

Factors Influencing University Students' Behavior In Using Artificial Intelligence In Learning: A Review

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ABSTRACT: The growing integration of Artificial Intelligence (AI) in higher education offers transformative potential, enabling personalized learning, adaptive feedback, and streamlined administrative processes. However, the effectiveness of these technologies hinges on students' willingness and ability to adopt them. This study investigates the multifaceted factors influencing university students' behavior toward AI use in academic settings. Drawing on established theoretical frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), the research highlights key determinants including perceived usefulness, ease of use, performance expectancy, and social influence. Additionally, individual characteristics—such as digital literacy, learning preferences, motivation, and prior experience—emerge as significant predictors of AI adoption. Contextual and institutional elements, including technological infrastructure, instructor support, and policy alignment, further shape students' engagement with AI tools. Ethical considerations, particularly regarding data privacy, algorithmic bias, and transparency, also play a critical role in fostering trust and responsible usage. By synthesizing these factors, this study offers a comprehensive perspective on student-AI interaction, providing insights to guide higher education institutions in the ethical and effective deployment of AI-enhanced learning systems.

Keywords: artificial intelligence, students, behavior.

I. INTRODUCTION

The integration of Artificial Intelligence (AI) in education has transformed traditional learning environments, offering personalized experiences, adaptive feedback, and automation of administrative tasks. As universities increasingly adopt AI tools such as intelligent tutoring systems, chatbots, and predictive analytics platforms, understanding the factors that influence students' behavior in using these technologies becomes critical. Despite the growing presence of AI in academia, students' acceptance and effective utilization of such tools vary considerably, influenced by a range of psychological, technological, and contextual factors.

The Technology Acceptance Model (TAM), proposed by Davis (1989), remains a foundational framework in understanding user behavior towards technology. According to TAM, perceived usefulness and perceived ease of use significantly affect an individual's intention to use a particular system. Subsequent models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) further extended this framework by incorporating variables like performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). In the context of AI in education, these factors play a pivotal role in determining how students engage with AI-enabled learning tools.

Moreover, individual characteristics such as digital literacy, learning styles, and prior experience with technology also shape how students interact with AI systems (Selwyn, 2019). Ethical concerns, including data privacy, algorithmic transparency, and trust in AI, have emerged as critical considerations that may influence student attitudes and behavior (Luckin et al., 2016). Furthermore, institutional support, availability of training, and the perceived relevance of AI tools to academic success can impact student motivation and sustained use. This study aims to explore the multifaceted factors influencing university students' behavior in using AI for learning, drawing from established theoretical models and emerging literature. By identifying these influences, higher education institutions can better design and implement AI strategies that enhance student engagement and learning outcomes.

II. LITERATURE REVIEW

The application of Artificial Intelligence (AI) in education has garnered increasing attention in recent years, with growing research on its benefits, challenges, and the behavioral responses of students toward these technologies. This literature review synthesizes key findings from previous studies, structured around the following themes: technology acceptance models, individual and contextual factors, ethical concerns, and pedagogical impact.

1. Technology Acceptance Frameworks

Understanding the behavioral intentions of university students toward using Artificial Intelligence (AI) in learning often begins with established technology acceptance theories. These frameworks provide structured models to explain how and why individuals adopt new technologies, based on their perceptions, attitudes, and contextual influences.

1.1. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), introduced by Davis (1989), is one of the most influential frameworks in the field of information systems. TAM posits that two key beliefs drive users' acceptance of technology:

- Perceived Usefulness (PU) – the degree to which a person believes that using a particular technology will enhance their performance.
- Perceived Ease of Use (PEOU) – the degree to which a person believes that using the technology will be free from effort.

These beliefs influence the user's attitude toward using the technology, which in turn affects their behavioral intention to use and actual use of the system. TAM has been widely applied in educational contexts to examine the acceptance of learning management systems, e-learning platforms, and more recently, AI-powered educational tools (Teo, 2011).

1.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

To address limitations in TAM and integrate findings from various models, Venkatesh et al. (2003) proposed the Unified Theory of Acceptance and Use of Technology (UTAUT). This comprehensive model identifies four core constructs:

- Performance Expectancy – the belief that using the technology will provide benefits in job performance or outcomes.
- Effort Expectancy – the ease associated with using the technology.
- Social Influence – the extent to which individuals perceive that others believe they should use the technology.
- Facilitating Conditions – the degree to which the user believes that organizational and technical support is available.

UTAUT has been increasingly applied in higher education to study AI adoption, as it accommodates the social and infrastructural factors that are especially relevant in a university setting (Al-Emran et al., 2020).

2. Individual Factors Influencing AI Adoption

While technological and institutional factors are critical, individual learner characteristics also play a pivotal role in shaping how university students perceive and use Artificial Intelligence (AI) in educational contexts. These factors include students' digital literacy, technological self-efficacy, learning preferences, prior experience, and motivation—each influencing their readiness, attitude, and engagement with AI tools.

2.1. Digital Literacy and Technological Self-Efficacy

Digital literacy refers to a student's ability to effectively use digital technologies for learning, communication, and problem-solving. Students with higher digital literacy levels are generally more confident in navigating AI applications and more likely to use them productively in their academic activities. Technological self-efficacy, which reflects an individual's belief in their ability to use technology successfully, has also been positively correlated with higher levels of AI adoption (Hatlevik et al., 2015; Tsai & Tsai, 2010).

2.2. Prior Experience with AI and Familiarity with Technology

Students who have had **previous exposure to AI tools**—such as intelligent tutoring systems, predictive analytics platforms, or chatbots—are more likely to feel comfortable and competent when using them in formal learning environments. Familiarity with general technological tools (e.g., mobile apps, cloud-based platforms) also reduces anxiety and resistance, leading to higher adoption rates.

2.3. Learning Preferences and Cognitive Styles

Students' learning preferences (e.g., visual, auditory, kinesthetic) and cognitive styles can influence how they interact with AI-driven platforms. For instance, students who prefer self-paced, exploratory learning may be more inclined to use AI tools that offer personalized feedback and adaptive content. Conversely, students who favor structured, instructor-led approaches may initially resist or underuse AI-based systems unless guided.

2.4. Motivation and Perceived Value

Another key driver is student motivation, particularly intrinsic motivation—the desire to learn for personal satisfaction—and extrinsic motivation, such as grades or career advancement. When students perceive that AI tools will enhance their academic performance or efficiency, they are more likely to engage with them (Chai et al., 2019). Furthermore, the perceived value of AI tools—whether they are seen as relevant, beneficial, and worth the effort—strongly predicts usage behavior.

2.5. Psychological Factors: Anxiety and Trust

Some students may experience **technology-related anxiety** or **distrust** toward AI systems, especially when they do not understand how the technology works or fear it may replace human roles. These affective responses can inhibit usage and lead to resistance. Building **trust** through transparency, usability, and ethical design is essential for overcoming these barriers.

3. Contextual and Institutional Factors

In addition to individual beliefs and capabilities, **contextual and institutional factors** significantly influence university students' adoption and sustained use of Artificial Intelligence (AI) tools in learning environments. These factors encompass the broader educational ecosystem, including technological infrastructure, institutional policies, training opportunities, and social influences within the learning environment.

3.1. Technological Infrastructure and Accessibility

The availability and reliability of **technological infrastructure**—including high-speed internet, access to computers or mobile devices, and compatibility of AI tools with institutional learning management systems—are fundamental for effective AI adoption. Without proper infrastructure, even the most advanced AI tools may remain underutilized (Alshahrani & Ally, 2016). This is particularly relevant in developing contexts, where technological disparities across regions or institutions can widen the digital divide.

3.2. Institutional Support and Policies

Institutional support plays a critical role in shaping how students perceive and use AI in their academic journey. Support can include the integration of AI into the curriculum, availability of technical assistance, formal training programs, and clear guidelines on ethical AI use. When institutions actively promote AI tools, demonstrate their academic value, and provide continuous support, students are more likely to adopt these technologies with confidence and consistency (Chen et al., 2020).

3.3. Instructor Attitudes and Peer Influence

The attitudes and behaviors of **instructors and peers** can shape students' openness to AI technologies. Instructors who model effective AI use—such as employing AI for assessment feedback, recommending AI-based study aids, or incorporating AI tools in assignments—can positively influence students' behavior. Similarly, **peer influence** can play a role, especially in collaborative or group learning environments where students often rely on each other for technology-related guidance and recommendations (Venkatesh et al., 2003).

3.4. Alignment with Academic Goals

The degree to which AI tools are aligned with students' academic objectives also matters. Tools that clearly support coursework, exam preparation, or skill development are more likely to be used. If students perceive that AI applications are relevant to their immediate learning needs and career goals, they are more inclined to adopt them (Luckin et al., 2016).

3.5. Cultural and Regulatory Contexts

In some cases, cultural norms and regulatory policies can influence perceptions of AI use. For example, societies with higher uncertainty avoidance may be more cautious about AI integration in education, especially

when ethical or privacy concerns are not fully addressed. Additionally, national education policies that promote or restrict AI adoption can directly shape institutional strategies and student exposure.

4. Ethical Concerns and Trust in AI

As Artificial Intelligence (AI) becomes more integrated into educational systems, **ethical** considerations and trust emerge as critical factors influencing students' willingness to adopt and continue using AI tools. While AI offers potential for personalized learning and academic support, its acceptance among university students depends significantly on how ethical, transparent, and trustworthy the systems are perceived to be.

4.1. Data Privacy and Security

One of the primary ethical concerns relates to data privacy. AI systems used in education often require the collection and analysis of large amounts of personal data, including learning behavior, academic performance, and sometimes biometric data. Students may be reluctant to use AI tools if they feel uncertain about how their data is collected, stored, or shared. Lack of **transparency** in data handling can lead to distrust and resistance (Luckin et al., 2016). Ensuring robust data protection policies and informing students about how their information is used are essential to foster trust.

4.2. Algorithmic Bias and Fairness

Another growing concern is **algorithmic bias**, which occurs when AI systems produce unfair or discriminatory outcomes due to biased training data or flawed design. In educational settings, biased AI systems may disadvantage certain groups of students based on gender, ethnicity, socioeconomic status, or learning styles. Awareness of such risks may lead students to question the fairness and objectivity of AI recommendations, automated grading, or feedback systems (Binns, 2018; Eubanks, 2018).

4.3. Transparency and Explainability

Trust in AI is closely linked to the system's transparency and explainability. Students are more likely to adopt AI if they understand how decisions are made, especially when the system influences grades, learning pathways, or feedback. Lack of explainability can make users feel powerless or skeptical about the AI's role in their education. Studies show that students are more confident in using AI tools that provide clear, interpretable outputs or allow for human oversight (Zhang & Aslan, 2021).

4.4. Autonomy and Human Oversight

There is also concern about the potential loss of student autonomy and over-reliance on AI. While AI can support learning, excessive dependence on automated systems may undermine students' critical thinking and decision-making skills. Ethical educational AI systems should aim to augment—not replace—human instructors, allowing for human oversight and giving students the ability to challenge or override AI recommendations (Selwyn, 2019).

4.5. Institutional Responsibility and Ethical Guidelines

Trust in AI is not built solely on the technology itself, but also on institutional governance. Universities must establish clear ethical frameworks and guidelines for AI implementation, ensuring fairness, inclusivity, and accountability. When institutions demonstrate commitment to ethical AI use, students are more likely to engage with these systems positively and confidently.

III. CONCLUSIONS

The integration of Artificial Intelligence (AI) into higher education is shaped by a complex interplay of technological, individual, contextual, and ethical factors. Technology acceptance frameworks such as TAM and UTAUT offer foundational insights into how university students perceive and adopt AI tools, highlighting the roles of perceived usefulness, effort, and social influence. However, these models are enriched by considering individual-level variables, including digital literacy, motivation, learning styles, and prior experience with AI. Equally important are contextual and institutional influences, such as technological infrastructure, instructor support, and institutional policies, all of which can either facilitate or hinder the adoption of AI in learning environments. Ethical concerns—including data privacy, algorithmic bias, transparency, and autonomy—remain central to building trust and ensuring responsible AI use in education.

Ultimately, the successful adoption of AI in higher education depends not only on technological advancement but also on addressing students' needs, institutional readiness, and ethical imperatives. A holistic

and student-centered approach will be crucial to maximizing the benefits of AI while minimizing its risks in educational settings.

Table 1. Summary of factors influencing AI adoption in university learning

Category	Sub-Factors	Description	Key References
Technology Acceptance Frameworks	Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Performance Expectancy	Students' belief in the usefulness and ease of AI tools determines their intention to use them.	Davis (1989); Venkatesh et al. (2003); Teo (2011)
	Social Influence, Facilitating Conditions	The influence of peers and the availability of institutional support can affect adoption.	Venkatesh et al. (2003); Al-Emran et al. (2020)
Individual Factors	Digital Literacy & Technological Self-Efficacy	Students with higher digital skills and self-confidence are more likely to adopt AI.	Hatlevik et al. (2015); Tsai & Tsai (2010)
	Prior Experience	Familiarity with AI or related technologies reduces anxiety and resistance.	Selwyn (2019)
	Learning Preferences & Cognitive Styles	Personal learning styles influence how students engage with AI tools.	Chai et al. (2019)
	Motivation & Perceived Value	Intrinsic and extrinsic motivation drives adoption when AI is seen as helpful or relevant.	Chai et al. (2019)
	Psychological Factors (e.g., Anxiety, Trust)	Fear or mistrust of AI can hinder adoption.	Zhang & Aslan (2021); Selwyn (2019)
Contextual and Institutional Factors	Technological Infrastructure & Access	Adequate internet, devices, and tool integration are foundational for usage.	Alshahrani & Ally (2016)
	Institutional Support	Training, curriculum integration, and technical help encourage adoption.	Chen et al. (2020)
	Instructor & Peer Influence	Role models and peer usage patterns affect students' willingness to try AI tools.	Venkatesh et al. (2012)
	Relevance to Academic Goals	Students adopt AI more readily when it's aligned with their learning needs.	Luckin et al. (2016)
	Cultural and Policy Environment	Broader norms and regulations shape attitudes toward AI use.	Selwyn (2019)
Ethical Concerns and Trust	Data Privacy & Security	Students are concerned about how their data is collected, stored, and shared.	Luckin et al. (2016)
	Algorithmic Bias & Fairness	Perceived unfairness can undermine trust and acceptance.	Binns (2018); Eubanks (2018)
	Transparency & Explainability	AI systems that clearly explain their processes are more trusted.	Zhang & Aslan (2021)
	Human Oversight & Student Autonomy	Students prefer AI tools that support, rather than replace, human judgment and control.	Selwyn (2019)
	Institutional Ethical Guidelines	Ethical leadership from universities helps build student confidence in AI use.	Luckin et al. (2016); Chen et al. (2020)

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