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Student Perceptions of AI in Learning: The Role of Credibility and Emotional Well-Being in Supporting Critical Thinking Skills

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ABSTRACT

This study explores university students' perceptions of artificial intelligence (AI) in enhancing critical thinking skills within higher education. Using a quantitative cross-sectional design, data were collected from 90 Indonesian students who had used AI tools such as ChatGPT or Grammarly in academic contexts. The study examined five independent variables: perceived credibility of AI, AI quality, cognitive absorption, emotional well-being, and user satisfaction, and their relationship to students' overall perception of AI benefits. Descriptive statistics revealed that students' perceptions were generally moderate, with emotional well-being and perceived credibility emerging as significant predictors of positive perceptions. Multiple linear regression showed that emotional well-being had the strongest influence, followed by credibility. These findings emphasize the importance of affective experiences and trust in shaping acceptance and effective use of AI in learning. This research contributes to a deeper understanding of how AI integration can support 21st-century skills development, and suggests the need for emotionally engaging and trustworthy AI systems in educational environments.

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INTRODUCTION

The development of artificial intelligence (AI) technology has had a significant impact across various sectors, including higher education. In today's digital era, AI is utilized not only as an administrative support tool but also as an interactive, adaptive, and personalized learning medium. One of the potential benefits of AI implementation in education is its ability to support the development of students' critical thinking skills—an essential competency for navigating complex information and making decisions in the 21st century [1], [2], [3].

Various AI-based tools, such as ChatGPT, Grammarly, and machine learning–driven educational platforms, offer features that facilitate students in analyzing information, evaluating arguments, and generating innovative solutions. AI has the capability to simplify complex concepts, present content contextually, and provide instant feedback that fosters reflection and deeper reasoning [4]. Statistics from the journal *Sustainability* report that approximately 67.5% of students feel satisfied using AI due to its relevant content and emotionally supportive learning experience [5]. According to a journal published in IJIRMPS (International Journal of Innovative Research in Management, Planning and Social Sciences), around 40% of students perceive the impact of AI as very positive, while another 33.3% view it as moderately positive. Overall, 73.3% of students

regard AI in education as a beneficial influence. However, concerns remain regarding the effectiveness of AI in supporting the development of students' social and metacognitive skills [6]. Although numerous studies have provided valuable insights into AI usage, some questions remain unanswered—such as how AI can support collaborative learning experiences, what steps are needed to ensure AI does not replace essential human interaction, and which specific critical thinking skills are most effectively developed through AI in education [7].

However, despite various studies highlighting the benefits of AI in education, students' perceptions of the actual usefulness of AI in supporting critical thinking skills have not been thoroughly explored. Some research suggests that these perceptions may be influenced by several factors, such as the perceived credibility of AI tools, AI quality, cognitive absorption, emotional well-being, and satisfaction with AI usage [8], [9]. AI credibility refers to the extent to which students trust the accuracy and reliability of the information provided by AI. AI quality encompasses ease of use and technical features that enhance learning comfort. Cognitive absorption reflects the level of mental engagement when using AI, while emotional well-being relates to students' affective experiences. On the other hand, satisfaction serves as a key indicator in evaluating students' overall experiences with AI tools. Several research gaps remain, including limited understanding of the relationships among these factors and their influence on perceived AI benefits, the lack of an integrative framework for educators, and the scarcity of longitudinal studies assessing AI's long-term impact [10]. Moreover, concerns about algorithmic bias and the potential decline of human interaction in the learning process also remain unresolved.

With this background, the present study aims to analyze students' perceptions of AI usage in supporting critical thinking skills, focusing on five independent variables: perceived credibility of AI tools, AI quality, cognitive absorption, emotional well-being, and satisfaction with AI. The findings of this research are expected to contribute both theoretically and practically to the development of technology-based learning strategies, particularly in designing more effective, credible, and impactful applications of AI to enhance students' critical thinking competencies.

METHOD

Research Design

This study employed a quantitative approach with a cross-sectional design, in which data were collected at a single point in time to evaluate the relationship between the use of artificial intelligence (AI)-based tools and students' critical thinking skills. This design was chosen to obtain a clear and efficient overview of the impact of AI in education [11].

Participants and Sampling

The respondents in this study were active university students from various institutions in Indonesia who had experience using AI-based tools in the learning process. The sampling technique used was purposive sampling, which involves selecting respondents based on specific criteria aligned with the research objectives [12]. Data were collected through an online questionnaire distributed via platforms such as Google Forms to reach a wide range of participants and facilitate ease of participation. The inclusion criteria for respondents were as follows:

- Students who have used AI tools (such as ChatGPT, Grammarly, or other AI platforms) in academic activities
- Aged between 18–25 years

The sample size was determined using the Slovin formula with a margin of error of 5%, resulting in a minimum required sample of 385 respondents. However, due to practical limitations, data were collected from 90 respondents.

Instrument

The primary instrument used in this study was a questionnaire consisting of 26 closed-ended statements using a 5-point Likert scale and 3 open-ended questions. The questionnaire was developed to measure six key aspects related to students' perceptions of using artificial intelligence (AI) tools in the learning process. Table 1 presents these six aspects of student perception.

Table 1. Student Perception of AI

Aspect	Definition
AI Tool Credibility	Describes the extent to which students view AI tools as a reliable and accurate source of information [13].
AI Tool Quality	Assesses ease of use, reliability, and innovative features of AI tools [14].
Real Benefits	Identifies the positive impact of AI use on academic performance and critical thinking skills [15].
Cognitive Absorption	Measures students' cognitive engagement when interacting with AI [16]
Emotional Well-being	Assesses the influence of AI on students' emotions, stress, and learning motivation [17].
Satisfaction	Measures overall satisfaction with the effectiveness of AI use in learning [18]

Each aspect is measured through several closed-ended statements, and this instrument was developed by referring to previous studies by [10], [19]. In addition, there are 3 open-ended questions aimed at exploring more in-depth information regarding:

- Whether the use of AI makes students more confident or more dependent on technology
- How AI helps in understanding difficult topics
- The risks or drawbacks of using AI in learning

Data Analysis

The data obtained from the questionnaire were analyzed using the Jamovi software. The first analysis conducted was descriptive statistics, which included calculating the mean, median, mode, minimum value, maximum value, and total score for each item in the questionnaire [20]. This step aimed to provide an overall picture of the data trends and the distribution of respondents' answers.

Next, to determine the relationships between variables, Pearson correlation analysis was used. This technique measures the strength and direction of the linear relationship between two numerical variables. The results of this analysis indicate the extent to which one variable is significantly related to another. As the main analysis, multiple linear regression was employed to examine the simultaneous influence of independent variables on the dependent variable [21], [22]. This regression allows identification of the relative contribution of each predictor to the observed variable. All analyses were performed using the menus and features available in Jamovi, with results presented in the form of statistical tables and numerical interpretations.

RESULTS AND DISCUSSION

Respondent Demographics

To understand the basic characteristics of the participants in this study, an analysis of the respondents' demographic data was conducted. This information includes gender and average age as the main variables describing the sample distribution. The purpose of this analysis is to provide context regarding the respondents' backgrounds, which may influence their perceptions of using artificial intelligence (AI) tools in the learning process. The following table presents a summary of the respondents' demographic data based on relevant categories.

Table 2. Demographic Distribution of Respondents

Characteristic	Category	Frequency (n)	Percentage (%)	Mean Age (Tahun)
Gender	Male	31	34.4%	19.5
	Female	59	65,6%	19.2
Total	–	90	100%	19.3

The majority of respondents in this study were female (65.6%), nearly twice the number of male respondents (34.4%). The average age of respondents was around 19 years, with the average age of male respondents slightly higher (19.5 years) compared to females (19.2 years). The age difference between genders was only about 0.3 years, indicating that the age distribution within this sample was fairly homogeneous. Overall, this demographic data shows that the respondents belong to the late adolescent or early university student phase, with females being more dominant in participation. This information provides an important basis for understanding the social and academic context of the subsequent research findings.

Descriptive Statistics

Descriptive analysis was conducted to describe students' perceptions of using artificial intelligence (AI) tools in supporting critical thinking skills. Each statement in the questionnaire was analyzed using statistical measures such as mean, median, mode, minimum value, maximum value, and total score (sum) [23]. The purpose of this analysis was to identify general response patterns of the respondents regarding various measured aspects, including credibility, quality, real benefits, cognitive absorption, emotional well-being, and satisfaction with AI usage. The mean value of each item indicates the tendency level of respondents' perceptions toward the given statements. The median and mode are used to determine the central value and the most frequently occurring value, respectively. Meanwhile, the minimum and maximum values provide information about the range of respondents' answers, and the sum value shows the total accumulated score from all respondents for each item.

Table 3. Results of Descriptive Analysis

Aspect	Item/Statement/Question	Descriptive Statistics					
		Mean	Median	Modus	Min	Maks	Sum
AI Credibility	I feel that the content generated by AI tools in education can be trusted	2.49	3.00	3.00	1	5	224

AI Quality	I feel that the content generated by AI tools in education is accurate	2.61	3.00	3.00	1	5	235
	I feel AI tools generate and provide educational materials and content without bias	2.57	3.00	3.00	1	5	231
	I feel the content provided by AI tools in education is complete	2.74	3.00	3.00	1	5	247
	I feel that the content generated by AI is easy to understand	2.24	2.00	2.00	1	5	202
	I feel that the content generated by AI is easy to comprehend	2.47	3.00	3.00	1	5	222
	I feel that the content generated by AI is popular	2.47	3.00	3.00	1	5	222
	I feel that the content generated by AI is relevant to users	2.49	3.00	3.00	1	5	224
Perceived Benefits	I feel using AI tools positively impacts my academic performance	2.50	2.00	2.00	1	5	225
	I feel AI tools speed up my learning process by providing quick access to needed resources	2.36	2.00	2.00	1	5	212
	Using AI tools increases my creativity in solving problems I face in class	2.37	2.00	2.00	1	5	213
	I intend to continue using AI tools in my learning process in the future	2.76	3.00	3.00	1	5	248
Cognitive Absorption	Overall, I am satisfied with the experience of using AI tools in education	2.37	2.00	2.00	1	5	213
	I feel time passes quickly when I use AI tools	2.47	3.00	3.00	1	5	222
	I feel I spend more time than planned when using AI	2.70	3.00	3.00	1	5	243
	I feel sometimes I have to catch up with time when using AI	2.82	3.00	3.00	1	5	254
	I feel engaged with what I am doing when using AI	2.47	2.47	3.00	1	5	222
Emotional Well-being	I feel curious when interacting with AI	2.51	3.00	3.00	1	5	226
	I feel happy when using AI tools	2.41	2.00	3.00	1	5	217
	I feel excited when using AI tools	2.49	3.00	3.00	1	5	224
	I feel calm when using AI tools	2.59	3.00	3.00	1	5	233
	I feel satisfied when using AI tools	2.48	3.00	3.00	1	5	223
Satisfaction	I fully accept AI tools	2.49	3.00	3.00	1	5	224
	I feel AI tools greatly improve my learning	2.53	3.00	3.00	1	5	228
	I feel AI tools significantly improve my learning ability	2.59	3.00	3.00	1	5	233
	I feel the information obtained from AI tools is very valuable	2.53	3	3.00	1	5	225

Based on the descriptive analysis results, the mean values of most statements range from 2.2 to 2.8, indicating that students' perceptions toward AI use in learning tend to be neutral to somewhat positive but have not reached a high level of agreement. The consistent median and mode values around 3.00 in most items suggest that respondents tended to choose neutral responses, with response variations not being too extreme.

Overall, these results show that students have a cautious and moderate view of AI in the educational context. Although some recognition of certain benefits from AI use exists, respondents have not shown full confidence or satisfaction. These findings can serve as a foundation for further research aimed at developing more effective and relevant AI usage approaches tailored to students' learning needs.

Pearson Correlation

Pearson correlation analysis was conducted to examine the relationships among variables in this study, namely AI Credibility, AI Quality, AI Perception, Cognitive, Emotional, and AI Satisfaction. The results, presented in Table 3, indicate that all correlations among these variables are positive and significant at the $p < .001$ level.

Tabel 4. Correlation Matrix

		Credibility	AI Quality	AI Perception	Cognitive	Emotional	AI Satisfaction
Credibility	Pearson's r	—					
	df	—					
	p-value	—					
AI Quality	Pearson's r	0.763	—				
	df	81	—				
	p-value	<.001	—				
AI Perception	Pearson's r	0.736	0.782	—			
	df	81	81	—			
	p-value	<.001	<.001	—			
Cognitive	Pearson's r	0.604	0.660	0.670	—		
	df	81	81	81	—		
	p-value	<.001	<.001	<.001	—		
Emotional	Pearson's r	0.683	0.769	0.782	0.633	—	
	df	81	81	81	81	—	

		Credibility	AI Quality	AI Perception	Cognitive	Emotional	AI Satisfaction
AI Satisfaction	p-value	<.001	<.001	<.001	<.001	—	
	Pearson's r	0.698	0.771	0.771	0.659	0.803	—
	df	81	81	81	81	81	—
	p-value	<.001	<.001	<.001	<.001	<.001	—

Overall, these results indicate a positive and significant relationship among all variables, suggesting that an increase in one variable is likely to be followed by an increase in the others. The highest correlation was found between Emotional and AI Satisfaction (r = 0.803), while the lowest yet still significant correlation was observed between Credibility and Cognitive (r = 0.604).

Multiple Linear Regression

Linear regression analysis was used in this study to evaluate the extent to which the independent variables—AI Credibility, AI Quality, Cognitive, Emotional, and AI Satisfaction—affect Perception of AI as the dependent variable. This approach aims to understand the contribution of each factor in shaping users' perceptions of artificial intelligence (AI). The results of the analysis are presented in three parts: model fit measures, ANOVA test results, and regression coefficients.

Table 5. Model Fit Measures

Model	R	R^2	Adjusted R^2
1	0.858	0.737	0.720

The model fit results indicate that the regression model has an excellent level of fit, with an R^2 value of 0.737 and an Adjusted R^2 of 0.720. This means that approximately 73.7% of the variation in AI Perception can be explained by the combination of the five independent variables included in the model.

Table 6. Omnibus ANOVA Test

Variabel	Sum of Squares	df	Mean Square	F	p
Credibility	0.809	1	0.809	4.25	0.043
AI Quality	0.631	1	0.631	3.31	0.073
Cognitive	0.481	1	0.481	2.53	0.116
Emotional	1.158	1	1.158	6.08	0.016
AI Satisfaction	0.471	1	0.471	2.47	0.120
Residuals	14.663	77	0.190		

The ANOVA test shows that the regression model as a whole is significant. Individually, the variables AI Credibility (p = 0.043) and Emotional (p = 0.016) contribute significantly to the model. Meanwhile, AI Quality (p = 0.073), Cognitive (p = 0.116), and AI Satisfaction (p = 0.120) do not show statistical significance at the 95% confidence level.

Table 7. Regression Coefficients for AI Perception

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept	-0.0131	0.2011	-0.0653	0.948	
Credibility	0.2219	0.1076	2.0614	0.043	0.196
AI Quality	0.2069	0.1137	1.8200	0.073	0.205
Cognitive	0.1508	0.0949	1.5891	0.116	0.132
Emotional	0.2547	0.1033	2.4659	0.016	0.267
AI Satisfaction	0.1600	0.1017	1.5731	0.120	0.175

The regression coefficient results indicate that two variables make statistically significant contributions to AI Perception: AI Credibility (β = 0.196, p = 0.043) and Emotional (β = 0.267, p = 0.016). Among all predictors, the Emotional variable has the strongest influence, followed by AI Quality (although not statistically significant). The model intercept is not significant (p = 0.948), which is common and not the main focus of interpretation.

Discussion

The results of this study indicate that students' perceptions of the use of Artificial Intelligence (AI) in learning remain at a moderate level. The mean scores ranged between 2.2 and 2.8, with both the median and mode at 3.00, suggesting that most respondents held neutral views toward AI in the educational context. This attitude implies that although students are beginning to recognize the potential of AI, they have not yet fully embraced its effectiveness and reliability. These findings align with previous research [3], [24] which indicates that user acceptance of AI in education is significantly influenced by their understanding of the technology's benefits and risks.

The Pearson correlation analysis reinforced the descriptive findings, showing that all study variables are positively and significantly correlated with one another. The strongest correlation was found between Emotional Engagement and AI Satisfaction (r = 0.803), emphasizing that high emotional involvement when using AI is closely linked to student satisfaction with the technology. This is consistent with the findings of [8] which highlight the importance of emotional experience in shaping users' perceptions of learning technologies, especially in digital, interactive environments.

Linear regression analysis revealed that AI Credibility significantly influenced AI Perception (β = 0.196, p = 0.043). This demonstrates that students' trust in the reliability, accuracy, and objectivity of AI directly enhances their perception of the benefits and acceptability of the technology. This finding supports the results of [13] who emphasized that trust is a critical prerequisite for AI adoption, particularly in education, where the validity of information is paramount. Although AI Quality (β = 0.205, p = 0.073) did not reach statistical significance, it still showed a

notable numerical contribution to perception. This suggests that factors such as ease of use, user interface design, and content relevance play an important role in shaping user comfort and confidence. Similarly, [10] noted that a positive user experience can foster favorable perceptions of AI in higher education settings. The Cognitive variable ($\beta = 0.132$, $p = 0.116$) indicated that students' mental engagement while using AI was not strong enough to significantly influence their perception. Despite a positive tendency, this could imply that AI has not yet been optimally utilized to support critical thinking or deep learning processes. Prior studies [1], [4], [5] have underscored the importance of pedagogical intelligence—AI's ability to tailor content and strategies to users' learning needs—in fostering meaningful cognitive impact.

Interestingly, the Emotional variable had the strongest and most significant influence on AI Perception ($\beta = 0.267$, $p = 0.016$), indicating that affective factors such as enjoyment, calmness, and motivation while using AI play a crucial role in shaping students' perceptions. As noted by [8] positive emotional engagement enhances the intention to use technology consistently. This finding also aligns with the Technology Acceptance Model 3 (TAM3) proposed by [25]**,** which positions emotional factors as key determinants in technology acceptance. Meanwhile, Satisfaction with AI did not show a statistically significant effect ($\beta = 0.175$, $p = 0.120$), although it remained positively associated with AI Perception. This suggests that while students have begun to perceive some benefits of AI, their experiences have not yet been sufficiently satisfying to strongly enhance their perception of the technology. According to [26] user satisfaction is a crucial indicator of the sustainability of AI use in education, highlighting the need to evaluate and improve the overall user experience.

Overall, this study highlights that emotional engagement and AI credibility are the two main factors shaping students' positive perceptions of AI in learning. Although technical quality, cognitive engagement, and user satisfaction contribute positively, their influence was not statistically significant. These findings suggest that the successful implementation of AI in education depends not only on its functional aspects but also on users' emotional experiences and trust. However, this study has several limitations. First, the sample size of 90 students may not fully represent the broader population of university students in Indonesia, limiting the generalizability of the findings. Second, the cross-sectional design does not capture the dynamic evolution of user perceptions over time. Third, the use of quantitative instruments may constrain deeper exploration of psychological and contextual factors affecting students' views of AI. Therefore, future research is encouraged to expand the sample, employ longitudinal designs, and integrate qualitative data to capture a more holistic and in-depth understanding of user experience.

CONCLUSIONS

The findings of this study indicate that students' perceptions of using Artificial Intelligence (AI) in learning tend to be moderate. Significant effects were observed for two key variables: AI credibility and emotional well-being. This suggests that trust in the reliability of AI and positive emotional experiences—such as feeling comfortable and motivated when using AI—play a crucial role in shaping users' perceptions. Meanwhile, AI quality, cognitive engagement, and user satisfaction contributed positively but were not statistically significant. These results highlight the importance of addressing emotional and trust-related aspects when designing educational AI systems that are more widely accepted and impactful. The main limitations of this study lie in its relatively small sample size and cross-sectional design. Therefore, future research is recommended to involve a larger and more diverse sample and adopt a longitudinal approach for a more comprehensive understanding.

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