Ilmiy tadqiqotlar va ularning yechimlari jurnali
Aoka guvohnoma № 323759 ISSN: 3060-4818

UDC 378.147:811.111

BETWEEN ASSISTANCE AND DEPENDENCE: HOW ARTIFICIAL INTELLIGENCE RESHAPES THE WAY UNIVERSITY STUDENTS THINK

Nodirbek Saidtovboyev
University of World Economy and Diplomacy
Faculty of International Relations,
1st-year student (group 3-46a-26)
E-mail: nodirbektovbayev@gmail.com
Munirakhon R. Mukhitdinova
University of World Economy and Diplomacy
Doctor of Philosophy (PhD) in
Pedagogical Sciences, Associate Professor
E-mail: mmuxitdinova@uwed.uz
ORCID: 0009-0005-3340-7231
https://doi.org/10.5281/zenodo.24375532

Abstract:
Artificial intelligence (AI) tools such as ChatGPT have become a normal and everyday part of university study, and they raise a serious question about where helpful assistance ends and harmful dependence begins. This article examines how the use of AI affects university students' critical thinking and independent problem solving, using a structured review of recent international studies that include surveys, experiments, brain-activity research and systematic reviews. The findings show that when students use AI to get ready answers, they make less mental effort, reason less deeply and remember less of what they study, and these problems become clear when the tool is removed, whereas AI used after a personal attempt, together with checking and reflection, can support thinking instead of replacing it. The article concludes that AI should remain an assistant to the student's own mind, and that universities need clear rules, reflective assignments and basic AI literacy to help students keep this healthy balance.

Keywords:
artificial intelligence; generative AI; higher education; critical thinking; independent problem solving; AI dependency; cognitive offloading; metacognition; AI literacy; responsible AI use.

INTRODUCTION

Artificial intelligence (AI) tools such as ChatGPT have become a normal part of university life. Students use them to find information quickly, to understand difficult topics and to prepare written assignments in a short time. These benefits are real, but they create a risk. Many students now turn to AI before they try to solve a problem on their own, and some simply copy the answer to save time. Critical thinking and independent problem solving are central aims of higher education, and they develop only through effort, when a learner analyses information, compares ideas and builds an argument. If a tool does this work for the student, the practice that builds these skills may disappear. At the same time, AI is not harmful by nature, and recent studies show that it can support learning when it is used with a clear

purpose and under guidance. The important question is therefore not whether students should use AI, but how they should use it. This article is built around the three research questions given above.

LITERATURE REVIEW AND METHODOLOGY

Literature Review

Many scholars have studied how AI affects the way students think. Chunpeng Zhai and colleagues argue that over-reliance happens when students accept AI answers without questioning them. M.Gerlich[1] explains that frequent use of AI leads to cognitive offloading, which means handing demanding mental work to a tool and thinking less deeply as a result. Y. Fan[2] and colleagues introduced the term metacognitive laziness for learners who leave the planning, checking and evaluation of their own work to AI. Matthias Stadler and colleagues point out that language models make research feel easier, but the quality of students' reasoning becomes weaker. Nataliya Kosmyna and colleagues report, on the basis of brain recordings, that writers who use ChatGPT show weaker brain connectivity and have difficulty quoting their own essays. Muhammad Abbas and colleagues found that university students who use ChatGPT more often tend to procrastinate more, forget more and achieve lower grades. In the same direction, Shunan Zhang and colleagues found that dependence on AI among university students is linked to laziness and to weaker critical and independent thinking. Jing Liu and colleagues, who reviewed studies on language learners, state that AI can both support and hinder critical thinking, and that learner dependency is one of its main limitations. Roman Yavich argues that AI does not have to damage independent thought if teachers supervise its use with feedback and reflective tasks. Finally, Riski Dwi Andrian and colleagues conclude that AI can strengthen students' critical thinking when it is used to support independent thinking, with clear rules and good digital literacy.

Research Questions:

How does dependence on AI affect university students' ability to solve problems independently?
How is the use of AI related to students' critical thinking and the quality of their reasoning?
Under what conditions can students use AI as a helpful tool without becoming dependent on it?

Methodology

This article is a structured narrative review. Recent studies on students, AI, critical thinking and dependence were found through online searches and were accessed on the platforms of academic publishers, including ScienceDirect, SpringerLink, Wiley Online Library and MDPI, as well as an open preprint server. A study was selected if it focused on students or learners, reported empirical results or a systematic review, and was directly related to critical thinking, independent problem solving or dependence on AI. Retracted publications were excluded, and one preprint was included with extra caution. The findings of the selected studies were compared and grouped around the three research questions of this article. No new data were collected, so the article does not report original experiments.

RESULTS

The results are based on the findings reported in the reviewed studies, most of which examined university students. They show a clear pattern for independent problem solving. Abbas and colleagues found that heavier ChatGPT use among university students was linked to more procrastination, more memory loss and lower academic performance. Fan and colleagues found that ChatGPT improved essay

[1] Michael Gerlich. AI tools in society: Impacts on cognitive offloading and the future of critical thinking. *Societies*, 2025, 15(1), Article 6. doi.org/10.3390/soc15010006

[2] Yizhou Fan et al. Beware of metacognitive laziness. *British Journal of Educational Technology*, 2025, 56(2), pp. 489–530. doi.org/10.1111/bjet.13544

scores but did not improve knowledge transfer, and that students engaged less in self-evaluation. In the brain-activity study of Kosmyna and colleagues, writers who used ChatGPT showed the weakest brain connectivity and often could not quote their own text. The results for critical thinking point in the same direction. Zhang and colleagues found that dependence on AI was linked to weaker critical and independent thinking among university students, and Gerlich found that frequent AI use was negatively related to critical thinking through cognitive offloading, especially among younger users. Stadler and colleagues found that students who used ChatGPT instead of Google felt less mental effort but produced weaker reasoning. Zhai and colleagues showed in a systematic review that over-reliance can weaken critical and analytical thinking, and Liu and colleagues listed user dependency among the main limitations of AI in language learning. At the same time, the effect depends on how AI is used. Yavich reported higher critical thinking where AI use was supervised with teacher feedback and reflective tasks, and Andrian and colleagues found that AI strengthens critical thinking when it supports reflection under clear guidelines.

DISCUSSION

The results give a fairly clear answer to the first question. Dependence reduces independent problem solving when AI supplies the answer before the student has tried to solve the task, and the loss appears when the tool is taken away. For the second question, heavy and uncritical AI use is associated with weaker critical thinking, although much of this evidence comes from surveys, which show association rather than proof of cause. The effect is not automatic, because critical thinking was higher where AI use was supervised and reflective. For the third question, the findings suggest four simple habits for students: make an attempt before asking AI, ask for hints and explanations instead of final answers, check important claims in a reliable source, and rewrite the result in one's own words. Universities can support these habits with tasks in which students compare their own solution with an AI-generated one, with short lessons on AI literacy and with clear rules on when AI use is allowed. This review has limits: it is narrative, several studies have small or specialised samples, most measure short-term effects, and none was conducted in Uzbekistan, so local and long-term research is needed.

CONCLUSION

AI has become part of everyday study, and the question is no longer whether students will use it. The reviewed research shows that its effect on thinking depends on how it is used. When AI gives ready answers, students think less, remember less and perform worse without it. When AI is used after a first attempt, with verification and reflection, it can support critical thinking. Therefore, AI should remain a useful assistant and not a replacement for the student's own mind. Universities and students need a clear balance, based on simple rules, reflective tasks and basic AI literacy.

REFERENCES

1. Chunpeng Zhai et al. The effects of over-reliance on AI dialogue systems on students' cognitive abilities. *Smart Learning Environments*, 2024, 11, Article 28. doi.org/10.1186/s40561-024-00316-7
2. Jing Liu et al. How do generative AI tools and LLMs influence language learners' critical thinking in EFL education? *Smart Learning Environments*, 2025, 12, Article 48. doi.org/10.1186/s40561-025-00406-0
3. Matthias Stadler et al. Cognitive ease at a cost. *Computers in Human Behavior*, 2024, 160, Article 108386. doi.org/10.1016/j.chb.2024.108386
4. Michael Gerlich. AI tools in society: Impacts on cognitive offloading and the future of critical thinking. *Societies*, 2025, 15(1), Article 6. doi.org/10.3390/soc15010006
5. Muhammad Abbas et al. Is it harmful or helpful? Examining the causes and consequences of generative AI usage among university students. *International Journal of Educational Technology in Higher Education*, 2024, 21, Article 10. doi.org/10.1186/s41239-024-00444-7

6. Nataliya Kosmyna et al. Your brain on ChatGPT. *Preprint*, 2025. arxiv.org/abs/2506.08872
7. Riski Dwi Andrian et al. The role of artificial intelligence in enhancing critical thinking skills of educational technology students. *Journal on Smart Learning Technologies*, 2025, 1(2), pp. 109–120. doi.org/10.26740/jslt.v1i2.46867
8. Roman Yavich. Will the use of AI undermine students' independent thinking? *Education Sciences*, 2025, 15(6), Article 669. doi.org/10.3390/educsci15060669
9. Shunan Zhang et al. Do you have AI dependency? *International Journal of Educational Technology in Higher Education*, 2024, 21(1), pp. 1–14. doi.org/10.1186/s41239-024-00467-0
10. Yizhou Fan et al. Beware of metacognitive laziness. *British Journal of Educational Technology*, 2025, 56(2), pp. 489–530. doi.org/10.1111/bjet.13544