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Generative AI in Indian Higher Education: Students' Familiarity, Willingness, and Concerns

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Abstract: *This study explores university students' perceptions, willingness, and concerns regarding the use of Generative Artificial Intelligence (GenAI) technologies such as ChatGPTin higher education across India. A survey design involving 1,197 undergraduate and postgraduate students from diverse disciplines was employed to assess their familiarity, attitudes, and expectations toward GenAI. Findings reveal that most students possess a strong understanding of GenAI's capabilities and limitations, recognizing its potential to enhance personalized learning, research efficiency, and writing support. Students appreciated GenAI's accessibility, time-saving features, and ability to provide 24/7 assistance, aligning with previous studies (Atalas, 2023; Berg, 2023). However, notable concerns emerged regarding the reliability, transparency, privacy, and ethical implications of AI use, echoing issues raised by Peres et al. (2023). Participants also expressed apprehension about over-reliance, diminished creativity, reduced social interaction, and future job insecurity (Ghotbi et al., 2022). Overall, the findings highlight the need for responsible GenAI integration in education through enhanced AI literacy, ethical guidelines, and adaptive pedagogical strategies (Biggs, 2011). By addressing students' diverse perspectives, institutions can leverage GenAI to improve teaching, learning, and preparation for an AI-driven future*

Keywords: Generative Artificial Intelligence (GenAI), Student Perceptions, Higher Education, ChatGPT, AI Literacy, India

I. INTRODUCTION

Generative Artificial Intelligence (GenAI) refers to a set of machine learning models that create new data resembling existing datasets. GenAI systems learn data patterns and can generate new forms of text, images, music, videos, and even computer code. Well-known GenAI tools include ChatGPT, Bard, Stable Diffusion, and DALL·E, which have broad applications in healthcare, education, media, and tourism.

ChatGPT, introduced by OpenAI in November 2022, is an advanced conversational AI based on a large language model with over 175 billion parameters (Hu, 2023). Trained on diverse text sources like books and articles, it can understand prompts and generate coherent, human-like responses. Its ability to simulate natural communication has sparked significant research into its potential for transforming practices in medical writing (Biswas, 2023), surgical procedures (Bhattacharya et al., 2023), and higher education teaching and teach(Adiguzel et al., 2023).

Benefits and Challenges of Using Generative AI in Higher Education:

Generative Artificial Intelligence (GenAI) offers significant benefits for higher education but also presents ethical and academic challenges. One major advantage is its ability to enhance student learning through personalized and creative engagement. Text-based AI tools like ChatGPT can assist student's especially non-native speakers with brainstorming, improving writing, and receiving real-time feedback (Atlas, 2023). Similarly, image-generating tools such as DALL·E and Stable Diffusion help in teaching artistic and technical concepts (Dehouche&Dehouche, 2023). GenAI can also assist researchers by synthesizing large volumes of information, generating ideas, and summarizing data to speed up

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writing and publication processes (Berg, 2023). Studies such as Mizumoto and Eguchi (2023) confirm that ChatGPT can improve grading consistency, reduce marking time, and deliver immediate feedback showing its potential to transform teaching and learning outcomes in higher education.

However, several challenges accompany GenAI use. Ethical concerns include plagiarism, misinformation, and the erosion of academic integrity. Kumar (2023) found that AI-generated responses, though original, often lacked authentic perspectives and included inaccurate references. Moreover, GenAI outputs can reflect biases or harmful content from training data and AI-generated images might be misused to create deepfakes (Maerten&Soydaner, 2023). AI cannot verify truthfulness or detect misinformation, underscoring the need for human oversight. Since AI-written texts often bypass plagiarism detectors, they pose risks to fair assessment and academic honesty (Peres et al., 2023).

Thus, this study seeks to address the following research questions:

To what extent are university students familiar with Generative AI (GenAI) technologies, such as ChatGPT?

What benefits and challenges do university students perceive in the use of GenAI for teaching and learning?

In what ways can GenAI be effectively integrated into higher education to improve teaching practices and learning outcomes?

Students' Perceptions of the Use of Generative AI in Higher Education:

User acceptance plays a crucial role in the successful adoption of new technologies (Davis, 1989). According to John Biggs' 3P (Presage–Process–Product) model, students' perceptions of their learning environment, abilities, and teaching strategies strongly influence how they learn and what outcomes they achieve (Biggs, 2011). When students view their learning environment positively such as the curriculum, assessment methods, and support services they are more likely to engage in deep learning, seeking understanding and connections between ideas. Conversely, negative perceptions or low confidence can lead to surface learning, focused on memorization and minimum achievement (Biggs, 2011).

In the context of Generative AI (GenAI), students' attitudes, concerns, and experiences with tools like ChatGPT affect their willingness to use them and their integration into learning. However, while many studies explore student perceptions of AI and chatbots in general, research specifically addressing GenAI tools and the factors shaping student perceptions such as gender, discipline, age, and study level remains limited.

Research on students' attitudes and experiences with AI in education reveals generally positive perceptions alongside notable concerns. In language learning, AI tools such as chatbots and Plot Generator have been found useful for improving grammar, generating ideas, and supporting communication in the target language (Bailey et al., 2021). Similarly, AI chatbots improved students' achievement, motivation, self-efficacy, and learning attitude (Lee et al., 2022). In business education, chatbots enhanced students' learning through responsiveness, interactivity, and privacy (Chen et al., 2023).

Many students recognized AI's growing influence in their disciplines and careers and supported its inclusion in university curricula (Bisdas et al., 2021). Those familiar with AI reported less anxiety, though others expressed conflicting views, acknowledging both personal benefits and threats to employment (Jeffrey, 2020). Concerns also included reduced human interaction (Bisdas et al., 2021), data privacy risks (Bisdas et al., 2021), lack of emotional connection (Chen et al., 2023), ethical issues (Jha et al., 2022), and job insecurity due to automation (Ghotbi et al., 2022; Park et al., 2020).

YildizDurak's (2023) study found no significant correlation between the frequency of chatbot use and factors such as visual design self-efficacy, course satisfaction, chatbot satisfaction, or learner autonomy. This suggests that how often students use chatbots does not necessarily influence their learning outcomes; rather, user satisfaction plays a more important role in shaping self-efficacy. In contrast, Bailey et al. (2021) reported that in a second language writing class, increased time spent using chatbots was linked to greater confidence in using the target language and a stronger perception of task value, highlighting that meaningful engagement rather than mere frequency enhances learning benefits.

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Research Approaches to Studying Student Perceptions of AI and GenAI:

Most studies examining students' perceptions of AI and GenAI use a quantitative survey design to collect data from large groups of participants (Bisdas et al., 2021). Some researchers have also added open-ended questions (Jeffrey, 2020) or conducted semi-structured interviews (Park et al., 2020) to gain deeper insights into students' experiences and opinions. While qualitative approaches allow for richer exploration of individual perspectives, they usually involve smaller samples. In contrast, survey-based studies are more effective for reaching diverse and geographically dispersed participants, as demonstrated in earlier research (Bisdas et al., 2021). Despite growing interest in AI, research specifically exploring students' perceptions of GenAI remains limited. Therefore, further investigation is needed to understand students' attitudes and experiences with GenAI and how it can be meaningfully integrated into higher education.

Methodology:

This study used a survey design to examine university students' use and perceptions of Generative AI (GenAI) in teaching and learning across India. A questionnaire containing both closed-ended and open-ended questions was distributed to gather diverse responses. The survey explored students' knowledge of GenAI tools such as ChatGPT, their views on AI integration in higher education, related challenges, and the impact of AI on learning. Using a convenience sampling method, 1197 undergraduate and postgraduate students from various disciplines participated voluntarily after providing informed consent. The data were analyzed using descriptive statistics for quantitative responses and thematic analysis for qualitative feedback.

Results:

Demographic information:

Participants in this study were from differentuniversities across India, comprising 633 males (52.9%) and 564 females (47.1%). There were (46.9%, n = 561) undergraduate students and (53.1%, n = 636) postgraduate students. Additionally, 83.5% participants have reported using GenAI technologies at least once. Specifically, 26.0% reported rarely using it, 35.0% using it sometimes, 14.0% often using it, and 8.5% reported always using it.

KnowledgeofGenerativeAITechnologies:

Mean values and Standard Deviation of understanding about different aspects of Knowledge of Generative AI Technologies are given in Table 1.

Table 1 Knowledge of Generative AI Technologies

I understand generative AI technologies like ChatGPT ……..	**Mean**	**SD**
…have limitations in handling complex tasks.	4.23	0.83
…can produce factually inaccurate information.	4.10	0.87
…may generate inappropriate responses.	4.03	0.89
…can reflect biases or unfairness in their responses.	3.93	0.92
…lack emotional intelligence, sometimes resulting in insensitive output.	3.81	0.97

As presented in Table 1, the mean values indicate that participants possess a strong understanding of the limitations and challenges associated with generative AI technologies like ChatGPT. The highest mean score was observed for the statement "have limitations in handling complex tasks" (Mean = 4.23, SD = 0.83), suggesting that most participants are aware that GenAI tools may struggle with nuanced or multifaceted problems. This was followed by high agreement with the statements that GenAI "can produce factually inaccurate information" (Mean = 4.10, SD = 0.87) and "may generate inappropriate responses" (Mean = 4.03, SD = 0.89), indicating recognition of the potential reliability and contextual issues in AI-generated output.

Slightly lower mean values were recorded for statements regarding bias or unfairness (Mean = 3.93, SD = 0.92) and lack of emotional intelligence (Mean = 3.81, SD = 0.97), implying that while participants are generally aware of these ethical and affective limitations, they may not fully comprehend their broader implications. The relatively low standard deviations across all items reflect consistency in participants' understanding, confirming a well-informed awareness of both the capabilities and constraints of generative AI technologies.

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WillingnesstouseGenerativeAITechnologies:

Mean values and Standard Deviation of willingness to use Generative AI Technologies are given in Table 2.

Table 2 Willingness to use Generative AI Technologies

I understand generative AI technologies like ChatGPT…….	**Mean**	**SD**
… can help me save time in my academic tasks.	4.37	0.82
…are great tools because they are available 24/7.	4.22	0.83
… are important for students to learn for their future careers.	4.15	0.92
...can be integrated into my teaching practices in the future.	4.05	0.96
… serve as valuable tools for students.	3.87	0.92
… can provide unique insights and perspectives.	3.79	0.98
… can help improve my digital competence.	3.75	0.94

As shown in Table 2, the mean values indicate a generally positive willingness among participants to use generative AI technologies like ChatGPT in academic and professional contexts. The highest mean score was recorded for the statement "can help me save time in my academic tasks" (Mean = 4.37, SD = 0.82), suggesting that most participants recognize the efficiency and time-saving potential of GenAI tools. This was followed by the belief that these technologies "are great tools because they are available 24/7" (Mean = 4.22, SD = 0.83), highlighting their accessibility and convenience. Similarly, participants agreed that learning to use GenAI is important for future career development (Mean = 4.15, SD = 0.92) and that such tools can be integrated into teaching practices (Mean = 4.05, SD = 0.96).

However, relatively lower mean scores were observed for statements related to digital competence improvement (Mean = 3.75, SD = 0.94) and unique insights (Mean = 3.79, SD = 0.98), suggesting that participants were slightly less confident about GenAI's potential to enhance cognitive or skill-based outcomes. Overall, the low standard deviations across all items indicate consistency in participants' positive perceptions and a strong general acceptance of GenAI technologies in educational contexts.

Concerns about Generative AI Technologies

Mean values and Standard Deviation of concerns about Generative AI Technologies are given in Table 3.

Table 3 Concerns about Generative AI Technologies

I understand generative AI technologies like ChatGPT…….	**Mean**	**SD**
… can undermine the value of university education.	4.15	1.07
… may limit opportunities to interact and socialize with others.	3.96	1.10
… may hinder the development of skills like problem-solving.	3.70	1.03
… may lead to over-reliance if used excessively.	3.55	1.33

The data in Table 3 reveal that respondents generally hold moderate to high levels of concern regarding the potential negative effects of generative AI technologies such as ChatGPT. The highest mean score (M = 4.15, SD = 1.07) indicates that many participants strongly agree that generative AI could undermine the value of university education, suggesting apprehension about its impact on learning authenticity and academic integrity. Concerns about reduced social interaction also scored relatively high (M = 3.96, SD = 1.10), implying that users perceive AI as potentially limiting human engagement. Similarly, the belief that AI use may hinder the development of problem-solving skills shows a moderate concern (M = 3.70, SD = 1.03). The lowest mean (M = 3.55, SD = 1.33) relates to over-reliance on AI, though the higher standard deviation suggests varied opinions on this issue. Overall, the results suggest that while users acknowledge the usefulness of generative AI, they are cautious about its possible consequences on education quality, interpersonal skills, and dependency levels.

Reasons behind Students' Willingness to Utilise Generative AI Technologies:

Students demonstrate a strong willingness to use generative AI (GenAI) technologies due to their perceived value in enhancing learning, writing, research, and creative work. GenAI serves as a personalized, on-demand learning companion, offering instant feedback, tailored explanations, and adaptive recommendations that foster motivation and

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independent study. It also alleviates teachers' workloads by automating feedback and lesson preparation. In academic writing, students appreciate GenAI's ability to generate ideas, refine structure, and provide technical assistance with grammar, citations, and paraphrasing, making it especially helpful for non-native speakers. As a brainstorming tool, it stimulates creativity and streamlines the writing process. In research contexts, GenAI supports literature review, data interpretation, and hypothesis generation, allowing students to engage more deeply with their subjects while saving time on repetitive tasks. Its analytical capabilities help them remain current with emerging trends and synthesize complex information effectively. Beyond text-based tasks, GenAI also enriches creative and multimedia endeavors by generating visuals, audio, and video materials. Tools like DALL·E and Stable Diffusion enable students to visualize abstract ideas and produce engaging content efficiently. Overall, students view GenAI as a transformative educational aid that enhances productivity, creativity, and self-directed learning across multiple domains.

Reasons behind Students' Concerns Regarding Generative AI Technologies:

Students' perceptions of generative AI (GenAI) reflect a mix of optimism and apprehension. While many acknowledge AI as a natural step in technological progress and a tool to enhance human efficiency, significant concerns persist regarding its reliability, ethics, and broader social implications. A major issue relates to accuracy and transparency, as students question the trustworthiness of AI-generated content and express discomfort with its "black box" nature, which obscures how outputs are produced. The risk of misinformation and the inability to verify AI responses undermine users' confidence. Privacy and ethics are equally pressing worries; students fear data misuse and blurred boundaries between authentic and AI-generated work, raising plagiarism and academic integrity concerns. Additionally, they worry about intellectual dependency, believing excessive reliance on AI could hinder creativity, critical thinking, and independent decision-making skills crucial for lifelong learning. Career implications also generate unease, with many fearing that AI's growing capabilities could automate key professional roles, increase job competition, and reshape employability standards. Finally, students emphasize the need to preserve human values, expressing anxiety that AI may deepen inequality, weaken interpersonal relationships, and reduce respect within educational settings. Collectively, these concerns highlight students' desire for responsible AI integration that ensures transparency, ethical accountability, and the preservation of human agency in an increasingly automated world.

Discussion:

The study of students' perceptions of Generative AI (GenAI) technologies, such as ChatGPT, in higher education presents a multifaceted understanding of both enthusiasm and concern. Findings indicate that students possess a general familiarity with GenAI, which is positively correlated with their knowledge and frequency of use. This familiarity enhances their acceptance and informed use of AI tools. Overall, participants demonstrated an awareness of both the capabilities and limitations of GenAI, recognizing its potential benefits for personalized learning, research, and professional development while remaining mindful of associated risks.

Students viewed GenAI as a valuable tool for delivering individualized learning support, providing tailored resources, and facilitating 24/7 assistance. They also valued its role in writing and brainstorming, seeking more advanced feedback beyond grammar correction echoing findings by Atalas (2023). In research and analysis, students anticipated GenAI's ability to streamline literature reviews, generate hypotheses, and consolidate data insights, aligning with Berg's (2023) observations on AI's potential to enhance academic efficiency. These findings underscore GenAI's transformative role in supporting adaptive, self-directed learning and improving educational outcomes.

Despite these benefits, students also identified several challenges. Concerns centered on issues of reliability, transparency, and ethical integrity. Participants expressed unease about misinformation and plagiarism, consistent with Peres et al. (2023), emphasizing the need for human oversight. Further concerns included AI's potential to reduce creativity, critical thinking, and job opportunities (Ghotbi et al., 2022; Park et al., 2020), as well as its misalignment with human values (Jha et al., 2022).

Understanding these perceptions is crucial for educators and policymakers seeking to integrate GenAI responsibly. By addressing ethical, pedagogical, and developmental concerns, institutions can harness GenAI's potential to enhance teaching, learning, and innovation while safeguarding academic integrity and human-centered values.

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II. CONCLUSION

This study examined students' perceptions of Generative AI (GenAI) technologies in higher education. As Biggs (2011) emphasizes students' perceptions of their learning environment influence whether they adopt deep or surface learning approaches. Understanding these perceptions is therefore crucial for effectively integrating GenAI into education. By acknowledging students' enthusiasm and concerns, educators and policymakers can design AI applications that enhance, rather than replace, traditional learning. Insights into students' willingness, reservations, and AI literacy can guide targeted interventions that promote responsible and ethical AI use. Strengthening AI literacy will prepare students for future, technology-driven careers, while well-informed policies can ensure that GenAI supports meaningful, reflective, and equitable learning experiences.

Implications:

The varied perspectives of students suggest key implications for integrating GenAI into higher education. Institutions should provide training and workshops to enhance students' understanding of GenAI and its ethical dimensions, enabling informed use. Development efforts must prioritize transparency, accuracy, and privacy through explainable AI models and strong data protection. Additionally, universities should adapt policies and curricula to emphasize critical thinking, creativity, digital literacy, and AI ethics. By addressing concerns and fostering responsible engagement, higher education can leverage GenAI to improve learning outcomes and prepare students for an AI-driven future (Biggs, 2011).

Limitations and Future Research

This study's small sample size limits generalizability, and reliance on self-reported data may introduce bias due to social desirability or recall errors. Its cross-sectional design also prevents analysis of changing perceptions over time, and it did not directly assess GenAI's impact on learning outcomes. Future research should use larger, more diverse, and longitudinal samples to track evolving attitudes, examine discipline-specific differences, and assess learning effects. Further studies should explore AI literacy across demographics to ensure responsible, ethical, and effective GenAI integration in higher education (Biggs; 2011).

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