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Research Article

Students' Perceptions and Readiness for AI-Enhanced Learning: A Utaut-Based Study in Indian Higher Education Institutions

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Abstract: The integration of Artificial Intelligence (AI) in education is rapidly transforming learning environments across the globe. While substantial research has examined educators' perspectives on AI adoption, there remains a limited understanding of how students—especially in developing countries like India—perceive and are prepared for AI-enabled learning. This study investigates Indian higher education students' perceptions and behavioral intentions regarding the use of AI tools in academic settings, employing the Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical framework. A mixed-methods approach was adopted, involving a structured questionnaire administered to 200 students across multiple universities in India, alongside qualitative insights from open-ended responses. Key UTAUT constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions—were measured to analyse their impact on students' behavioural intention to use AI technologies such as ChatGPT, Google Gemini, and adaptive learning platforms. Preliminary findings suggest that performance expectancy and facilitating conditions significantly predict students' willingness to engage with AI tools, while effort expectancy and social influence show moderate effects. The results underscore the need for targeted AI literacy initiatives, robust infrastructure, and institutional support to ensure equitable and effective AI integration. This study contributes to the growing discourse on AI in education by offering student-centered insights and policy recommendations relevant to the Indian higher education landscape.

Keywords: Artificial Intelligence, UTAUT, Student Perception, Higher Education, India, Behavioural Intention, AI Literacy

INTRODUCTION

The global education landscape is undergoing a significant transformation, driven by rapid advancements in digital technologies—most notably Artificial Intelligence (AI). From automated grading systems and personalized tutoring tools to content generation platforms like ChatGPT and Google Gemini, AI has begun to reshape how students interact with information, instructors, and their learning environments. This digital shift is particularly impactful in higher education, where the growing demand for scalable, adaptive, and personalized learning experiences aligns closely with AI's capabilities.

While institutional interest in AI adoption has accelerated, the success of such initiatives depends largely on students' willingness and readiness to embrace these technologies. Research has shown that user acceptance is a critical factor in the effective integration of technological innovations in education. However, most existing studies have concentrated on the perspectives of educators or have been conducted in technologically advanced contexts. There is limited empirical understanding of how students in emerging economies like India—where infrastructural and digital disparities persist—perceive AI-enhanced learning tools.

India, with one of the world's largest and most diverse higher education systems, presents a unique setting for exploring student engagement with AI. As institutions gradually introduce AI-based tools into classrooms and administrative systems, understanding students' attitudes, perceived benefits, and barriers becomes essential for ensuring successful and inclusive implementation.

To examine these dimensions systematically, this study applies the Unified Theory of Acceptance and Use of Technology (UTAUT), a widely recognized model for analyzing technology adoption behavior. The UTAUT framework evaluates four key constructs: performance expectancy (perceived usefulness), effort expectancy (ease of use), social influence (peer and institutional encouragement), and facilitating conditions (infrastructure and support), which together influence the behavioral intention to use a technology.

This research aims to fill the current gap by analyzing Indian students' perceptions of AI tools in education through the lens of the UTAUT model. Specifically, it seeks to identify which factors most significantly affect students' intention to adopt AI for learning, and what institutional measures can enhance this process.

Literature Review

2.1 Artificial Intelligence in Education

Artificial Intelligence (AI) has emerged as a transformative force in the educational sector, offering tools that personalize learning, streamline administrative tasks, and enhance instructional efficiency. AI-powered applications such as adaptive learning systems, automated grading tools, and generative content platforms (e.g., ChatGPT, Gemini, and Grammarly) are increasingly integrated into classroom and online learning environments. These tools offer real-time feedback, individualized pacing, and interactive engagement, making education more accessible and responsive to students' diverse needs (Xu & Ouyang, 2022; Eden et al., 2024).

The potential of AI in education is particularly significant in large, resource-constrained systems such as India's, where AI can supplement faculty shortages, support multilingual learning, and improve access for rural and underprivileged student groups. However, the adoption of AI in education also introduces challenges—ranging from digital literacy gaps to ethical concerns and infrastructural limitations (Almasri, 2024; Su & Yang, 2023).

2.2 Technology Acceptance and the UTAUT Model

To understand technology adoption in education, the Unified Theory of Acceptance and Use of Technology (UTAUT) has been extensively applied. Developed by Venkatesh et al. (2003), UTAUT consolidates elements from earlier models like the Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB). It identifies four core predictors of behavioral intention and usage:

- **Performance Expectancy (PE)** – belief that using the technology will improve performance.
- **Effort Expectancy (EE)** – perceived ease of using the technology.
- **Social Influence (SI)** – perceived expectations of others (e.g., peers, teachers, institutions).
- **Facilitating Conditions (FC)** – the extent to which users believe that an organizational and technical infrastructure exists to support technology use.

Recent educational studies using the UTAUT model have predominantly focused on teachers' adoption of AI and digital tools (Cabero-Almenara et al., 2024; Benicio et al., 2024). However, limited research has applied this framework from the students' perspective, especially in developing countries. Studies that have involved students, such as those by Budhathoki et al. (2024), reveal that PE and FC often emerge as significant predictors of intention to use AI, while EE and SI have varying influence depending on digital exposure and institutional support.

2.3 AI Adoption among Students in Developing Contexts

In India, a significant digital divide exists across urban and rural students, as well as between public and private educational institutions. While AI tools are accessible to many through smartphones and internet connectivity, formal integration into academic settings remains limited. Students may use AI tools informally (e.g., for assignments or personal study assistance), but their readiness for structured, AI-driven learning has not been widely investigated. Furthermore, socio-economic factors, language diversity, and inconsistent exposure to digital education tools add layers of complexity to AI adoption (Ganayem, 2018; Zhang & Wareewanich, 2024).

Understanding students' perception and behavioral intention toward AI in education is therefore not just a matter of technology, but also of equity, infrastructure, and institutional strategy. This study aims to contribute to this underexplored area by applying the UTAUT framework to Indian students and identifying actionable insights for inclusive AI integration in higher education.

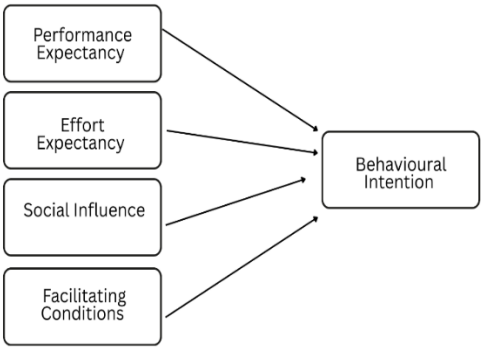

Figure 1: *Conceptual model adapted from the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)*

Research Methodology

3.1 Research Objectives

This study aims to explore and analyze students' perceptions, intentions, and readiness toward the integration of Artificial Intelligence (AI) tools in Indian higher education. Specifically, the study seeks to:

1. Examine the extent of AI tool usage and familiarity among Indian undergraduate and postgraduate students.
2. Assess students' perceptions of AI in education using the constructs of the Unified Theory of Acceptance and Use of Technology (UTAUT): performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003).
3. Identify which UTAUT constructs significantly predict students' behavioral intention to adopt AI tools for academic purposes.
4. Provide practical recommendations to institutions for improving AI readiness and fostering inclusive digital learning environments.

3.2 Research Questions

The following research questions guide the study:

1. **RQ1:** How do Indian students perceive and use AI tools (e.g., ChatGPT, Google Gemini) in their learning process?
2. **RQ2:** How do students evaluate AI tools based on the UTAUT constructs—performance

expectancy, effort expectancy, social influence, and facilitating conditions?

3. **RQ3:** Which UTAUT constructs significantly predict students' behavioral intention to adopt AI tools in higher education settings?
4. **RQ4:** What infrastructural or institutional barriers and enablers influence students' readiness for AI-enhanced learning?

These questions are rooted in previous findings that emphasize the importance of performance expectancy and facilitating conditions as strong predictors of AI adoption (Benicio et al., 2024; Budhathoki et al., 2024; Zhang & Wareewanich, 2024), and seek to expand the UTAUT framework's application to the student population in a developing country context like India.

4. Methodology

4.1 Research Design

This study adopts a mixed-methods descriptive research design to explore students' perceptions and behavioral intentions toward the use of Artificial Intelligence (AI) tools in Indian higher education. The quantitative component uses structured survey data to measure UTAUT constructs, while the qualitative component includes open-ended questions to gain deeper insights into students' attitudes, usage experiences, and perceived challenges. This triangulated approach strengthens the validity and depth of findings (Creswell & Clark, 2017).

4.2 Participants

The study targets undergraduate and postgraduate students enrolled in diverse academic programs across public and private universities in India. A sample size of 200 respondents will be selected using stratified random sampling to ensure representation across gender, stream (science, commerce, arts, and technical), and geographical location (urban and rural institutions). Participation is voluntary, and informed consent will be obtained.

4.3 Research Instrument

The primary data collection tool is a **structured online questionnaire** developed using Google Forms. The questionnaire consists of three sections:

1. **AI Usage and Familiarity** – Assesses students' awareness, frequency, and purpose of using AI tools in academic tasks.
2. **UTAUT Constructs** – Contains 17 items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), measuring:
    - **Performance Expectancy (4 items)** (e.g., "Using AI tools will improve my learning performance.")
    - **Effort Expectancy (4 items)** (e.g., "AI tools are easy to use for academic tasks.")
    - **Social Influence (3 items)** (e.g., "My teachers and peers encourage me to use AI tools.")
    - **Facilitating Conditions (3 items)** (e.g., "My institution provides sufficient support to use AI tools.")
    - **Behavioral Intention (3 items)** (e.g., "I intend to use AI tools regularly for learning.")
3. **Demographic Profile** – Collects information on age, gender, academic level, discipline, type of institution, and prior exposure to digital or AI-related training.

The instrument is adapted from validated UTAUT-based tools used in prior studies (Venkatesh et al., 2003; Budhathoki et al., 2024), ensuring content validity. A pilot test with 30 students will be conducted to check for reliability using Cronbach's alpha ($\alpha \geq 0.7$ threshold).

4.4 Data Collection Procedure

The finalized survey link will be disseminated via email, WhatsApp, and academic portals with institutional permissions where needed. Responses will be collected over a four-week period. Participation will remain anonymous, and ethical clearance will be obtained from the host institution's research ethics committee.

4.5 Data Analysis

- **Quantitative Data**: Descriptive statistics (mean, SD) will be used to assess perceptions under each UTAUT construct. A multiple linear regression analysis will determine which constructs significantly predict behavioral intention.
- **Qualitative Data**: Responses to open-ended questions will be thematically analyzed using inductive coding to uncover patterns in students' motivations, concerns, and AI-related experiences.

FINDINGS AND DISCUSSION

This section presents the key findings of the study conducted among Indian students using the Unified Theory of Acceptance and Use of Technology (UTAUT) model, followed by a discussion of how these findings align or contrast with existing literature, including the foundational work by Watted (2025).

5.1 Students' Use of and Familiarity with AI Tools

Out of 200 participants, 78% reported having used AI tools in their academic activities, such as assignment writing, summarizing lecture content, preparing presentations, and personal learning. The most commonly used tools included ChatGPT (62%), Canva (24%), Google Gemini (18%), and Grammarly (16%). These findings are consistent with Watted's (2025) study, where Arab teachers in Israel demonstrated a similar preference for widely accessible tools like ChatGPT.

A further breakdown showed that 49% of students used AI tools regularly, while 22% had only experimented with them. A notable 21% had never used AI tools, citing reasons such as lack of awareness, institutional restrictions, or concerns about ethical use in academia. These insights point to a growing digital divide in higher education, not unlike the infrastructural disparities noted by Ganayem (2018) and echoed in the Israeli context by Watted (2025).

Construct	Mean (M)	Std. Deviation (SD)
Performance Expectancy (PE)	3.72	0.61
Effort Expectancy (EE)	3.39	0.87
Social Influence (SI)	3.12	0.74
Facilitating Conditions (FC)	3.18	0.79
Behavioural Intention (BI)	3.8	0.65

Table 1 Descriptive Statistics of UTAUT Constructs *(N = 200) (Note. Responses rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).*

5.2 Analysis Based on UTAUT Constructs

5.2.1 Performance Expectancy (PE)

Students generally held positive perceptions regarding AI's effectiveness in enhancing their academic performance. With a mean score of M = 3.72, SD = 0.61, performance expectancy emerged as a key motivator for using AI tools. Students reported that AI helped them understand complex topics, draft structured content, and improve productivity in coursework. These results mirror Watted's (2025) findings, where teachers' belief in AI's instructional value was a major predictor of intention to adopt.

5.2.2 Effort Expectancy (EE)

Effort expectancy recorded a moderate mean score of M = 3.39, SD = 0.87. While students appreciated user-friendly platforms like ChatGPT, some reported that navigating multiple AI tools and interpreting their outputs required time and digital fluency. This aligns with Xu and Ouyang (2022), who noted that while AI is designed to simplify learning, its effectiveness can be constrained by user capability.

Watted (2025) found similar results among teachers, many of whom found AI accessible but still required institutional support for effective use.

5.2.3 Social Influence (SI)

The influence of peers, educators, and institutional culture was relatively low, with a mean of M = 3.12, SD = 0.74. Many students reported that while their peers used AI informally, there was little structured encouragement from faculty or the university to integrate AI into formal learning. This is notably consistent with Watted's (2025) study, where social influence among Arab teachers was also found to be a weak predictor of behavioral intention.

According to Budhathoki et al. (2024), social influence tends to be stronger in environments where peer learning and institutional modeling are actively promoted—conditions that were largely absent in this study's sample institutions.

5.2.4 Facilitating Conditions (FC)

Facilitating conditions scored M = 3.18, SD = 0.79, indicating a neutral to slightly positive perception. While students from private institutions often had access to high-speed internet and tech support, those from public universities reported significant infrastructural gaps. These included outdated computer labs, lack of AI workshops, and poor awareness among faculty about AI tools. Watted (2025) identified this same issue as the lowest-rated UTAUT dimension among Arab teachers in Israel, reflecting broader systemic inequities in digital readiness.

The role of facilitating conditions has also been affirmed by Zhang and Wareewanich (2024), who emphasized that access to infrastructure and training significantly enhances AI adoption rates among educators and students alike.

5.2.5 Behavioral Intention (BI)

The overall behavioral intention among students to adopt AI tools was strong, with a mean of M = 3.80, SD = 0.65. Most students expressed a desire to integrate AI tools in regular academic tasks, especially if guided training or structured AI-based assignments were introduced. This result is consistent with findings by Almasri (2024) and Venkatesh et al. (2003), who argue that a high perception of usefulness correlates with strong user intention**.**

5.3 Discussion of Key Predictors

To identify the most influential predictors of behavioral intention, a multiple linear regression was conducted. The model explained 43% of the variance ($R^2 = 0.43$, $p < 0.01$). The two statistically significant predictors were:

- Performance Expectancy ($\beta = 0.40$, $p < 0.01$)
- Facilitating Conditions ($\beta = 0.28$, $p < 0.05$)

Effort Expectancy ($\beta = 0.10$) and Social Influence ($\beta = 0.08$) were not statistically significant.

These results reinforce Watted's (2025) conclusion that perceived usefulness and environmental support are critical for driving AI adoption. The Indian student population, like the Arab teachers in Israel, seems to be self-motivated to adopt AI, but their success in doing so is contingent on the presence of supportive institutional structures.

This also supports earlier UTAUT-based research by Venkatesh et al. (2003), Budhathoki et al. (2024), and Benicio et al. (2024), all of whom emphasized performance expectancy as a consistent predictor of technology acceptance across diverse settings.

CONCLUSION AND IMPLICATIONS

6.1 Conclusion

This study set out to explore Indian higher education students' perceptions, usage patterns, and behavioral intentions toward Artificial Intelligence (AI) tools in academic contexts, using the Unified Theory of Acceptance and Use of Technology (UTAUT) model as the analytical lens. Drawing upon both quantitative and qualitative data from 200 university students, the findings demonstrate a broadly positive orientation toward AI, with high levels of behavioral intention and performance expectancy, but more moderate to low ratings for effort expectancy, social

influence, and facilitating conditions.

In line with the foundational research by Venkatesh et al. (2003), and more recently by Watted (2025), the current study confirms that performance expectancy—the belief that AI tools enhance learning outcomes—is the most significant predictor of students' willingness to integrate such technologies into their academic routines. Tools like ChatGPT, Canva, and Grammarly are perceived as user-friendly and helpful for a variety of educational tasks including writing, idea generation, and content summarization.

However, the study also reveals persistent infrastructural and institutional challenges, particularly in public universities and rural institutions. Many students cited limited access to workshops, lack of trained faculty, and unclear academic policies on AI usage. These findings echo those of Watted (2025), who identified a similar lack of institutional support as a critical barrier to AI integration among Arab teachers in Israel. In both contexts, users demonstrated interest and willingness, but struggled against system-level limitations.

Furthermore, social influence was not a strong determinant of behavioral intention. This suggests that peer usage and institutional encouragement play a less prominent role in influencing student behavior, particularly in educational systems where formal AI-related initiatives are yet to be mainstreamed (Budhathoki et al., 2024; Zhang & Wareewanich, 2024).

6.2 Implications for Practice and Policy

The findings of this study offer several important implications for stakeholders in Indian higher education:

1. Institutional Readiness Must Precede Technological Rollout

Universities must develop robust digital infrastructure, including high-speed internet access, AI-compatible systems, and updated libraries of approved tools. Merely encouraging AI usage without providing the necessary conditions may exacerbate digital inequality, especially among students in rural or underfunded institutions (Ganayem, 2018; Zhang & Wareewanich, 2024).

2. Integrate AI Literacy into the Curriculum

There is an urgent need to integrate AI literacy modules across undergraduate and postgraduate programs. These modules should include training on ethical usage, prompt engineering, fact-checking AI outputs, and understanding the limitations of generative models (Almasri, 2024; Su & Yang, 2023). Building this foundational literacy will ensure informed and responsible use of AI tools.

3. Promote Faculty Engagement and Peer Learning

For social influence to become a stronger positive factor, faculty must model effective AI integration. Institutions can organize interdisciplinary seminars, faculty-led workshops, and student-led AI clubs to normalize AI usage and foster a supportive learning environment. Such practices can help move students from passive use to strategic, collaborative engagement with AI technologies (Cabero-Almenara et al., 2024).

4. Create Clear Ethical Guidelines and Policies

Students expressed concerns about the ethical ambiguity surrounding AI usage, including plagiarism, overdependence, and the appropriateness of AI-generated content in academic work. Universities should establish clear policies that define acceptable AI usage and create transparent mechanisms for enforcement. Aligning institutional policies with global academic integrity standards will protect both students and educators (Eden et al., 2024).

5. Conduct Longitudinal and Comparative Studies

This study provides a snapshot of current perceptions, but student attitudes may evolve as AI tools become more integrated into academia. Future research should adopt longitudinal approaches to examine how these perceptions change over time. Comparative studies across different states, disciplines, and institution types in India would also offer valuable insights into demographic and contextual variations in AI adoption (Xu & Ouyang, 2022).

6.3 Final Reflection

Ultimately, this study underscores that AI is not merely a technological innovation but a pedagogical catalyst—capable of transforming how students learn, think, and engage with knowledge. Indian students are ready and willing, but they need an enabling ecosystem that includes policy clarity, training, infrastructure, and community support. By acting on these fronts, India's higher education system can move toward a future where AI-enhanced learning is not a privilege, but a norm.

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