Asian Journal of Distance Education

Acceptance of AI Chatbots Among College Students- Implications for Autonomous Learning in the Digital Age

Antara Mukherjee, Shashi Singh

Abstract: The digital age has witnessed a rapidly evolving educational landscape, with AI chatbots emerging as powerful tools supporting autonomous learning. This study investigates the acceptance level of AI chatbots among college students and evaluates the influence of factors such as gender, age, education level, learning styles, and major disciplines on students' receptiveness to AI chatbots. Employing a quantitative research design, a combination of stratified and convenience sampling was used to select a sample of 200 students from various colleges in Jharkhand, India, representing diverse courses and academic levels. Results revealed over 72% acceptance of AI tools among college students for self-learning. Additionally, the study failed to find any significant differences among demographic groups, suggesting that students across backgrounds are equally open to using AI chatbots for learning. This study underscores the growing significance of AI in Education 4.0 era, which promises individualised educational experiences, enhances digital literacy, and prepares learners for future job demands. However, being limited to basic inferential statistics and one Indian state, future research should further explore the factors driving the acceptance of AI chatbots among college learners across the country.

Keywords: artificial intelligence, AI chatbots, technology acceptance, autonomous learning, higher education, digital literacy.

Highlights

What is already known about this topic:

- AI chatbots are emerging as effective tools for supporting autonomous learning.
- Students' acceptance depends on perceived usefulness, ease of use, and trust in AI tools.
- Technology adoption in higher education enhances self-paced and self-directed learning.

What this paper contributes:

- Reports a good percentage of acceptance level for AI chatbots among college students.
- Finds no significant difference in acceptance across gender, age, education, or discipline.
- Develops and validates a 30-item AI chatbots Acceptance Scale with strong reliability.

Implications for theory, practice and/or policy:

- Supports the integration of AI tools in higher education aligned with NEP 2020 goals.
- Suggests embedding AI literacy and ethics modules in curricula to promote responsible use of AI in education.

Published by Asian Society for Open and Distance Education (ASODE), Japan
ISSN 1347-9008 http://www.asianjde.com/

Introduction

"The mind is not a vessel to be filled, but a fire to be kindled"

- *Plutarch.*

In today's fast-paced world of education, the rise of artificial intelligence (AI) is transforming how students learn, fostering curiosity and self-directed learning rather than simply delivering information. The integration of AI into daily life has become increasingly prominent, and one area where it is making a significant impact is in the field of education. AI in education (AIEd) represents a paradigm shift, using intelligent systems to personalize learning, providing adaptive feedback, and enhancing student engagement across diverse learning contexts. AI-powered applications such as chatbots are advanced conversational agents that enhance educational experiences and make self-directed learning more accessible and effective. These chatbots can provide immediate support, reshape traditional education and allow students more control over their learning journey. They are designed to simulate humane-like discussions and thus can interact with pupils in real-time, providing tailored assistance, answering questions, and even offering tutoring on complex subjects. However, the success of these AI chatbots in educational settings largely depends on their acceptance by the students.

The acceptance of AI chatbots in educational settings remains uncertain, as it is still a relatively new technology with limited empirical understanding of how students perceive and adopt it. College students today are digital natives, accustomed to leveraging technology for a myriad of purposes, from social interaction to academic research, yet they express reservations about data privacy, accuracy, and overdependence on AI systems (Kaya, 2024). Students acknowledge that easy availability of AI tools is decreasing their efforts and critical thinking (Mukherjee and Chatterjee, 2025). Understanding these perceptions is crucial, as acceptance of AI chatbots can have far-reaching implications for promoting autonomous and self-directed learning. In a world where self-learning is important, AI chatbots offer a unique opportunity to provide personalized, on-demand support, which is often not feasible in traditional classroom settings. As such, understanding student acceptance of these tools is not only pertinent but also vital for shaping the future of autonomous learning in the digital age. This study aims to explore the acceptance of AI chatbots among college students, examining their attitudes, perceptions, and experiences, thus contributing to the conversation on the role of AI in education and how it can promote autonomous learning and transform student learning practices.

Review Of Literature

Technology Acceptance Frameworks

Recently, several research has been conducted in the realm of education to see the effect of AI-tool usage, and to comprehend adoption of AI tools among students for their learning endeavours. The adoption of technology has been found to enhance knowledge acquisition among higher education students engaged in self-paced learning (Mondal and Das, 2025). Moreover, the extent of technology adoption largely depends on factors such as the software's perceived value, usability and the level of trust students place in these digital assistants (Davis, 1989; Esiyok et al., 2024; Sandu and Gide, 2019). Esiyok et al. (2024) tested the use of AI tools for educational needs, especially in autonomous learning, where it was found that perceived utility and simplicity have a favourable impact on the utilization of AI chatbots. The study artfully suggested that higher education institutions should upgrade their curriculum to support technology integrated self-directed learning thereby increasing ICT self-efficacy among students. Similarly, Al-Abdullatif (2023) combined the value-based adoption model with the technology acceptance model, finding that chatbot acceptance among Saudi students is significantly influenced by their attitudes, utility of the tools, perceived usefulness and value. Even teachers are also open to using technology in all phases of education, which is perceived as a good strategy towards enhancing quality in education (Mukherjee and Bhuyan, 2023). William and Misheal (2024) further highlighted that, students pursuing graduation in Zimbabwe, have an optimistic outlook towards chatbots due to its

potential to uplift learning experience and develop higher order cognitive skills. These studies collectively suggest that students are generally open to using AI chatbots in their learning, particularly when they perceive them as beneficial and easy to use.

Student Factors

Beyond theoretical frameworks, personal and contextual student factors play a major role in shaping AI acceptance and engagement. This section synthesizes studies on how digital literacy, learning motivation, and individual learning styles affect chatbot acceptance and self-directed learning. Scheel et al. (2022) advocated that students' usage and acceptance is essential for the incorporation of technology into higher education, which is influenced by students' self-organization, digital literacy and capacity for independent learning. Even students with greater readiness for online learning were seen to engage effectively in self-regulated learning process (Dai et al., 2023). In an empirical study conducted by Lee et al. (2017), 404 English major students were examined to assess the association between technology use, autonomous learning and learner characteristics where beneficial relationships were found between the three components. Jeon (2022) revealed that students may not always engage effectively with AI chatbots because of their lower levels of digital literacy and language proficiency. In fact, learning motivation acted as a mediating factor in technological acceptability and attitude towards technology based self-learning (Pan, 2020). Similarly, Nazari et al. (2021) conducted a randomized controlled trial and found that writing tools empowered by AI might successfully encourage non-native postgraduate English students' learning habits and attitudes towards accepting new technologies. Pupils who felt more comfortable with technology and more confident in their ability to use it, demonstrated a more optimistic outlook on self-directed learning facilitated by technology. Although research on learning styles is debated, students' preferences for receiving information like visual, auditory, reading/writing, or kinaesthetic (VARK), may influence how they interact with AI chatbots (Fleming, 1995; Dunn and Dunn, 1993). Since chatbots can deliver content via text, audio, images, or interactive tasks, a learner's preferred mode of learning may affect their perceived usability and perceived usefulness, a key antecedent of technology acceptance (TAM/UTAUT). Therefore, this study explores learning styles as a possible factor influencing chatbot acceptance, not to claim that matching teaching as per learning styles improves outcomes, but to see whether personal preferences shape students' acceptance of AI chatbots (Pashler et al., 2008). Further, there is lack of literature assessing the acceptance of AI-technology among learners based on their study major, so it was considered to measure it as a factor influencing AI chatbot usage.

Chatbot-specific Affordances

AI chatbots offer unique affordances that distinguish them from other educational technologies, such as adaptive feedback, personalisation, and scaffolding for autonomous learning. McGrath et al. (2024) in their study examined AI chatbot usage in higher educational scenarios, highlighting the lack of shared ideas on human learning and the contrasting opinions about their future. Riel (2021) investigated the chatbot-based learning design making sure that its educational and motivating aims satisfy with pedagogical roles, educational goals, and verifiable conversational capabilities that enhance students' capacity to learn independently at their own pace. Goli et al. (2023) claimed that opinions about usefulness, innovation, quality of information, and personalization of chatbots have a favourable influence on peoples' intentions to use them. With a high potential of providing the appropriate environment for self-learning, the AI interface needs to keep in consideration the needs and satisfaction of the students (Xia et al., 2023). Further it has been shown that, digital media and chatbots powered by AI can make self-coaching more interesting (Mai et al., 2022). According to Neo (2022), students' online learning experiences are enhanced by the scaffolding nature of AI chatbots. Singh and Paudel (2020) saw that students that engage in self-directed learning are able to progress towards their career goals and learn with more self-control. Hence, teachers must concentrate on choosing educational materials that stimulate students' curiosity and help them develop their capacity for independent learning.

Gaps in the Literature

Although global research on AI chatbots in education is expanding, significant contextual and conceptual gaps remain. Rosita and Fatmasari (2023) discussed educational technology acceptance in distance learning, arguing that the specific academic focus of students is modifying their engagement with technology, thus affecting their acceptance. Kingchang (2024) recommended that higher education may gain by using AI chatbot platforms, as they have the ability to precisely and reliably assess the questions that users pose and satisfy users' needs. According to Wu and Yu's (2023) meta-analysis, AI chatbots have a greater impact on pupils of higher education than those of primary levels. In view of these studies, assessing the acceptance level of AI chatbots among Indian college students was found essential. Further, there is a necessity to delve deeper into this acceptance by analysing it through the lenses of different factors like gender, age, levels of education, learning styles and major discipline. In view of this, Sandu and Gide (2019) showed that adoption of Chatbots is not influenced in the Indian context by differences of gender, age, and levels of education. Despite extensive studies on chatbot adoption, little is known about how learning styles and academic disciplines influence acceptance, particularly in the Indian higher education context. Further, there are no studies based in Jharkhand state of India. Considering the literatures on AI chatbots, it was found essential to gauge the general receptivity and potential effectiveness of these tools in supporting independent learning activities, mainly after ChatGPT's debut. Also, the study seeks to offer insightful information on the variables influencing AI chatbot adoption, ultimately guiding educators and developers in designing more effective and inclusive educational technologies.

Objectives

1. To assess the overall acceptance of AI chatbots among college students for autonomous learning.
2. To examine whether acceptance of AI chatbots differs based on gender, age, education level, learning styles, and academic discipline.

Hypothesis

H1: The mean acceptance score of the college students will be significantly higher than the scale midpoint.
H2: There is no significant difference in acceptance of AI chatbots among college students based on their gender.
H3: There is no significant difference in acceptance of AI chatbots among college students across age groups.
H4: There is no significant difference in acceptance of AI chatbots among college students across learning styles.
H5: There is no significant difference in acceptance of AI chatbots among college students across different levels of education.
H6: There is no significant difference in acceptance of AI chatbots among college students based on their academic major.

Methodology

Study design:

The empirical study used a quantitative, cross-sectional, survey-based design with both descriptive and inferential analyses. Data were collected from some of the prominent higher education institutions of Jharkhand, India, to learn about college students' acceptance of AI chatbots for their autonomous learning. Primarily data were about demographic information of the participants viz. their gender, age, level of education they are pursuing, academic major, and their individual learning styles,

as well as on their AI chatbot usage. A subsequent set of 30 statements assessed on 5-point Likert scale, was included to gauge participant's acceptance of AI chatbots for autonomous learning. The collected data were tabulated in MS Excel and analysed with the help of the statistical software for social sciences IBM SPSS 20.0, at a confidence level of 95%. Descriptive statistics like Mean, Standard Deviation (SD), Percentage and Inferential statistics like t-test and ANOVA were employed to analyse the acceptance level of AI chatbots among the participants.

Construction of the Acceptance scale on AI chatbots usage:

The construction of a self-developed acceptance scale, validated through expert review and statistical tests, was conducted through the following steps.

1. **Item collection:** Initially, a broad set of potential items/statements were constructed based on 5-point Likert scale, which were 40 in number. These items were designed to reflect various aspects of the acceptance intention towards AI chatbots among users for their autonomous learning. Items covered trust, usability, effectiveness, preferences and technical barriers encountered while using AI chatbots for self-learning among learners. Both positive and negative sentences were included, where the responses were scored as, Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1, and just the reverse for negative sentences.

2. **Relevance test (content validation):** The initial items were reviewed by six experts in educational technology and psychology to evaluate their relevance, clarity, and representativeness. The average expert agreement was high (mean CVR = 0.90), indicating strong consensus on item relevance. However, due to small expert panel (n = 6), this value was interpreted as evidence of substantial expert agreement rather than strict compliance with Lawshe's critical CVR value of 0.99 (Lawshe, 1975). Items with low agreement were refined or removed.

3. **Item analysis and factor extraction:** A statistical item analysis was conducted to refine the scale. Items with weak correlations or low communalities were removed, resulting in 30 retained items. To explore the underlying structure, Exploratory Factor Analysis (EFA) was conducted using Principal Component Analysis with Varimax rotation. The values of Kaiser-Meyer-Olkin Measure of sample adequacy (KMO = 0.68) and the Bartlett's test of sphericity ($\chi^2 = 397.36$, $p < 0.001$) came in the acceptable range (Shrestha, 2021). Factor loadings of the final items are depicted in table 1. EFA extracted five distinct factors with eigenvalues greater than 1, corresponding to the theoretical dimensions of : User-friendliness, Usefulness, Perceived Risk, Satisfaction and trust, and Behavioural intention, accounting for a total variance of 62.45%, with all factor loadings exceeding 0.50 (Hair et al., 2010).

4. **Validity test:** Construct validity was established through factor solution and satisfactory Average Variance Extracted (AVE > 0.5) as depicted in table 1 for each construct. Convergent validity was thus confirmed, as each construct captured adequate variance of its items.

5. **Reliability test:** The reliability of the scale was tested to ensure consistency. This ensures that the items produce stable and consistent results overtime. The reliability was measured using the Cronbach-alpha coefficient and the final scale achieved the reliability coefficient of 0.82 indicating good reliability (Hair et al., 2006). In addition, construct wise reliability coefficients ranged from 0.78 to 0.86 conforming stability across the five dimensions.

After completing these steps, 30 items were finalised for inclusion in the final acceptance scale. These items were chosen based on their relevance and statistical performance, resulting in a reliable and valid tool for measuring the adoption of AI chatbots among the college students for their learning.

Table 1. Construct report summary of the items of the acceptance of AI chatbots scale.

Constructs	Items	Factor Loading	AVE
User-friendliness	1. I find it easy to interact with the AI chatbots for education-related inquiries.	.729	0.56
	2. AI chatbots Gives responses, according to my study area.	.810	
	3. I am satisfied with the response time of the AI chatbot in providing educational information	.706	
	4. My interaction with AI chatbots is clear and understandable	.646	
Usefulness	5. Using AI chatbots for self-learning will enhance my academic performance.	.590	0.58
	6. AI chatbots will enhance my overall self-learning experience and outcomes.	.839	
	7. AI chatbots usage enhances my thinking skills.	.622	
	8. Using AI chatbots helps me to complete my projects and assignment more effectively.	.661	
Perceived Risk	9. I am afraid of the Misinformation and disinformation generated by the different AI chatbots that I use.	.759	0.60
	10. I am concerned about AI chatbots collecting or revealing my personal information.	.737	
	11. I am concerned about plagiarism of the content produced by AI chatbots.	.699	
	12. I face technical difficulties when interacting with AI chatbots for self-learning.	.679	
	13. I encounter compatibility issues between the AI chatbot and my devices or operating systems.	.721	
	14. Poor network connectivity often hinders my seamless use of AI chatbots for self-learning.	.837	
	15. The interface of AI chatbots is sometimes challenging for me to understand or navigate.	.578	
Satisfaction and Trust	16. I feel confident in relying on the AI chatbot for academic support.	.618	0.57
	17. I am satisfied with using AI chatbots for my self-guided learning	.509	
	18. I feel comfortable interacting with the AI chatbots.	.692	
	19. The AI chatbot adapted well to my specific learning needs.	.596	
	20. Overall, my experience with the AI chatbot was positive.	.604	
	21. I enjoy using AI chatbots for learning activities.	.636	
	22. I trust AI chatbots for providing accurate and reliable information.	.668	
Behavioural Intention	23. I intend to use AI chatbots more frequently in the future.	.743	0.59
	24. I would recommend using AI chatbots to other learners.	.763	
	25. AI chatbots generally customise my queries to better fit my learning needs.	.791	
	26. I prefer AI chatbots over other learning resources.	.544	
	27. I prefer human interaction over AI chatbots for self-learning as I believe it (human interaction) offers a more personalized and responsive experience.	.803	
	28. I think AI chatbots are compatible with my learning style and preferences.	.571	
	29. AI chatbots allows me to learn at my own pace.	.516	
	30. Using AI chatbots makes self-learning more engaging for me.	.644	

Participants

The population frame comprised of college students from various institutions of higher education, studying varied courses from Jharkhand, India. Five educational institutions delivering different courses were first selected through stratified sampling to ensure representation across disciplines. Within these institutions, data were collected from students who voluntarily agreed to participate, constituting convenience sampling. Out of 500 questionnaires distributed, 380 complete responses were received. A response rate of 76% was achieved, which is considered acceptable for educational survey research (Hair et al., 2010). Among them 228 participants reported using AI chatbots for learning. The main inclusion criterion was that participants must use AI chatbots for self-learning purposes. And after removing outliers, 200 valid responses were retained for final analysis. The AI chatbot acceptance scale was prepared in Google form and distributed in printed form among the participants. Details of the sample are presented in table 2. The study was conducted in accordance with institutional ethical guidelines, and informed consent was obtained from all participants.

Table 2. Demographic details of the subjects. (N=200)

Demographics	Item	Frequency	Percentage
Gender	Male	91	45.5
	Female	109	54.5
Age	Below 20	41	20.5
	20-25 years	107	53.5
	26- 30 years	37	18.5
	31- 35 years	7	3.5
	36 and above	8	4.0
Level of Education	Graduation	68	34.0
	Post-Graduation	73	36.5
	Pursuing Ph.D. / M.Phil.	36	18.0
	Certificate/ Vocational	23	11.5
Learning Style	Visual Learning	80	40.0
	Auditory Learning	13	6.5
	Reading and Writing	77	38.5
	Kinaesthetic Learning	30	15.0
Major Discipline	Social Science	84	42.0
	Humanities	44	22.0
	Pure Science	36	18.0
	Engineering and Medical	36	18.0

Analysis of Data

- ***Acceptance of AI chatbots among college students for their self-learning***

Table 3. Descriptive statistics of college students' acceptance of AI chatbots for self-learning

Variable	N	Mean	SD
Acceptance of AI chatbots	200	108.50	9.5

Total score = 150

The 30 items of the acceptance scale had 5 as the highest score for each item (as per scoring on the 5-point rating scale) thus having a total score of 150, and the mean acceptance score being 105.69, so the resulting acceptance level among the college students towards AI chatbots was {(105.69 / 150) *100} = 72.33% (Table 3).

To facilitate interpretation, acceptance levels were categorized using percentage benchmarks of the maximum possible score (Field, 2018):

- Low acceptance: < 50% of total score (< 75 points)
- Moderate acceptance: 50-70% of total score (75-105 points)
- High acceptance: > 70% of total score (> 105 points)

Thus, the result indicates a relatively high acceptance level towards AI chatbots among the students pursuing higher education. The benchmark approach provides a clear empirical framework for classifying acceptance levels rather than relying on subjective interpretation. Based on this, H1 was accepted, confirming that students demonstrated a high level of acceptance for AI chatbots in their learning activities.

- ***Acceptance of AI chatbots among male and female college students for their self-learning***

Table 4. Gender-wise comparison of acceptance of AI chatbots among college students

	Gender	N	Mean	SD	t-value	Sig.
Acceptance of AI chatbots	Male	91	107.76	9.2	-1.005	0.397
	Female	109	109.12	9.9		

The Mean, SD and t-value was calculated. The acceptance levels of AI chatbots for autonomous learning between male and female participants revealed a calculated t-value of -1.005 and a p-value of 0.397 (Table 4) which is not significant at 0.05 level of significance. These results suggest that male and female students have no statistically significant difference in their acceptance levels towards AI chatbots. Thus, retaining the null hypothesis H2, at least in the context of AI chatbots for learning, gender may not play a significant role in shaping students' attitudes.
The effect size (Cohen's d = 0 .14) indicated a very small practical difference between male and female students, reinforcing that the observed difference in means scores is statistically and practically negligible.

ANOVA testing

To further explore the variations in the acceptance of AI chatbots for autonomous learning among college students across different demographic and academic groups, one-way Analysis of Variance (ANOVA) was employed at 0.05 level of confidence. Prior to the testing, essential assumptions were tested and found to be satisfactory met: the data exhibited approximate normality (verified through skewness and kurtosis values within ±1), homogeneity of variances (confirmed using Levene's test, $p > 0.05$), and independence of observations ensured through the study's sampling design.
Since the same independent variable, i.e. acceptance of AI chatbots for autonomous learning was analysed across all group comparisons using the same data set (N = 200), the total sum of squares (SS = 18,092.000) remained constant in tables 5-8. However, the between-group and within-group variances differed for each ANOVA test, depending on the respective grouping variable. This approach provides a comprehensive understanding of whether students' acceptance levels vary meaningfully across demographic and academic characteristics.

- ***Acceptance of AI chatbots among college students of different age groups***

Table 5. ANOVA results of acceptance of AI chatbots among college students across different age groups

Age groups	Sum of squares	df	Mean square	F	Sig.
Between groups	703.734	4	175.933		
Within groups	17388.266	195	89.171	1.973	.100
Total	18092.000	199			

The acceptance levels of AI chatbots for autonomous learning among college students of different ages resulted in an F-value of 1.973 and a p-value of 0.100 which is greater than 0.05 (table 5). These results supported that AI chatbots are widely accepted among college students, spanning a range of age

groups, and highlight their potential as a widely available tool for improving autonomous learning experiences, thus retaining H3.
The non-significant results may reflect a genuine similarity in acceptance levels across each group. However, unequal group sizes, particularly the smaller number of participants in older age categories, might have limited the ability to detect subtle differences Further studies with more balanced samples are recommended to validate this finding.

- ***Acceptance of AI chatbots among college students with varied learning styles***

Table 6. ANOVA results of acceptance of AI chatbots among college students with varied learning styles

Learning styles	Sum of squares	df	Mean square	F	Sig.
Between groups	174.622	3	58.207		
Within groups	17917.378	196	91.415	.637	.592
Total	18092.000	199			

AI chatbot acceptance levels for autonomous learning among college students with varied learning styles analysed through ANOVA test resulted in an F-value of 0.637 and a p-value of 0.592, which is much greater than 0.05 at 95% level of confidence, thus indicating a statistically not significant difference in acceptance levels based on different learning styles (table 6). Failing to reject H4, this result implies that AI chatbots are generally well-received by college students regardless of their individual learning preferences. Whether a student is a visual, auditory, kinesthetics, or reading/writing learner, their attitude towards using AI chatbots for autonomous learning remains consistent.

- ***Acceptance of AI chatbots among college students for their self-learning purpose based on the different levels of education***

Table 7. ANOVA results of acceptance of AI chatbots among college students across different levels of education

Level of Education	Sum of squares	df	Mean square	F	Sig.
Between groups	118.670	3	39.557		
Within groups	17973.330	196	91.701	.431	.731
Total	18092.000	199			

The acceptance of AI chatbots for self-learning among college students based on the different levels of education they are pursuing yielded an F-value of 0.431 and a p-value of 0.731, which is greater than 0.05, indicating a no significant difference in acceptance levels across different education levels (table 7). This finding implies that students' acceptance of AI chatbots for self-learning is consistent regardless of whether they are undergraduate, graduate, or doctoral students, thus failing to reject H5. The uniformity in acceptance levels across various educational stages underscores the broad appeal and utility of AI chatbots as learning aids.

- ***Acceptance of AI chatbots among college students for their self-learning purpose based on their major discipline***

Table 8. ANOVA results of acceptance of AI chatbots among college students across major disciplines

Study major	Sum of squares	df	Mean square	F	Sig.
Between groups	189.056	4	47.264	.515	.725
Within groups	17902.944	195	91.810		

Total	18092.000	199			

AI chatbot acceptance for autonomous learning among college students, based on their major disciplines, resulted in an F-value of 0.515 and a p-value of 0.725 (table 8). These findings reveal a statistically not significant difference in students' acceptance levels across different academic disciplines, thus failing to reject H6. This suggests that students from various majors whether they are studying pure science, social science, humanities, engineering, medical showed the same levels of acceptance towards using AI chatbots for their learning needs. The consistent acceptance across disciplines highlights the versatility of AI chatbots, demonstrating their potential to support and enhance the educational experience for students regardless of their academic focus. This might reflect a general trend towards increasing technological integration across all major fields of education.

Discussion

With the aim to explore the acceptance of AI chatbots for autonomous learning among college students, our research indicates that students are positive about using the AI chatbots for helping them in their autonomous learning endeavour. In light of current technological developments, there is a tremendous need for AI chatbot to be used and accepted by all user types, in all fields. Within our sample (N = 200), students reported a mean acceptance score of 108.50 out of 150 (72.33%), indicating a relatively high acceptance level towards AI chatbots among college students for their self-directed learning. Aligning with the result, in a policy analysis study investigated by Ioku et al. (2024), revealed that nearly 63% of US universities encourages the usage of AI-tools along with providing direction for its implementation in the classrooms effectively. Inferential analyses showed statistically no significant differences in acceptance based on gender ($t = -1.005$, $p = 0.397$), age ($F = 1.973$, $p = 0.100$), learning styles ($F = 0.637$, $p = 0.592$), academic level ($F = 0.431$, $p = 0.731$), or major disciplines ($F = 0.515$, $p = 0.725$). This indicates a broad and consistent acceptance of AI chatbots within our sample, transcending demographic and educational boundaries. However, subgroup sizes in the age category, particularly in older age groups were unequal, which limits the statistical power and generalizability of these findings.

Similar trends have been reported internationally. For instance, students in Malaysia (Pallivathukal et al., 2024), Japan (Masutani, 2023), and the U. S (Hennessey, 2023)) have shown positive acceptance and adoption of AI tools for educational purposes. Conversely, in a study by Bancoro (2024), it was found that there is a moderate usage of AI among students indicating that respondents appreciate the advantages and benefits of AI technology in different areas of their academic work, yet they do not depend on it extensively. Further, in contrast to the study's results, a research paper by Balabdaoui et al. (2024) reported that acceptance and attitude towards AI vary across academic disciplines as well as gender, though majority of the study's respondents agreed to integrating AI in their learning. These mixed findings highlight that acceptance may be context dependent influenced by institutional practises, technology exposure, and user familiarity. The findings also align with national policy directions. While NEP-2020 encourages AI integration (Mukherjee, 2025), our findings echo student concerns about privacy and bias (Holmes et al., 2019), suggesting that implementation policies must address these barriers.

The uniformity in the findings implies that the perceived utility and accessibility of AI chatbots for autonomous learning are broadly consistent across diverse student demographics and academic context. This could be attributed to the widespread exposure to and familiarity with technology across all student groups in contemporary educational settings. In spite of these, several limitations should be noted. First, the study was restricted to a single state (Jharkhand), limiting external validity, thus calling for need of larger, multi-regional studies to test generalizability. Second, unequal subgroup sizes in the age demographic, reduced the statistical power to detect differences. Third, reliance on self-reported measures may introduce response biases, and the cross-sectional design precludes assessment of long-term acceptance trends. Future research could expand the geographic scope, include longitudinal

designs, and explore other potential moderators, such as digital literacy or prior AI experience, to provide a more nuanced understanding of chatbot acceptance.

Recommendations

Considering the study results and the responses of the participants, some basic yet needful suggestions for enhancing the usefulness of AI in autonomous learning are recommended:

i. Educational institutions should embed AI literacy and ethics modules within foundational courses to familiarise learners with responsible and critical use of AI chatbots for autonomous learning.
ii. Faculty development programme should be organised to train educators on incorporating AI chatbots into teaching and assessment practises, thereby promoting blended and personalised learning experiences.
iii. Institutions should establish clear guidelines and policies addressing data privacy, academic integrity and bias in AI usage, aligned with the principles of NEP 2020.
iv. Periodic surveys and focus group discussions can be conducted among students to evaluate the perceived usefulness, challenges, and learning outcomes associated with AI chatbots, ensuring ongoing improvement of AI based learning environments.
v. Future studies should investigate the longitudinal impact of AI Chatbot use on learner autonomy, motivation, and performance across diverse educational settings to build a stronger empirical foundation for policy and practice.

Conclusion

This study explored the acceptance of AI chatbots for autonomous learning among college students in Jharkhand and found generally high levels of acceptance across demographic and academic groups. While the results suggest that AI chatbots are perceived positively by students, they reflect attitudes rather than measuring learning effectiveness. Hence, conclusions about impact on learning outcomes should be drawn cautiously. The consistent acceptance observed within the sample indicates that AI chatbots hold potential as supportive tools in higher education when integrated thoughtfully. Future research should focus on identifying special features and support systems that can enhance the user experience and educational outcomes associated with AI chatbot usage. Additionally, studies should employ larger and more diverse samples, qualitative approaches to understand the reasons behind acceptance, and experimental or longitudinal designs to assess actual learning outcomes and long-term adoption patterns. Additionally, the study recognises limitations related to potential issues raised by participants such as misinformation, data privacy, and technical reliability, which are evident from the item 9-15 of our scale, highlighting the need for future research to address these practical concerns when integrating AI into learning environments. Such investigations can strengthen the evidence, for effectively and equitably integrating AI chatbots in educational context.

References

Al-Abdullatif, A. M. (2023). Modeling students' perceptions of chatbots in learning: integrating technology acceptance with the value-based adoption model. *Education Sciences*, *13*(11). https://doi.org/10.3390/educsci13111151

Balabdaoui, F., Dittmann-Domenichini, N., Grosse, H., Schlienger, C., & Kortemeyer, G. (2024). A survey on students' use of AI at a technical university. *Discover Education,* *3*(1). https://doi.org/10.1007/s44217-024-00136-4

Dai, Y., Luan, L., & Lin, X. (2023). The effects of online learning readiness on self-regulated learning for the first-time online learning students . *Asian Journal of Distance Education*, *18*(2), 42-62. Retrieved from http://www.asianjde.com/ojs/index.php/AsianJDE/article/view/719

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Dunn, R. S., and Dunn, K. J. (1993). *Teaching secondary students through their individual learning styles: practical approaches for grades 7–12*. New Jersey: Prentice Hall.

Esiyok, E., Gokcearslan, S., & Kucukergin, K. G. (2024). Acceptance of educational use of AI chatbots in the context of self-directed learning with technology and ICT self-efficacy of undergraduate students. *International Journal of Human-Computer Interaction*. https://doi.org/10.1080/10447318.2024.2303557

Fleming, N. D. (1995). I'm different; not dumb. Modes of presentation (VARK) in the tertiary classroom. *Research and Development in Higher Education, Proceedings of the Annual Conference of the Higher Education and Research Development Society of Australasia*, *18*.

George Pallivathukal, R., Kyaw Soe, H. H., Donald, P. M., Samson, R. S., & Hj Ismail, A. R. (2024). ChatGPT for academic purposes: survey among undergraduate healthcare students in Malaysia. *Cureus*, *16*(1), e53032. https://doi.org/10.7759/cureus.53032

Goli, M., Sahu, A., Bag, S., & Dhamija, P. (2023). Users' acceptance of artificial intelligence-based chatbots. *International Journal of Technology and Human Interaction, 19*(1), 1-18. https://doi.org/10.4018/ijthi.318481

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. (2006). *Multivariate data analysis*. Upper Saddle River, Pearson Prentice Hall

Hennessey, M. (2023). Almost half of Cambridge students admit they have used ChatGPT. *Varsity*. https://www.varsity.co.uk/news/25463

Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education: Promises and implications for teaching and Learning. *Centre for Curriculum Redesign*, *14*(4). https://curriculumredesign.org/wp-content/uploads/AIED-Book-Excerpt-CCR.pdf

IBM Corp. (2011). IBM SPSS Statistics for Windows (Version 20.0) [Computer software]. *IBM Corp*

Ioku, T., Kondo, S., & Watanabe, Y. (2024). Acceptance of generative AI in higher education: A latent profile analysis of policy guidelines. *Research Square*. https://doi.org/10.21203/rs.3.rs-4515787/v1

Jaysone Christopher M. Bancoro. (2024). The relationship between artificial intelligence (AI) usage and academic performance of business administration students. *International Journal of Asian Business and Management*, *3*(1). https://doi.org/10.55927/ijabm.v3i1.7876

Jeon, J. H. (2022). Exploring AI-chatbot affordances in the EFL classroom: Young learners' experiences and perspectives. *Computer Assisted Language Learning, 37*(1-2), 1-26. https://doi.org/10.1080/09588221.2021.2021241

Kaya, Ü. Ü. (2024). What if ChatGPT Could...? Navigating the Ethical Frontiers of Generative AI in Academia. *Asian Journal of Distance Education, 19*(2), 145-156. https://doi.org/10.5281/zenodo.12656373

Kingchang, T. (2024). Artificial intelligence chatbot platform: AI-chatbot platform for educational recommendations in higher education. *International Journal of Information and Education Technology, 14*(1), 34-41. https://doi.org/10.18178/ijiet.2024.14.1.2021

Lee, C., Yeung, A. S., & Ip, T. (2017). University English language learners' readiness to use computer technology for self-directed learning. *System*, *67*. https://doi.org/10.1016/j.system.2017.05.001

Mai, V., Neef, C., & Richert, A. (2022). "Clicking vs. writing"- The impact of a chatbot's interaction method on the working alliance in AI-based coaching. *Coaching Theor. Prax. 8*(1), 15-31. https://doi.org/10.1365/s40896-021-00063-3

Masutani, F. (2023). Survey: 32.4% of college students in Japan say they use ChatGPT. *Asashi Shimbun*. https://www.asahi.com/ajw/articles/14927968

McGrath, C. (2024). AI chatbots in higher education. A state-of-the-art review of an emerging research area. https://doi.org/10.21203/rs.3.rs-3893749/v1

Mondal, S., & Das, M. K. (2025). Tech-infused learning: Exploring the relation between technology adoption and knowledge acquisition in self-paced online learning among higher education learners. *MIER Journal of Educational Studies Trends and Practices*, *15*(1), 177–192. https://doi.org/10.52634/mier/2025/v15/i1/2862

Mukherjee, A., & Bhuyan, S. (2023). awareness and attitude of teacher-educators towards blended learning- in the light of NEP: 2020. *Journal of Social Work & Social Development, 14* (3), 13-32. https://scholar.google.com/scholar?oi=bibs&cluster=5209635716052341615&btnI=1&hl=en&authuser=2

Mukherjee, A. (2025). AI in Indian education: a critical analysis of NEP 2020 recommendations. *NEP 2020 various recommendations.* Indu book services pvt. ltd., New Delhi. https://www.researchgate.net/publication/390268087_Integrating_AI_in_Indian_Education_A_Critical_Analysis_of_NEP_2020_Recommendations

Mukherjee, A. & Chatterjee, M. B. (2025). Critical thinking in the age of AI: A survey of generative AI usage among college learners. *Ritvi. 2*(1). 14-24. Retrieved from: https://kalnacollege.ac.in/public/kalna-e-journal/view_text?p=MTY=

Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial. *Heliyon*, *7*(5). https://doi.org/10.1016/j.heliyon.2021.e07014

Neo, M. (2022). The Merlin project: Malaysian students' acceptance of an AI chatbot in their learning process. *Turkish Online Journal of Distance Education, 23(*3), 31-48. https://doi.org/10.17718/tojde.1137122

Pan, X. (2020). Technology acceptance, technological self-efficacy, and attitude toward technology-based self-directed learning: learning motivation as a mediator. *Frontiers in Psychology,* 11. https://doi.org/10.3389/fpsyg.2020.564294

Riel, J. (2021). Essential features and critical issues with educational chatbots. *Handbook of Research on Modern Educational Technologies, Applications, and Management*, 246-262. https://doi.org/10.4018/978-1-7998-3476-2.ch015

Rosita, T. and Fatmasari, R. (2023). Acceptance of distance learning technology in technology-based learning management. *Al-Tanzim Jurnal Manajemen Pendidikan Islam*, 7(4), 1191-1201. https://doi.org/10.33650/al-tanzim.v7i4.5945

Sandu, N., & Gide, E. (2019). Adoption of AI chatbots to enhance student learning experience in higher education in India. *18th International Conference on Information Technology Based Higher Education and Training, ITHET 2019*. https://doi.org/10.1109/ITHET46829.2019.8937382

Scheel, L., Vladova, G., & Ullrich, A. (2022). The influence of digital competences, self-organization, and independent learning abilities on students' acceptance of digital learning. *International Journal of Educational Technology in Higher Education, 19*(1). https://doi.org/10.1186/s41239-022-00350-w

Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American Journal of Applied Mathematics and Statistics, 9*(1). https://doi.org/10.12691/ajams-9-1-2

Singh, I. and Paudel, B. (2020). Readiness for self-directed learning among nursing students in a medical college, Chitwan. *Journal of Chitwan Medical college, 10*(1), 27-30. https://doi.org/10.3126/jcmc.v10i1.28066

William, F. K. A., & Misheal, M. R. (2024). Exploring graduate students' perception and adoption of AI chatbots in Zimbabwe: Balancing pedagogical innovation and development of higher-order cognitive skills. *Journal of Applied Learning and Teaching*, *7*(1). https://doi.org/10.37074/jalt.2024.7.1.12

Wu, R. and Yu, Z. (2023). Do AI chatbots improve students learning outcomes? Evidence from a meta-analysis. *British Journal of Educational Technology, 55*(1), 10-33. https://doi.org/10.1111/bjet.13334

Xia, Q., Chiu, T., Chai, C., & Xie, K. (2023). The mediating effects of needs satisfaction on the relationships between prior knowledge and self-regulated learning through artificial intelligence chatbot. *British Journal of Educational Technology, 54*(4), 967-986. https://doi.org/10.1111/bjet.13305

About the Authors:

- Antara Mukherjee, Central University of Jharkhand, India; antaramukherjee02@gmail.com; 0009-0002-2401-8064
- Shashi Singh, Central University of Jharkhand, India; shashi.singh@cuj.ac.in; 0000-0001-8706-8590

Author's Contributions

All authors have read and agreed to the published version of the manuscript. Both the authors have equally contributed to the conceptualization till the writing and editing the research study.

Sustainable Development Goals

This study is linked to the following SDG(s):

1. **SDG 4: Quality Education-** as the study highlights how AI chatbots support autonomous, individualized, and self-paced learning. It also reflects Education 4.0, preparing learners with future-ready skills.
2. **SDG 9: Industry, Innovation and Infrastructure-** as investigating AI chatbots in education contributes to digital innovation and infrastructure for learning. It bridges the gap between traditional education and tech-driven innovation.
3. **SDG 10: Reduced Inequalities-** the study findings show no significant differences in chatbot acceptance across gender, age, education level, or discipline. This supports equitable access to digital learning tools, reducing disparities in education.

Data Accessibility Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics and Consent

No formal ethical approval was required for this study as it did not involve any intervention or collection of sensitive personal data. However, due permissions were obtained from the concerned educational institutions prior to data collection. Participation was entirely voluntary and informed consent was secured from all participants. Confidentiality and anonymity of responses were maintained throughout the research process in accordance with institutional ethical standards.

Conflict of Interest

The authors declare no conflict of interest associated with this study, and there has been no significant financial support that could have influenced its outcome.

Article History

Received: August 21, 2025 – Accepted: October 17, 2025.

Suggested citation:
Mukherjee, A., & Singh, S. (**2025**). Acceptance of AI Chatbots Among College Students- Implications for Autonomous Learning in the Digital Age. *Asian Journal of Distance Education, 20*(2), 76-90. https://doi.org/10.5281/zenodo.17373183