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UNIVERSITY STUDENTS' ATTITUDES TOWARDS THE USE OF ARTIFICIAL INTELLIGENCE IN SUPPORTING CRITICAL THINKING SKILLS

The use of artificial intelligence in education increases the demands on school and university students' critical thinking skills. The widespread use of artificial intelligence tools in higher education has increased the need to explain their impact on students' critical thinking. The aim of this study was to determine how university students perceive artificial intelligence as a tool to support critical thinking. The study involved 116 students from two Kazakhstani universities. Data were collected using a 24-item questionnaire and analyzed across four content areas: information analysis and comparison, information evaluation, reasoning and argumentation, and reflection and self-control. Participants rated their responses on a 5-point Likert scale. Data were processed in IBM SPSS Statistics, Version 26. The internal consistency of the questionnaire was good (Cronbach's $\alpha = .88$). The overall mean score was $M = 3.59$ ($SD = 0.58$). The highest score was in the information evaluation dimension ($M = 3.76$, $SD = 0.64$), and the lowest score was in the reasoning and argumentation dimension ($M = 3.42$, $SD = 0.72$). The results showed that students perceive AI as a useful tool in the processes of checking information, comparing, considering alternative points of view and re-evaluating their own opinions. The results obtained showed that students perceive AI tools as a supporting resource that allows them to support critical thinking activities.

Keywords: artificial intelligence, critical thinking, higher education, student perspectives, generative AI, information evaluation.

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Университет студенттерінің сыни ойлау дағдыларын қолдауда жасанды интеллектті пайдалануға көзқарасы

Жасанды интеллектті білім беруде пайдалану мектеп оқушылары мен студенттердің сыни ойлау дағдыларына қойылатын талаптарды арттырады. Жоғары білім беруде жасанды интеллект құралдарын кеңінен қолдану студенттердің сыни ойлауына әсерін түсіндіру қажеттілігін арттырды. Бұл зерттеудің мақсаты университет студенттерінің жасанды интеллектті сыни ойлауды қолдау құралы ретінде қалай қабылдайтынын анықтау болды. Зерттеуге екі қазақстандық университеттен 116 студент қатысты. Деректер 24 тармақтан тұратын сауалнама арқылы жиналып, төрт мазмұндық сала бойынша талданды: ақпаратты талдау және салыстыру, ақпаратты бағалау, пайымдау және дәлелдеу, сондай-ақ рефлексия және өзін-өзі бақылау. Қатысушылар өз жауаптарын 5 балдық Ликерт шкаласы бойынша бағалады. Деректер IBM SPSS Statistics, 26 нұсқасында өңделді. Сауалнаманың ішкі сәйкестігі жақсы болды (Кронбахтың $\alpha = .88$). Жалпы орташа балл $M = 3.59$ болды ($SD = 0.58$). Ең жоғары балл ақпаратты бағалау саласында болды ($M = 3.76$, $SD = 0.64$), ал ең төменгі балл пайымдау және дәлелдеу саласында болды ($M = 3.42$, $SD = 0.72$). Нәтижелер студенттердің жасанды интеллектті ақпаратты тексеру, салыстыру, балама көзқарастарды қарастыру және өз пікірлерін қайта бағалау процестерінде пайдалы құрал ретінде қабылдайтынын көрсетті. Алынған нәтижелер студенттердің жасанды интеллект құралдарын сыни ойлау әрекеттерін қолдауға мүмкіндік беретін қолдаушы ресурс ретінде қабылдайтынын көрсетті.

Түйін сөздер: жасанды интеллект, сыни ойлау, жоғары білім, студенттердің көзқарастары, генеративті жасанды интеллект, ақпаратты бағалау.

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Отношение студентов университетов к использованию искусственного интеллекта для развития навыков критического мышления

Использование искусственного интеллекта в образовании повышает требования к навыкам критического мышления школьника и студента. Широкое использование инструментов ИИ в высшем образовании повысило необходимость объяснения их влияния на критическое мышление студентов. Целью данного исследования было определить, как студенты университетов воспринимают искусственный интеллект как инструмент для развития критического мышления. В исследовании приняли участие 116 студентов из двух казахстанских университетов. Данные были собраны с помощью анкеты из 24 вопросов и проанализированы по четырем содержательным областям: анализ и сравнение информации, оценка информации, рассуждение и аргументация, а также рефлексия и самоконтроль. Участники оценивали свои ответы по 5-балльной шкале Лайкерта. Данные были обработаны в программе IBM SPSS Statistics, версия 26. Внутренняя согласованность анкеты была хорошей (коэффициент альфа Кронбаха = 0,88). Средний общий балл составил $M = 3,59$ ($SD = 0,58$). Наивысший балл был получен в области оценки информации ($M = 3,76$, $SD = 0,64$), а самый низкий – в области рассуждений и аргументации ($M = 3,42$, $SD = 0,72$). Результаты показали, что студенты воспринимают ИИ как полезный инструмент в процессах проверки информации, сравнения, рассмотрения альтернативных точек зрения и переоценки собственных мнений. Полученные результаты показали, что студенты воспринимают инструменты ИИ как вспомогательный ресурс, позволяющий им развивать критическое мышление.

Ключевые слова: искусственный интеллект, критическое мышление, высшее образование, взгляды студентов, генеративный ИИ, оценка информации.

Introduction

The introduction of artificial intelligence (AI) into higher education has become one of the most important trends in educational technology in the last decade. In the early stages, AI in higher education was mainly used for the purpose of predicting student learning outcomes, automated assessment, intelligent learning systems, and personalized learning. Zawacki-Richter et al. (2019) systematically reviewed research on the use of AI in higher education and showed that the main directions were focused on student profiling and prediction, assessment, adaptive systems, and intelligent learning systems. Later, Crompton and Burke (2023) analyzed research from 2016–2022 and found that the scope of AI in higher education has expanded, and it is increasingly used in tasks such as supporting the learning process, assessing, providing student assistance, and managing learning. These changes have reinforced the need to consider AI not only as a technological tool, but also as a pedagogical resource that can contribute to the educational experience.

The widespread use of generative artificial intelligence has taken this process to a new level. Tools like ChatGPT allow students to not only search for information or create text, but also to explain a prob-

lem, present ideas, compare multiple perspectives, develop arguments, get answers to questions, and revise text. Therefore, it is becoming increasingly important to focus on how students interact with the technology rather than on its functionality. Chan and Hu (2023) found that in a study of 399 undergraduate and graduate students in Hong Kong, students generally had positive attitudes toward generative AI. While participants found the ability of AI to adapt to individual learning needs, assist with writing, and support research to be useful, they also expressed concerns about the accuracy of information, privacy, and ethical issues.

The introduction of generative AI into higher education makes the issue of critical thinking particularly relevant. In today's digital environment, students are required to not only find information, but also to determine its reliability, compare evidence, evaluate conflicting opinions, and make informed decisions. Critical thinking in this context is considered as a complex cognitive process that involves the analysis, comparison, evaluation, reasoning and reflection of information to arrive at a well-founded conclusion. Yrymbayeva et al. (2026), who studied the work of Kazakhstani students with digital information, also connects critical thinking with higher-level thinking activi-

ties such as analysis, comparison, justification and reflective judgment. For this reason, the ability to evaluate information generated by AI is becoming one of the important manifestations of critical thinking in the digital environment.

The relationship between AI and critical thinking, however, is not straightforward. On the one hand, generative AI allows students to consider a problem from different perspectives, compare alternative explanations, test their arguments, and receive immediate feedback. Essien et al. (2024) demonstrated a complex relationship between AI text generators and critical thinking in a mixed-methods study of 107 postgraduate business students in the UK; the most pronounced improvements were observed at the lower levels of Bloom's taxonomy. Suriano et al. (2025) showed that active interaction with ChatGPT can be associated with complex critical thinking. On the other hand, Zhai et al. (2024) found that over-reliance on AI dialogue systems can pose risks to decision-making, analytical reasoning, and critical thinking. Deng et al. (2025) and Li et al. (2026) also show that the cognitive impact of AI depends on the learning design, the task, and the way the technology is used. Therefore, the current literature provides grounds to consider AI not as a technology that automatically develops critical thinking, but as a tool that can support it in certain pedagogical situations.

In this case, it is important to study students' own views. Students' perceptions allow us to understand for what purpose they use AI, how they assess its benefits and risks, and how much they trust the technology. At the same time, perceived benefit and actually measured critical-thinking performance are not the same concept. A student may believe that AI helps his critical thinking, but such self-assessment does not prove that critical thinking has objectively increased. Therefore, this study is not aimed at determining the cause-and-effect effect of AI on students' critical thinking skills, but at studying how students perceive artificial intelligence as a tool that supports critical thinking.

The purpose of the article is to determine university students' attitudes towards the use of artificial intelligence in supporting critical thinking skills. The study examines how students relate AI to critical thinking activities such as analyzing information, assessing the reliability of information, comparing different points of view, justifying their opinion, and reflecting.

Literature review

Artificial intelligence and student perceptions in higher education

Student perceptions of AI have been growing rapidly since the widespread use of generative AI in higher education. Most of these studies show that students do not perceive the technology as a completely positive or negative phenomenon. In a study by Chan and Hu (2023), students showed that generative AI helps personalize the learning process, improve access to information, and support writing and research-related activities. They also noted issues of information accuracy, privacy, ethics, and technology dependence. These results indicate that students' attitudes towards AI are not only related to its technical capabilities, but also to the reliability and responsibility of using the technology.

Studying student perceptions is particularly important because the same technology can serve different learning functions for different students. One student may use ChatGPT to retrieve a ready-made text, while another may use it for brainstorming, argument development, or searching for alternative viewpoints. In this case, usage frequency alone is not enough to understand the educational value of the technology; It is necessary to study why and in what cognitive activities students use ICT. Such an approach allows us to consider students not as passive users of technology, but as subjects who adapt it to their learning goals.

Artificial intelligence as a support for critical thinking

One line of research that integrates AI and critical thinking considers generative AI as a cognitive scaffold. In this approach, AI is used as an aid to extend the student's thinking process rather than as a tool to think for them. For example, a student might ask an AI to present two opposing positions on a given issue and compare their arguments; identify weak arguments in an AI-generated answer; check the information presented with scientific sources, or reconsider their original position based on a counterargument presented by the AI. All of these activities require analysis, evaluation, reasoning, and reflection rather than simply accepting information.

In a bibliometric and systematic review of the integration of AI and critical thinking in higher education, Salido et al. (2025) show that the connection between these two fields has become an increasingly important area of research. The authors emphasize

that information verification, argument evaluation, evidence-based reasoning, and reflective judgment are important learning strategies that link AI with critical thinking. In other words, using AI to support critical thinking requires students to move from asking “What did the AI say?” to asking “Why did the AI give that answer? Is this answer credible? What evidence is missing? Is there an alternative explanation?”

A study by Suriano et al. (2025) provides empirical support for this idea. The authors examined students' interactions with ChatGPT and found significant associations between active engagement and complex critical thinking. Essien et al. (2024) showed that AI text generators showed more significant improvements at the lower levels of Bloom's taxonomy, while also considering the reliability, accuracy, and ethical implications of the technology. Therefore, the impact of AI on critical thinking should be viewed as a result of the interaction between the student, the task, and the pedagogical context, rather than as a fixed property of the technology itself.

This idea is further developed in the conceptual analysis presented by Vendrell and Johnston (2026). The authors propose the use of generative AI as a scaffolding for critical thinking in higher education, arguing that large language models should not replace students' thinking, but rather encourage them to ask questions, examine evidence, compare answers, and reflect. This approach is also important for the current study: examining students' perceptions of AI in relation to specific critical thinking activities is more meaningful than simply assessing the perceived usefulness of AI in general.

Risks of over-reliance and uncritical use

Along with the potential of AI to support critical thinking, the negative effects of its ineffective use are also widely discussed in the literature. Zhai et al. (2024) analyzed the problem of over-reliance on AI dialogue systems and showed that students' uncritical acceptance of information provided by AI can weaken analytical reasoning and decision-making. According to the authors, the problem is not so much the frequency of AI use as the criticality of the response provided by the system. If technology completely replaces the work of searching, analyzing, and making decisions, the student's active cognitive engagement may decrease.

Here, the speed and convenience of AI itself be-

come a two-way factor. On the one hand, the student can spend time evaluating and developing ideas rather than on technical search. On the other hand, a quick ready-made answer may reduce the need for a person to independently research the problem. Therefore, effective AI-supported learning requires the student to perceive the result of AI not as a final answer, but as a source material for further analysis. Li et al. (2026) also review the current empirical literature, where the results of critical and creative thinking in AI are inconsistent, suggesting that these contextual differences are important.

Evidence from Kazakhstan

Empirical research on the use of AI by students in Kazakhstan has begun to emerge in recent years. Zhunusbekova and Askarkyzy (2025) surveyed 840 undergraduate students at three universities in Kazakhstan and found that 90% of students were aware of ChatGPT, and 65% used AI tools for academic purposes at least once a week. AI was mainly used for essay writing, problem-solving, and idea generation. At the same time, 96% of participants expressed the need for clear institutional rules governing the use of AI in universities. This result suggests that AI has become part of the academic experience of Kazakhstani students, but questions about its responsible use remain important (Zhunusbekova & Askarkyzy, 2025).

Student trust in AI in Kazakhstan was examined in a study by Omirali et al. (2025). A study involving 150 students at Narxoz University focused on perceived educational value, trust, privacy, autonomy, and readiness for proactive AI agents. The results showed that while students showed high levels of interest and readiness to use AI tools, the level of trust was uneven and there were significant concerns about ethical issues. This suggests that in the Kazakhstani context, student perception is not limited to the usefulness or otherwise of AI, but also includes factors such as trust, responsibility, and autonomy (Omiraali et al., 2025).

One of the most relevant Kazakh studies to the current research topic is the study by Yrymbayeva et al. (2026). The authors studied 77 undergraduate students in Kazakhstan's digital search for information, their assessment of information reliability, their reactions to conflicting information, and their attitudes toward AI tools using a sequential mixed-methods design. The results showed that students used a variety of resources, including Google, university databases, and AI tools. AI was often used to explain, summarize, and generate ideas, but stu-

dents were also aware of its potential inaccuracies. The study described students' attitudes toward AI as conditional trust: the technology was perceived as useful, but the need to verify its results was also acknowledged (Yrymbayeva et al., 2026).

At the same time, Yrymbayeva et al. (2026) show that students in Kazakhstan have unevenly developed critical thinking skills. While some students used strategies such as cross-checking conflicting information across multiple sources, considering the author's authority, and comparing evidence, such practices were not common to all participants. The authors note that learner-centered empirical evidence on information competence and critical thinking in the digital environment and AI context in Kazakhstan is still limited. This finding highlights the need for further research into the relationship between AI and critical thinking in Kazakhstani higher education.

Research gap

A cross-sectional study of AI and critical thinking suggests that the relationship between AI and critical thinking is complex and contingent. Several studies have shown that AI can support higher-order thinking by providing students with alternative perspectives, reframing arguments, comparing information, and reflecting (Essien et al., 2024; Deng et al., 2025; Salido et al., 2025; Suriano et al., 2025). Other studies have shown that overreliance on technology can lead to uncritical acceptance of information, cognitive offloading, and reduced independent judgment (Zhai et al., 2024). Research in 2026 is also increasingly showing that the impact of AI depends more on the pedagogical and cognitive context in which it is used than on the technology itself (Li et al., 2026; Vendrell & Johnston, 2026).

In the Kazakhstani literature, the frequency of students' use of AI, academic integrity, digital trust, assessment of information reliability, and ethical issues related to AI have begun to be studied (Ominali et al., 2025; Yrymbayeva et al., 2026; Zhunusbekova & Askarkyzy, 2025). However, how students perceive AI as a tool that supports specific cognitive actions of critical thinking – analyzing information, evaluating it, comparing different points of view, building arguments, and reflecting – has not been sufficiently addressed as a separate research issue. Therefore, this study aims to fill this gap in the existing literature by determining how Kazakh university students perceive the relationship between AI and critical thinking.

Research methods and materials

The purpose of the study was to determine the attitudes of university students towards the use of artificial intelligence in supporting critical thinking skills. In accordance with this purpose, a quantitative research method was used. The study was aimed at describing how students perceive artificial intelligence tools as a tool to support the critical thinking process.

116 students from M. Auezov South Kazakhstan University and O. Zhanibekov South Kazakhstan Pedagogical University participated in the study. 97 of the participants were female and 19 were male. Students were selected using the convenience sampling method. Students with experience in using artificial intelligence tools for educational or academic purposes participated in the study.

A specially designed questionnaire was used to collect data in accordance with the purpose of the study. The questionnaire was developed based on an analysis of domestic and foreign scientific literature on critical thinking, generative artificial intelligence, and the use of AI in higher education. The questionnaire consisted of two parts. The first part identified general information about the participants and their experience in using artificial intelligence. The second part consisted of 24 statements designed to assess students' perception of artificial intelligence as a tool to support critical thinking.

The survey included four content areas: information analysis and comparison; information evaluation; reasoning and argumentation; reflection and self-monitoring. These areas were identified based on an analysis of current research on analysis, information evaluation, reasoning, and reflection activities that occur when working with AI (Salido et al., 2025; Yrymbayeva et al., 2026). Six statements were included in each area. The statements included activities such as using AI to view information from different perspectives, compare alternative points of view, assess the reliability of information, justify one's opinion, consider counterarguments, and reevaluate one's original point of view.

Participants rated each statement on a 5-point Likert scale: 1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, 5 – strongly agree. A high score indicated that students positively perceived artificial intelligence as a tool that supports critical thinking.

The following intervals were used to interpret average values: 1.00–1.80 – very low level; 1.81–2.60 – low; 2.61–3.40 – moderate; 3.41–4.20 – high; 4.21–5.00 – very high. These levels characterize the students' perception of the possibilities of artificial intelligence, rather than the objectively measured level of their critical thinking.

The survey was conducted using the Google Forms platform. Participants were informed about the purpose of the study and that participation in the study was voluntary. No personally identifiable information was collected during the survey. The statistical analysis of the data was performed using IBM SPSS Statistics, Version 26. Mean (M) and Standard Deviation (SD) were used to describe the data, and the internal consistency of the survey was assessed using Cronbach's alpha coefficient.

Table 1

Results in the dimension of information analysis and comparison

№	Statement	M	SD
1	AI helps me look at information from different perspectives	3.48	0.79
2	With AI, I can compare multiple opinions on the same issue	3.56	0.76
3	The answers AI provides help me identify different aspects of the issue	3.60	0.74
4	AI helps me identify similarities and differences between information	3.49	0.81
5	AI allows me to consider alternative explanations for the issue	3.58	0.77
6	When using AI, I try to analyze information more deeply	3.53	0.80
Overall score		3.54	0.68

Source / Note: This table was compiled by the authors based on the analysis of materials.

The overall mean score for this dimension was $M = 3.54$, $SD = 0.68$. The highest score was observed for the statement that the answers provided by the AI helped to identify different aspects of the problem ($M = 3.60$). The lowest score was found for the statement that the information was viewed from different perspectives ($M = 3.48$). The results indicate that students perceive the AI as useful to some extent in comparing information and considering several alternative points of view. The value of $M = 3.54$ indicates that the responses ranged from

Results and discussion

A total of 116 students participated in the study. 97 of them were girls (83.6%), 19 were boys (16.4%). The participants studied at M. Auezov South Kazakhstan University and O. Zhanibekov University.

To assess the internal consistency of the questionnaire, Cronbach's alpha coefficient was calculated. For the total questionnaire consisting of 24 statements, Cronbach's alpha coefficient was $\alpha = .88$. This indicator indicated a good level of internal consistency of the questionnaire.

Analysis and comparison of information

The first direction included students' views on using AI to view information from different perspectives, compare several opinions, and identify alternative explanations.

neutral to agreement, while the $SD = 0.68$ indicates that there was some variability in the responses. This result is consistent with the assessment of students in the study by Chan and Hu (2023) as a useful tool for generating ideas and considering different perspectives.

Information Evaluation

The second direction identified students' attitudes towards assessing the accuracy, reliability, and validity of the information provided by AI.

Table 2
Results for the information evaluation dimension

№	Statement	M	SD
7	I believe it is important to check the accuracy of the information provided by the AI	3.82	0.73
8	I compare the answers provided by the AI with other reliable sources	3.89	0.71
9	I try to assess how reliable the information provided by the AI is	3.74	0.76
10	I consider whether the evidence in the AI answer is sufficient or insufficient	3.65	0.82
11	I am aware that the AI information may contain incorrect or unsubstantiated information	3.80	0.75
12	The use of AI encourages critical evaluation of information	3.66	0.81
Overall score		3.76	0.64

Source / Note: This table was compiled by the authors based on the analysis of materials.

The average score for this dimension was $M = 3.76$, $SD = 0.64$ and showed the highest result among the four dimensions. The highest score was determined in the statement related to comparing the answers of the AI with other reliable sources ($M = 3.89$).

These results indicate that students do not just accept the information provided by the AI, but also pay attention to checking its accuracy and reliability. The study by Yrymbayeva et al. (2026) also found that Kazakhstani students show conditional trust in

AI tools and tend to check the information received through other sources. Zhai et al. (2024) note that excessive dependence on AI can weaken attempts to independently evaluate information. In this regard, a high score in the information evaluation dimension is an important result.

Reasoning and Argumentation

The third dimension described how students perceive the IA in the process of justifying their opinions, considering counterarguments, comparing solutions, and drawing logical conclusions.

Table 3
Results for the Reasoning and Argumentation dimension

№	Statement	M	SD
13	AI helps me to support my opinion with concrete evidence	3.49	0.83
14	With AI, I can consider arguments against my opinion	3.44	0.86
15	With AI, I can compare the advantages and disadvantages of different solutions	3.37	0.88
16	With AI, I can draw logical conclusions on a given issue	3.41	0.85
17	With AI, the ideas I provide allow me to improve my arguments	3.46	0.84
18	When working with AI, I try to explain why I agree or disagree with a certain opinion	3.35	0.89
Overall score		3.42	0.72

Source / Note: This table was compiled by the authors based on the analysis of materials.

The overall mean score for this area was $M = 3.42$, $SD = 0.72$. This was the lowest score across the four areas. The highest score was for the AI's ability to support one's opinion with concrete evidence ($M = 3.49$), and the lowest score was for the AI's ability to explain one's reasons for agreeing or disagreeing with a particular opinion ($M = 3.35$).

These scores may indicate that students are more cautious about the AI's ability to reason and build arguments. Although the AI presents a specific idea or counter-idea, drawing logical conclusions and justifying one's position requires the student to

think for themselves. Essien et al. (2024) showed that the effects of using AI text generators were not uniform across cognitive levels, with the most pronounced improvements observed at the lower levels of Bloom's taxonomy. Suriano et al. (2025) also found that active engagement with ChatGPT may be associated with complex critical thinking scores.

Reflection and self-monitoring

The fourth area involved students revising their initial opinion after receiving the IA response, identifying weaknesses in their thinking, and making their own final decision.

Table 4

Results for reflection and self-monitoring

No	Statement	M	SD
19	I reconsider my original opinion after seeing the AI answer	3.68	0.78
20	AI helps me to see the weaknesses in my thinking	3.55	0.82
21	I think about the content of the AI answer instead of immediately accepting it	3.64	0.79
22	I reassess the validity of my conclusion after using AI	3.60	0.80
23	AI helps me to critically examine my own thinking process	3.70	0.76
24	I try to make my own final decision without being completely dependent on the AI answer	3.61	0.83
Total Score		3.63	0.67

Source / Note: This table was compiled by the authors based on the analysis of materials.

The mean score for the reflection and self-monitoring dimension was $M = 3.63$, $SD = 0.67$. This was the second highest score among the four dimensions. The highest score was observed for the statement that the AI helped the student to critically examine his/her own thinking process ($M = 3.70$).

The results obtained indicate that students perceive the AI to some extent as a tool that helps

them to reconsider their opinions and evaluate their conclusions. However, the variation in responses indicates that not all students use AI as a reflection tool to the same extent. Salido et al. (2025) emphasize the importance of reflection, checking information, and re-evaluating the answers obtained in the integration of AI and critical thinking.

Table 5

Generalized results in four dimensions of critical thinking

Criterion	Indicators	Number of statements	M	SD	Level	Interpretation
Information Analysis and Comparison	Consideration of different points of view, comparison of opinions, identification of similarities and differences, study of alternative explanations	6	3.54	0.68	High	Students generally perceive AI as a useful tool for comparing information and considering problems from different angles.

Table continued

Criterion	Indicators	Number of statements	M	SD	Level	Interpretation
Information Evaluation	Checking accuracy, comparing AI answers with reliable sources, evaluating evidence and identifying possible errors	6	3.76	0.64	High	This is the highest result, showing that students attach special importance to checking the reliability of information provided by AI.
Reasoning and argumentation	Supporting opinions with evidence, considering counterarguments, comparing solutions, formulating conclusions and justifying one's position	6	3.42	0.72	High	Despite the high level, this is the lowest result, indicating a relatively less pronounced perception of the possibilities of AI in the construction and substantiation of arguments.
Reflection and self-monitoring	Review of the initial opinion, identification of shortcomings of own thinking, re-evaluation of conclusions and adoption of independent decision	6	3.63	0.67	High	Students perceive AI as a tool that helps them analyze their own thinking and revise their initial conclusions.
Overall score	General perception of AI as a tool for supporting critical thinking	24	3.59	0.58	High	In general, students positively perceive the role of AI in supporting critical thinking, although the level of agreement is not the highest.

Source/Note: The table was compiled by the authors based on the results of research.

Among the four areas, the highest mean value was obtained for the information evaluation criterion ($M = 3.76$; $SD = 0.64$). The statement about comparing AI responses with other reliable sources received the highest rating ($M = 3.89$). This result demonstrates that students recognize the need to verify information provided by AI and are reluctant to fully accept it without further evaluation. The relatively small standard deviation indicates fairly consistent responses across participants. However, this result reflects students' self-assessment and awareness of the need to verify information, but does not prove that they always perform such verification in practice. From a pedagogical perspective, this tendency should be supported by tasks that require comparing AI responses with scientific sources, identifying unsupported statements, assessing the quality of evidence, and detecting factual errors and unreliable references.

The lowest mean value was found for the reasoning and argumentation criterion ($M = 3.42$; $SD = 0.72$). Although this indicator formally ranks high, it lies close to the boundary between moderate and high levels and should be interpreted with caution. The comparatively low scores for statements ex-

plaining reasons for agreeing or disagreeing with a particular position ($M = 3.35$) and comparing the advantages and disadvantages of different solutions ($M = 3.37$) indicate that students are less receptive to AI support in complex thinking tasks that require independent justification, analysis of counterarguments, and drawing logical conclusions. A higher standard deviation also indicates greater heterogeneity in student responses. From a pedagogical perspective, instructors are encouraged to use tasks based on the "statement-evidence-justification" model, discussions, analysis of counterarguments, comparison of alternative solutions, and written justification of the final conclusion. In such tasks, the AI should provide material for critical analysis, but the evaluation of evidence and the formulation of a final, reasoned position should be performed by the students themselves.

Conclusion

The study aimed to determine the attitudes of university students towards the use of artificial intelligence in supporting critical thinking skills. The results of the study showed that students perceive

AI tools as an additional resource that allows them to support critical thinking activities. Students' attitudes were examined in the areas of information analysis and comparison, information evaluation, reasoning and argumentation, as well as reflection and self-monitoring.

According to the results, it was observed that students attach particular importance to the capabilities of AI to evaluate information. Participants indicated that they understand the need to check the accuracy of the information provided by AI, compare it with other reliable sources, and take into account possible errors. In addition, students evaluated AI as a tool that helps them reconsider their opinions, analyze information from multiple perspectives, and consider alternative points of view. Although the reasoning and argumentation direction showed a relatively low score, it was found that students recognize to a certain extent the capabilities of AI in developing arguments and considering opposing views.

The results obtained indicate that AI should not be considered as a tool to completely replace critical thinking, but as an auxiliary resource that supports the student's own analysis, evaluation and reflection. In this regard, it is important that the use of AI tools in higher education institutions is not limited to obtaining information or completing tasks, but is combined with learning tasks aimed at checking the reliability of information, comparing different points of view, evaluating evidence and drawing well-founded conclusions.

Since the research results are based on the views of 116 students from two universities, their direct generalization to all students of higher education institutions in Kazakhstan is limited. In addition, the study was based on the subjective assessment of students and did not measure their

actual critical thinking skills. Future research is recommended to supplement students' views on AI with tasks that objectively assess critical thinking skills, experimental studies or qualitative interviews.

Overall, the research results showed that students perceive artificial intelligence as a tool that supports their efforts to analyze, evaluate, substantiate information and reflect on their own thinking processes. Therefore, when introducing AI tools into the higher education system, the main focus should be on students' conscious, critical, and independent use of technology.

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Conflict of Interest

Authors declare no conflict of interest

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