

Research Paper

The Relationship Between AI Dependency and Academic Self-Efficacy Among Indian College Students

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ABSTRACT

The present study examines the relationship between AI dependency and academic self-efficacy among Indian college students. Artificial Intelligence (AI) tools have become increasingly embedded in the academic lives of college students across India, reshaping how they learn and complete assignments. This research aimed to understand how AI usage patterns affect students' confidence in academic tasks. Using a correlational design, data were collected from a sample of university students through two instruments: an adaptation of the Internet Addiction Scale (IAS) to measure AI dependency and the College Academic Self-Efficacy Scale (CASES) to measure academic self-efficacy among students. Statistical analysis revealed a significant moderate level of AI dependency and higher levels of self-efficacy, the relationship was not very strong but statistically significant. These findings reveal that the reliance on AI is negatively and significantly related to academic self-efficacy among Indian college students. This indicates that students who rely heavily on AI tend to have low confidence in their ability to perform academic tasks independently. These results suggest that excessive reliance on AI may undermine the development of cognitive and academic skills among Indian college students. Limitations may include gender gap, sampling bias and self-report bias. The study may limit compatibility with parametric studies. Future research should explore this relationship using longitudinal and experimental study methods, incorporating gender and socio-economic status as moderating variables.

Keywords: *Artificial Intelligence (AI), AI Dependency, Academic Self-Efficacy, Indian College Students, Educational Psychology*

Artificial intelligence (AI) refers to computer systems that typically perform tasks associated with human intelligence, such as generating language, identifying patterns, making predictions, and providing automated responses. AI is increasingly being used for teaching, learning, feedback, tutoring, assessment, and administration in education. Crompton and Burke (2023) found that AI has become a powerful educational resource,

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Received: June 18, 2026; Revision Received: July 19, 2026; Accepted: July 23, 2026

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enhancing information access, supporting personalized learning, facilitating language learning, generating content, and streamlining administration.

Generative AI has accelerated this process. Systems such as ChatGPT, Grammarly, and QuillBot are now widely used by students for brainstorming, checking grammar, paraphrasing, summarizing text, creating outlines, generating arguments, and explaining concepts. AI has become a tool for many students to get a head start on challenging tasks, improve their writing, and increase productivity.

AI is appealing because it is fast, accessible, readily available, and user-friendly. These qualities have transformed AI from an elite technology to a common tool used by many students in their learning. However, its growing use has also prompted debate. While some researchers highlight the benefits of AI for personalized instruction, inclusivity, and learning support, others point to the potential for overuse to promote superficial learning, dependency, decreased learning autonomy, and reduced effort (Chan & Hu, 2023; Wang et al., 2025). Universities are therefore being challenged to develop approaches that facilitate innovation while ensuring academic integrity and meaningful learning (An et al., 2025).

Students are among the heaviest users of AI in higher education because of the amount of writing, researching, analyzing, presenting, and planning required in academic settings. AI is used for coursework, assignments, presentations, literature searches, idea generation, language support, citations, and explaining concepts. Often, AI makes tasks easier that may otherwise be time-consuming. AI can assist students with generating outlines, improving language, paraphrasing text, and explaining concepts. This type of assistance can be helpful, particularly in challenging educational contexts.

Students' AI use exists on a continuum. At one end, AI functions as a form of guided learning, where students remain actively engaged in their academic work. However, AI can also become a dominant source of ideas, reasoning, and writing. This distinction is important because using AI as a support differs from relying on AI for key learning activities. Recent research indicates that students appreciate the convenience of AI but also recognize concerns regarding authenticity, overuse, cheating, and reduced personal effort in learning (Çerkini et al., 2025; Chan & Hu, 2023). Similarly, Wang et al. (2025) found that students have a complex relationship with generative AI that includes both trust and distrust, suggesting that while AI can support learning, it may also contribute to overreliance.

Academic self-efficacy refers to students' beliefs regarding their capacities to accomplish academic tasks. It is based on Social Cognitive Theory, which proposes that self-efficacy influences how individuals think, feel, motivate themselves, and behave under specific circumstances (Bandura, 1986, 1997). In educational contexts, academic self-efficacy shapes students' beliefs about their ability to complete coursework, meet deadlines, solve academic problems, perform well, and achieve success through their own efforts.

Academic self-efficacy is closely associated with motivation, persistence, confidence, resilience, and achievement. Students with higher academic self-efficacy are more likely to undertake challenging tasks and persist in the face of difficulties, whereas students with lower self-efficacy may experience reduced confidence when academic demands become challenging. This construct is particularly relevant in the context of AI-assisted learning, as students may begin to compare their own abilities with technological assistance and develop

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reduced confidence in independent learning if they believe academic tasks can only be completed effectively with the support of AI.

One of the main concerns in educational psychology is that excessive reliance on AI may decrease students' confidence in their academic abilities. Bandura (1997) maintains that mastery experiences are among the most powerful sources of self-efficacy. As students accomplish difficult tasks independently, they develop confidence in their ability to succeed. By routinely delegating challenging aspects of writing, brainstorming, analyzing, or problem-solving to AI, students may lose opportunities to gain these mastery experiences.

This concern is beginning to emerge in empirical literature. Zhang et al. (2024) found that academic self-efficacy, academic stress, and performance expectations were associated with problematic AI use. Similarly, Estrada-Araoz et al. (2025) reported a negative relationship between academic self-efficacy and AI use among university students. However, findings remain mixed. Zhang and Xu (2025) suggested that generative AI can enhance students' confidence and efficiency while simultaneously increasing technological dependence. These findings indicate that AI is neither inherently beneficial nor harmful. Rather, the key issue is whether students use AI as a tool to support learning or become reliant on it in place of self-directed effort.

Indian higher education is large, diverse, rapidly growing, increasingly digital, and highly competitive. Students often experience considerable academic pressure due to examinations, grades, expectations of employability, family expectations, and future career concerns. Such stressors may make AI tools particularly appealing because they provide quick academic assistance and help reduce the burden of challenging tasks.

At the same time, these circumstances may increase the risk of AI dependency. In a competitive academic environment, students may be more willing to use tools that help them meet deadlines, improve the quality of their work, and achieve better academic outcomes. Over time, however, practical use may develop into habitual dependence, particularly when students begin to perceive AI-generated outputs as superior to their own abilities. Research examining the relationship between AI dependency and academic self-efficacy among Indian college students remains limited, highlighting the importance of investigating this relationship within the Indian higher education context.

Despite growing international interest in the educational and psychological implications of AI use, limited research has examined academic self-efficacy as a potential outcome of AI dependency, particularly among Indian college students. Existing studies have primarily focused on AI adoption, AI literacy, and attitudes toward AI rather than the possible consequences of excessive reliance on AI for students' academic confidence. Therefore, further investigation is needed to better understand the relationship between AI dependency and academic self-efficacy within the Indian higher education context.

The present study aimed to examine the relationship between AI dependency and academic self-efficacy among Indian college students. Based on existing theoretical and empirical evidence, it was hypothesized that AI dependency would be significantly negatively associated with academic self-efficacy.

METHODOLOGY

Research Design

The present study employed a quantitative correlational research design to examine the relationship between AI dependency and academic self-efficacy among Indian college students. The study did not involve manipulation of variables; rather, it examined naturally occurring variations in participants' levels of AI dependency and academic self-efficacy. A correlational design was selected because it allows for the investigation of the direction and strength of the relationship between variables in a natural educational setting. However, while this design permits the identification of significant associations, it does not establish causal relationships between variables.

Sample and Sampling Procedure

The study included 206 Indian college students (N = 206) between the ages of 18 and 24 years. Participants were recruited from various colleges and academic disciplines across India. This age group was selected because it represents a population with high exposure to digital technologies and AI-based tools. A non-probability convenience sampling technique was employed. Participants were recruited through an online survey administered via Google Forms based on their accessibility and willingness to participate. To be eligible for participation, individuals were required to be currently enrolled in a college or university program, fall within the specified age range, actively use AI tools such as ChatGPT, Gemini, or similar platforms, and be able to understand English and provide informed consent. Individuals below 18 years or above 24 years of age, those not enrolled in an academic program, those unable to understand English, and respondents with incomplete or inconsistent responses were excluded from the study.

Instruments

- **AI Dependency Scale:** AI dependency was measured using an adapted version of the Internet Addiction Scale (IAS). As no standardized instrument specifically measuring AI dependency was available, 18 items from the IAS were modified to assess participants' reliance on AI tools in academic contexts. Items referring to internet use were adapted by replacing internet-related terminology with AI-related terminology to assess participants' reliance on AI tools in academic contexts. The scale was administered using a Likert-type response format.
- **College Academic Self-Efficacy Scale (CASES):** Academic self-efficacy was measured using the College Academic Self-Efficacy Scale (CASES) developed by Owen and Froman (1988). The instrument consists of 33 items that assess students' confidence in performing a variety of academic tasks, including completing assignments, taking notes, studying course material, and preparing for examinations. The CASES is a widely used instrument with established reliability and validity in educational research.

Procedure

Data were collected using an online survey administered through Google Forms. The questionnaire began with an informed consent form outlining the purpose of the study, confidentiality of responses, and participants' right to withdraw at any stage. Demographic information, including age, gender, and field of study, was also collected. Participants were recruited through various online student networks and groups. After providing consent, participants completed the AI Dependency Scale and the College Academic Self-Efficacy Scale (CASES). The questionnaire required approximately 10–15 minutes to complete.

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Following data collection, responses were screened for completeness and consistency. Incomplete or invalid responses were excluded, and the final dataset was prepared for statistical analysis.

Data Analysis

Data were analyzed using appropriate statistical techniques to address the research objectives. Reliability analysis was conducted for both the adapted AI Dependency Scale and the College Academic Self-Efficacy Scale (CASES) to assess internal consistency. Descriptive statistics were computed to summarize participants' levels of AI dependency and academic self-efficacy. Tests of normality were performed to examine the distribution of the data. As the assumptions for parametric correlation were not met, Spearman's rank-order correlation was used to examine the relationship between AI dependency and academic self-efficacy. In addition, a scatterplot was generated to provide a visual representation of the relationship between the two variables.

Ethical Considerations: Ethical principles were followed throughout the study. Informed consent was obtained from all participants prior to participation. Participants were informed about the purpose of the study, the voluntary nature of participation, and their right to withdraw at any time without penalty. Confidentiality and anonymity of responses were maintained throughout the research process. No sensitive personal information was collected, and the data were used solely for research purposes. Access to the data was restricted to the researchers and the research supervisor.

RESULTS

Reliability Analysis

Reliability analysis was conducted to assess the internal consistency of the study instruments. The adapted AI Dependency Scale demonstrated excellent internal consistency (Cronbach's $\alpha = .927$). Similarly, the College Academic Self-Efficacy Scale (CASES) showed excellent reliability (Cronbach's $\alpha = .938$). These findings indicate that both instruments were reliable measures of their respective constructs. The reliability analysis is presented in Table 1.

Table 1 Reliability Statistics for AI Dependency and Self-Efficacy Scales

Scale	Number of Items	Cronbach's α
AI Dependency	18	0.927
Self-Efficacy	33	0.938

Descriptive Statistics

Descriptive statistics were computed for AI dependency and academic self-efficacy. Participants reported a mean AI dependency score of 36.61 (SD = 16.26) and a mean academic self-efficacy score of 115.18 (SD = 20.07). The descriptive statistics are presented in Table 2.

Table 2 Descriptive Statistics of Study Variables

	N	Minimum	Maximum	Mean	Std. Deviation
AI Dependency	206	0.00	90.00	36.61	16.26
Self-Efficacy	206	58.00	165.00	115.18	20.07
Valid N(Listwise)	206				

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Tests of Normality

The Shapiro-Wilk test was conducted to assess the normality of the study variables. AI dependency significantly deviated from a normal distribution ($W = .981, p = .007$), whereas academic self-efficacy did not significantly deviate from normality ($W = .991, p = .264$). Given the non-normal distribution of AI dependency, Spearman's rank-order correlation was used for subsequent analyses.

Table 3 Shapiro-Wilk Tests of Normality

	Statistic	df	Sig.
AI Dependency	0.981	206	0.007
Self-Efficacy	0.991	206	0.264

Correlation Analysis

Spearman's rank-order correlation was conducted to examine the relationship between AI dependency and academic self-efficacy. The analysis revealed a statistically significant moderate negative correlation between the two variables, $\rho = -.394, p < .001$. Higher levels of AI dependency were associated with lower levels of academic self-efficacy among Indian college students, indicating that students who reported greater reliance on AI tended to report lower confidence in their academic abilities.

Table 4 Spearman's Correlation Between AI Dependency and Academic Self-Efficacy

Variable	AI Dependency	Self-Efficacy
AI Dependency	1	-.394***
Self-Efficacy	-.394***	1

Note. *** $p < .001$; $N = 206$

DISCUSSION

The present study examined the relationship between AI dependency and academic self-efficacy among Indian college students aged between 18 and 24 years. Using Spearman's correlation analysis, a significant moderate negative relationship was found between AI dependency and academic self-efficacy ($\rho = -.394, p < .001$). The findings suggest that students who reported greater reliance on AI tools for academic purposes also reported lower levels of confidence in their ability to perform academic tasks independently.

The findings may be explained through the concept of cognitive offloading, whereby students delegate cognitive tasks such as summarizing readings, generating ideas, structuring arguments, and preparing responses to AI systems. Although AI may help students complete academic work more efficiently, excessive reliance on such tools may reduce active intellectual engagement with academic material. Over time, this may influence how students perceive their own academic capabilities and confidence as learners.

The findings are consistent with previous research suggesting that excessive dependence on digital technologies may negatively affect critical thinking, logical reasoning, and self-directed learning. Students who become accustomed to relying on AI-generated solutions may engage less frequently in the deeper learning processes required to develop genuine confidence in their academic abilities. This interpretation is also consistent with Bandura's

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concept of mastery experiences, which emphasizes that confidence develops through successfully completing challenging tasks independently.

The findings are particularly relevant in the Indian higher education context, where students often experience considerable academic and competitive pressure. Under such circumstances, AI tools may become attractive because they reduce workload and assist with academic performance. However, an excessive focus on performance outcomes rather than learning processes may limit opportunities for independent intellectual engagement and the development of academic self-efficacy.

At the same time, it is important to recognize that AI is not inherently harmful. When used appropriately, AI can support learning by improving understanding, providing feedback, and increasing access to educational resources. Concerns arise when AI begins to replace rather than support students' own cognitive effort. The present findings therefore highlight the importance of promoting responsible and balanced use of AI within educational settings so that technological assistance complements, rather than substitutes for, independent learning and academic development.

Limitations

The findings of the present study should be interpreted in light of several limitations. First, the sample was characterized by a gender imbalance, with female participants being overrepresented. Second, the use of convenience sampling may limit the generalizability of the findings. Third, data were collected through self-report measures, making the results susceptible to response and social desirability biases. Finally, the correlational design of the study does not permit causal conclusions regarding the relationship between AI dependency and academic self-efficacy.

Future Directions

Future research should employ longitudinal and experimental designs to better understand the causal relationship between AI dependency and academic self-efficacy. Studies involving larger and more diverse samples would improve the generalizability of the findings. Future investigations may also examine potential moderating variables such as gender, academic discipline, academic performance, and frequency of AI use. Additionally, qualitative research could provide deeper insight into how students perceive the role of AI in their learning experiences and academic confidence.

CONCLUSION

The present study examined the relationship between AI dependency and academic self-efficacy among Indian college students. The findings revealed a significant moderate negative relationship between AI dependency and academic self-efficacy, suggesting that students who reported greater reliance on AI tools tended to report lower confidence in their ability to perform academic tasks independently.

These findings contribute to the growing literature on the psychological implications of AI use in higher education and support the relevance of Bandura's self-efficacy theory in understanding technology-related learning behaviors. While AI can serve as a valuable educational resource that enhances learning efficiency, accessibility, and academic support, excessive reliance on AI may reduce opportunities for independent engagement, mastery experiences, and the development of academic confidence.

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The findings highlight the importance of promoting responsible and balanced use of AI within educational settings. Educational institutions should encourage students to use AI as a learning aid rather than a substitute for independent thinking and problem-solving.

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Acknowledgment

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Thakur, P., Vaghela, P., Bhawsar, M., Munge, S., Solanki, N. & Sathe, V. (2026). The Relationship between AI Dependency and Academic Self-Efficacy among Indian College Students. *International Journal of Indian Psychology*, 14(3), 315-324. DIP:18.01.028.20261403, DOI:10.25215/1403.028