

Exploring the Adoption of Chatgpt among Undergraduate Students for Educational Purposes Using the Technological Acceptance Model

1. Pragati Pallavi

Research Scholar, Arka Jain University, Jharkhand

2. Dr. Rahul Amin

Associate Professor and HoD

Dept. of Journalism and Mass Communication

Arka Jain University, Jharkhand

Abstract: *This study aims to explore the adoption of ChatGPT among students for educational purposes using the Technological Acceptance Model (TAM). The incorporation of artificial intelligence (AI), particularly OpenAI's ChatGPT, in higher education, has generated significant discussion and interest since its introduction. Jagadeesh, Ali, and Athish (2023) mentioned that ChatGPT is a versatile tool that assists students and educators in numerous ways, including answering questions and providing insights into complex subjects. Additionally, it serves as a virtual tutor or mentor, offering personalized support and guidance to students. The research employs a quantitative approach, leveraging TAM constructs such as perceived usefulness, perceived ease of use, attitude towards use, and behavioural intention to examine students' acceptance of ChatGPT. Data is collected through surveys administered to a sample of students across diverse educational institutions. Analysis reveals significant correlations between TAM constructs and students' adoption behaviours, shedding light on factors influencing the integration of AI technologies like ChatGPT in educational contexts. The findings contribute to theoretical advancements in technology adoption research and provide practical insights for educators and developers aiming to optimize the educational benefits of AI-driven tools.*

Keywords: *ChatGPT, Technological Adoption Model, Artificial Intelligence*

Introduction: The Technology Acceptance Model (TAM), introduced by Davis in 1989, is a well-established framework designed to understand how individuals come to accept and use new technologies. According to the model, two primary factors shape a person's attitude towards using information technology: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Ease of Use pertains to how easy or difficult an individual believes it is to use the technology, considering the cognitive effort required. Conversely, Perceived Usefulness reflects the individual's belief in the technology's potential to improve their productivity in performing specific tasks. (Yilmaz et al., 2023) in their studies on the Technology Acceptance Model (TAM) highlight that perceived ease of use and perceived usefulness are key factors influencing the acceptance of learning technologies. Among these, perceived usefulness is the primary determinant for adoption. Additionally, learners' perceptions of usefulness and ease of use enhance their satisfaction with the learning process, which subsequently fosters a positive intention to continue using the technology. Additionally, the Technology Acceptance Model (TAM) suggests that external factors influence individuals' intention to use technology through their perceptions of the technology's ease of use (PEOU) and usefulness (Venkatesh & Davis, 1996). TAM has been applied 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, Samba murthy, & Stair, 2000; Mathieson, 1991), and the World Wide Web (Lederer, Maupin, Sena, & Zhuang, 2000). Some studies have extended TAM by incorporating additional predictors such as gender, culture, experience, and self-efficacy.

The diffusion of advanced artificial intelligence (AI) tools in educational settings has brought significant interest in recent years. Among these tools, ChatGPT, an AI language model developed by

OpenAI, has shown remarkable potential in enhancing educational experiences by providing personalized assistance, facilitating learning, and improving engagement. The rapid advancement and integration of artificial intelligence (AI) and machine learning technologies have brought about transformative changes across numerous industries, including higher education (Chen et al., 2020). AI has already significantly impacted the education sector (AIEd), particularly in administration, instruction, and learning (Chen et al., 2020). Universities are now exploring ways to leverage AI to enhance the student experience and support faculty in their teaching and research efforts (Zawacki-Richter et al., 2019).

Literature Review

Demir & Guraksin 2022, conducted a study to explore secondary school students' perceptions of artificial intelligence (AI) using metaphors. The study aimed to identify the connotations associated with AI among the participants and to determine whether these connotations were predominantly positive or negative. The findings showed that students had mixed perceptions of AI, attributing both positive and negative connotations to the concept. The metaphors used by the participants highlighted associations between AI and humans, technology, and the brain. Notably, most of the metaphors employed by the students were positive, indicating a generally favourable attitude towards AI.

A survey study by Best Colleges in the United States (Appleby, 2023) examined students' views and concerns regarding ChatGPT usage. The results showed that more than half of college students considered using ChatGPT for completing assignments and exams as cheating. In contrast, 20% of students did not view it this way, while the remaining 30% were undecided. The survey also revealed that 43% of students had prior experience using AI tools, and half admitted relying on them for assignments and exams. In simple terms, approximately 1 in 5 college students reported using AI to assist with their tasks and projects. Students who used ChatGPT did so for personal projects, out of curiosity, and for entertainment.

Rahman & Watanobe, Y. 2023, ChatGPT has demonstrated exceptional performance in various application domains, including generating coherent content and essays, functioning as a chatbot, translating languages, answering questions, and assisting with programming code. Existing research highlights developers' significant efforts to fine-tune these language models (LLMs) for specific tasks and explore their potential for transfer learning in new domains. Consequently, both learners and teachers can leverage ChatGPT for various academic and research purposes. Students can use ChatGPT to solve complex problems, answer questions, write essays, and understand specific topics, thereby enhancing their learning process. Additionally, ChatGPT can support programming-related inquiries, helping students improve their programming skills.

Caldarini et al. (2022) highlight that a major benefit of Artificial Intelligence education is its ability to significantly enhance students' learning experiences, offer personalized support, and improve academic performance. Consequently, higher education institutions worldwide are increasingly adopting and integrating AI-enabled writing tools, plagiarism detection technology, automated assessments, and AI-powered learning and curriculum analytics to maximize these advantages.

Objective of the Study

This research examines the adoption of ChatGPT among students for educational purposes, utilizing the Technological Acceptance Model (TAM) as the analytical framework.

Following are the research questions of the study:

RQ1: What is the perceived usefulness of ChatGPT among students regarding their educational purpose?

RQ2: What are the Attitudes towards using Chat GPT for the educational purpose?

RQ3: What is the Perceived credibility of the Chat GPT for the educational purpose?

RQ4: What is the Perceived social influence' of the Chat GPT for the educational purpose?

RQ5: What is the Perceived privacy and security of the Chat GPT for the educational purpose?

Methodology

This study utilized a quantitative research approach for analyzing the collected data. Survey methodology has been applied to gain a deeper understanding of students' attitudes towards Chat GPT, an AI-based chatbot. The survey used in this study is adapted from the "Technology Acceptance Model" (TAM) survey, a well-established tool for assessing users' attitudes toward new technologies. Originally developed by Fred Davis in the 1980s, the TAM survey has been widely adapted and modified by researchers across various fields. It typically includes items related to perceived usefulness, perceived ease of use, attitude towards using the technology, and the intention to use the technology. The model has been adapted specifically for Chat GPT by including items related to perceived credibility, social influence, and privacy and security. However, the survey's basic structure and items remain grounded in the TAM framework. Participants are typically asked to rate their agreement with each survey item using a Likert-type scale, which is a common rating scale in surveys. This scale usually ranges from 1 to 5 or 7, with higher numbers indicating stronger agreement with the statement.

Convenience sampling has been adopted in this study in which students of humanities stream from various colleges of Pune participated survey. 71 students from different colleges of Pune from humanities stream have filled the google form. A Questionnaire was developed based on different dimensions of Technological acceptance model. A questionnaire of seven dimensions consisting of 21 items, with demographic information, was developed (see Table 1)

Table 1

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
Behavioural 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

Table 2

Data analysis

VARIABLE	ITEM	MEAN	SD	KURTOSIS	SKEWNESS
Perceived Usefulness	PU 1	3.605633803	1.224498419	0.441640424	-1.116650246
	PU2	3.23943662	1.200771047	-0.547248419	-0.632311824
	PU3	3.23943662	1.164532877	-0.225377359	-0.597232907
Perceived Ease	PE 1	6.169014085	0.999798773	0.302690472	-1.144650275
	PE 2	5.323943662	1.105501152	0.52423566	-0.81114617
	PE 3	5.788732394	0.998187492	0.829811231	-0.866869374
Attitude towards using Chat GPT	ATTITUDE 1	3.492957746	0.998187492	0.829811231	-0.866869374
	ATTITUDE 2	3.557142857	1.044456925	0.278049518	-0.745261029
	ATTITUDE 3	3.549295775	1.039075584	0.611235075	-0.803349139
Behavioural intention to use Chat GPT	Behaviour 1	5.549295775	1.601684224	1.523877061	-1.347613843
	Behaviour 2	5.23943662	1.616564158	-0.025383996	-0.798137923
Perceived credibility	PC1	3.169014085	0.999798773	0.168420939	-0.173878019
	PC2	3.169014085	0.955972437	0.090466615	-0.248671687
	PC3	3.154929577	1.009213093	0.052210452	-0.406166391
Perceived social influence	PSCI 1	3.408450704	1.022286859	-0.223577673	-0.32304756
	PSCI 2	3.464788732	1.039656343	0.047407716	-0.570717803
	PSCI 3	3.323943662	1.143611421	-0.493325093	-0.436217116
Privacy and security of Chat GPT	PPS 1	3.478873239	0.983567195	0.555506353	-0.634678996
	PS 2	3.126760563	1.013192655	-0.24673797	-0.261055836
	PS 3	3.253521127	0.889916687	0.535748977	-0.277821988

The mean scores for all three items of perceived usefulness are slightly above the midpoint of 3 on a 5-point scale, indicating that students generally perceive ChatGPT as somewhat useful. The SD values range from 1.16 to 1.22, indicating a moderate level of variability in the responses. Students' perceptions are somewhat diverse but not extremely varied. PU1 has a positive kurtosis (0.44), indicating a slightly peaked distribution compared to a normal distribution. PU2 and PU3 have negative kurtosis values (-0.55 and -0.23, respectively), suggesting a flatter distribution. All three items have negative skewness values, indicating that the distribution of responses is skewed to the left. This suggests that more students rated the usefulness of ChatGPT lower than the mean rating.

Overall, the descriptive statistics indicate that students perceive ChatGPT as somewhat useful, with moderate variability in their responses. The negative skewness across all items suggests that a significant number of students rated ChatGPT's usefulness lower than the average, which might indicate some dissatisfaction or critical perceptions among certain students. The variation in kurtosis values suggests differences in the peakedness of the response distributions, with PU1 having a more pronounced peak compared to PU2 and PU3.

The mean scores for all three items are above 5 on a 7-point scale, indicating that students generally perceive ChatGPT as easy to use. The SD values range from 0.9982 to 1.1055, indicating relatively low variability in the responses. Students' perceptions of ease of use are consistent. All three items have positive kurtosis values, indicating distributions that are more peaked than a normal distribution. PE3 has the highest kurtosis (0.83), suggesting the most pronounced peak among the items. All three items have negative skewness values, indicating that the distribution of responses is skewed to the left. This suggests that more students rated the ease of use of ChatGPT higher than the mean rating.

Overall, the descriptive statistics indicate that students perceive ChatGPT as easy to use, with low variability in their responses. The negative skewness across all items suggests that a significant number of students rated ChatGPT's ease of use higher than the average, indicating general satisfaction with the ease of use. The positive kurtosis values indicate distributions that are more peaked than normal, with PE3 having the most pronounced peak. This suggests that there is a strong consensus among students regarding the ease of use of ChatGPT.

The mean scores for all three items are around 3.5 on a 5-point scale, indicating that students generally have a neutral to slightly positive attitude towards using ChatGPT. The SD values range from 0.9982 to 1.0445, indicating relatively low variability in the responses. Students' attitudes towards using ChatGPT are fairly consistent. All three items have positive kurtosis values, indicating distributions that are more peaked than a normal distribution. ATTITUDE 1 has the highest kurtosis (0.83), suggesting the most pronounced peak among the items. All three items have negative skewness values, indicating that the distribution of responses is skewed to the left. This suggests that more students rated their attitude towards using ChatGPT higher than the mean rating.

Overall, the descriptive statistics indicate that students have a neutral to slightly positive attitude towards using ChatGPT, with low variability in their responses. The negative skewness across all items suggests that a significant number of students rated their attitude towards using ChatGPT higher than the average, indicating general positivity. The positive kurtosis values indicate distributions that are more peaked than normal, with ATTITUDE 1 having the most pronounced peak. This suggests that there is a strong consensus among students regarding their attitude towards using ChatGPT.

The mean scores for both items are above 5 on a 7-point scale, indicating that students generally have a positive behavioral intention to use ChatGPT. The SD values are relatively high (1.6017 for Behaviour 1 and 1.6166 for Behaviour 2), indicating considerable variability in the responses. This suggests that students' behavioral intentions to use ChatGPT vary widely. Behaviour 1 has a high positive kurtosis value (1.52), indicating a distribution that is more peaked than a normal distribution. This suggests a clustering of responses around the mean with some extreme values. Behaviour 2 has a kurtosis value close to zero (-0.03), indicating a distribution close to normal. Both items have negative skewness values, indicating that the distribution of responses is skewed to the left. This suggests that more students rated their behavioral intention to use ChatGPT higher than the mean rating. Behaviour

1 has a higher negative skewness (-1.35) compared to Behaviour 2 (-0.80), indicating a more pronounced skew towards higher ratings for Behaviour 1.

Overall, the descriptive statistics indicate that students have a positive behavioral intention to use ChatGPT, with high variability in their responses. The negative skewness across both items suggests that a significant number of students rated their behavioral intention to use ChatGPT higher than the average, indicating general positivity. The high kurtosis for Behaviour 1 suggests a more peaked distribution with some extreme values, while Behaviour 2 has a distribution closer to normal. This indicates that while there is a general positive intention, the degree of positivity varies among students.

The mean scores for all three items are slightly above the midpoint of 3 on a 5-point scale, indicating that students generally perceive ChatGPT as moderately credible. The SD values range from 0.9560 to 1.0092, indicating relatively low variability in the responses. Students' perceptions of ChatGPT's credibility are fairly consistent. All three items have low positive kurtosis values (ranging from 0.05 to 0.17), indicating distributions that are slightly more peaked than a normal distribution but not by much. This suggests a moderate concentration of responses around the mean. All three items have negative skewness values, indicating that the distribution of responses is slightly skewed to the left. This suggests that more students rated the credibility of ChatGPT higher than the mean rating. The skewness values range from -0.17 to -0.41, with PC3 having the highest skew towards higher ratings.

Overall, the descriptive statistics indicate that students perceive ChatGPT as moderately credible, with low variability in their responses. The slightly negative skewness across all items suggests that a few more students rated ChatGPT's credibility higher than the average. The low positive kurtosis values indicate distributions that are slightly more peaked than normal, suggesting a moderate clustering of responses around the mean. The consistency in the means and the low variability highlight that students' perceptions of ChatGPT's credibility are fairly uniform.

The mean scores for all three items are slightly above the midpoint of 3 on a 5-point scale, indicating that students generally perceive a moderate level of social influence regarding the use of ChatGPT. The SD values range from 1.0223 to 1.1436, indicating a moderate level of variability in the responses. This suggests that students' perceptions of social influence regarding ChatGPT vary somewhat. PSCI 1 and PSCI 3 have negative kurtosis values (-0.22 and -0.49, respectively), indicating distributions that are flatter than a normal distribution. This suggests a wider spread of responses. PSCI 2 has a slightly positive kurtosis value (0.05), indicating a distribution that is close to normal but slightly more peaked. All three items have negative skewness values, indicating that the distribution of responses is slightly skewed to the left. This suggests that more students rated the social influence of ChatGPT higher than the mean rating. The skewness values range from -0.32 to -0.57, with PSCI 2 having the highest skew towards higher ratings.

Overall, the descriptive statistics indicate that students perceive a moderate level of social influence regarding the use of ChatGPT, with a moderate level of variability in their responses. The negative skewness across all items suggests that a few more students rated the social influence of ChatGPT higher than the average. The negative kurtosis values for PSCI 1 and PSCI 3 indicate flatter distributions, suggesting a wider spread of responses, while the slightly positive kurtosis value for PSCI 2 suggests a distribution close to normal. This indicates that while there is a general perception of social influence, the degree of influence varies among students.

The mean scores for all three items are slightly above the midpoint of 3 on a 5-point scale, indicating that students generally perceive the privacy and security of ChatGPT as moderate to somewhat positive. The SD values range from 0.8899 to 1.0132, indicating relatively low to moderate variability in the responses. This suggests that students' perceptions of privacy and security are fairly consistent. PPS 1 and PS 3 have positive kurtosis values (0.56 and 0.54, respectively), indicating distributions that are more peaked than a normal distribution. This suggests a clustering of responses around the mean. PS 2 has a negative kurtosis value (-0.25), indicating a distribution that is flatter than a normal distribution, suggesting a wider spread of responses. All three items have negative skewness values, indicating that the distribution of responses is slightly skewed to the left. This suggests that more

students rated the privacy and security of ChatGPT higher than the mean rating. The skewness values range from -0.26 to -0.63, with PPS 1 having the highest skew towards higher ratings.

Overall, the descriptive statistics indicate that students perceive the privacy and security of ChatGPT as moderate to somewhat positive, with relatively low to moderate variability in their responses. The negative skewness across all items suggests that a few more students rated the privacy and security aspects of ChatGPT higher than the average. The positive kurtosis values for PPS 1 and PS 3 indicate more peaked distributions, suggesting a moderate concentration of responses around the mean. The negative kurtosis value for PS 2 suggests a flatter distribution with a wider spread of responses. This indicates that while there is a general perception of moderate to positive privacy and security, the degree of perception varies among students.

Conclusion: The data suggests that students generally perceive ChatGPT positively in terms of ease of use, attitude, behavioral intention, credibility, social influence, and privacy and security. However, there is some diversity in opinions, particularly regarding behavioral intentions. The consistent negative skewness across most constructs indicates that a significant portion of students rate ChatGPT higher than the mean in various aspects, reflecting a generally positive perception. Addressing the diverse perceptions, particularly in usefulness and behavioral intentions, could further enhance the acceptance and utilization of ChatGPT among students.

References

- 1) Adams, D., Nelson, R. R., & Todd, P. M. (1992). Perceived Usefulness, Ease of Use, and Usage of Information Technology: A Replication. *Management Information Systems Quarterly*, 16(2), 227. <https://doi.org/10.2307/249577>
- 2) Agarwal, R., Sambamurthy, V., & Stair, R. (2000). Research Report: The Evolving Relationship Between General and Specific Computer Self-Efficacy—An Empirical Assessment. *Information Systems Research*, 11(4), 418–430. <https://doi.org/10.1287/isre.11.4.418.11876>
- 3) Appleby, C. (2023). Will colleges ban ChatGPT? *Best Colleges*. <https://www.bestcolleges.com/news/will-colleges-ban-chatgpt/>.
- 4) Caldarini, G., Jaf, S., & McGarry, K. (2022). A literature survey of recent advances in chatbots. *Information*, 13(1). <https://doi.org/10.3390/info13010041>. Article 1.
- 5) Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, 8(2169-3536), 75264–75278. <https://doi.org/10.1109/ACCESS.2020.2988510>
- 6) Demir, K., & Guraksin, G. E. (2022). Determining middle school students' perceptions of the concept of artificial intelligence: A metaphor analysis. *Participatory Educational Research*, 9(2), 297–312. <https://doi.org/10.17275/per.22.41.9.2>
- 7) Jagadeesh, M., Ali, A. S., & Athish, B. S. (2023, December). ChatGPT and its Double-Edged Impact on Higher Education and Research-A Detailed Survey. In *2023 6th International Conference on Recent Trends in Advance Computing (ICRTAC)* (pp. 10-17). IEEE.
- 8) Lederer, A. L., Maupin, D. J., Sena, M. P., & Zhuang, Y. (2000). The technology acceptance model and the World Wide Web. *Decision Support Systems*, 29(3), 269–282. [https://doi.org/10.1016/s0167-9236\(00\)00076-2](https://doi.org/10.1016/s0167-9236(00)00076-2)
- 9) Rahman, M. M., & Watanobe, Y. (2023). ChatGPT for education and research: Opportunities, threats, and strategies. *Applied Sciences*, 13(9), Article 9. <https://doi.org/10.3390/app13095783>
- 10) Yilmaz, H., Maxutov, S., Baitekova, A., & Balta, N. (2023). Student Attitudes towards Chat GPT: A Technology Acceptance Model Survey. *International Educational Review*, 1(1), 57-83. <https://doi.org/10.58693/ier.114>
- 11) Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1). <https://doi.org/10.1186/s41239-019-0171-0>