

# Analysis of the use of Artificial Intelligence (AI) in lectures of science education student's at faculty of teacher training and education UNS

Qolbina Alfaatihah\*, Bayu Antrakusuma

Faculty of Teacher training and Education, Sebelas Maret University, Surakarta, Indonesia

\*Corresponding author, email: qolbinalfaa@gmail.com

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## Abstract

This research aims to know the views of science education students at faculty of teacher training and education UNS on the use of Artificial Intelligence in lectures. The sampling technique used is purposive random sampling. This study uses a quantitative approach with a descriptive type of research and is included in the category of non-experimental research. The data collection technique used a questionnaire survey. Data analysis uses descriptive statistical analysis techniques. The results of the study indicate that science education students at faculty of teacher training and education UNS have a very positive view of the use of AI in lectures. A good level of AI literacy allows for the use of diverse AI among students of faculty of teacher training and education UNS science education. The use of this technological advancement is to help in lectures and in preparing for learning in the classroom. The use of AI with many conveniences does not escape the impact received, such as data bias and the absence of accurate references, making it necessary for faculty of teacher training and education UNS science education students to anticipate it. Wise use is necessary to continue to take advantage of these technological advancements that are and will continue to evolve. This research is expected to be a reference and evaluation material for students, especially education students who are also prospective educators in the future.

## 1. Introduction

Rapid advances in technology and science have propelled humanity into the digital age (Sasmita, 2020). Digitalization has entered all aspects of human life, with the rapid shift in information and communication changing people's perspectives and ways of interacting. APJII (2024), data shows that of Indonesia's total population of 278,696,200 in 2023, 221,563,479 people or 79.50% are internet users, an increase of 1.31% from the previous year. The duration of internet use has also intensified, with usage of more than 10 hours increasing significantly by 4.28% from 7.14% in 2023, indicating the increasing intensity of digital technology use, including as a learning medium in the era of education 4.0 (Gontina & Asyhar, 2023).

One of the rapidly developing technologies is artificial intelligence (AI), which is a technology that enables computer systems to think or work intelligently like humans (Bajaj & Sharma, 2018). APJII (2024), data shows that the second highest use of AI services is in the field of education with a percentage of 5.40%, in line with UNESCO's mission to introduce AI to improve the quality of education in accordance with 21st century thinking skills (Gunawan et al., 2021). In the context of higher education, the use of AI is increasingly popular among students (Nabila et al., 2024). This has created a significantly changing educational paradigm (Jamal, 2023).

The Science Education Study Program at Faculty of Teacher Training and Education UNS carries a vision of developing science and technology to produce science education graduates with a global perspective who are able to adapt to current technological developments. Students of the Science Education Study Program have unique characteristics as prospective educators who must master both scientific content and pedagogy. They are not only required to understand science concepts in depth but also to be able to integrate technology into learning. Initial observations show that students have utilized various artificial intelligence applications to support the completion of their academic assignments, but it is not yet known to what extent they utilize AI and how they use it in various courses.

Although AI provides various conveniences, its use in an academic context also poses challenges such as excessive dependence that can reduce critical thinking skills, concerns about the originality of academic work, and the potential for plagiarism. In the context of prospective teachers, understanding the ethics of AI use is very important because they will be role models for future students. Based on this, research entitled “Analysis of the Use of Artificial Intelligence (AI) in Lectures of Science Education Students Faculty of Teacher Training and Education UNS” needs to be conducted using a descriptive quantitative approach to provide an accurate and comprehensive picture of the conditions of AI use in the context of higher education, particularly in science education study programs.

## 2. Method

The type of research used is quantitative descriptive. Quantitative descriptive research that is oriented to analyze data by describing the information that has been obtained. According to Sugiyono (2023), quantitative descriptiveness is consistent with research variables, focusing on the phenomenon that occurs, and data results in the form of meaningful numbers. This research is survey-based using questionnaires assisted by kuesio.

This research was conducted in June 2025. This study provides an overview of the views of faculty of teacher training and education UNS science education students towards Artificial Intelligence (AI) in their lectures. The population in this study is the 2021-2024 batch of faculty of teacher training and education UNS SCIENCE education students. Purposive random sampling was used to determine the sample in this study. The category of respondents is science education students of faculty of teacher training and education UNS class of 2021-2024 and know and/or use AI in lectures and learning. The sample in this study amounted to 192 students out of 339 students. This study uses questionnaire data collection techniques. The questionnaire was made using the online quiz website with primary sources or directly to the intended respondents, namely students of science education faculty of teacher training and education UNS. This study uses a likert scale with 5 scales for the collection of data on the variables of AI Literacy, AI Utilization, and Ethics and Legality of AI use.

The research procedure consists of several stages, namely the preparation stage which includes the preparation of instruments and instrument trials. The implementation stage includes data collection by providing questionnaires assisted by kuesio to faculty of teacher training and education UNS science education students. The final stage includes analyzing student or respondent answers and describing them. Data analysis uses descriptive statistics, namely the data obtained is described and depicted of the results data without the intention of making generalized conclusions is descriptive statistics.

## 3. Results and Discussion

### 3.1. AI Literacy

The level of AI literacy of faculty of teacher training and education UNS Science Education students is analyzed through several main indicators, as summarized in Table 1.

**Table 1. AI Literacy of science education students faculty of teacher training and education UNS**

Item	STS	TS	R	S	SS
I understand the concepts of AI including machine learning, neural networks and data processing	0	11	62	107	12
I know relevant AI to support its productivity (such as AI for lab simulations or AI for science analysis)	0	2	25	120	45
I understand the influence of AI on human feelings, so I can use this technology wisely by prioritizing empathy and emotional intelligence	2	4	15	128	43
I learned about the security and compatibility of AI, including the potential risks that an AI system poses	0	5	33	127	27
I understand the use of AI and its accountability (such as where the data is obtained, publication ethics when using the data obtained)	0	3	25	129	35

STS = Strongly disagree; TS = Disagree; R = Undecided; S = Agree; SS = Strongly agree

The AI literacy of science education students of faculty of teacher training and education UNS is relatively good when looking at the existing results. As seen in the table 1, 64% of students or as many as 611 answers agreed with 5 statements related to AI literacy. 162 answers strongly agreed in favor of this. 160 hesitant answers interpreted in the student's neutrality regarding AI literacy. Only 25 answers disagree (2%) and 2 strongly disagree (0%) on this first aspect.

The understanding of science education students at faculty of teacher training and education UNS regarding Artificial Intelligence (AI) enables them to make optimal use of technological advances in accordance with their academic needs. With an awareness of ethical and emotional aspects, students become wiser in using AI. They do not simply rely on the convenience it offers, but also understand the risks involved. Good AI literacy shapes students' responsible attitude in utilizing AI technology, enabling them to maintain integrity and ethics in all their academic activities. The findings of this study are in line with several previous studies. Suwahyu et al., (2024), found that students have good AI literacy, a high level of awareness, and fairly good utilization skills. In line with this research, Simanjuntak et al., (2024), stated that the AI literacy of students in Indonesia is quite good. Students agree that there is an increase in productivity and analytical skills with adequate AI literacy.

Good AI literacy among faculty of teacher training and education UNS science education students influences their ability to sort and select relevant AI platforms. When students have an understanding of this technology, they will be more selective in determining which ones suit their needs. This also reflects one aspect of AI literacy, namely knowledge of the appropriate platforms. It is known that the AI platforms frequently used by faculty of teacher training and education UNS science education students are ChatGPT, Gemini, Perplexity AI, Blackbox AI, Deepseek, Claude AI, etc. The study also found that faculty of teacher training and education UNS science education students use more than one AI application or Multi-Platform Usage. The popular combination used by students is Chat GPT, Gemini, and Perplexity. Students use more than one AI platform to obtain more accurate results through cross-verification of information, utilizing the advantages of each system, and reducing dependence on a single AI source. This multi-platform approach reflects a more advanced level of AI literacy, where students not only use AI as a simple tool but also develop effective strategies in utilizing various AI sources to optimize their academic results.

### 3.2. Utilization of AI

The aspect of the use of AI in the learning process of Science Education students of faculty of teacher training and education UNS is analyzed through several statements that reflect the use of AI as an academic and learning tool. The distribution of respondents' responses to each of these statements is shown in Table 2.

**Table 2. Utilization of AI of science education students faculty of teacher training and education UNS**

Item	STS	TS	R	S	SS
AI helps me find relevant references and literature	0	4	31	104	53
AI can be used to generate relevant writing ideas, and help me develop the writing (still prioritizing the authenticity of the work)	0	2	11	113	66
AI can help me in creating writing, presentations and multimedia content efficiently	0	3	14	128	47
AI can help me create practice questions that are tailored to my learning needs	0	4	11	133	44
AI can explain difficult material concepts in a more understandable way (including the validity of the source)	0	4	22	124	42

STS = Strongly disagree; TS = Disagree; R = Undecided; S = Agree; SS = Strongly agree

The next aspect is the use of AI. Based on the analysis of the five aspects of AI use, it can be concluded that faculty of teacher training and education UNS science education students show a very high and comprehensive level of AI use. Of the five statements presented, no student chose strongly disagree on any point, indicating universal acceptance of the usefulness of AI in academic activities. Overall, 602 responses or 63% agreed, 252 responses or 26% strongly agreed, 89 responses or 9% were unsure, and only 17 responses or 2% disagreed with the five statements. This very positive distribution of responses (89% positive responses) shows that AI has become an integral part of the learning system for science education students.

The capabilities of AI technology can also contribute to adjusting learning approaches to the needs of students and realizing personalized learning (Robiul et al., 2023). This is particularly relevant for science education students who will become educators, as they will be able to utilize AI technology to create personalized and adaptive learning experiences for their future students. This high level of AI utilization also shows that students have developed advanced AI literacy and practical skills in integrating AI tools into their academic workflow. They do not only use AI as a passive tool, but have developed a strategic approach in utilizing AI capabilities to improve their learning outcomes and academic productivity.

Therefore, in response to the open-ended question regarding the use of AI, namely whether AI will continue to be used by science education students at faculty of teacher training and education UNS, who are also future educators, the results show that most students answered yes to the future use of AI, with a total of 158 respondents. 12 respondents answered “maybe” with consideration of the negative impacts but still considering the benefits of its use, which are also in line with technological advances that will continue to develop. 22 respondents answered “no” by giving reasons for the negative impacts of its use.

### 3.3. Ethics and Legality of the use of AI

The level of awareness of faculty of teacher training and education UNS Science Education students towards the ethics and legality of using AI is shown in Table 3.

**Table 3. Ethics and Legality of the use of AI of science education students faculty of teacher training and education UNS**

Item	STS	TS	R	S	SS
I realized that AI can provide inaccurate and unreferenced information	1	0	28	97	66
I realized that AI can provide biased data (unfair or discriminatory data against a group)	0	6	33	110	43
I realized that by using AI the data entered may be saved by AI, even when the account is deleted	0	2	43	43	31

STS = Strongly disagree; TS = Disagree; R = Undecided; S = Agree; SS = Strongly agree

The final aspect is on the issue of ethics and legality of using AI. Based on the results of the research in Table 3, students realize that AI can provide inaccurate and unreferenced information. As many as 51% agreed, 34% said they strongly agreed, and 15% expressed hesitation. This shows that the promised benefits in the use of AI do not close the awareness of faculty of teacher training and education UNS science education students on the results of the answers received. The existence of inaccurate information emphasizes the importance of an in-depth study of the responsible use of AI in each field, to ensure that the use of AI in learning does not deviate from its main purpose (Stojanov, 2023).

Students are aware that AI can provide biased data, as can be seen from the results that 57% agree, 23% strongly agree, 17% express hesitation, and only 3% express their disagreement. This shows the awareness of faculty of teacher training and education UNS science education students on based data that may be received when using AI technology. The findings, stated that students expressed their concerns about ethical and social issues of the use of AI, such as data bias, negative impacts received, and existing privacy issues (Tampubolon et al., 2024).

A total of 61% said they agreed, 16% said they strongly agreed, and 22% expressed hesitation in the awareness statement of stored AI data even when the account has been deleted. This shows that faculty of teacher training and education UNS science education students are aware of data storage or privacy in AI. Hasanah (2024), findings mention the potential for data privacy violations when AI systems manage information.

Integration between technological advances and learning needs to be carried out (Nurhayati et al., 2024). The readiness, understanding, and trust of teachers or educators greatly determine the success in the application of advances in AI technology in learning (Taufik & Rindaningsih, 2024). Continuous professional development, in-depth training related to AI, ethical understanding, and curriculum integration are steps that can be taken. As an education student as well as a prospective educator, there are several ways to anticipate the impact of the use of AI that is received such as

increasing technological literacy, teaching the ethics of its use, and guiding students to use AI as a learning aid, not as a substitute for the critical thinking process. In fact, AI may be able to replace educators in providing knowledge, but emotionally the role of educators is still very necessary. Therefore, educators can prioritize the emotional development of students rather than just as a transfer of knowledge. Educators can integrate AI simulation of science concepts, while still conducting hands-on experiments in the classroom for learners to gain real-world experience and practical skills. As an educator, you can also control students' work, crosscheck, review, and validity tests.

The use of Artificial Intelligence by science education students as future educators is in line with the need for them to be literate about this technological development. In accordance with the discussion in "AI Will Transform Teaching and Learning. Let's Get it Right.", it explains that the development of artificial intelligence technology will bring changes in the world of education, educators are the vanguard in its proper and correct use (Chen, 2023). Chen et al.'s theory, in Xu & Ouyang (2022), states that Artificial Intelligence in Education (AIED) is a growing interdisciplinary field by applying AI technology in learning and education, changing and promoting the design, process, and assessment of learning.

### **3.4. Conclusion**

This study was conducted with the aim of determining the use of Artificial Intelligence (AI) among science education students at faculty of teacher training and education UNS. Based on the results of the study, it can be concluded that science education students at faculty of teacher training and education UNS have a very positive view of the use of AI in their lectures. In terms of AI literacy, 81% of students showed positive responses with a comprehensive understanding of basic AI concepts, the ability to identify relevant tools for academic productivity, awareness of emotional aspects and digital empathy, understanding of security and potential risks, and responsibility in the use of AI. This high level of AI literacy is supported by the diversity of AI applications used, with ChatGPT being the most dominant (148 users), followed by Gemini (55 users), and various specialized tools such as Perplexity and Virtual Lab AI, which demonstrate students' awareness of specialized tools relevant to the academic needs of Science Education.

The use of AI in students' academic activities shows a very high level with 89% positive responses. Students utilize AI comprehensively for reference and literature searches (82% positive responses), generating ideas and developing writing (93% positive responses), creating presentations and multimedia content (91% positive responses), creating practice questions (92% positive responses), and explaining complex concepts (87% positive responses). This high level of utilization shows that AI has become an integral part of the student learning system, with strategies for using various advanced platforms to cross-check information and optimize academic results. A total of 158 students agreed to continue using AI in the future, reflecting a high level of acceptance of the integration of this technology into the educational process. Despite their positive views, students also have a high awareness of the ethical and legal aspects of AI use. A total of 85% of students are aware of the potential inaccuracy of AI information, 80% understand the risks of data bias, and 77% are aware of privacy and data storage issues. This awareness demonstrates the maturity of students in approaching AI technology in a responsible and balanced manner.

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