited the disadvantages of AI in education.

Literature Review

AI-human collaboration has intrigued organizations, governmental agencies, and everyday citizens, populating the popular press with predictions of staggering levels of improvement to work and everyday living (Maheshwari, 2023). AI systems can do highly detailed work perfectly in seconds, and “tune” or “learn” over time as experience (added training data), making this technology an attractive worker or partner in human-AI teams. As an “AI-worker,” for instance,

the technology can do work that was practically impossible before, such as finding needed details in massive public records, because the time needed to inspect all relevant public documents was prohibitive (Lemieux & Werner, 2024). In Human-AI teams, the AI can co-decide or cue up items for human inspection, making the decisions more efficient and prioritizing the higher risk cases for review (Poon & Sung, 2021). Reports of experimentation with AI automation of tasks and as a teammate in organizations and society occur at staggering rates.

In education specifically, AI has been touted as an industry ripe for revolution with AI technology. A recent study claimed that AI will be the driving force behind a majority of learning systems in just a few years (Miszczak, 2023). Hasanein and Sobaih (2023) stated that there is a limited and growing body of literature on perceptions of students and faculty on the use of ChatGPT in higher education. At the time of this study, 90% of students considered ChatGPT better than tutoring, 95% of students with hearing impairments use AI effectively in their studies, 34,700 failing students were identified and cued up for remediation, and in the U.K., 67% of secondary schools use AI for projects and homework. While “AI tutors” (AI-powered chatbots) delivered personalized learning supports with 91% accuracy, Educators have concerns about possible errors, plagiarism, privacy, ethical issues, and bias in responses (Slimi & Beatriz Villarejo Carballido, 2023). These educator concerns have limited the deployment of AI in student-centered applications that might, for instance, deliver timely feedback 24/7 and customize the pace of lessons (Kuleto et al., 2021).

Students understandably love being able to look up something quickly to complete assignments, with 50% of students surveyed indicating they have used AI to complete coursework (Miszczak, 2023). AI tools help the user complete tasks quickly, find information more quickly, and improve work quality (Fauzi et al., 2023; Firaina & Sulisworo, 2023). Noy and Zhang (2023) found that the average time to complete a written task was reduced by 40% relative to completing tasks without AI, and the quality of these written tasks improved by 18%. AI in education is especially powerful for non-native English speakers (Chan & Hu, 2023). Users of LLMs can become over-reliant on them and trust the responses without using personal judgment or research to reinforce their validity (Fui-Hoon Nah et al., 2023). Students may be especially vulnerable since they may use AI to get an assignment done quicker or answer a question they may not know without questioning the prompt response or knowing if the shortcutting will diminish learning goals.

Whether AI use is productive (enhancing learning) versus helping students to quickly get good marks (with questionable learning) is an open question for research. Some claim that college students are mature enough to recognize their educational needs and direct their learning productively with prompts (Niu et al., 2024). Students notice that AI-tutors do not always understand prompts, are not perfect in responding, and lack depth in academic writing (Chan & Hu, 2023; Kumar, 2023; Lo, 2023). LLMs will respond in a confident and expert manner regardless of whether the information is correct, which may make students overly trusting and misinformed (Meyer et al., 2023). Despite possible drawbacks, Hasanein and Sobaih (2023) identified six positive drivers of student perception: time saving, reduced anxiety, improving language skills, self-confidence, punctual submission, and both academic and non-academic support.

Of course, student perceptions of AI are not limited to their impression of the technology in educational settings. Given the rapid evolution of AI use cases, most citizens (including students) struggle to fully absorb the full implications of AI, such as job displacement, bias in the training data of AI models, and concerns about how AI is handling data. As AI-powered uses in education grow rapidly, we need to know if students perceive not just the benefits, but also possible disadvantages of AI solutions in teaching and learning. Further, does being informed about AI improve student perceptions of the usefulness, advantages, and disadvantages of AI in education, potentially improving their caution and deliberate choices of when and where to use AI in their learning? Therefore, we pose these research questions:

RQ1: Is the level of knowledge in AI associated with reports of the usefulness of AI?

RQ2: Is the level of knowledge of AI associated with reporting the advantages of AI in education?

RQ3: Is the level of knowledge of AI associated with reporting the disadvantages of AI in education?

RQ4: Does the level of AI knowledge impact the reporting of AI advantages or disadvantages in education?

Methods

Participants

We used a public dataset (Petrascu, 2023), that used a convenience sample of 91 students enrolled in their second or third year of study in a cybernetics/informatics undergraduate program in Romania, which is taught in the English language; further, the survey was administered in English. Table 1 shows the demographics of this sample.

Table 1. Participant demographics

	Students	Percent of Sample
Gender, male	32	35.2%
Year of study (second or third), third year	57	62.6%
GPA (scale 1-10), above 70%	77	84.6%

Survey instrument

Students were asked to respond to 16 questions (Exhibit 1) about AI knowledge and their agreement or disagreement about the benefits and threats of AI in society and particular industries, and then about education settings. Their responses are summarized in Table 2, grouped by the independent variable (level of AI knowledge, dependent variable (usefulness of AI), opinions about AI, perceived advantages of AI, and perceived disadvantages of AI.

Table 2. Survey Responses

Survey item	Min	Max	Mean	Std. Dev.
PANEL A				
Independent variable:				
Q1 Level of AI knowledge (Likert scale 1-10, 10 = extremely informed)	1	10	5.91	1.97
Dependent variable:				
Q7 Usefulness of AI in education (Likert scale 1-10, 10 = extremely useful)	2	10	7.44	2.16
PANEL B				
Student opinions about AI (yes = 1)				
Q2 Internet: sources used for learning	0	1	0.81	0.39
Q2 books/paper: sources used for learning	0	1	0.35	0.48
Q2 social media: sources used for learning	0	1	0.44	0.50
Q2 discussions: sources used for learning	0	1	0.20	0.40
Q2 not seeking AI info: sources used for learning	0	1	0.07	0.25
Q5 feeling curiosity	0	1	0.68	0.47
Q5 feeling fear	0	1	0.13	0.34
Q5 feeling indifference	0	1	0.11	0.31
Q5 feeling trust	0	1	0.08	0.27
Q6 AI most impact education	0	1	0.67	0.47
Q6 AI most impact medicine	0	1	0.80	0.40
Q6 AI most impact agriculture	0	1	0.51	0.50
Q6 AI most impact construction	0	1	0.55	0.50
Q6 AI most impact marketing	0	1	0.36	0.48
Q6 AI most impact public admin	0	1	0.38	0.49
Q6 AI most impact art	0	1	0.13	0.34
PANEL C				
Perceived advantages of AI				
-----Likert scale 1-5, 5 = strongly agree-----				
Q3 advantage: problem solving	1	5	4.20	1.01
Q4 advantage: contribution to economic growth	2	5	3.66	0.87
-----yes = 1-----				
Q8 adv teaching answer questions immediately	0	1	0.43	0.50
Q8 adv teaching efficient use teacher time	0	1	0.22	0.42
Q8 adv teaching more interactive engaged lesson	0	1	0.35	0.48
Q8 adv teaching other	0	0	0.00	0.00
Q9 adv learning personalized to student needs	0	1	0.30	0.46
Q9 adv learning universal access special needs	0	1	0.53	0.50

Table 2. Survey Responses (Cont.)

Survey item	Min	Max	Mean	Std. Dev.
Q9_adv_learning_interactive_and_engaging_lessons	0	1	0.18	0.38
Q9_adv_learning_other	0	0	0.00	0.00
Q10_adv_evaluation_automated_grading	0	1	0.24	0.43
Q10_adv_evaluation_fewer_errors_in_grading	0	1	0.26	0.44
Q10_adv_evaluation_constant_feedback	0	1	0.49	0.50
Q10_adv_evaluation_other	0	0	0.00	0.00
PANEL D				
Perceived disadvantages of AI				
-----Likert scale 1-5, 5 = strongly agree-----				
Q3 disadvantage: AI dehumanizing	1	5	2.52	1.17
Q3 disadvantage: replaces jobs	1	5	3.20	1.21
Q3 disadvantage: will rule society	1	5	2.43	1.20
Q4 disadvantage: costly	1	5	3.57	0.92
Q4 disadvantage: contributes to the economic crisis	1	5	2.56	1.06
Q4 disadvantage: job loss	1	5	3.40	1.07
-----yes = 1-----				
Q11_disadv_edu_process_no_teacher_relationship	0	1	0.37	0.49
Q11_disadv_edu_process_internet_addiction	0	1	0.26	0.44
Q11_disadv_edu_process_rare_interact_stud_teach	0	1	0.25	0.44
Q11_disadv_edu_process_loss_info_system_failure	0	1	0.11	0.31

Data analysis

We used multiple regression analysis with *Level of AI knowledge* as the independent variable, gender and GPA as covariates, and *Usefulness of AI* as the dependent variable. To check for multicollinearity risk in the prediction model, we verified that the model variables have a VIF below 10 and tolerance level values over 0.1. We verified that the goodness of fit, represented by the adjusted multiple correlations (R^2_{adj}) of the regression model, was low but acceptable ($R^2_{adj} = 0.137$). We also verified, using the ANOVA test, that the relationship between model variables and the dependent variable was linear ($F=0.001$).

RQ1: Is the level of knowledge in AI associated with reports of the usefulness of AI?

To investigate how level of AI knowledge is associated with reported usefulness of AI, we ran a regression with *Usefulness of AI* as the dependent variable, *Knowledge of AI* as the independent variable, with gender and GPA as a covariates (Table 3), find a significant relationship between AI knowledge and perceptions of AI usefulness.

Table 3. Regression on the Usefulness of AI

Model	B	Std. Error	Std. Beta	t	Sig.
(Constant)	2.635	1.973		1.336	0.185
Level of AI Knowledge	0.341	0.112	0.311	3.041	0.003
Gender	0.242	0.453	-0.054	-0.534	0.595
GPA	0.400	0.232	0.180	1.723	0.088
Adjusted R square 0.137, Degrees of freedom 87					

RQ2: Is the level of knowledge of AI associated with reporting the advantages of AI in education?

None of the advantages of AI in education were significantly correlated with *Levels of AI Knowledge* (See Table 2 for a list of advantages of AI in education). As a post-hoc, we reviewed the Pearson correlation between *Usefulness of AI* and the survey items for advantages of AI in education, finding a significant **positive** correlation between *Usefulness of AI* and

- feeling curious about AI (Pearson Correlation 0.304, $p=0.003$), and
- ability to personalize lesson to student needs (Pearson Correlation 0.217, $p=0.039$).

There was a significant **negative** relationship between the *Usefulness of AI* and

- feeling fear about AI (Pearson Correlation -0.219, $p=0.005$),
- ability to make efficient use of teacher time (Pearson Correlation -0.207, $p=0.049$), and
- ability to automate grading (Pearson Correlation -0.235, $p=0.025$).

RQ3: Is the level of knowledge of AI associated with reporting the disadvantages of AI in education?

None of the disadvantages of AI in education were significantly correlated with *Levels of AI Knowledge* (See Table 2 for a list of disadvantages of AI in education). As a post-hoc, we reviewed the Pearson correlation between *Usefulness of AI* and the survey items for disadvantages of AI in education, finding a significant **positive** correlation between *Usefulness of AI* and ability to personalize lesson to student needs (Pearson Correlation 0.234, $p=0.026$) and a **negative** relationship for no teacher relationship (Pearson Correlation -0.211, $p=0.045$), meaning lack of teacher relationship was not seen as a disadvantage.

RQ4: Does the level of AI knowledge impact the reporting of AI advantages or disadvantages in education?

To evaluate this question, we sorted the *Level of AI Knowledge* into *High/Average/Low AI knowledge*, coding the lowest 22% as “low” and the highest 22% as “high” and the middle 56% as average. *High/Average/Low AI knowledge* was significantly different for only three survey items (as reported in Table 4),

- using books and papers as a source for learning about AI ($F=6.03, p=0.004$),
- Not seeking information about AI ($F=8.13, p=0.001$), and
- AI will have the most impact on art ($F=6.59, p=0.002$).

Table 4. Responses for survey items differing by High/Average/Low Level of AI knowledge

Level of AI Knowledge	Low	Average	High
Using books and papers to learn about AI	10%	35%	60%
Not seeking information	25%	2%	0%
AI has the most impact on art	0%	10%	35%

Discussion and Implications

We add to the literature by showing that knowledge of AI is associated with reporting the usefulness of AI with an international student sample. We also found that those with higher AI knowledge were more likely to read books and papers on AI, report that AI will impact art, and actively seek information on AI. The most frequently mentioned source for learning about AI was the internet (81%), and the feeling about AI was mostly curious (68%). Participants thought AI would impact medicine the most (80%). Interestingly, only the participants with the highest reported knowledge of AI pointed out that art will be greatly impacted by AI. Our findings indicate that the more students know, the more they will describe the technology as ‘useful.’

We also add to the literature by reporting how students reacted to the possible advantages and disadvantages of AI in education. The most frequently cited advantage of AI was its ability to solve problems, and the most frequent disadvantage was the cost. Less than a third cited the disadvantages of AI in education. Approximately (37%) reported that the lack of student-teacher relationship was an issue, and (25%) reported infrequent interactions with teachers as a disadvantage. About a fourth mentioned that AI in education fueled internet addiction (26%). Unlike Koochang et al. (2024), who found that AI use and AI advantages/opportunities were significantly related, we did not find an association between self-reported AI knowledge and perceptions of AI advantages. AI frequent use may infer a higher level of knowledge and a self-report of AI knowledge.

We also add to the literature by reflecting international student perceptions about AI. These findings highlight student openness to using AI, especially as they know more about it. Students are enthusiastic and positive, but perhaps without fully vetting the new technology. Low reporting of disadvantages signals that students may need coaching about the downside of AI in educational settings.

Limitations and Future Research Directions

This sample consisted of 91 Romanian undergraduate students enrolled in the 2nd and 3rd year of study at the Faculty of Cybernetics, Statistics, and Economic Informatics. While the limited

number of participants provides insight, it precludes the generalizability of the data to broader populations. The survey was distributed to the participants online through various social media groups (Petrascu, 2023). This snowball method used by the researchers, utilizing their network and relying on the networks to grow the participant numbers, may have also narrowed the respondent pool (Parker et al., 2019). This exploratory work did not ask about all possible benefits and threats of AI in education, including ways that students might use the technology to avoid learning instead of enhancing it. Future work needs to explore whether students realize how the destructive use, while seeming expedient in the short term, will harm them in the long term. Additionally, a larger sample of students from various disciplines will reduce any sampling bias. Further, this work did not question shifting the curriculum to ask less about facts and knowledge that AI can provide as an expert digital librarian, and more about thinking about the quality of a prompt response and weighing multiple perspectives, a centerpiece of critical thinking.

More research on student perception, particularly about disadvantages, can help inform how to coach them on skeptical use of the technology, new policy ideas, AI training for both students and faculty, as well as other practical recommendations. Further research on the adoption of AI-based tools in education can assist in understanding how to integrate AI into higher education to mitigate the negative effects on the student learning experience.

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