

## IMPACT OF STUDENTS' DEPENDENCE ON ARTIFICIAL INTELLIGENCE TOOLS FOR ACADEMICS ON THEIR CRITICAL THINKING ABILITY

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### Abstract

Academic practices have undergone significant change as a result of the quick adoption of Artificial Intelligence (AI) tools in the classroom. Students are increasingly using tools like automated help platforms and AI-based content generators to finish their academic assignments. It was also found that Gen Z those born in late 1990s to 2010 may be in first generation to score lower in core cognitive measures than their millennial parents, including attention, memory problem solving and overall IQ. This has become a Global concern. It has broken 200 years trend of each generation scoring higher IQ from prior generation record. A structured questionnaire comprising 12 items was administered to 100 students for analysis. The reliability of the instrument was confirmed with a Cronbach's Alpha value of 0.838, indicating good internal consistency. Pearson correlation and linear regression analyses were employed to examine the relationship and predictive impact between AI dependency and critical thinking. The findings revealed a moderate and statistically significant positive correlation between AI dependency and critical thinking-related outcomes ( $r = 0.329$ ,  $p = 0.001$ ). Regression analysis further confirmed that AI dependency significantly predicts critical thinking ( $F = 11.808$ ,  $p = 0.001$ ), explaining 10.9% of the variance ( $R^2 = 0.109$ ). The standardized beta coefficient ( $\beta = 0.329$ ) indicates a moderate impact. The results suggest that increased reliance on AI tools is significantly associated with changes in students' critical thinking engagement, particularly in relation to depth of thinking and independent idea generation. The study highlights the need for balanced and responsible integration of AI tools in academic settings to ensure that technological assistance does not compromise higher order cognitive skills.

**Keywords:** Artificial Intelligence, AI Dependency, Critical Thinking, Academic, Higher Education, Educational Technology.

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### Introduction

The increasing use of Artificial Intelligence (AI) tools for completing academic assignments has transformed learning practices. While AI enhances efficiency and accessibility, excessive dependence may reduce students' engagement in analytical thinking, problem-solving, and independent reasoning. There is limited empirical evidence on whether AI dependency strengthens or weakens critical thinking skills among students, particularly in the Indian context. AI is no longer peripheral to education it is embedded in student practice.

Dr. Horvaths 2026 study claims that in many developed nations the fundamentals of cognitive development such as literacy numeracy, attention and higher order reasoning have plateaued or even reversed over the previous 20 years. He attributed this trend largely to rapid and largely to unregulated expansion of digital and educational technology in classrooms which he said weakens learning outcomes rather than strengthening them.

It has been discovered that Gen Z who were born between the late 1990s and 2010 might be the first generation to perform worse than their millennial parents on key cognitive tests like IQ memory attention and problem solving. This is now a global issue. It has broken 200 years trend of each generation scoring higher IQ from prior generation record. He added that mobile phones and artificial intelligence have opened up new possibilities in the classroom. As we marvel at its advantages the opposing viewpoint is more compelling. Although they are being marketed as educational innovations they are actually changing peoples' brains in surprising ways. (Trisha, 2026)

According to a 2024 Digital Education Council survey 86% of students are already utilizing AI tools for tasks like creating resumes summarizing readings and solving problems. This highlights how urgent it is for HEIs to incorporate these practices into their pedagogy and institutional policies. According to data from 30 Indian HEIs that participated in the FICCI-EY-P AI Adoption Survey 2025 57 percent of them currently have institutional AI policies in place and another 40 percent are working on one. Automated grading (38 percent) tutoring and chatbots (40 percent) adaptive learning platforms (39 percent) and generative AI for instructional materials (53 percent) are the most frequently cited academic application (Tomar, 2025). More than 56 percent of Indian HEIs have already put AI-related policies into place with 40 percent implementing chatbots and tutoring systems driven by AI according to the Ernst and Young-Parthenon report Future-Ready Campuses: Unlocking the Power of AI in Higher Education which was published in partnership with FICCI.

The reports analysis of AI adoption across key academic and operational functions including usage patterns, governance readiness, curriculum innovation and faculty development is based on a survey of 30 top HEIs in India. It presents a diagnostic maturity model and a workable roadmap to hasten the implementation of AI throughout the system. Risks at the classroom level are mostly related to teaching learning and assessment but using AI tools also brings up important data governance issues.

A lot of AI platforms depend on student submissions engagement trends or biometric data to work. When such data is handled carelessly organizations run the risk of privacy violations fines and damage to their reputation. In contrast to classroom procedures these risks are best managed at the institutional level through centralized governance structures compliance procedures and contracts with technology providers. These protections should be reflected in faculty policies but they shouldn't be a burden. (Hindu, 2025)

Despite the ease and effectiveness of AI tools for academic work many students now rely significantly on them to answer questions, finish assignments and solve problems often without exercising critical thinking or independent effort. There are concerns regarding the long-term effects on students' work ethic, creativity and intellectual growth due to this increasing reliance. (Adesokan, Salman, & Raheem, 2025).

As Artificial intelligence tools offer quick, easy and rational solutions and ideas they have significantly helped students with their academic assignments. Additionally they have helped students' with their written assignments by offering assistance with their grammar and sentence construction. AITs frequently present problems for students by producing generic inaccurate or

deceptive responses to their questions because they are programmed to follow a set of data or codes. Students' responses to the general answers problem end up being similar to those of other students. (Bacallo & G.Bie, 2024)

Artificial intelligence (AI) technologies increase the accessibility of information reduces the amount of time spent on tedious tasks and significantly raise the caliber of student projects. However problems like moral quandaries over-reliance and a lack of faculty guidance still persist. The results of the study indicate that integrating AI literacy into the curriculum can maximize benefits and minimize misuse. For academic administrators instructors and lawmakers who wish to use AI to enhance research and innovation outcomes in higher education the findings provide useful information.(Chavan, 2025)

By using Nanjing Vocational College of Economics and Trade as a case study this study examined the effects of using artificial intelligence (AI) tools on higher vocational students' capacity for independent learning. Based on the theoretical frameworks of self regulated learning and educational evaluation the study looked at four independent variables: the amount of knowledge required before using AI tools the difficulty of using them the frequency of using them and process evaluation. It also looked at how these factors affected the dependent variable autonomous learning ability. This study offers empirical evidence in favor of the claim that when applied properly AI tools can enhance vocational college students' autonomous learning. When used effectively AI-assisted learning environments can help students plan monitor and asses their learning more actively rather than taking the place of independent thought. (Hongren, 2025)

### **Objective**

- 1) To examine the relationship between AI dependence and critical thinking skills.
- 2) To measure the level of students' dependence on AI tools for academic assignments.
- 3) To assess the critical thinking ability of students.

### **Research Methodology**

**Data Collection Method:** Data were collected using a structured questionnaire consisting of 12 items measured on a Likert scale. The questionnaire was administered through an online platform to ensure ease of access and faster data collection.

**Sampling Method:** Convenience Sampling Method were Applied

**Independent Variable:** Dependence on AI tools (frequency of use, type of tasks, reliance level)

**Dependent Variable:** Critical thinking ability (analysis, evaluation, inference, reasoning)

**Sample Size:** 100 samples were considered from Higher Education Institute students of Jalgaon City.

**Statistical tools Applied:** Pearson Correlation & Linear Regression test were applied in SPSS software 26.0.

### **Hypothesis**

H1: There is a significant relationship between students' dependence on AI tools and their critical thinking ability.

H2: There is a significant impact of AI dependency on critical thinking.

### **Hypothesis Testing**

H1: There is a significant relationship between students' dependence on AI tools and their critical thinking ability.

Relationship between AI tools dependency and Critical thinking was analyzed by using Pearson correlation test in SPSS Software.

<b>Correlation</b>							
	Sig. (2-tailed)	N	Develop my own ideas	Analyze questions critically before answering	Excess use of AI reduces thinking ability	Think less deeply while using AI	Overuse of AI affect future professional skills
Frequently use AI tools for academics	0.00	100	.661	.503	-.159	.666	.425
Depend on AI Tools for answers	0.00	100	-.441	-.311	.492	.279	-.153
Use AI for simple academic task	0.00	100	.024	.006	.211	.676	.245
Feel uncomfortable without AI	0.00	100	-.474	-.438	.122	.134	-.473
Rely on AI for formatting	0.00	100	-.345	-.291	.453	.431	-.060
AI tools has become essential	0.00	100	.472	.412	.074	.846	.464
Use AI to reduce mental effort	0.00	100	.146	.224	.633	.737	.463

One to one item level analysis showed: Here **Positive correlation** means when one Variable increases other Variable also increases and **Negative correlation** means when one Variable increases other Variable decreases. For Example Frequently use AI tools for academics shows positive correlation with Develop my own ideas ( $r = 0.661$ ) that depicts that increase in frequently use AI tools for academics also increase in developing ideas. While depending on AI tools for answers decrease in generating own ideas which shows negative correlation ( $r = -0.441$ )

<b>Correlations</b>			
		AI Dependency	Critical thinking
AI Dependency	Pearson Correlation	1	.329**
	Sig. (2-tailed)		.001
	N	100	100

\*\* . Correlation is significant at the 0.01 level (2-tailed).

A statistically significant moderate positive correlation was found between AI dependency and critical thinking ( $r = .329, p = .001$ ). This indicates that higher levels of agreement with AI dependency are associated with higher levels of agreement with critical thinking statements. The direction of implication depends on whether the critical thinking items are positively or negatively framed.

Dependency based AI use (e.g., relying on AI for answers, reducing mental effort, feeling uncomfortable without AI) was significantly associated with reduced independent thinking and analytical engagement. Simple frequency of AI usage did not always show a significant negative association with thinking ability.

These findings suggest that **dependency intensity**, rather than mere usage frequency, plays a critical role in influencing thinking patterns.

Hence Alternative hypothesis **H1: There is a significant relationship between students' dependence on AI tools and their critical thinking ability is accepted and Null hypothesis is rejected.**

**Linear Regression**

H2: There is a significant impact of AI dependency on critical thinking

Linear Regression was applied to analyze the impact of AI dependency on Critical thinking ability of students.

Model Summary					
Model	R	R Square	Adjusted R Square	R	Std. Error of the Estimate
1	.329 <sup>a</sup>	.109	.099		4.54811
a. Predictors: (Constant), AI_Dependency					

ANOVA <sup>a</sup>						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	244.251	1	244.251	11.808	.001 <sup>b</sup>
	Residual	2006.476	97	20.685		
	Total	2250.727	98			
a. Dependent Variable: Critical_thinking						
b. Predictors: (Constant), AI_Dependency						

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.414	1.638		8.191	.000
	AI_Dependency	.243	.071	.329	3.436	.001
a. Dependent Variable: Critical_thinking						

A simple linear regression analysis was conducted to examine the predictive effect of AI dependency on students' critical thinking ability. AI dependency was entered as the independent variable, and critical thinking was treated as the dependent variable.

The regression model was found to be statistically significant,  $F(1, 97) = 11.81, p = .001$ , indicating that AI dependency significantly predicts critical thinking outcomes. The model yielded an **R value of .329**, suggesting a moderate association between the variables. The **R<sup>2</sup> value of .109** indicates that AI dependency explains approximately **10.9% of the variance** in critical thinking ability. The adjusted R<sup>2</sup> value (.099) confirms the stability of the model after adjusting for sample size. The regression coefficient for AI dependency was **B = .243 (SE = .071)**, indicating that a one unit increase in AI dependency corresponds to a .243-unit change in critical thinking scores. The standardized coefficient was  **$\beta = .329$** , with a significant t-value (**t = 3.436, p = .001**), demonstrating a moderate and statistically significant effect. Here the H<sub>2</sub>: There is significant impact of AI dependency on critical thinking is accepted.

### **Conclusion**

The present study examined the relationship between AI dependency and critical thinking among students using a five point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The findings revealed a statistically significant positive correlation between AI dependency and critical thinking ( $r = .329, p = .001$ ), indicating a moderate relationship between the two variables. The positive correlation suggests that as students' agreement with AI dependency increases, their agreement with critical thinking statements also increases. In other side Negative correlation suggest that Excess use of AI decrease thinking ability of students. Dependence on AI tools for answers also found negative correlation with developing own ideas by students. This indicates that AI usage is meaningfully associated with students' perceived thinking abilities. Linear regression suggests a moderate association between variables demonstrating a moderate and statistically significant effect. The study demonstrates that AI dependency does not exist in isolation but is significantly linked to students' cognitive processes. AI tools should be viewed as academic support mechanisms rather than replacements for independent thinking. Their impact depends largely on how they are used, guided, and regulated within educational institutions. A balanced and ethical approach to AI integration is essential to ensure that technological advancement enhances rather than diminishes students' intellectual development.

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