

Exploring undergraduates' attitudes towards ChatGPT. Is AI resistance constraining the acceptance of chatbot technology?

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Abstract. The advent of Artificial Intelligence (AI) has revolutionized multiple sectors including education. The popularization of tools such as ChatGPT has sparked the debate concerning the impact of AI on traditional education and the nature of learning. This paper explores undergraduate students' attitudes towards AI and ChatGPT acceptance. A descriptive cross-sectional study with 72 Public Relations students (M age = 19.2 years old) took place in Barcelona (Spain) during the first semester of 2023. The study implemented a mixed method approach with two validated questionnaires and an open text question to gather comprehensive insights. Findings reveal positive attitudes towards artificial intelligence and ChatGPT acceptance. The assessment of negative perceptions show concerns regarding artificial intelligence and the use of ChatGPT among participants. The correlational analysis of scales showed an intricate relationship between AI attitudes and ChatGPT acceptance while the qualitative analysis highlighted three major attitudes among students: openness, awareness, and alertness. The present study contributes to the ongoing discourse surrounding the use of ChatGPT in educational settings, emphasizing the importance of exploring students' attitudes and concerns. As artificial intelligence continues to permeate various aspects in our daily life, it becomes crucial to explore its impact on education, particularly in higher education. By understanding students' attitudes, both educators and institutions can enhance their proficiency in integrating artificial intelligence in a more efficient manner, ensuring a well-balanced approach that maximizes benefits while mitigating potential drawbacks of adopting AI technology.

Keywords: A.I. Attitudes · A.I. Literacy · ChatGPT acceptance · Higher Education · Public Relations Students.

1 Introduction

ChatGPT has revolutionized the way educational institutions and individuals interact with artificial intelligence (AI). Renowned for its exceptional performance and ability to streamline task management for both educators and learners, ChatGPT has emerged as a potential game-changer in the field of education. While universities have incorporated this tool into virtual classes to enhance the learning experience [27], some professors make use of it as an assistant during lectures, allowing students to ask clarifying questions in real-time and receive instant responses [7]. The interactive nature of ChatGPT fosters a more personalized and adaptive educational environment, contributing to improved student comprehension and academic success. Nevertheless, the remarkable success of ChatGPT has also brought a series of apprehensions among teachers and learners regarding some limitations such as the potential biases in responses [17], ethical considerations [31], and the need to balance the use of technology integration with traditional teaching methods [4].

The impact of ChatGPT in education has instigated a large amount of discourses that either fear or embrace the transformative potential of AI technology. Advocates see on ChatGPT unprecedented opportunities to enhance the educational experience by providing personalized learning, instant access to information, and fostering critical thinking skills [9, 23]. On the contrary, skeptics express concerns about the potential drawbacks of integrating ChatGPT into education with students and teachers relying too heavily on the technology for information without developing independent research and analytical skills [14, 33]. Despite the ongoing debate, ChatGPT has already started to reshape the educational landscape providing support to students and teachers by fostering in person, hybrid, and virtual learning scenarios, and facilitating students to acquire knowledge in a more personalized and interactive manner [21].

The growing interest in ChatGPT has prompted a substantial discourse within the academic community about its impact on higher education. While some studies have thus far concentrated on evaluating the capacities and constraints of ChatGPT, thereby elucidating its potential applications and ethical considerations [7, 18], some others have documented its influence on educational outcomes and student involvement, culminating in a more comprehensive understanding of the prospects and obstacles associated with the implementation of artificial intelligence systems [25, 29, 32]. To contribute to the existing debate, this study aimed to investigate the engagement of university students with two emerging discussions that impact their professional growth and development: the integration of artificial intelligence systems and the adoption of ChatGPT in educational settings. The primary objective of this research was therefore to explore undergraduate students' attitudes towards AI systems and the acceptance of ChatGPT in their educational environment.

2 From fear to acceptance. A.I. tools in higher education.

Artificial Intelligence systems have revolutionized various industries and sectors by automating routine tasks and leveraging vast amounts of data to enhance efficiency, accuracy, and productivity [24]. These intelligent systems have proven to be invaluable tools in domains such as finance, manufacturing, transportation and others. From healthcare professionals to graphic designers, AI systems have revolutionized the way tasks are performed, enabling automation of repetitive processes, augmenting human capabilities, and facilitating faster and more informed decision-making [16]. The advent of artificial intelligence has also revolutionized the educational setting with AI systems utilized to bolster administrative services, provide academic teaching support, and customize learning experiences [20]. The integration of AI systems in education has sparked intense discussions regarding its benefits and drawbacks [8, 12]. The emergence of ChatGPT has become a focal point of research, exploring the factors that shape higher education students' intentions and motivations to embrace A.I. technology in their training.

The use of AI tools such as ChatGPT in educational settings can help support students in diverse learning materials, such as coding [22] and microbiology [2]. However, integrating ChatGPT into educational settings presents a unique blend of advantages and drawbacks [25]. While its flexibility and ability to engage in human-like conversations offer promising potential, its limitations in creativity, originality, and the risk of misinformation must be carefully considered.

In this context, ChatGPT has raised concerns among students regarding its use in educational settings. Students have expressed a need for increased supervision and critical thinking when utilizing ChatGPT, particularly in code-producing activities [3]. They recognize that ChatGPT can be prone to mistakes and can be misused, leading to inaccurate or biased information [3, 5]. Over-reliance on ChatGPT for assignments is also a concern, as it could hinder the development of students' own critical thinking and problem-solving skills [6].

Despite these negative remarks, students have also shown a strong preference for using ChatGPT as an educational tool, with research consistently demonstrating positive attitudes and perceived benefits towards its use. Studies have highlighted the positive perception of ChatGPT among students, who recognize its capabilities and find it helpful for study and work [29, 6, 1]. Furthermore, ChatGPT's integration into the learning process has shown a significant positive impact on students' learning motivation [30]. Additionally, students recognize ChatGPT as a robust resource that stimulates their productivity, generating high-quality written content while providing practical guidance and fostering creative expression [6].

However, the successful integration of AI technologies into education is determined on students' perceptions and attitudes towards these advancements [15]. To effectively integrate AI into the educational setting, it is important to cultivate positive attitudes towards AI among students by providing them with AI related experiences, fostering programming skills and encouraging AI use [13, 11, 35].

Given that positive attitudes towards AI are associated with the adoption of AI technology, the present study explored how undergraduate students perceive AI systems and the extent to which their acceptance correlates with their engagement with ChatGPT technology. To respond the research question, the study focused in the following research objectives:

- O1. Measure undergraduates' attitudes and acceptance to AI systems and ChatGPT technology
- O2. Evaluate the correlation between AI perceptions and ChatGPT acceptance of undergraduate students
- O3. Qualitatively explore undergraduates' attitudes towards ChatGPT technology.

3 Methodology

3.1 Study design and sample

We designed a descriptive cross-sectional study with 72 undergraduate students enrolled in the first course of Public Relations (76.7% female and 23.3% male students, (Mean $age = 19.2$ years old, age rank 18-24 years). The data was collected as part of a Media Literacy seminar titled "AI Society in the current communication structure" in April 2023. The seminar was conducted by the first author as a guest lecturer during the 7th week in a 12-week course. At this point of the course, students had already seen an introduction to A.I. topics and experienced the completion of different tasks with the assistance of ChatGPT.

3.2 Measurement

To assess the students' attitudes towards AI technologies, the "General Attitudes towards Artificial Intelligence" (GAAIS) questionnaire designed by [26] was utilized. The GAAIS employs positive and negative subscales, both of which encompass emotions in accordance with their valence. The positive subscale reflects societal and personal utility, while the negative subscale reflects concerns. The items of the scale (Figures 1 and 2) were measured with a Likert scale ranging from 1 (*Totally disagree*) to 5 (*Strongly agree*). The internal consistency for both subscales was acceptable as cronbach alpha values were found to be 0.703 and 0.685, respectively.

To measure students' acceptance of ChatGPT, the "Students' Perceptions of ChatGPT" survey designed by [29] was implemented. The survey is an instrument created from qualitative research that categorizes students' thoughts and valorations into patterns (codes and themes). The questionnaire consists of 27 items (Figures 3 and 4), each item requires students to indicate their level of agreement with a given statement using a 5-point Likert scale (*Yes very much, Yes, Average, No, and Not at all*). Since the questionnaire sees the evaluation of both positive and negative themes, we tested the internal consistency for each group of subscales. While the internal consistency for the positive subscale

showed highly satisfactory values ($\alpha = .867$), the subscale for the negative themes showed a lower threshold ($\alpha = .671$).

To have a wider perspective of students' attitudes towards the use of ChatGPT, an open text question was added to the questionnaire "*What do you think of ChatGPT?*". The question was aimed to collect freely opinions and the complementary quantitative data to enrich the quantitative responses.

3.3 Data collection

The data collection of the study was self-reported using online questionnaires (Google Forms). The decision to use this tool was based on students' familiarity with the tool (the tool was commonly used in class activities), plus its accessibility in different devices (tablets, smartphones and laptops). As part of the research protocol, students were firstly introduced to an overview of the seminar, including a short explanation of the research and its purpose. After that, students were asked to complete the questionnaire. Once they finished the survey, the lecture presented the topics and finalized the class with a debate activity. The participation in the study was optional and students attending the seminar and completing the tasks won an extra credit. All participants were informed about the research purpose of the seminar and agreed to participate in the study by signing a consent form approved by the Ethical Committee of the Pompeu Fabra University.

3.4 Data Analysis

The data analysis included the descriptive statistics for each of the subscales and the correlations for the observed variables: AI attitudes and ChatGPT acceptance. To report the descriptive results for the GAAIS scales and ChatGPT perceptions, we recorded the categories of agreement and visually reported the frequencies in three values: Disagree, Neutral and Agree. The data was normally distributed, and a Pearson test was computed to see the correlation between AI attitudes and ChatGPT acceptance. The SPSS package (v.25) was used for the statistical analysis. A complementary qualitative analysis of open questions was conducted with Atlas.ti (v.20) to spot the students' perceptions. The protocol of analysis involved the systematic coding and categorization of emerging themes. The analysis was grouped into three primary clusters: *Openness, Awareness, and Alertness* towards ChatGPT. Each cluster was examined in detail for a nuanced exploration of the students' perspectives. This qualitative approach facilitated a comprehensive understanding of the rich and diverse insights provided by the participants.

4 Results

4.1 General Attitudes towards Artificial Intelligence Systems (GAAIS)

Figure 1 displays the results for statements expressing positive attitudes. In overall terms, data shows a generally positive attitude towards artificial intelligence among participants. The majority agree on the impressive capabilities of AI (91.7%) and acknowledge its many beneficial applications (80.6%). Participants also see economic opportunities tied to AI (69.4%). However, when considering societal benefits, opinions are more diverse, with a significant proportion expressing neutrality or disagreement (45.8%). Participants display a mix of opinions on AI's impact on well-being (50%), excitement (48.6%), and personal interest in using AI in daily life (43.1%). Notably, there is a substantial level of skepticism among participants regarding AI's superiority to human employees in routine jobs (51.4%). The data also suggests ambivalence about AI's comparative performance with humans (29.2%) and the willingness to integrate AI into personal job roles (26.4%). Additionally, a considerable number of participants express a preference for human interactions over A.I. systems in daily routines (69.4%).

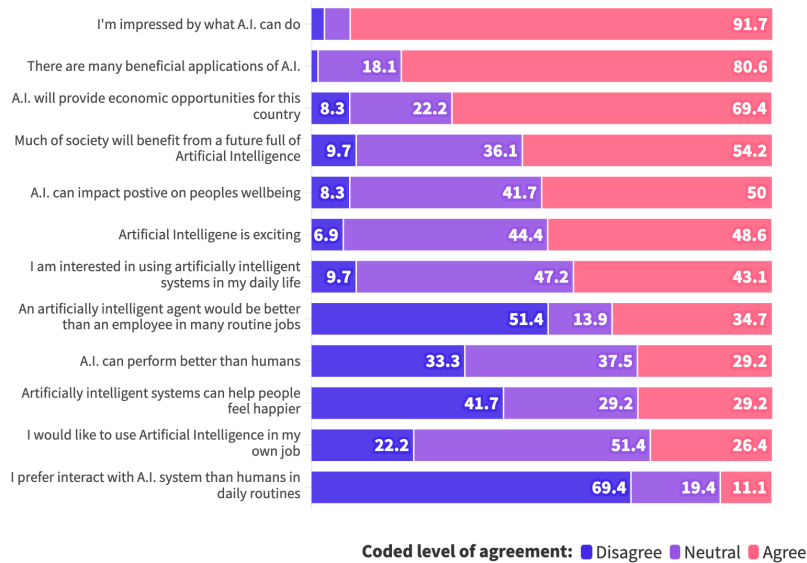


Fig. 1. Frequencies of responses to positive statements in the GAAIS. Levels of agreement from the original scale have been recorded.

Figure 2 displays the results for statements expressing negative attitudes. In summary, the results highlight significant concerns regarding artificial intelligence among participants. A substantial majority express apprehension, with

the belief that AI is potentially dangerous (59.7%) and concerns about unethical use by organizations (58.3%). There is a shared fear that AI might take control of people (58.3%), and a significant portion believes that people will suffer as AI usage increases (54.2%). Discomfort and unease are prevalent, as seen in participants shivering at the thought of future AI applications (51.4%). Additionally, a notable proportion holds concerns about AI being used for spying purposes (44.4%).

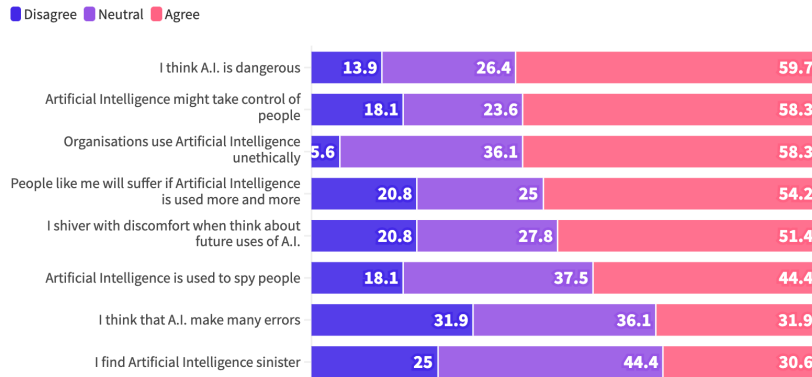


Fig. 2. Frequencies of responses to negative statements in the GAAIS. Levels of agreement from the original scale have been recorded.

4.2 Students' perceptions of ChatGPT

Figure 3 shows the results of statements expressing positive attitudes towards ChatGPT. Key highlights include high agreement on ChatGPT being easy to use (93.1%), interesting (90.3%), and the expectation that its quality will improve in the future (87.5%). Participants also acknowledge ChatGPT as a valuable complementary learning resource (84.7%) and appreciate its ability to provide good explanations (83.3%). The tool is also seen as helpful and effective for learning (76.4%), and students express optimism about its future (54.9%). While opinions are divided on its superiority over other search engines like Google (52.8%), there is motivation among users to use ChatGPT more (52.8%). Despite a more diverse agreement, participants generally find ChatGPT to make a human-like friendly impression (37.5%).

Concerning the negative expressions (Figure 4), the descriptive results highlight a nuanced set of perspectives and concerns regarding ChatGPT among the participants. Key points include a strong acknowledgment that ChatGPT is not perfect and needs improvement (80.6%). While a majority agrees that human intelligence is still necessary when working with ChatGPT (75.0%), there are significant uncertainties about its impact on individuals' lives (73.6%) and concerns

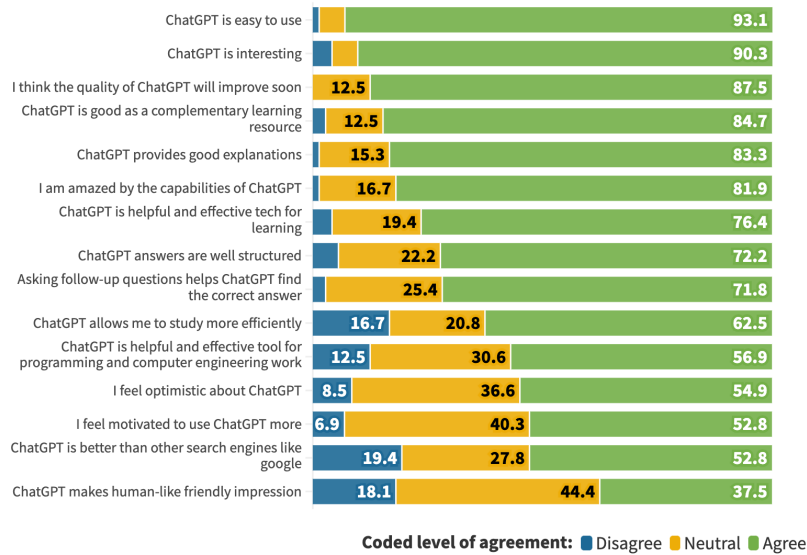


Fig. 3. Frequencies of responses to positive statements about ChatGPT. Levels of agreement from the original scale have been recorded.

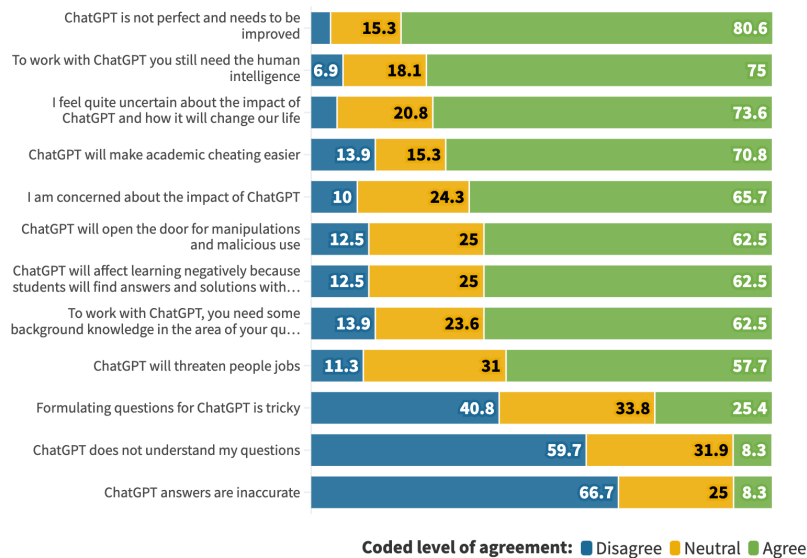


Fig. 4. Frequencies of responses to negative statements about ChatGPT. Levels of agreement from the original scale have been recorded.

about potential negative consequences, such as making academic cheating easier (70.8%). Participants express notable concerns about ChatGPT’s potential to facilitate manipulations and malicious use (62.5%), negatively impact learning (62.5%), and threaten jobs (57.7%). On the technical side, participants’ opinions are divided, finding formulating questions with tool tricky (40.3%), inaccuracy in their answers (33,3%) and ChatGPT problems to understand questions (40.2%).

4.3 AI attitudes and ChatGPT acceptance

Table 1 provides a concise overview of participants’ attitudes towards AI systems and ChatGPT. Concerning the attitudes towards AI, participants showed moderately positive sentiments with a mean value of 3.29 and a slightly lower mean (M = 2.63) for negative attitudes. The Global Attitudes toward Artificial Intelligence System (GAAIS) yields an overall score of 3.80, reflecting a generally positive disposition towards AI. Regarding ChatGPT, participants exhibit strong positive attitudes (M = 3.89) and moderate negative attitudes (M = 3.10), resulting in an acceptance score of 3.54.

Table 1. Participants attitudes toward AI systems and ChatGPT acceptance.

Measurement	Min. Value	Max. Value	Mean value in scale (SD)
Positive Attitudes towards the use of A.I.	2.42	4.33	3.29(.417)
Negative Attitudes towards the use of A.I.*	1.50	3.75	2.63(.480)
Score for the GAAIS scale	2.15	3.80	3.80(.307)
Positive Attitudes towards ChatGPT	2.47	4.87	3.89(.502)
Negative Attitudes towards ChatGPT*	1.92	4.33	3.10(.502)
Score for acceptance of ChatGPT	2.74	4.22	3.54(.317)

* The Likert items of the scale were reversed for the calculation of Mean values of scales.

The correlational analysis of scales (Table 2) shows a significant positive correlation between Positive Attitudes towards AI and Positive Attitudes towards ChatGPT ($r = 0.464$, $p < 0.01$), indicating that individuals with positive attitudes towards AI tend to exhibit positive attitudes towards ChatGPT. The analysis did not identify any significant correlation between Negative Attitudes towards AI and Negative Attitudes towards ChatGPT.

4.4 Qualitative analysis

The qualitative examination of the open-ended question yielded ten emerging themes that were categorized into three primary clusters: Openness, Awareness, and Alertness towards ChatGPT. Table 3 exemplifies instances of students’ perceptions of ChatGPT within these dimensions. In regards to openness, students

Table 2. Correlational Analysis of AI attitudes and ChatGPT acceptance

	Positive Attitudes AI	Negative Attitudes AI	Positive Attitudes ChatGPT	Positive Attitudes ChatGPT
Positive Attitudes AI	1			
Negative Attitudes	-0.054	1		
Positive Attitudes ChatGPT	.464**	-0.122	1	
Negative Attitudes ChatGPT*	-0.114	.146	-0.219	1

** The correlation is significant at the 0.01 level (two-tailed).

show a notable level of acceptance towards ChatGPT, acknowledging its significance as a valuable tool, particularly when combined with conventional learning approaches and human ingenuity. They appreciate its effectiveness in task management and prompt responsiveness. Furthermore, ChatGPT is praised due to its sophisticated abilities in interpreting and generating text, adaptability, and its potential utilization in content creation, language translation, and information retrieval. In the domain of awareness, students demonstrate a nuanced perspective characterized by ambivalence. While acknowledging the advantageous aspects of ChatGPT, they emphasize the importance of responsible and moderate usage. Mixed opinions emerge, reflecting practical benefits alongside concerns about societal challenges and ethical implications. Students thus acknowledge the necessity for responsible use, advocating for training in information verification. They underline the significance of verification given instances of misinformation, showcasing a balanced and discerning awareness. Finally, the alertness attribute encompasses students' vigilance and cautious attitude towards ChatGPT, as they maintain a sense of wariness towards potential inaccuracies or biases in its responses. Ethical concerns related to the dissemination of misinformation and malicious manipulation are also expressed. Furthermore, students express apprehension regarding the wider societal implications of AI, specifically in relation to future employment prospects, with a concern for potential unemployment.

5 Discussion

While the integration of AI tools like ChatGPT in education remains a topic of controversy, a growing corpus of research is contributing to a better understanding of its impact and implications. This study has sought to investigate the relation of higher education students' attitudes towards AI and the acceptance of ChatGPT in the classroom. The findings underscore the intricate and varied attitudes held by students regarding AI, encompassing both enthusiasm and reservations. Participants acknowledge the advantages of AI while expressing concerns about its potential adverse effects, particularly emphasizing a cautious approach toward ethical implications associated with the increased integration of artificial intelligence in education. Regarding the acceptance of ChatGPT, the results indicate a predominantly positive outlook among the participants.

Table 3. Participants attitudes toward AI systems and ChatGPT acceptance.

Perceived Attitudes	Exemplary Instances
<p>Openness. Recognition of ChatGPT as a useful tool. Acknowledge its efficiency to perform tasks such as content production, language translation, and information retrieval.</p>	<p><i>“I think it’s a good tool to contribute new ideas and to give information that you might not find so easily on the internet.”</i></p> <p><i>“I believe that a regulated use of gpt chat is beneficial to people. Especially when we don’t know about a subject and want to learn new things. I also think it is very useful for simple brainstorming.”</i></p> <p><i>“I use chat gpt on a daily basis. I use it for study-related questions, to improve my writing or to translate. I could say that I don’t use google anymore, the chat gives you the information instantly and makes it much easier to manage work.”</i></p>
<p>Awareness. Recognition of ChatGPT’s benefits, accompanied by ambivalence of AI impact in society. Recognize the need for training, information verification and responsible use.</p>	<p><i>“My opinion is that it is an impressive tool, but that today we do not have the knowledge to know how to use it with control.”</i></p> <p><i>“I think it’s like everything else, if we use it incorrectly it can bring bad consequences as well as a society without reasoning capacity. On the other hand, it can bring ease and speed when studying or researching because it collects information in a very fast way, if used correctly it can be a perfect tool for the application to the study and others, if used incorrectly it can be a weapon for our brain”.</i></p>
<p>Alertness. Show distrust due to the potential negative effects in society. Manifest concerns related to misinformation distribution and manipulation.</p>	<p><i>“In my opinion ChatGPT is a good tool when you need to search for quick responses, but it’s true that if citizens use too much AI in the future it will be a problem as they will lose abilities to write and formulate responses. I’m also scared about what will be the future of some jobs that can be replaced by AI (teachers, doctors...)”</i></p> <p><i>“It is quite obvious that not everything is that positive [...] I actually kind of fear the future we are creating, in terms of who I am going to trust when I go to the hospital or I take my kids to school, since the so-called professionals who I should trust, may not have the knowledge they should since they did not learn as much due to ChatGPT and other AI.”</i></p>

The prevailing sentiment highlights the utility of ChatGPT and the potential for improvement. Furthermore, there are some significant drawbacks as students address ethical considerations in the development and use of ChatGPT.

Aligned with recent studies [1, 6, 29], our work yields affirmative insights regarding the acceptability of ChatGPT and its beneficial implications for students' education and training. Notably, our findings unveil a distinctive association between positive attitudes towards artificial intelligence (AI) and the acceptance of ChatGPT, underscoring the key role of AI openness in shaping students' inclination to embrace and actively engage with technological innovations such as ChatGPT. This correlation resonates with the perspectives of [11, 15, 35], who posit that the successful integration of AI technologies in education hinges on students' perceptions and attitudes. Our research, therefore, emphasizes the significant link between positive attitudes towards artificial intelligence (AI) and the acceptance of ChatGPT, highlighting the crucial role of fostering AI openness for encouraging students to embrace and actively engage with technological innovations like ChatGPT in educational contexts. Addressing the rhetorical question "Is AI resistance constraining the acceptance of chatbot technology?" Our research reveals a nuanced sentiment, emphasizing the intricate nature of students' perspectives. This complexity encompasses not only favorable recognition but also nuanced understanding and heightened awareness of potential challenges and ethical considerations associated with ChatGPT. The acceptance of AI technology, exemplified by GPT, appears to be conditioned by diverse factors, including resistance to change, technology readiness, and perceived ease of use [10]. Our exploration of undergraduates' attitudes towards AI provides valuable insights into the multifaceted relationship between technology acceptance and students' sentiments regarding the use of ChatGPT in educational contexts.

The present study sees some important limitations and, therefore, the results should be considered within the context of a case study. The background of the participant students (in media studies and media literacy training) should be recognized as potential influencing factors shaping both their attitudes and critical thinking. The explainability in AI has been underscored as a pivotal element in cultivating trust and fostering critical attitudes towards AI technologies [28]. Future research endeavors could benefit from the observation of students across diverse educational backgrounds and varying levels of AI literacy training. This approach would not only enrich academic discussions but also broaden the possibilities for more diverse digital education, curricula, and policy.

As a final remark, this work emphasizes the importance of promoting media education to cultivate critical thinking skills that encompass attitudes towards the media, information literacy and self-regulated use [19, 34, 36]. Educational opportunities that promote literature towards the inner workings of AI technologies can help cultivate a sense of trust and positive perceptions towards AI and eventually empower individuals to confidentially embrace AI technologies.

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