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Student's Perception of Chat GPT: A Technology Acceptance Model Study

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Abstract: This study aimed to develop and validate an instrument to explore university students' perception of Chat GPT, while also investigating potential variations across gender, grade level, major, and prior experience with using Chat GPT. Employing a quantitative research approach, the study involved 239 students enrolled in the Science and Mathematics Education Program at a private university in Almaty, Kazakhstan. The results indicated an overall positive perception of Chat GPT among the participants. Notably, the only significant disparity in perception between male and female students was observed in the dimension of "Perceived ease of use." Moreover, no significant differences were found across any survey dimensions when comparing students from different grade levels (first to fourth grade). However, statistically significant differences emerged in the dimension of "Perceived social influence" between Mathematics majors and Chemistry-Biology majors, as well as between Chemistry-Biology majors and Physics-Informatics majors. Additionally, except for the dimension of "Perceived social influence," statistically significant differences were observed among groups based on their prior experience using artificial intelligence (AI) or chatbots. These findings provide valuable insights into university students' perceptions of Chat GPT and highlight the influence of factors such as gender, major, and prior experience on their perceptions. The implications of these findings can inform the design and implementation of educational technologies involving AI-based chat systems in higher education settings.

Keywords: Artificial intelligence in Education; Chat GPT perception; Prior experience with AI; Technology acceptance model.
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Introduction

The Technology Acceptance Model (TAM) is a widely recognized theoretical framework that seeks to understand individuals' acceptance and usage of new technologies (Davis, 1989). The model suggests that individuals' attitudes towards using information technology are influenced by two primary factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Ease of Use refers to an individual's perception of the level of difficulty or simplicity associated with using the technology, based on the cognitive resources required. On the other hand, Perceived Usefulness can be understood as an individual's belief in the technology's ability to enhance their productivity in performing a specific activity.

The findings from existing studies on the Technology Acceptance Model (TAM) reveal that perceived ease of use and perceived usefulness serve as crucial antecedent factors influencing the acceptance of learning technologies, with perceived usefulness being the primary determinant for adoption. Moreover, it has been observed that learners' perceptions of usefulness and ease of use positively impact their satisfaction with the learning process, which in turn contributes to a favorable intention to continue using the technology. (Granić & Marangunić, 2019). Additionally, according to the TAM, it is suggested that the influence of external factors on individuals' intention to use technology will be mediated by their perceptions of the technology's ease of use (PEOU) and usefulness (PU) (Venkatesh & Davis, 1996).

Numerous information systems researchers have explored the applications of the Technology Acceptance Model (TAM) in diverse contexts. Additionally, several studies have been conducted by researchers to replicate the original TAM study, aiming to assess its reliability and validity. Between 1989 and 2001, approximately 100 studies related to TAM were published in journals, proceedings, and technical reports. These studies extensively tested TAM using diverse sample sizes and user groups within or across organizations. They employed different statistical methods and compared TAM with competing models, as noted by Gefen (2000).

TAM's applicability extended to a wide range of end-user technologies, including email (Adams, Nelson & Todd, 1992; Davis, 1989), word processors (Adams, Nelson & Todd, 1992; Davis, Bagozzi & Warshaw, 1989), groupware (Taylor & Todd, 1995), spreadsheets (Agarwal, Sambamurthy & Stair, 2000; Mathieson, 1991), and the World Wide Web (Lederer, Maupin, Sena & Zhuang, 2000). Some studies expanded TAM by incorporating additional predictors such as gender, culture, experience, and self-efficacy.

Overall, researchers consistently argue that TAM is a valid, concise, and robust model (Venkatesh & Davis, 2000), supported by its wide application and the diverse empirical evidence accumulated over the years.

Attitudes toward artificial intelligence (AI) have garnered significant attention in recent years, as AI technologies continue to permeate various aspects of our lives. According to Fast and Horvitz (2016), an analysis of the long-term trends in public perception of artificial intelligence (AI) reveals a notable increase in discussions surrounding AI since 2009. Furthermore, their research suggests that these discussions have consistently displayed a greater degree of optimism than pessimism. This finding highlights a positive overall sentiment towards AI among the general public. Understanding how individuals perceive and interact with AI is crucial for the successful adoption and integration of these technologies. Gender, as a social construct, has been recognized as a potential factor influencing attitudes toward AI. Gender-related differences in experiences, beliefs, and societal expectations may shape individuals' perceptions and interactions with AI systems. Therefore, exploring the attitudes toward AI across gender groups can provide valuable insights into the complex interplay between gender and technology acceptance.

According to Lozano, Molina, and Gijón (2021), their study on the perception of Artificial Intelligence in Spain revealed that men exhibited a higher interest in technological developments compared to women. The findings of their research, showed that the probability of men having a positive or very positive attitude towards AI and robots was 1.481 times higher than that of women. In a study conducted by Mozilla (2023), it was found that men (41%) expressed a higher inclination compared to women (31%) in desiring artificial intelligence (AI) to surpass their own intelligence. This gender disparity suggests differing attitudes towards AI capabilities, with men showing a greater preference for AI systems that exhibit superior intelligence.

According to Araujo et al. (2020), gender significantly influenced perceptions of usefulness, with females perceiving automated decision-making (ADM) by AI as significantly less useful than males. Gender also exhibited a marginal association with perceptions of risk in relation to ADM.

In the study conducted by Yeh et al. (2021) the authors investigated the public's perception of artificial intelligence (AI) and its relationship with the Sustainable Development Goals (SDGs). Within this study, a significant gender difference was identified concerning confidence levels in AI knowledge. The findings, supported by a t-test analysis, indicated that male respondents exhibited higher confidence compared to females ($t = -6.294$, $p < 0.001$). These results highlight the importance of considering gender dynamics in understanding public attitudes and perceptions towards AI, particularly regarding confidence in AI-related knowledge.

As AI technology increasingly permeates classrooms, it is essential to examine the attitudes and perceptions of students at different grade levels toward this emerging technology. Understanding how students across grade levels perceive AI can provide valuable insights into their readiness to embrace its integration in educational settings and can help inform effective strategies for its implementation.

In a study conducted by Demir and Guraksin (2022), the perceptions of secondary school students regarding artificial intelligence (AI) were explored through the use of metaphors. The study aimed to determine the connotations associated with AI among participants and whether these connotations leaned towards positive or negative views. The findings revealed that the students had mixed perceptions of AI, with both positive and negative connotations being attributed to the concept. Metaphors used by the participants highlighted associations between AI and humans, technology, and the brain. Interestingly, the majority of the metaphors employed by the students were positive in nature, indicating a generally favorable attitude towards AI.

Jeffrey's (2020) study aimed to explore college students' perceptions of AI based on their level of understanding, beliefs in its benefits, and concerns about its future development. The findings revealed conflicting beliefs among participants, with those perceiving personal benefits from AI also expressing concerns about its rapid advancement and its impact on human jobs. Notably, participants who possessed greater knowledge and understanding of AI were more uncertain about its outcomes. The study highlighted the significant influence of participants' level of information on their perception of AI, demonstrating a tension between their beliefs in AI's benefits and their concerns about potential negative consequences. Moreover, the research indicated that AI was generally viewed as a positive technological advancement, but caution was advised due to potential negative outcomes. The study aligns with existing literature and emphasizes the tension between the inevitability of AI development and its actual impact on humanity, with implications for individuals and society. As AI continues to advance, this tension is expected to escalate due to increasing efforts by businesses and governments to gain a competitive advantage.

In accordance with Atwell (1999) and Parker (2007), students' perspectives on AI in the L2 classroom were examined in a study conducted by Gallacher, Thompson, and Howarth (2018). The findings revealed that students perceived conversing with Cleverbot, an AI chatbot, as beneficial for their English language study due to its independence. However, the reported merits of AI partners were primarily associated with the speech-to-text function of smartphones rather than the AI itself. This suggests that existing smartphone functions might offer similar benefits as certain AI iterations, without the need to learn a new software platform, reducing potential confusion. Despite these perceived benefits, students did not view Cleverbot as a viable substitute for communication with human beings. Its lack of emotion, visible cues, and inability to confirm understanding were reported as significant drawbacks in terms of interaction. Consequently, the study suggests that educators should exercise skepticism when incorporating current AI technology in the L2 classroom, as the frustrations arising from interactions with AI might outweigh the benefits within an English curriculum. The authors recommend future research to develop a quantifiable survey using the categories discussed, enabling more consistent analysis across various AI chatbot platforms. This approach would provide deeper insights into students' perceptions of AI and facilitate more informed decision-making in integrating AI technology in language learning settings.

Liu et al. (2022) conducted a study to examine the effects of an AI chatbot on children's interest in reading. The research focused on analyzing the interaction between children and the chatbot and its impact on their reading engagement. The findings revealed that the AI chatbot had a positive influence on children's reading experiences, leading to increased interest and engagement in reading activities. This study contributes to the understanding of how AI technology can enhance children's reading motivation and enjoyment.

Based on the findings of Yeh et al. (2021), significant differences in the perception of artificial intelligence (AI) were observed among different college major groups. The study revealed that business majors perceived AI as more virtuous compared to humanities majors, which aligns with previous research. Furthermore, engineering majors expressed greater concern about the possibility of human lives being monitored by AI compared to business majors. These results highlight the influence of college major on individuals' perceptions of AI and suggest the importance of considering disciplinary backgrounds when examining public attitudes towards AI.

In a study conducted by Firat (2023), the perceptions of scholars and students regarding the integration of ChatGPT and AI into education were examined. Through thematic content analysis of comments, nine main themes emerged, highlighting the diverse opinions and concerns of participants. The findings indicate that there is a consensus among scholars and students that AI will have a significant impact on traditional learning methods, shifting the focus towards skills and competencies and redefining the roles of educational institutions. Despite recognizing the challenges and potential issues, participants expressed optimism for the future of AI in education.

The research by Iqbal, Nayab, Ahmed, and Azhar (2023) reveals that teachers generally hold a negative attitude towards ChatGPT. They express concerns about its potential for facilitating cheating, promoting student laziness, and

lacking value in the learning process. However, some teachers recognize specific benefits, such as automated feedback and increased student engagement. Overall, the study emphasizes the need for addressing teachers' concerns and providing support when integrating ChatGPT as an educational tool. Further exploration is warranted to understand the potential benefits and challenges of AI technologies like ChatGPT in education.

The literature review highlights that the Technology Acceptance Model (TAM) is a widely recognized framework for understanding technology acceptance. Perceived usefulness and ease of use are key factors influencing the acceptance of learning technologies. Attitudes towards AI show a generally positive sentiment, although gender-related differences exist. Students' perceptions of AI vary, with mixed connotations and considerations of its limitations. AI chatbots have been found to positively impact children's reading engagement. College majors and disciplinary backgrounds influence perceptions of AI. Teachers generally have negative attitudes towards ChatGPT, citing concerns about cheating and lack of value, but recognize some benefits. Further research is needed to address teacher concerns and explore AI's potential in education.

The aim of this study was twofold: First, develop and validate an instrument to explore university students' perception of Chat GPT. Second, identify students' perception across gender, grade level, major and prior experience with using Chat GPT. Following research questions guided this study:

- Is the developed survey considered valid?
- Are there differences in participants' perception of Chat GPT across gender groups?
- Are there differences in participants' perception of Chat GPT across grade level groups?
- Are there differences in participants' perception of Chat GPT across major groups?
- Do participants' perception of Chat GPT differ based on their prior experience using artificial intelligence (AI) or chatbots?

Methods

In this study, a quantitative research approach was employed to ensure a thorough analysis of the gathered data. It is a survey study providing a better understanding of students' attitudes towards Chat GPT, an artificial intelligence-based chatbot. The survey we adapted is based on the "Technology Acceptance Model" (TAM) survey, which is a widely used model for evaluating users' attitudes toward new technologies. The original TAM survey was developed by Fred Davis in the 1980s and has since been adapted and modified by many researchers in various fields. The TAM survey typically includes items related to perceived usefulness, perceived ease of use, attitude towards using the technology, and intention to use the technology.

This model is adapted to fit specifically with Chat GPT by adding items related to perceived credibility, perceived social influence, and perceived privacy and security. However, the basic structure and items of the survey are still rooted in the TAM framework. For each item in the survey, participants are typically asked to rate their agreement with a statement on a Likert-type scale. The Likert-type scale is a commonly used rating scale in surveys, and it typically ranges from 1 to 5 or 7, with higher numbers indicating greater agreement with the statement.

Sample

When conducting survey research, the researchers used a representative and convenience sample from the population of science and mathematics education students from a private university in Almaty, Kazakhstan. This study's convenience sample was available and provided helpful information for answering questions and hypotheses (Creswell, 2002). The participants comprised 235 undergraduates, 2 graduates, and 2 Ph.D. students who were enrolled in Science and Mathematics Education Program. The participants, were from mathematics (42), physics-informatics (100), and chemistry-biology (77) double programs and 79 were male and 175 were female students aged between 17-23 years.

Table 1
Demographic Information

Variable	Group	N=239
Age	17	19
	18	56
	19	71
	20	48
	21	19
	22	4
	23	2
Grades	Freshman (1st grade)	56
	Sophomore (2nd grade)	70
	Junior (3th grade)	58
	Senior (4th grade)	35
Gender	Female	145
	Male	79
Educational level	Bachelor	235
	Master	2
	PhD	2
Major/field of study	Mathematics	42
	Chemistry-Biology (double program)	77
	Physics-Informatics (double program)	100

Instrument

Initially, a questionnaire was developed based on the artificial intelligence-based chatbot (https://chat.openai.com/). The question posed was, "Could you create a questionnaire to assess students' perception of ChatGPT?" The resulting instrument, consisting of seven dimensions, can be found in the Appendix. However, during the validation process, the last dimension concerning perceived privacy and security did not meet the required criteria and was subsequently eliminated. The construct validity of the questionnaire was established through factor analysis. Finally, a questionnaire of seven dimensions consisting of 21 items, with demographic information, was developed (see Table 2).

Table 2

The Dimension of the Instrument

Dimension	Number of items	Option Range
Perceived usefulness	3	in five choices as 1: Strongly Disagree, 2: Disagree, 3: Uncertain, 4: Agree, 5: Strongly Agree
Attitudes using Chat GPT	3	
Perceived credibility	3	
Perceived social influence’	3	
Perceived privacy and security	3	
Perceived ease of use	3	in seven choices as 1: Very difficult, 2: Difficult, 3: Somewhat difficult, 4: Neither difficult nor easy, 5: Somewhat easy, 6: Easy, 7: Very easy.
Behavioral intention to use Chat GPT	3	in seven choices as 1: Very unlikely, 2: Unlikely, 3: Somewhat unlikely, 4: Neutral, 5: Somewhat likely, 6: Likely, 7: Very likely.

Data collection

In this study, the instrument was administered in three languages, that is, English, Kazakh and Russian. Our participants speak English at B2 and above levels and speak Kazakh and Russian as native languages. The original questionnaire was in English and was translated to both Kazakh and Russian by four instructors who were native speakers of Kazakh and Russian.

The data for this research was gathered using the "Student Attitudes Towards Chat-GPT" questionnaire. Questionnaires are a reliable method of data collection, as they provide highly structured, objective, and accurate data for thorough analysis (Taherdoost, 2021). The questionnaire was administered to students during the 2022-2023 academic year. The final version of the questionnaire was distributed via Google Forms to all science and mathematics education program students in April 2023. The questionnaire stayed online for a duration of two weeks and to ensure an adequate response rate, lecturers were involved in facilitating the questionnaire administration. The collected responses were handled with confidentiality and students voluntarily participated in this study. The ethical permission was taken from the institution's ethical committee.

Data analysis

The analysis was conducted by the use of Jamovi (The Jamovi Project, 2022) software program to measure the normality, reliability, and factor analysis.

Results

Validity and reliability studies

Content validity

This type of validity is an evaluation of each of the items constituting the factor for content relevance, representativeness, and technical quality (Boetang et al., 2018). Four experts, who specialize in science teaching (one from mathematics, one from chemistry, and two from physics) judged the items of the questionnaire. After the feedback from experts, the item validity was complemented by expert agreement to provide the quality of each item in measuring the target dimension to reach a valid instrument about the students` perception of Chat GPT.

Construct validity

Two-factor analyses: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were recommended to identify factors (Rattray & Jones, 2007) and to describe items in factors (Fraenkel et al., 2011), and also were considered for the validation of scale, sampling adequacy, assessing the item loadings in factors, interpreting the factors, and determining each Factor's reliability.

Exploratory Factor Analysis (EFA)

Before the EFA, tests for homogeneity and sampling adequacy were determined to obtain conceptually similar and significant factors of the variables. If the Bartlett test of sphericity should be significant or better, and the KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy should be at 0.6 or above (Cohen et al., 2017:570), then the sample size is appropriate for factor analysis. The KMO of 0.842 shows the sample adequacy and significant data set homogeneity ($x2=2765.61$, $df=210$, $p<.000$). Concerning the 21 items used, oblimin rotation of the items yielded

seven factors with three items of each factor. The factors were named with reliability coefficients, respectively: The Perceived usefulness (0.816), The Perceived ease of use (0.899), The Attitude towards using Chat GPT (0.715), The Behavioral intention to use Chat GPT (0.932), The Perceived credibility (0.921), The Perceived social influence (0.821), and The Perceived privacy and security (0.650). Due to a low coefficient of reliability and the absence of factor loadings in the factor analyses, the final dimension (Perceived privacy and security) of the survey were excluded. The remained items were examined with the minimum residual technique with oblimin rotation based on parallel analysis and keeping item factor loadings of greater than 0.3 (Boetang et al., 2018) were extracted. The final version of the scale with 18 items, revealed its implicit structure and six factors with loadings, shown in Table 3.

Table 1

Factor Loadings

Factor names		Factor Loadings					
		1	2	3	4	5	6
The Perceived usefulness	Use1				0.650		
	Use2				0.938		
	Use3				0.558		
The Perceived ease of use	Ease1			0.856			
	Ease2			0.853			
	Ease3			0.781			
The Attitude toward using Chat GPT	Atti1						0.42
	Atti2						0.45
	Atti3						0.98
The Behavioral intention to use Chat GPT	Beh1	0.800					
	Beh2	0.987					
	Beh3	0.802					
The Perceived credibility	Cre1		0.815				
	Cre2		0.879				
	Cre3		0.909				
The Perceived social influence	Soc1					0.777	
	Soc2					0.657	
	Soc3					0.734	

Confirmatory factor analysis (CFA).

The factors extracted provided a hypothetical structure of the scale and it should be tested the dimensionality of these factors with the confirmatory analysis before the reliability and validity. For testing dimensionality, CFA was performed to determine acceptable the measurement model's fit indexes and convergent validity.

Model fitting: The measurement model's fit indexes are measured to determine how well the instrument data fit the proposed factorial dimension by checking the model with various indexes. The fitting model method is provided to measure the factor independence and fitting sufficiency of a hypothesis (Harrington, 2009). These indexes include the chi-square test of exact fit (CMIN/DF), Root Mean Square Error of Approximation (RMSEA), Tucker Lewis Index (TLI), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR) (Boetang et al., 2018; Dong et al., 2020; Hu and Bentler, 1999; Lee et al., 2008; Swisher et al., 2004; Zheng et al., 2014). As shown in Table 2, the results indicated the acceptable fit indexes, and the final model was accepted as statistically significant and sufficient. All indexes as shown in Table 4, provided the perfect and acceptable values; CMIN/DF value (Zheng et al., 2014), CFI and TFI values (Hu and Bentler, 1999; Lee et al., 2008; Swisher et al., 2004), SRMR (Hu and Bentler, 1999), and RMSEA (Hu and Bentler, 1999). The results of CFA show that the dimensionality test was accepted in sufficient with the fitting model.

Table 2

Fit Indexes for the scale

Fit index	Perfect Fit Measures	Finding Measures	Interpretation
CMIN/DF (x^2/df)	≤ 0.02	0.00196	Perfect fit
RMSEA	≤ 0.06	0.0664	Acceptable fit
TLI	≥ 0.95	0.941	Acceptable fit
CFI	≥ 0.95	0.954	Acceptable fit
SRMR	≤ 0.08	0.0476	Perfect fit

Convergent validity: Convergent validity was examined through the standardized regression weights of measurement items, composite reliability (CR), average variance extracted (AVE), and the square root of the AVE for discriminant validity. The CR and AVE values were calculated by using online reliability and validity calculator (Weiss, 2011). According to the rule of thumb, CR reliability criteria need to be above 0.70 (Hair et al., 2020). The criterion of AVE is the value should be 0.5 (50%) or higher (Hair et al., 2020). The results; a greater CR than 0.7 and a greater AVE than 0.5 (50%) for each factor, indicated the perfect and acceptable values to achieve convergent validity (Awang, 2015; Zheng et al., 2014, Hair, et al., 2017) (see Table 5).

Table 3

Convergent validity results

Factor Names, codes	Standardized weights	CR	AVE	Sqr. AVE
The perceived usefulness (Use1, Use2, Use3)	0.781; 0.877; 0.670	0.822	60.9%	0.780
The Perceived ease of use (Ease1, Ease2, Ease3)	0.850; 0.844; 0.841	0.882	71.4%	0.845
The Attitude towards using Chat GPT (Atti1, Atti2, Atti3)	0.850; 0.324; 0.838	0.734	51.0%	0.714
The Behavioral intention to use Chat GPT Beh1, Beh2, Beh3)	0.880; 0.949; 0.887	0.932	82.1%	0.906
The Perceived credibility (Cre1, Cre2, Cre3)	0.848; 0.902; 0.906	0.916	78.5%	0.886
The Perceived social influence (Soc1, Soc2, Soc3)	0.768; 0.800; 0.728	0.810	58.7%	0.766

Discriminate validity: The discriminate validity test was also helpful in determining whether factors are significantly different from each other. It means the results of different constructs should be different (Xu & Lewis, 2011). The findings show that the square root of the AVE value of each Factor was greater than the correlations between factors (Zheng et al., 2014). The greater value of the square root of AVE than correlations indicated the perfect acceptance of scale discriminant validity by comparisons between the square roots of AVE and correlation values (see Tables 5 and 6).

Table 4

Factor correlations

	1	2	3	4	5	6
1	—	0.409	0.287	0.371	0.530	0.487
2		—	0.345	0.413	0.538	0.322
3			—	0.357	0.236	0.430
4				—	0.460	0.480
5					—	0.471
6						—

Reliability: In the achievement of reliability of the final scale version, Cronbach reliability values were 0.809 for the perceived usefulness, 0.881 for The Perceived ease of use, 0.690 for The Attitude towards using Chat GPT, 0.929 for The Behavioral intention to use Chat GPT, 0.915 for The Perceived credibility, and 0.809 for The Perceived social influence. The overall scale reliability value was 0.904, more than the accepted value of 0.7 (Hair et al., 2020; Boateng et al., 2018; Rattray & Jones, 2007).

Findings from the questionnaire

Initially, we provided descriptive statistics, including the mean, standard deviation, and assessment of the data's normality, which can be found in Table 7. It is important to note that the items within the second and fourth

dimensions of the survey were rated on a scale ranging from 1 to 7, while the items in the remaining dimensions were rated on a scale of 1 to 5.

Table 5

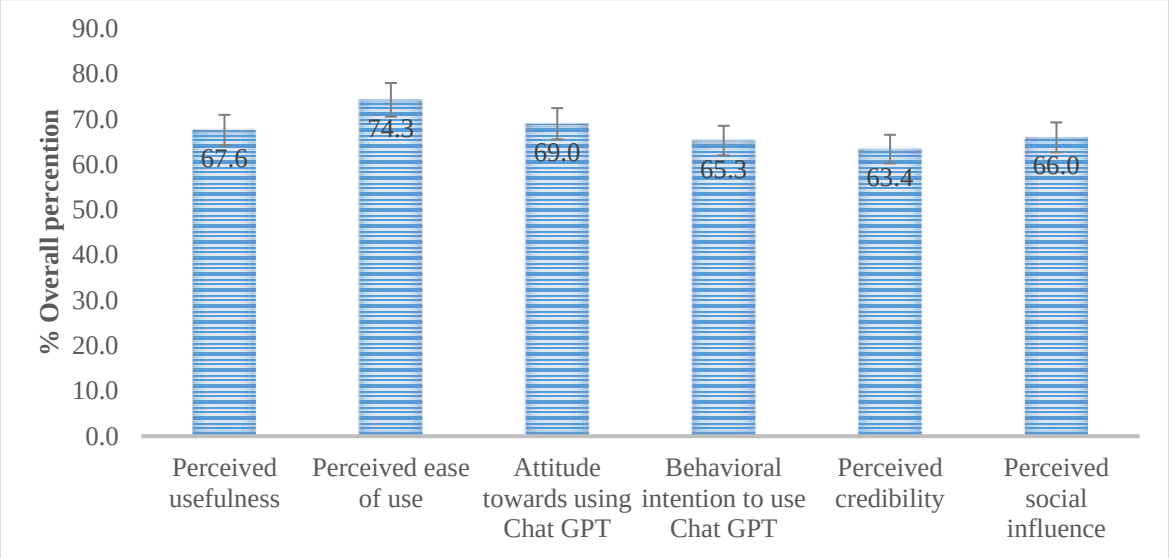
Descriptives statistics for the dimension of the survey

	Perceived usefulness	Perceived ease of use	Attitude towards using Chat GPT	Behavioral intention to use Chat GPT	Perceived credibility	Perceived social influence
N	219	219	219	219	219	219
Mean	3.38	5.20	3.45	4.57	3.17	3.30
Standard deviation	0.950	1.31	0.832	1.71	0.916	0.918
Shapiro-Wilk W	0.946	0.937	0.955	0.949	0.965	0.964
Shapiro-Wilk p	< .001	< .001	< .001	< .001	< .001	< .001

Table reveals that the average scores for each dimension surpass the "Neither agree nor disagree" or "Neither difficult nor easy" options for both 5-point and 7-point scales. Which indicates a positive perception of Chat GPT. However, the dimension with the lowest overall perception score was found to be " Perceived credibility " (with a mean score of 3.17, representing 63% perception), while the highest score was recorded for the "Perceived ease of use" dimension (with a mean score of 5.20, indicating 74% perception). In order to facilitate better comparison, we converted all scores into percentages and graphically presented them in Figure 1.

Figure 1

Average scores across dimensions



To address the second research question, we utilized the Mann-Whitney U test due to the non-normal distribution of the data (See Table 8). This test was employed to identify significant gender differences across the various dimensions of the survey.

Table 6

Mann-Whitney U test for gender groups

	Statistic	p	Effect Size
Perceived usefulness	4923	0.281	0.0883
Perceived ease of use	4475	**0.037**	0.1713
Attitude towards using Chat GPT	4828	0.194	0.1059
Behavioral intention to use Chat GPT	4860	0.224	0.1000
Perceived credibility	5188	0.630	0.0394
Perceived social influence	5205	0.659	0.0362

The sole significant disparity in how male and female students perceive Chat GPT was found in the dimension of "Perceived ease of use (P=.037)." Male students (M=5.44) reported finding Chat GPT easier compared to their female counterparts (M=5.04).

To investigate the third research question, we examined potential significant differences among grade level groups. With four grades ranging from first grade to fourth grade, we conducted a Kruskal-Wallis test due to the non-normal distribution of the data (See Table 9).

Table 7

Kruskal-Wallis test for grade level groups

	χ^2	df	p	ε^2
Perceived usefulness	5.378	3	0.146	0.02467
Perceived ease of use	2.373	3	0.499	0.01089
Attitude towards using Chat GPT	0.768	3	0.857	0.00352
Behavioral intention to use Chat GPT	4.475	3	0.214	0.02053
Perceived credibility	5.818	3	0.121	0.02669
Perceived social influence	5.232	3	0.156	0.02400

Based on the findings presented in Table 9, no significant differences were observed across any of the dimensions of the survey among students from first grade to fourth grade ($p>0.05$).

In responding the fourth research question, in order to examine potential significant differences in the perception of major groups (Mathematics, Chemistry-Biology, and Physics-Informatics), a Kruskal-Wallis test was conducted due to the failure to meet the parametric test requirements (See Table 10).

Table 8

Kruskal-Wallis test for major groups

	χ^2	df	p	ε^2
Perceived usefulness	4.35	2	0.114	0.01995
Perceived ease of use	6.07	2	**0.048**	0.02784
Attitude towards using Chat GPT	1.38	2	0.502	0.00633
Behavioral intention to use Chat GPT	2.31	2	0.315	0.01061
Perceived credibility	3.32	2	0.191	0.01521
Perceived social influence	8.93	2	**0.011**	0.04098

As observed in Table 10, there are statistically significant differences in the "Perceived ease of use" (p=0.048) and "Perceived social influence" (p=0.011) dimensions of the survey. Since there are three major groups, pairwise comparisons were conducted using the Dwass-Steel-Critchlow-Fligner test (See Table 11).

Table 9

Pairwise comparisons for perceived ease of use and perceived social influence

		Perceived ease of use		Perceived social influence	
		W	**p**	**W**	**p**
Mathematics	Chemistry-Biology	3.24	0.057	3.72	**0.023**
Mathematics	Physics-Informatics	2.73	0.13	1.24	0.657
Chemistry-Biology	Physics-Informatics	-1.43	0.571	-3.4	**0.042**

According to Table 11, there are statistically significant differences in the perceived social influence dimension between Mathematics majors (M=3.08) and Chemistry-Biology majors (M=3.54), as well as between Chemistry-Biology majors (M=3.54) and Physics-Informatics majors (M=3.22). While the Kruskal-Wallis test indicated

significant differences in the perceived ease of use dimension, pairwise comparisons did not yield statistically significant differences.

To address the fifth research question, we examined potential differences among groups based on their prior experience using artificial intelligence (AI) or chatbots. There were three groups classified as: having a lot, neither more nor less, or little experience with AI or chatbots. Due to the non-normal distribution of the data, a Kruskal-Wallis test was performed, as indicated in Table 12.

Table 10

Kruskal-Wallis test for experience with AI groups

	χ^2	df	p	ε^2
Perceived usefulness	6.69	2	**0.035**	0.03070
Perceived ease of use	15.54	2	**< .001**	0.07130
Attitude towards using Chat GPT	15.45	2	**< .001**	0.07087
Behavioral intention to use Chat GPT	27.26	2	**< .001**	0.12506
Perceived credibility	8.58	2	**0.014**	0.03935
Perceived social influence	1.83	2	0.400	0.00840

Upon examining Table 12, it is evident that, with the exception of the dimension "Perceived social influence" statistically significant differences exist between the groups. To identify the specific differences between these groups, pairwise comparisons were conducted using the Dwass-Steel-Critchlow-Fligner test, as shown in Table 13.

Table 11

Pairwise comparisons for usefulness, ease of use, attitude, intention to use, and credibility

		Usefulness		Ease of use		Attitude		Intention to use		Credibility	
		W	**p**	**W**	**p**	**W**	**p**	**W**	**p**	**W**	**p**
A lot	Neither more nor less	0.248	0.983	-2.04	0.32	-2.05	0.314	-3.91	**0.016**	-3.544	**0.033**
A lot	Little	-1.821	0.402	-4.01	**0.013**	-4.5	**0.004**	-6.54	**< .001**	-4.211	**0.008**
Neither more nor less	Little	-3.556	**0.032**	-4.7	**0.003**	-4.39	**0.005**	-5	**0.001**	-0.835	0.825

In the Perceived usefulness dimension, there is a statistically significant difference between individuals with "Neither more nor less experience" (M=3.54) and "Little experience" (M=3.24) with AI. In the Perceived ease of use and Attitude towards using Chat GPT dimensions, there are statistically significant differences between individuals with "A lot" of experience (M=5.84, M=3.95) and "Little experience" (M=4.84, M=3.25), as well as between individuals with "Neither more nor less experience" (M=5.43, M=3.57) and "Little experience" (M=4.84, M=3.25) with AI. In the behavioral intention to use Chat GPT dimension, there are statistically significant differences between individuals with "A lot" of experience (M=5.98) and "Neither more nor less experience" (M=4.85), between individuals with "A lot" of experience (M=5.98) and "Little experience" (M=4.02), and between individuals with "Neither more nor less experience" (M=4.85) and "Little experience" (M=4.02) with AI. Lastly, in the Perceived credibility dimension, there are statistically significant differences between individuals with "A lot" of experience (M=3.69) and "Neither more nor less experience" (M=3.17), as well as between individuals with "A lot" of experience (M=3.69) and "Little experience" (M=3.07) with AI.

Discussion and conclusion

The first research question in this study is focused on assessing the validity of the developed survey. The survey assesses various factors linked to the adoption of Chat GPT in the context of education, including its perceived

usefulness, perceived ease of use, attitudes toward utilizing Chat GPT, behavioral intention to use Chat GPT, perceived credibility, and perceived social impact. To offer a summary of the survey results, descriptive statistics were used. The study's findings indicate that participants had favorable perceptions of Chat GPT in the educational environment in general, implying that participants acknowledged the benefits and worthwhile of utilizing Chat GPT in their educational experiences. This conclusion supports prior research on technology acceptance models, which highlight the relevance of perceived usefulness in influencing users' attitudes and intentions for using technology (Davis, 1989; Venkatesh & Davis, 1996). Furthermore, the survey results display that the majority of participants positively perceived the ease of use. This is consistent with the Technology Acceptance Model (TAM) idea of perceived ease of use, which states that people are more likely to accept and use technology if they believe it to be simple to use (Davis, 1989). As a result, participants' perceptions regarding using Chat GPT in their educational activities were equally positive. Positive attitudes are frequently recognized as a major factor affecting the acceptance and adoption of technology (Granić & Marangunić, 2019). Regarding Chat GPT behavioral intention, it was assessed at 65.3%. This indicates that participants have shown a moderate level of interest in using Chat GPT in the future. Because it indicates individuals' willingness and motivation to adopt and engage with technology, behavioral intention is a significant predictor of actual technology usage (Venkatesh & Davis, 1996). The perceived credibility category has a moderate score that is nearly equal to the score of the preceding category. According to Liu et al. (2022), credibility is a critical factor influencing individuals" confidence and trust in technology. Finally, the survey's results show that perceived social impact is 66%. These findings correspond with prior study, which discovered that others' influence was a key role in their decision to employ Chat GPT in the educational environment. Individuals' technological acceptance and adoption behaviors are influenced by social influence, according to Iqbal et al. (2022). In summary, the descriptive statistics findings give preliminary insights into the survey's validity by examining participants' perceptions of Chat GPT in the educational setting.

Regarding the differences in participants' perception of Chat GPT across gender groups, the survey results revealed a significant disparity in the perceived ease of use dimension between male and female students. Specifically, male students reported finding Chat GPT easier to use compared to their female counterparts. Gender disparities in technology acceptance have been studied by scholars such as Mathieson (1991) and Parker (2007), who discovered that males and females may have different perceptions and behaviors toward technology. These disparities might be explained by sociocultural factors and gender norms, which impact individual opinions and decisions (Fast & Horvitz, 2016). As a result, it is possible that gender influences Chat GPT perception, particularly in variables like as perceived ease of use (PEOU) (Liu et al., 2022). The finding of a considerable disparity in perceived ease of use across gender groups emphasizes the need of taking gender into account when researching technology acceptance and individuals' perceptions. Understanding gender differences may help guide the design and implementation of Chat GPT and other related technologies in educational settings, ensuring that they are accessible and user-friendly for all students, regardless of gender.

The third research question sought to determine whether participants' perceptions of Chat GPT differed by grade level. The survey findings, as shown in Table 9, show that no significant differences were identified across any of the survey variables among participants from first to fourth grade ($p>0.05$). Granić and Marangunić (2019) investigated the acceptance of educational technology among primary school students and discovered that perceived usefulness and perceived ease of use both strongly affected their desire to utilize the technology. The study, however, found no significant changes in acceptance and perception across grade levels. These data imply that students' perceptions of Chat GPT do not differ much by grade level. In contrast, Parker (2007) stated that younger learners may be more supportive of technology due to their experience with digital tools, but older students may be more resistant or skeptical. These findings are consistent with the Technology Acceptance Model (TAM), which states that perceived utility (PU) and perceived ease of use (PEOU) are important factors influencing technology acceptance across age groups (Firat 2023). The lack of significant differences among grade level groups in the current study suggests that students at different grade levels interpret Chat GPT similarly. This shows that Chat GPT has the potential to be a powerful instructional tool that students of all grade levels may use effectively.

The fourth research question examines how participants' perceptions of Chat GPT differ between major groups. Recognizing that students from various disciplines may have varied needs, interests, and technical capabilities, this study tries to determine whether different disciplines affect students' perceptions of Chat GPT. According to research by Demir and Guraksin (2022), students' academic backgrounds and disciplinary attitudes might influence their acceptance of educational technology. For example, those studying in STEM disciplines may have a higher degree of competence and perceived ease of use (PEOU) with technology than those majoring in non-STEM subjects. These perceptional discrepancies might be explained by differences in past exposure to technology tools and their relevance to particular fields. Subsequently, the study's findings shed important light on how different major groups perceive the Chat GPT in an educational setting. It implies that depending on the major they have selected, students may have distinct opinions of usefulness and social influence. This knowledge may help instructors and developers customize Chat GPT's implementation and design to the unique requirements and preferences of different major groups.

The fifth research question investigates if users' perceptions of Chat GPT differ depending on their past experience with AI or chatbots. This question acknowledges that earlier experiences may impact individual opinions, attitudes, and acceptance of new technology. Previous research into the importance of past experience in technology acceptance discovered that users with more experience with AI or chatbots may have higher perceived usefulness (PU) and ease of use (PEOU) of Chat GPT (Iqbal et al., 2022). According to the findings of Iqbal et al.'s (2022) study, these individuals may have established a stronger degree of familiarity, comfort, and confidence in engaging with AI-based systems, resulting in more favorable attitudes and behavioral intents to utilize Chat GPT.

In conclusion, the research questions in this study seek to investigate the survey's validity as well as changes in participants' perceptions of Chat GPT based on multiple variables like as gender, grade level, major, and past experience with AI or chatbots. Scholars in the field of technology acceptance, such as Granić and Marangunić (2019),

Davis (1989), and Venkatesh and Davis (1996), have provided valuable insights and frameworks, such as the Technology Acceptance Model (TAM), perceived usefulness (PU), and perceived ease of use (PEOU), that can inform the discussion and analysis of the survey results.

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Appendix

Student's Perception of Chat GPT: A Technology Acceptance Model Study

Dear Participant,

We are conducting a survey to better understand students' attitudes towards Chat GPT, an artificial intelligence-based chatbot that provides information and assistance to users. Your participation in this survey will help us understand how students perceive Chat GPT and how it can be improved to better serve their needs.

This survey is completely voluntary and anonymous. Your responses will be kept confidential and will only be used for research purposes. The survey will take approximately 10 minutes to complete.

Please answer all questions to the best of your ability. There are no right or wrong answers, and we are interested in your honest opinions and experiences.

Thank you for your time and participation. Your feedback is greatly appreciated.

Sincerely,

A. Items

Have you ever heard of Chat GPT?

Yes

No

Perceived usefulness:

To what extent do you agree with the following statements regarding Chat GPT?

1. Chat GPT can help me find the information I need quickly and easily.
2. Chat GPT is a valuable resource for answering my questions.
3. Chat GPT enhances my ability to learn.

Perceived ease of use:

To what extent do you agree with the following statements regarding Chat GPT?

1. Chat GPT is easy to use.

2. It is easy to get Chat GPT to do what I want it to do.
3. I find Chat GPT to be a user-friendly tool.

Attitude towards using Chat GPT:

To what extent do you agree with the following statements?

1. I enjoy using Chat GPT.
2. Using Chat GPT is fun.
3. I find it interesting to interact with Chat GPT.

Behavioral intention to use Chat GPT:

To what extent do you agree with the following statements?

1. I intend to use Chat GPT in the future.
2. I plan to use Chat GPT frequently in the future.
3. I expect to use Chat GPT more often in the future than I do now.

Perceived credibility:

To what extent do you agree with the following statements regarding Chat GPT?

1. Chat GPT is a trustworthy source of information.
2. I believe that Chat GPT provides accurate information.
3. I perceive Chat GPT to be a reliable resource.

Perceived social influence:

To what extent do you agree with the following statements?

1. My peers think I should use Chat GPT.
2. I believe that using Chat GPT is socially acceptable.
3. I am encouraged by others to use Chat GPT.

Perceived privacy and security:

To what extent do you agree with the following statements regarding Chat GPT?

1. I am concerned about the privacy of my information when using Chat GPT.
2. I am confident that Chat GPT will keep my information secure.
3. Chat GPT takes adequate measures to protect my privacy.

Rating

Dimension	1	2	3	4	5	6	7
Perceived usefulness	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree		
Perceived ease of use	Very difficult	Difficult	Somewhat difficult	Neither difficult nor easy	Somewhat easy	Easy	Very easy
Attitude towards using Chat GPT	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree		
Behavioral intention to use Chat GPT	Very unlikely	Unlikely	Somewhat unlikely	Neutral	Somewhat likely	Likely	Very likely
Perceived credibility	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree		
Perceived social influence:	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree		
*Perceived privacy and security:	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree		

*This dimension was removed because of validation process

B. **Demographic information**

Please provide the following demographic information.

Age

Gender

Educational level

Major/field of study

Prior experience using artificial intelligence (AI) or chatbots (A lot, neither more nor less, little)

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