

Drastic Decrease in Critical Thinking and Problem-Solving Ability Among Youth Due to Increasing Reliance on AI

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ABSTRACT

The study aimed to investigate the relationship between generative AI dependence and cognitive abilities such as critical thinking and problem-solving among young adults using a quantitative research approach. To achieve the research objectives, the Generative AI Dependency Scale (GAIDS), Critical Thinking Disposition Scale (CTDS), and Problem-Solving Inventory (PSI) were administered to 300 participants within the age range of 18-30 years in Chennai city, India. The findings of the study using quantitative research design indicated a moderate level of AI dependence with a mean score of 30.22 (SD=10.73), a moderate level of critical thinking with a mean score of 41.69 (SD=7.38), and a moderate level of problem-solving ability with a mean score of 144.48 (SD=29.29). Pearson's correlation analysis indicated a strong negative relationship between AI dependence and critical thinking ability ($r=-0.902$; $p<0.01$) and problem-solving ability ($r=-0.958$; $p<0.01$), and a strong positive relationship between critical thinking and problem-solving ability ($r=0.922$; $p<0.01$). The null hypothesis was rejected since the findings indicated a significant relationship among the variables.

Keywords: Generative AI Dependence, Critical Thinking Ability, Problem-Solving Ability, Young Adults

INTRODUCTION

The acceleration of artificial intelligence technology is changing the processes of learning and the methodologies of thinking and interacting with information. Virtual tutors, chatbots, and automated content generators accomplish academic activities. Devoid of concern for the cognitive skills typically acquired and necessary for mental and active engagement through the use of these technologies, many individuals are content to use these devices as a means for solving diverse problems. The core of the concern related to the dependence on and use of increasingly complex AI tools usage (for instance, ChatGPT, Gemini, and Google Bard) involves the apparent and significant decline in critical thinking skills and the capacity to resolve problems in these three areas of daily living: personal, academic, and professional. Scheduling, route navigation, content generation, and professional decision evaluation are a few of the activities that have transitioned to the control of AI technologies. The tendency to reason, think, and generate solutions to problems will decline as the reliance on automated thinking and problem

resolution becomes the norm. The intentional use of these processes for thinking and problem resolution will decline; the processes, however, will remain dormant.

Critical thinking is the ability to deliberate and to reflect on issues in an objective manner, and for people to arrive at sound and logical conclusions. In this regard, (Robert Ennis 1996) has pointed to a more specific definition of critical thinking directed at the evaluation of one's beliefs by a given set of criteria (logic, evidence, purpose). Such a person has the ability to interpret information, evaluate evidence, identify and deal with bias, reason in a logical manner, and arrive at sound conclusions (draw inferences). In recent decades, critical thinking has been closely associated with the work of Schön (1983), who proposed the concept of reflective practice. His model emphasized that systematic reflection on one's own professional actions can enhance the quality of practice. Contemporary educational frameworks increasingly emphasize the cultivation of students' critical and reflective dispositions, positioning critical thinking as a central pedagogical goal aimed at fostering thoughtful analysis, self-evaluation, and informed judgment (Ennis, 2008; Sosu, 2013). The Ennis-Weir Critical Thinking Model or test was introduced by Robert H. Ennis (1996) views critical thinking as a thoughtful and reflective process where an individual decides to figure out what to believe or what to do. Dual-Process Theory (2000) basically says there are two ways the brain works when it comes to thinking - a fast and intuitive way (System 1) and a slower, more deliberate way (System 2). Although there are a lot of biases and errors in our thinking (Kahneman, 2011).

Problem solving was defined as a behavioral process which (a) makes available a variety of response alternatives for dealing with a problematic situation, and (b) increases the probability of selecting the most effective response from among these alternatives (D'Zurilla & Goldfried, 1971). These processes are relevant across the lifespan and are actively used by adults in personal, occupational, and social settings, as well as by students in academic and developmental settings. A Relevant problem-solving skills can make individuals to adapt to changing situations, make informed decisions, and cope with stressors in daily life functioning. An empirical number of research has explored the relationship between problem-solving abilities, mental capabilities, and psychological adjustment. Its research findings consistently indicate that poor problem-solving skills are associated with elevated levels of stress, depression, maladaptive behaviors, and even physiological health complaints among both adults and young people (D'Zurilla & Nezu, 1999). Wertheimer (1945), proposed that the overall structuring of the problematic solution might assist in successful resolution, instead of emphasizing the isolated elements. The Information Processing Model describes problem solving as a controlled process of cognition with inputs, processing, storage, and outputs of information. Newell and Simon's theory (1972) describes problem solvers as operating in a problem space with an initial state, a goal state, and different operators to change from the initial state to the goal state. Strategies employed for problem solving include means-ends reasoning, heuristics, and algorithms. Polya's approach (1945) to problem solving involves a systematic four-step procedure: (1) understanding the problem, (2) devising a plan, (3) ability to carry out the plan, and (4) looking back at the solution (review). Polya's approach to problem solving also heavily implied the need for using "critical thinking" or "reflective thinking" and "perseverance" in solving problems. Dual-Process Theory (2007) is a cognitive theory describing the manner by which problem-solving occurs using both an intuitive and an analytical system. Stanovich and West (2000) have suggested that an intuitive system needs to be suppressed when problem-solving by the use of an analytical system, and finally, Kahneman (2011) expanded this difference by claiming that an intuitive system would result in an error when problem-solving, but the analytical system would help solve the problem accurately

Higher-level executive functions, including planning, cognitive flexibility, inhibitory control, decision-making, and problem-solving, play vital roles in adaptive behavior and goal-directed behavior. As AI tools are being swiftly integrated into scholastic, professional, and mundane environments, more people are depending on AI tools for information processing, task management, and decision-making. AI tools do help in increasing efficiency, but reliance on AI tools could minimize active participation in complicated cognitive tasks, thus hampering overall higher-level executive functions (Al Said et al. 2025). Dependent behavior on AI tools could result in decreased analytical ability, reduced problem-solving, and poor self-regulation, as everything is in the hands of AI tools, meaning that everything is externally processed. However, AI tools could be a catalyst in promoting overall executive functioning by minimizing cognitive overload and increasing strategic cognition. In view of increasing AI tool dependency among adolescent and young populations, it is important to explore how AI tool use affects higher-level executive function. Such implications would have serious effects on cognition, schooling, and intellectual independence in today's digital era.

REVIEW OF LITERATURE

Zhai, Wibowo & Li, (2024) A systematic review on the cognitive effects of the use of AI dialogue systems on students in educational settings. Through the synthesis of evidence from fourteen empirical studies, the authors establish the dual effects produced by the use of AI. On the one hand, AI supports the efficiency and efficacy of academic writing, the structuring of ideas, and comprehension on the surface level. On the contrary, overdependence on the outputs produced by AI is linked to a diminishment in the domain of high-level cognitive activities, including the levels of critical thinking and analysis and decision-making independently. Through the systematic review, the authors establish the significant point that the overdependence on the outputs produced by AI dialogue systems influences students to pursue heuristic rather than analytical pathways in the evaluation and synthesis of arguments. Notably, the authors establish the significant point that the ill effects are not system-dependent but rather dependent on the lack of structure and reflection in the process.

Al-Zahrani (2024) studied the relationship between human cognition and artificial intelligence in problem-solving, creativity, and decision-making using an intensive interview technique. This research highlights how the use of artificial intelligence increased the generation of ideas with less cognitive strain in complex problem-solving. Nonetheless, the research touches on the challenges associated with decreased efforts driven by reliance on suggestions offered by artificial intelligence. This research highlights the significance of preserving critical judgment in humans, especially in ambiguous or creative problem-solving. According to Al-Zahrani, the integration offered by artificial intelligence should enhance but not replace human cognition.

Omeh, Olelewe, & Ohanu in (2025) carried out the study focused on the effects of Artificial Intelligence technology on the computational, reflective, and critical thinking abilities of learners in a computer programming course. In this study that utilized a Quasi-Experimental design, the researchers compared the effects of problem-based learning aided by AI technology with traditional teaching approaches. The findings showed that learners who utilized AI technology were significantly better in terms of algorithmic thinking, reflection, and problem-solving abilities. According to the researchers, the main advantage of AI technology is that it provides an explorative learning environment that allows learners to test

hypotheses, code, and then evaluate mistakes, thus increasing opportunities for intensive cognitive engagement with critical thinking processes.

Shanmugasundaram & Tamilarasu (2023) analyzed the effect of digital technology, social media, and Artificial Intelligence on cognitive functions. This analysis not only emphasizes the positive effect of AI tools in terms of increasing access to knowledge and efficiency, but it also suggests that overdependence on these tools may reduce individual thought and critical reasoning. The paper focuses on the significance of metacognition in overcoming this challenge, and it recommends reliance on technology in a balanced manner. This paper also presents an analytical review of the role of technology in influencing overall individual cognitive patterns associated with cumulative exposure to AI tools

Hasan, Nasreen, and Rasul (2025,) carried out the study on the application of AI in developing soft skills such as critical thinking skills with a survey of 300 participants. The results showed that the more AI is used, the more positive the outcomes for teamwork, communication, and critical thinking. Although the impact is less for creativity, the results indicate some limitations on creative idea generation. The authors have emphasized the benefits of AI-assisted learning environments for analytical thinking and problem-solving by interacting with multiple information sources and teamwork. On the other hand, they have suggested some limitations to increased AI usage, such as diminishing confidence in the generation of creative ideas by the learners. They referred to AI-driven problem-solving tasks as being related to the improvement of analytical reasoning skills and higher-order decision-making. The importance of AI-driven tasks is clarified as they promote the idea of evaluating, comparing, and synthesizing information. But, they also stress that overdependence on AI can lead to a situation that impacts self-thinking skills adversely. -

RESEARCH METHODOLOGY

Operational Definitions

Generative AI dependency: This is the level at which an individual relies on artificial intelligence tools such as chatbots, artificial intelligence writers, and search assistants. The level of generative AI dependency employed in this study is the total score of the scale labeled as the Generative AI Dependency Scale (GAIDS). A higher score on this scale indicates a higher level of dependency on artificial intelligence.

Critical Thinking Ability: Critical thinking ability is defined as the individual's tendency or choice to be reflective, analytical, and open-minded in their evaluation of information when forming judgments. In particular, for the purpose of the research, it is described as the result obtained from the Critical Thinking Disposition Scale with scores indicating higher levels of critical thinking ability.

Problem-Solving Ability: Problem-solving skills are regarded as the perceived competence of individuals at finding problems and coming up with solutions. In this current research, problem-solving skills are operationally defined as the score derived from the Problem-Solving Inventory (PSI), which is seen to measure individual confidence, style of approach and avoidance, and feelings of personal control encountered during problem-solving.

Conceptual Definitions

Critical Thinking Ability:

Robert H. Ennis (1985): "Critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do."

George Pólya (1945): “Critical thinking involves the ability to understand a problem, devise a plan, carry out the plan, and look back to evaluate the solution.”

Peter A. Facione (1990): “Critical thinking is purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based.”

Diane F. Halpern (1998): “Critical thinking is the use of cognitive skills or strategies that increase the probability of a desirable outcome; it is purposeful, reasoned, and goal-directed thinking.”

Problem Solving Ability :

John Dewey (1910): “Problem solving is a process of reflective thinking that involves identifying a problem, generating possible solutions, and testing them to reach a conclusion.”

George Polya (1945): “Problem solving is the process of finding a way out of a difficulty, a way around an obstacle, or attaining a goal which was not immediately achievable.”

Robert Sternberg (1985): “Problem-solving ability is the capacity to apply knowledge, skills, and cognitive processes to overcome obstacles and achieve desired goals.”

Herbert A. Simon (1978): “Problem solving is a search process in which an individual moves from a given state to a desired goal state using a set of operations.”

Objectives of the Research

- To investigate the relationship existing between the usage of AI tools and the level of critical thinking and problem-solving skills amongst the young generation.
- To examine the impact of generative AI dependence on critical thinking and problem-solving ability among adolescents and young adults aged 18–30 years.
- To explore how participants perceive the impact of AI on their own thinking, autonomy, and confidence to solve problems independently.
- To study the gap which exists between technological evolution and cognitive impacts.

Hypothesis of the Study

- H₀: There is no significant relationship between generative AI dependence and either critical thinking ability or problem-solving ability among young adults.
- H₁: Higher generative AI dependence is significantly associated with lower critical thinking and problem-solving abilities, and critical thinking ability is positively related to problem-solving ability among young adults

Research Design

The study adopted a quantitative correlational research design, using standardized self-report scales to examine the relationship between reliance on AI and critical thinking and problem-solving abilities.

Sampling Technique

Purposive sampling was used as the sampling strategy for this study. Singh (2019) describes purposive sampling a non-probability sampling method in which the investigator makes a judgment based on his/her impressions regarding the concerned cases, which are thought to be typical of the population. The research is conducted on young adults, and participants were selected based on their ability to provide relevant information. The sample was collected from Chennai, India.

Data Collection

The study population consists of young adults aged 18–30 years, sample was taken from 300 participants in south india, including participants from different religions, family types, area of residence, educational qualifications, and occupational statuses. Data will be collected through offline questionnaires distributed to the participants. Participants will provide demographic information, followed by responses to the two standardized scales.

Tool Description

- **Generative AI Dependency Scale (GAIDS):** The Generative AI Dependency Scale assesses individuals' reliance on AI tools for thinking, decision-making, learning, and problem solving. It was developed by Adalia Yin Hui Goh & Andree Hartanto,(2025). is a 10-item instrument scale rated on a 5-point Likert scale. It measures behavioral, cognitive, and emotional dependence. The scale demonstrates good internal consistency reliability (Cronbach's $\alpha \approx 0.80-0.88$), indicating stable and reliable measurement.
- **Critical Thinking Disposition Scale (CTDS):** Developed by Sosu (2013), the Critical Thinking Disposition Scale consists of 11 items and uses a 5-point Likert scale It assesses individuals' inclination toward critical thinking, including open-mindedness, engagement, and reflective skepticism. The scale demonstrates good internal consistency, with reported reliability coefficients (Cronbach's α) ranging from 0.78 to 0.86, indicating acceptable to strong reliability.
- **Problem-Solving Inventory (PSI):** Developed by Heppner and Petersen (1982), the Problem-Solving Inventory assesses individuals' perceptions of their problem-solving abilities, including problem-

solving confidence, approach–avoidance style, and personal control. The scale contains 35 items and shows good reliability, with reported Cronbach’s alpha coefficients around 0.72–0.90, indicating satisfactory to high internal consistency. It is the rated on a 6-point Likert scale.

Procedure

This research was done in an ethical and scientific manner. Before embarking on data accumulation, consent was sought from the appropriate authorities, if necessary. The ethics of participation being voluntary, obtaining consent, maintaining confidentiality, as well as keeping the respondents anonymous, were followed. The participants were recruited from Chennai, South India. The participants were selected on the basis of the inclusion and exclusion criteria. The objectives and purpose of the study were made clear to the participants. The participants were asked to sign the written consent form. The participants were made to understand that their information would only be used for the purpose of the study and that they were free to leave the study at any point. A structured questionnaire containing four sections: Participant Demographic Information, Generative AI Dependency Scale (GAIDS), Critical Thinking Disposition Scale (CTDS), or the Problem-Solving Inventory (PSI), was employed for the collection of data. The questionnaires were carried out either online or offline, depending on the preference of the participants. This reduced any potential ambiguity, and the participants were encouraged to answer all the questions honestly. Respondents were given adequate time to fill the questionnaires. Questions asked by respondents were also clarified by the research investigator. After filling the questionnaires, the data was checked for completeness, coded, and then analyzed using the SPSS computer program. The data was also analyzed using some relevant statistical analysis based on the objectives of this research.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS) was used to analyse the data that were collected. A correlation analysis was conducted using the Pearson Product-Moment Correlation Coefficient to assess the strength and direction (positive or negative) of the relationship between generative AI dependence, critical thinking, and problem-solving ability. Based on these analyses, it was found that there is a strong negative relationship between AI dependence and critical thinking ($r = -0.902$; $p < 0.01$) and between AI dependence and problem-solving ability ($r = -0.958$; $p < 0.01$), while a strong positive relationship was observed between critical thinking and problem-solving ability ($r = 0.922$; $p < 0.01$).

Inclusive criteria:

- Young adults from 18-30 years
- Male and female participants
- Those who are frequent users of AI tools (for example, chatbots, AI writers, search assistants, and recommendation software) in academic, professional, or any kind of everyday activity
- Participants who can read, understand, and respond to the assessment tools in the language of the study
- People with at least secondary-level education, to ensure a minimum level of cognitive and educational grounding for the evaluation of critical thinking and problem-solving skills
- People who are the participants after giving voluntary informed consent.

Exclusive criteria:

- Persons below the age of 18 years and above 30 years
- Persons with a diagnosed neurological disorder or severe psychiatric problems that may affect their cognition
- Persons currently taking medications or substances that significantly influence attention, memory, or reasoning capability

- Participants with never/rarely use of AI tools, as use of AI cannot be measured properly
- People with advanced professional training in fields such as artificial intelligence, computer science, or formal logic which could affect performance on tasks of critical thinking beyond that of the general population
- Those who cannot or refuse to give informed consent

RESULTS

The data collected for 300 participants was analyzed using the Statistical Package for Social Sciences (SPSS) software. Descriptive statistics and Pearson’s Product Moment Correlation were computed to measure the relationship among generative AI dependence, critical thinking ability, and problem-solving ability.

Table 1 : Levels of Reliance on AI, Critical Thinking Ability, and Problem-Solving Ability among young adults.

| Variables | Mean (M) | Standard Deviation (SD) | N |
|---------------------------------|----------|-------------------------|-----|
| Reliance on AI (RAI) | 30.22 | 10.729 | 300 |
| Critical Thinking Ability (CTA) | 41.69 | 7.376 | 300 |
| Problem-Solving Ability (PSA) | 144.48 | 29.291 | 300 |

The descriptive table 1 shows the mean and standard deviation for the variables. The descriptive statistics indicated that participants reported a moderate level of AI dependence (M = 30.22, SD = 10.73), a moderate level of critical thinking ability (M = 41.69, SD = 7.38), and a moderate level of problem-solving ability (M = 144.48, SD = 29.29). The relatively higher standard deviation in problem-solving ability suggests greater variability among participants compared to the other variables.

Table 2 : Correlational analysis showing the relationship between Reliance on AI, Critical Thinking Ability, and Problem-Solving Ability among young adults.

| Variables | | RAI | CTA | PSA |
|-----------|---------------------|---------|---------|---------|
| RAI | Pearson Correlation | 1 | -.902** | -.958** |
| | Sig. (2-tailed) | | .000 | .000 |
| | N | 300 | 300 | 300 |
| CTA | Pearson Correlation | -.902** | 1 | .922** |
| | Sig. (2-tailed) | .000 | | .000 |
| | N | 300 | 300 | 300 |
| PSA | Pearson Correlation | -.958** | .922** | 1 |
| | Sig. (2-tailed) | .000 | .000 | |
| | N | 300 | 300 | 300 |

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

Table 2 shows the Pearson correlation results for all three variables. Pearson correlation analysis results showed a strong negative correlation between AI dependence and critical thinking ability (r = -0.902, p <

0.01), indicating a strong negative linear relationship between AI dependence and critical thinking ability. This implies that young adults who show a high dependence on generative AI tend to show low critical thinking abilities. Similarly, a strong negative correlation was found to exist between AI dependence and problem-solving ability ($r = -0.958, p < 0.01$), indicating a strong negative linear relationship between AI dependence and problem-solving ability. This implies that young adults who show a high dependence on generative AI tend to show low problem-solving abilities. In addition, a strong positive correlation was found to exist between critical thinking ability and problem-solving ability ($r = 0.922, p < 0.01$), indicating a strong positive linear relationship between critical thinking ability and problem-solving ability. This implies that young adults who show high critical thinking abilities tend to show high problem-solving abilities. All correlation results were found to be statistically significant at 0.01, leading to the rejection of the null hypothesis. The results indicate that generative AI dependence plays a crucial role in influencing critical thinking and problem-solving abilities among young adults.

DISCUSSION

This study sought to explore the relationship between generative AI dependence and cognitive abilities such as critical thinking and problem-solving among young adults. The findings of this study provide robust empirical evidence regarding the impact of generative AI dependence on cognitive abilities. From the descriptive statistics, it is evident that the participants exhibited moderate generative AI dependence, with a mean of 30.22 and a standard deviation of 10.73. The critical thinking ability of the participants also exhibited moderate values, with a mean of 41.69 and a standard deviation of 7.38. The problem-solving ability of the participants also exhibited moderate values, with a mean of 144.48 and a standard deviation of 29.29. The relatively higher standard deviation of problem-solving ability suggests that individual differences may have an impact on cognitive abilities.

From the correlation analysis, it is evident that generative AI dependence and cognitive abilities such as critical thinking and problem-solving exhibited meaningful and significant relationships. A very strong negative correlation between generative AI dependence and critical thinking ability of the participants was observed, with a correlation coefficient of -0.902 and a probability of less than 0.01. This suggests that generative AI dependence may have a profound impact on the critical thinking ability of individuals, implying that generative AI dependence may result in a passive approach to information processing. The critical thinking ability of the participants may be compromised due to the frequent use of generative AI tools, which may not allow them to think and evaluate information in a critical manner.

Similarly, an extremely high negative correlation coefficient between AI dependency and problem-solving ability was found ($r = -0.958, p < 0.01$). This indicates that people who are heavily dependent on AI tools would not only become poor problem solvers, but their dependency would further affect their ability to solve problems by generating their own problem-solving strategies. Instead, they would depend on AI tools to solve their problems. This dependency would further affect their cognitive ability to solve problems. On the other hand, it was found that critical thinking is positively correlated with problem-solving ability ($r = 0.922, p < 0.01$). This indicates that people who are good critical thinkers would also become good problem solvers. This is consistent with the theoretical perspective that critical thinking is an underlying skill that would enhance an individual's performance in solving problems.

The results show that all correlation coefficients are significant at the 0.01 level, thereby rejecting the null hypothesis and supporting the alternative hypothesis. These results are consistent with the concerns that have been raised by scholars about the overdependency on technology, which would further affect an

individual's cognitive ability. It can therefore be concluded that the results of the research show the importance of maintaining a balance between the dependency on AI tools and the development of independent cognitive ability. Educational institutions, as well as individuals, need to promote the moderate dependency on AI tools, thereby using it as an auxiliary tool to assist them in solving problems.

SUMMARY

The present study aimed to examine the association between generative AI dependency and cognitive skills such as critical thinking and problem-solving skills in the population of young adults in the age group of 18 to 30 years. A quantitative research design was adopted for the study, and the data were collected from a sample of 300 participants in the city of Chennai. The research instruments employed were the Generative AI Dependency Scale (GAIDS), the Critical Thinking Disposition Scale (CTDS), and the Problem-Solving Inventory (PSI). The descriptive statistics showed that the participants showed moderate levels of generative AI dependency, critical thinking skills, and problem-solving skills, with a mean of 30.22 and a standard deviation of 10.73 for generative AI dependency, a mean of 41.69 and a standard deviation of 7.38 for critical thinking skills, and a mean of 144.48 and a standard deviation of 29.29 for problem-solving skills. The study results showed that generative AI dependency was strongly and negatively related to critical thinking skills and problem-solving skills in the population of young adults in the city of Chennai, as the correlation coefficient was -0.902 and -0.958, respectively, at $p < 0.01$ level. A strong and positive correlation was seen between critical thinking skills and problem-solving skills in the study population, as the correlation coefficient was 0.922 at $p < 0.01$ level. The study results showed that generative AI dependency is strongly and negatively related to critical thinking skills and problem-solving skills in the population of young adults in the city of Chennai. A strong and positive correlation was seen between critical thinking skills and problem-solving skills in the study population.

CONCLUSION

The present study concludes that the dependency on generative AI technologies significantly influences cognitive abilities, specifically critical thinking and problem-solving, among young adults. The present study clearly indicates that the dependency on generative AI tools is inversely proportional to the level of critical thinking ($r = -0.902$, $p < 0.01$) and problem-solving ability ($r = -0.958$, $p < 0.01$). At the same time, the positive relationship between critical thinking and problem-solving ability ($r = 0.922$, $p < 0.01$) clearly indicates the importance of independent thinking for effective problem resolution. The present study indicates that dependency on generative AI tools among adolescents and young adults may result in a decreased level of engagement in independent thinking, thereby affecting their critical thinking and problem-solving abilities. The dependency on generative AI tools, although making life easier, may result in a loss of opportunities for effective analytical thinking, decision-making, and creative problem resolution. Therefore, it is highly imperative that generative AI tools are used by young adults in a balanced manner. Independent thinking, learning, and problem-solving can significantly maintain and improve their cognitive abilities. The present study clearly indicates that generative AI tools can only act as a facilitative tool, not as a substitute for independent thinking.

LIMITATIONS

The study has some limitations, and while interpreting the study, these aspects need to be taken into consideration. Firstly, the study included only 300 participants from Chennai. This might be a limitation,

as the study's results might not be generalizable to other places. Secondly, the study followed a cross-section research design, which does not allow the researcher to analyze the cause and effect relationship between AI dependency and cognitive abilities. Thirdly, the study included only self-report measures, which might be affected by social desirability and inaccurate self-assessment. Moreover, the study included only two aspects of cognitive abilities, namely critical thinking and problem-solving, without considering other factors such as creativity, memory, and attention. The study included purposive sampling, which might be a limitation. Finally, the educational background and familiarity of the participants with AI tools were not controlled, which might be a limitation.

FUTURE SCOPE RECOMMENDED

Further research can be conducted to build on the current study by using larger and more diverse samples from other geographical locations. Longitudinal studies are also recommended to assess the causal effect of AI dependency on cognitive abilities. Other cognitive abilities, such as creativity, attention, and decision-making, can be included in further research to achieve a holistic understanding of AI dependency. Experimental studies can be conducted to assess the effect of controlled AI usage on cognitive abilities. From a pragmatic point of view, educational institutions can play an important role in promoting responsible AI usage by incorporating activities that foster independent thinking and problem-solving. Awareness can be raised among individuals to understand the potential risks to cognitive abilities associated with overreliance on AI. It is recommended to formulate guidelines for the responsible use of AI in academic and professional environments. Promoting critical evaluation of AI-generated content, rather than its acceptance, is likely to help in maintaining and enhancing cognitive abilities.

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REFERENCE

1. Aboodi, R. (2025). The worrisome potential of outsourcing critical thinking to artificial intelligence. *Educational Theory*.
2. Alam, A. (2022). Artificial intelligence and computational thinking in schools: A systematic review. *Education and Information Technologies*, 27(5), 5899–5934.
3. Çela, E., Fonkam, M., & Potluri, R. (2024). Risks of AI-assisted learning on student critical thinking. *International Journal of Risk and Contingency Management*, 13(1), 1–16.
4. Duhaylungsod, L., & Chavez, M. (2023). Generative AI in academic writing: Implications for originality and critical thinking. *Journal of Academic Ethics*, 21(4), 451–467.

5. Ennis, R. H. (1985). A logical basis for measuring critical thinking skills. *Educational Leadership*, 43(2), 44–48.
6. Gerlich, M. (2025). AI tools in society: Impacts on cognitive offloading and the future of critical thinking. *Societies*, 15(1), 6.
7. Gonsalves, C. (2024). Generative AI's impact on critical thinking: Revisiting Bloom's taxonomy. *Journal of Marketing Education*.
8. Hou, C., Zhu, G., & Sudarshan, V. (2025). The role of critical thinking on undergraduates' reliance behaviours on generative AI in problem-solving. *British Journal of Educational Technology*.
9. Joksimović, S., Ifenthaler, D., Marrone, R., de Laat, M., & Siemens, G. (2023). Opportunities of artificial intelligence for supporting complex problem-solving: A scoping review. *Computers and Education: Artificial Intelligence*, 4, 100138.
10. Kim, H., Park, J., & Lee, S. (2023). Student over-reliance on AI writing assistants and analytical reasoning. *Educational Psychology Review*, 35(3), 765–789.
11. Moşoi, A., Maican, C., Cazan, A., & Sumedrea, S. (2025). Do students need to think hard? The interplay of AI and cognitive abilities in solving problems. *Education and Information Technologies*.
12. Nazzal, H., & Kaufman, J. (2020). Creativity, problem identification, and prompt formulation. *Psychology of Aesthetics, Creativity, and the Arts*, 14(3), 325–337.
13. Özer, M., Tanberkan, H., & Perc, M. (2025). Artificial intelligence threatens critical thinking in education systems. *Journal of Higher Education and Science*.
14. Pólya, G. (1945). *How to solve it: A new aspect of mathematical method*. Princeton University Press.
15. Said, N., Osman, N. A., Mohamed, T. I., & Al-Said, K. M. (2025). The role of artificial intelligence in enhancing problem-solving skills: The mediating role of adaptive learning environments. *International Journal of Innovative Research and Scientific Studies*, 8(2), 355–368.
16. Yuhani, Y., Sadiyah, B., Safitri, U., Madya, S. N., & Sudarmono, S. (2025). The influence of artificial intelligence on quality, understanding, creativity, and problem-solving ability in completing college assignments. *JUPE: Jurnal Pendidikan Mandala*.
17. Zhai, C., Wibowo, S., & Li, L. (2024). The effects of over-reliance on AI dialogue systems on students' cognitive abilities: A systematic review. *Smart Learning Environments*, 11, 16.
18. Zhang, D., Wijaya, T. T., Wang, Y., Su, M., Li, X., & Damayanti, N. (2025). Exploring the relationship between AI literacy, AI trust, AI dependency, and 21st-century skills. *Scientific Reports*, 15, 99127.