Journal of Contemporary Educational Research, 2025, Volume 9, Issue 6
http://ojs.bbwpublisher.com/index.php/JCER
ISSN Online: 2208-8474
ISSN Print: 2208-8466

Research on the Influencing Mechanism of College Students' Reliance on AI Tools and Weakened Learning Ability and Educational Coping Strategies

Xiang Yuan, Ling Peng*

School of Management, Guangdong University of Science and Technology, Dongguan 523083, Guangdong, China

Author to whom correspondence should be addressed.

Abstract: With the rapid popularization of artificial intelligence technology in the field of higher education, college students are increasingly dependent on AI tools such as ChatGPT, automatic writing assistants, and intelligent translators. Behind the convenience and efficiency, a decline trend in students' core learning abilities such as autonomous learning ability, critical thinking ability, and knowledge construction ability has gradually emerged. This study aims to explore the interactive logical mechanism between college students' reliance on AI tools and the weakening of their learning abilities, and on this basis, propose practical and feasible educational intervention strategies. Research has found that while AI tools lower the learning threshold, they also weaken students' cognitive investment and independent thinking abilities, further intensifying their reliance on technology. In this regard, this paper proposes a three-dimensional intervention path based on guided usage, ability compensation, and value reconstruction to achieve the collaborative improvement of students' technical usage ability and learning ability. This research has certain theoretical value and practical enlightenment significance for solving the structural predicament of higher education in the intelligent era.

Keywords: Reliance on AI tools; Learning ability; Coping strategy; Interactive logic

Online publication: June 30, 2025

1. Introduction

Artificial intelligence (AI) is reshaping the higher education ecosystem at an unprecedented speed and depth. From teaching assistance to knowledge construction, AI tools (such as ChatGPT, automatic translation, intelligent writing assistants, etc.) have demonstrated strong advantages in enhancing students' learning efficiency and expanding learning resources. However, behind the technological dividends, the excessive reliance of college students on AI tools and the consequent degradation of their core learning abilities have also

been exposed [1,2]. Students tend to use AI to generate answers, write or translate automatically in their studies, thereby weakening their abilities such as critical thinking, independent exploration, and logical reasoning. Current research mostly focuses on the positive effects of AI technology, such as the improvement of teaching efficiency and the transformation of teachers' roles, but pays less attention to its impact on the deep structure of students' learning behaviors, especially how tool dependence affects students' core learning abilities [3,4]. The mechanism is still unclear. This study reveals the interaction mechanism between AI tool dependence and weakened learning ability, and explores feasible coping strategies for colleges and universities in educational practice, providing a theoretical basis and practical guidance for constructing a path of "dual improvement of technical literacy and learning ability" for students.

2. Literature review

With the rapid penetration of generative artificial intelligence technologies (such as ChatGPT, writing assistance systems, language translation models, etc.) in the higher education system, the issue of students' reliance on AI tools has gradually drawn widespread attention from the academic community. In recent years, a number of studies have begun to explore the potential impact of AI usage on students' learning abilities from multiple dimensions, such as cognition, ethics, and instructional design.

Zhai *et al.* found through a systematic review that over-reliance on AI dialogue systems can improve task completion efficiency in the initial stage, but at the same time, weaken students' cognitive processing ability, problem-solving ability, and reflective awareness [1]. This conclusion was also confirmed in the research of Szmyd and Mitera, who pointed out that AI, to a certain extent, weakens students' initiative in developing critical thinking, especially when facing complex concepts and open-ended questions, students are more inclined to accept the answers generated by AI rather than actively solve them [2]. Specifically for college students, Li *et al.* proposed at the ISEMSS conference that the boundless use of AI writing tools such as ChatGPT by college students is changing their learning behavior structure, manifested as "shifting from problem-solving to relying on tools to cope" [3]. However, Putri found in the context of foreign language learning that when students use AI for English writing, there are problems such as weakened semantic understanding and decreased language transfer ability, further demonstrating the substitution effect of AI on the construction of deep learning [4]. Further research has also revealed the interaction mechanism between AI dependence and weakened capabilities. Miranda *et al.* found in their empirical research on universities in many countries that AI dependence is gradually eroding students' critical reading, writing logic, and metacognitive regulatory ability. This "hidden degradation" process is often difficult to detect in a timely manner in the traditional teaching evaluation system [5]. Athar pointed out from the perspective of personality psychology that students who overly rely on AI tools often have characteristics such as avoidant learning tendencies, low self-efficacy, and ambiguous moral judgment, which may further intensify their behavioral inertia of avoiding complex tasks during the learning process [6].

However, there are also studies demonstrating the positive potential of AI tools. Zhao *et al.* pointed out that in a well-designed teaching context, generative AI can stimulate students' deeper thinking processes and strengthen their critical thinking ability, provided that teachers guide students to compare, question, and reconstruct the content of AI [7]. Gawlik-Kobylińska believed that AI has obvious advantages in promoting scientific research collaboration, information retrieval, and interdisciplinary learning, but the prerequisite is that students have a clear sense of purpose and the ability to reflect [8].

In short, the current research has basically confirmed that there is a complex two-way interaction mechanism between the use of AI tools and students' learning abilities: On the one hand, while AI improves efficiency, it may cause cognitive degradation. On the other hand, if used scientifically and guided, it can also become an effective tool for activating higher-order thinking. However, at present, most studies still focus on qualitative descriptions or local empirical evidence, lacking theoretical construction at the system mechanism level and research on intervention paths. Therefore, it is necessary to further reveal how AI dependence affects the entire process of students' ability development at the micro cognitive mechanism and propose targeted educational countermeasures. This research is precisely carried out under this background, attempting to clarify the interaction logic among "dependence–substitution–weakening" from the perspective of cognitive behavior and construct a systematic intervention model.

3. Influence mechanism

The reliance of college students on AI tools during the learning process, ostensibly a pursuit of learning efficiency, may, in essence, induce a series of deep-seated ability degradation problems. From the perspective of cognitive behavior, there is a funnel-like process between AI tool dependence and the weakening of students' learning ability, involving multiple mechanisms such as "tool induction–ability substitution–deepening dependence–weakening ability" (see **Figure 1**).

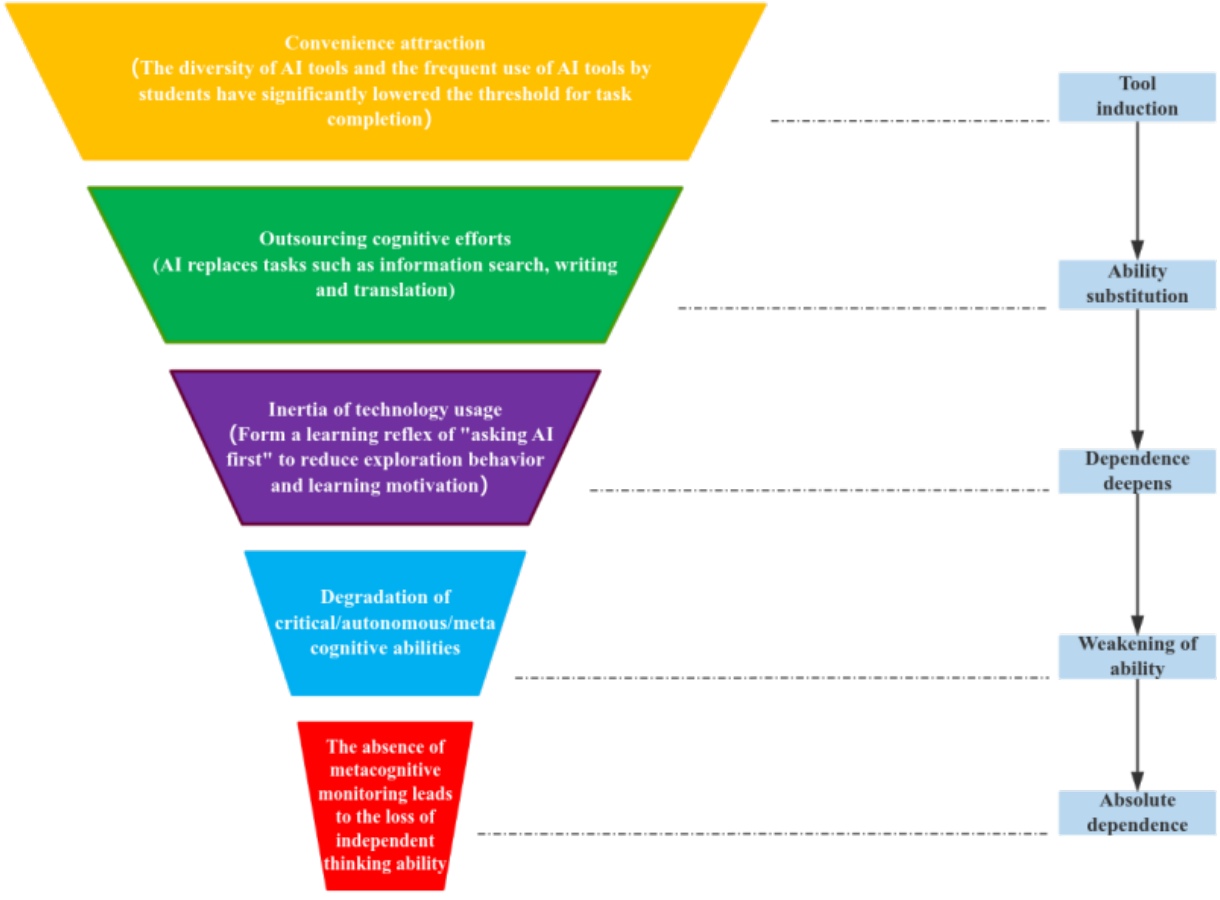

Figure 1. Influence mechanism model

First of all, AI tools, with their fast, convenient, and intelligent technological features, greatly reduce the threshold for students to obtain information and complete tasks, especially in specific tasks such as writing, translation, calculation, and answering questions. Students can use AI to complete learning content that originally required a longer processing time in just a few seconds. This kind of tool's inducement makes students, under the combined effect of factors such as time pressure, task density, and academic anxiety, naturally tend to use AI as a "shortcut" to deal with learning challenges. However, this seemingly rational choice has imperceptibly weakened students' cognitive input and thinking efforts.

Next, during the task processing, AI tools have gradually replaced the knowledge construction and information processing processes that students originally should undertake. Students no longer actively search for, screen, summarize, and evaluate information. Instead, they outsource these learning behaviors to AI systems, thus forming a behavioral pattern of low cognitive participation and high technological dependence. Research surveys show that students who frequently rely on AI for writing or answering questions have a significant decline in their ability to expand their thinking when facing open and comprehensive questions, which shows an obvious lack of critical thinking and weakened creativity. This kind of ability substitution not only affects students' current learning performance but is also likely to have a negative impact on their long-term academic development and problem-solving ability.

As the reliance on AI tools deepens continuously, students have developed a behavioral inertia of technological dependence. When facing learning tasks with high uncertainty or great thinking difficulty, students are more inclined to choose "seeking help from AI" rather than exploring independently. This kind of dependence inertia gradually evolves into a psychological dependence or even cognitive avoidance behavior, that is, students subjectively believe that "using AI is safer and more efficient than thinking by themselves," thereby reducing the motivation and confidence for autonomous learning and forming a self-reinforcing negative cycle mechanism.

Finally, the weakening of core capabilities caused by this dependency process is mainly reflected in three aspects: First, the degradation of metacognitive ability, that is, students lack the ability to monitor and regulate their own learning process, and it is difficult for them to judge the rationality and accuracy of the content produced by AI. The second is the decline in self-directed learning ability, where students gradually lose the ability to independently plan learning goals, develop strategies, and drive themselves. The third is a weak ability to think deeply. When facing open and complex problems, the thinking level is insufficient, and there is a lack of comprehensive analysis ability from multiple dimensions and perspectives. The degradation of these abilities makes it increasingly difficult for students to cope with the requirements of high-quality learning and continuous growth in the complex social context of the future.

To sum up, the relationship between the reliance on AI tools and the weakening of students' learning ability is not a simple linear causal relationship, but rather a dynamic interaction mechanism with inducibility, substitutability, inertia, and circularity. The existence of this mechanism not only exacerbates the problem of implicit ability loss in higher education but also poses new challenges to the instructional design, learning evaluation system, and student development support of colleges and universities.

4. Educational coping strategies

The wide application of artificial intelligence technology is profoundly changing the organizational mode and learning ecosystem of higher education. AI tools have indeed played a positive role in providing knowledge

assistance, enhancing learning efficiency, and reducing cognitive load. However, this study finds that their excessive use has also triggered a structural weakening problem of college students' learning ability. The weakening of this ability is not only manifested at the skill level, but more deeply reflects the degradation of students' learning motivation, cognitive patterns, and sense of responsibility. Therefore, it is necessary to conduct a systematic reflection and response to this issue from multiple perspectives, such as educational concepts, teaching practices, and institutional guarantees.

Firstly, universities should face up to the tension between technology and educational goals. The core mission of higher education lies in cultivating talents with independent thinking ability, critical spirit, and continuous learning ability, rather than merely pursuing the rapid acquisition of knowledge and the efficient completion of tasks. At present, in the process of promoting smart education in colleges and universities, they often overly emphasize the improvement of teaching efficiency by technological tools, while neglecting the long-term and complex nature of students' ability development. If the usage methods of AI tools are not guided and regulated, technology may mask the thinking process in learning, replace the cognitive efforts of the learning subjects, and thus deviate from the original intention of higher education—"human development-oriented."

Secondly, the role of teachers urgently needs to transform from "knowledge lecturers" to "learning guides." In the context of the wide accessibility of AI tools, teachers are no longer the main source of information, but should become the designers and guides of students' cognitive development. Teachers need to proactively introduce guiding reflections on the use of AI in their teaching designs. By setting boundaries between tool-assisted and autonomous thinking, they can help students establish a healthy relationship between the use of technology and the development of their abilities. For instance, in the course, guide students to compare the similarities and differences between AI-generated content and self-created content, encourage them to identify, judge, and reconstruct, thereby activating their critical thinking and metacognitive abilities.

Thirdly, the design of courses and learning tasks should pay more attention to the occurrence conditions of deep learning. Traditional courses are often result-oriented, but with the participation of AI tools, this orientation is more likely to evolve into superficial learning that is "just complete the task." Therefore, through inquiry-based, problem-oriented, or project-based learning models, challenging and uncertain tasks should be designed to encourage students to go through the complete learning process, such as information analysis, viewpoint collision, and logical deduction. For instance, have students record the entire process of AI participation when completing writing tasks, and write "usage reflection reports" or "value judgment logs" to prompt them to conduct a structural review of their own learning behaviors.

Fourthly, strengthening education on digital ethics and technical responsibility in the context of artificial intelligence has become an unavoidable issue for colleges and universities. There is nothing wrong with students using AI tools. The key lies in whether they have the ability to judge the boundaries of tool usage. At present, some students have indiscriminate trust and even dependent recognition towards AI tools, reflecting their lack of digital literacy and ethical awareness. Colleges and universities should incorporate AI ethics education into the general education curriculum system. Through methods such as case teaching, debate training, and ethical decision-making simulation, they should strengthen students' moral judgment, sense of responsibility, and construction of social values in the process of using AI.

Lastly, colleges and universities should provide a guarantee mechanism at the institutional level. Schools can establish norms for the use of AI tools and new standards for evaluating learning behaviors, guiding students to incorporate tool literacy, independent thinking, and value judgment into the assessment system of learning outcomes. Meanwhile, teachers should moderately set requirements for openness and critical thinking

in the design of homework and examinations to prevent AI-generated homework from becoming mainstream and enable students to return to their true identity as learners.

In summary, the application of AI tools is the trend of future educational development, but instrumental rationality must be guided and regulated by educational rationality. While universities are promoting teaching reform with the help of AI, they cannot ignore its potential impact on the development of students' learning ability. Only by establishing a systematic response mechanism from educational concepts, teaching practices, curriculum design to institutional guarantees can the quality of education empowered by technology be truly enhanced, and new era talents who can not only efficiently use technology but also possess independent thinking ability and a sense of responsibility be cultivated.

5. Conclusion

This study focuses on the increasing use of AI tools by college students and systematically explores their interactive relationship with weakened learning abilities. This paper finds that in a learning environment where AI tools are frequently involved, students are more likely to form a behavioral pattern of low cognitive input and high technological dependence, thereby triggering the gradual deterioration of their autonomous learning ability, critical thinking ability, and metacognitive regulatory ability. This kind of dependence is not only a deviation at the level of tool usage, but also a deep variation in the learning approach, reflecting the inherent conflicts that technical logic may have on educational goals.

This study constructed a dynamic interaction mechanism model of "tool induction–ability substitution–dependence solidification–ability weakening," revealing the negative circular path between the use of AI tools and learning ability, and pointing out that technological convenience gradually erodes students' subjectivity and thinking depth unconsciously. Especially in the current "task-oriented" learning atmosphere that is widespread in college teaching, AI tools are prone to being used by students as a means to complete tasks rather than auxiliary tools to promote cognitive development, further magnifying the risk of weakened abilities.

In response to the above problems, this paper proposes a three-dimensional educational intervention approach, that is, on the premise of guiding usage, clarifying the usage boundaries and purposes of AI tools; With ability compensation as the core, the construction of students' cognitive structure is strengthened through the design of deep learning tasks; Supported by value reconstruction, guide students to establish a sense of technical ethics and responsibility. These three aspects work together to achieve the synergistic improvement of students' technical application ability and core learning ability.

Acknowledgments

The author would like to express sincere gratitude to Guangdong University of Science and Technology for supporting this research. Special thanks go to the team members and students who actively participated in the teaching practice and provided valuable feedback throughout the course development and implementation.

Funding

The 2024 Higher Education Teaching Reform Project of Guangdong University of Science and Technology, "Teaching Practice of Human Resource Management Course Based on SPOC+FC Hybrid Teaching Mode" (GKZLGC2024024)

Disclosure statement

The authors declare no conflict of interest.

References

[1] Zhai C, Wibowo S, Li LD, 2024, The Effects of Over-Reliance on AI Dialogue Systems on Students' Cognitive Abilities: A Systematic Review. Smart Learning Environments, 11(1): 28–34.

[2] Li B, Jiang J, Ma L, et al., 2024, Mitigating University Students' Reliance on ChatGPT, 2024 8th International Seminar on Education, Management and Social Sciences (ISEMSS 2024), Atlantis Press, 245–251.

[3] Putri SA, 2025, Analyzing Students' Weaknesses in Using Artificial Intelligence for English Learning Purposes. Tadangate Journal of Educational Research, 2(1): 11–24.

[4] Szmyd K, Mitera E, 2024, The Impact of Artificial Intelligence on the Development of Critical Thinking Skills in Students. European Research Studies Journal, 27(2): 1022–1039.

[5] Miranda JPP, Cruz MAD, Fernandez AB, et al., 2025, Erosion of Critical Academic Skills Due to AI Dependency Among Tertiary Students. Don Honorio Ventura State University, 4(2): 1–24.

[6] Gawlik-Kobylinska M, 2024, Harnessing Artificial Intelligence for Enhanced Scientific Collaboration: Insights from Students and Educational Implications. Education Sciences, 14(10): 11–32.

[7] Zhao G, Sheng H, Wang Y, et al., 2025, Generative Artificial Intelligence Amplifies the Role of Critical Thinking Skills and Reduces Reliance on Prior Knowledge While Promoting In-Depth Learning. Education Sciences, 15(5): 554.

[8] Athar ME, 2025, The Constructive, Over-Reliant, and Irresponsible Use of Artificial Intelligence Tools in Academia: Personality Correlates and Implications for Academic Integrity. Computers in Human Behavior Reports, 18: 100679.