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The Influence of Artificial Intelligence (AI) Utilization on Learning Motivation and Creativity of Students

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ABSTRACT
The development of AI in education has a significant impact on changing how students learn, think, and create, particularly in enhancing access to information and learning effectiveness. The purpose of this study is to analyze the influence of AI on the learning motivation and creativity of FKIP students at Universitas Lambung Mangkurat. This study employs a quantitative research method with a random sampling technique, involving 125 students enrolled in the Scientific Writing course. Data collection was conducted by distributing a Likert-scale questionnaire with 4 response options to measure the variables of AI, learning motivation, and student creativity. The data analysis technique utilizes the Structural Equation Model (SEM) to determine the influence of the AI variable on student learning motivation and creativity. The results indicate that the utilization of Artificial Intelligence (AI) has a positive and significant influence on student learning motivation. However, the utilization of AI does not have a direct significant influence on student creativity. Conversely, learning motivation is proven to have a positive and significant influence on creativity and acts as a mediating variable. In conclusion, the enhancement of student creativity is more effectively achieved through the increase of learning motivation facilitated by the utilization of AI. Therefore, it is recommended that educators integrate AI with active learning strategies, such as project-based and problem-based learning, and encourage students to use AI as a tool for exploring ideas rather than merely for task completion.
Keywords: Artificial Intelligence; Study Motivation; Creativity

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INTRODUCTION
The development of Artificial Intelligence (AI) has a vast global impact across various sectors, including education. The integration and utilization of AI in learning, besides facilitating access to information, also possesses the potential to alter students' ways of thinking, learning, and creating (Chetry, 2024; Ilham et al., 2025). AI provides opportunities for learning that is more adaptive to current technologies, efficient through the provision of instant feedback, learning recommendations, and broad access to information (Akavova et al., 2023; Gligorea et al., 2023). Various international studies indicate that integrating AI into learning can increase student

engagement, strengthen motivation to learn, and encourage the exploration of creative ideas through technology-based platforms (Murakami et al., 2024; Xu, 2025).

On a national scale, Indonesia has begun to recognize and follow the trend of AI utilization. This indirectly increases digital literacy (Wardhani et al., 2025). Currently, many students utilize AI to search for lecture materials, references for scientific assignments, and to develop creative ideas in realizing solution-oriented concepts. This condition offers a major opportunity to enhance students' motivation to learn. This phenomenon can be measured using learning motivation indicators, namely attendance, interest, enthusiasm, sense of enjoyment, note-taking related to the material, paying attention to instruction, and curiosity (Rosiana et al., 2023). Student learning motivation influences the improvement of individual student learning to explore materials more deeply (Huang & Mizumoto, 2024; Lai, 2021). High learning motivation encourages students to actively explore material, not limited only to what is delivered in the classroom, but also through supplementary sources and independent learning experiences. This improves the quality of understanding because students are more cognitively engaged and possess an internal drive to achieve better learning outcomes.

In addition to potentially increasing learning motivation, this can also enhance student creativity. This can be measured based on student creativity indicators, namely the ability to create unique works, alternative ideas in creating works, self-confidence in creating works, developing ideas into works or elaboration, originality of work, and authentic work (Meiliza et al., 2025). The assistance of AI facilitates students in gaining broader access to references, making the process of creating works increasingly varied and better directed. Furthermore, the use of AI can also accelerate the process of idea exploration, enabling students to produce works that are not only creative but also relevant to contemporary developments.

Motivation and creativity possess a mutually reinforcing relationship in learning processes that utilize technology, particularly AI utilization. High learning motivation impacts the increase of student courage in exploring new notions, employing new approaches, and generating impactful innovations (Hartung & Kleinstreuer, 2025; Jauhiainen, 2024; Liu, 2023). In this context, creativity does not stand alone without student learning motivation, as well as the availability of digital learning resources that are constantly updated according to current developments. Proper utilization of AI provides opportunities for students to develop more specific ideas and visualize more complex concepts (Aini, 2023; Sabrina et al., 2025).

Although various previous studies have discussed the relationship between AI utilization and student learning motivation or creativity, most of these studies still focus on the effectiveness of AI usage in improving learning outcomes, digital literacy, and academic efficiency in general. Previous research also tends to test motivation and creativity separately, so the structural relationship between AI utilization, learning motivation, and student creativity has not been widely analyzed simultaneously, particularly using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. Furthermore, empirical studies on AI utilization among students in the field of education remain relatively limited, despite FKIP students possessing distinct academic characteristics, as they are prepared as prospective educators who are required to be adaptive to educational technology developments. The context of FKIP Universitas Lambung Mangkurat is crucial to study because students not only use AI as an academic aid but also as a means of developing learning ideas, compiling lesson-planning tools, and innovating digital learning media. Therefore, this study makes a theoretical contribution by clarifying the direct and indirect relationships among AI utilization, learning motivation, and student creativity in the context of higher education in Indonesia.

Students of FKIP Universitas Lambung Mangkurat have utilized AI as part of their learning or academic activities. The use of AI supports the learning process, such as by searching for references for lesson planning and scientific writing, and by developing digital technology-based learning media. Field conditions explicitly demonstrate that students are motivated and enthusiastic about completing course assignments by utilizing AI. AI is not only capable of impacting motivation but is also able to increase student creativity in building and shaping works. This indicates that AI functions not merely as an aid to access information, but also as an

important tool in the development of creative thinking and student innovation. Based on this research gap, this study proposes the hypothesis that AI utilization has a positive effect on student learning motivation and creativity, and that learning motivation affects student creativity. Additionally, learning motivation is presumed to mediate the relationship between AI utilization and student creativity.

This study aims to analyze the influence of AI on the learning motivation and creativity of FKIP ULM students. The results of the study are expected to serve as a reference in developing technology-based learning strategies and integrating AI to increase student motivation and creativity. Furthermore, this study is expected to provide empirical contributions to educational policymaking to optimize AI utilization in higher education environments.

METHODS

This study was conducted in Banjarmasin City, specifically within the environment of FKIP Universitas Lambung Mangkurat (ULM). The population in this study consists of active students of FKIP ULM, using a simple random sampling technique. Simple random sampling is applied to highly homogeneous populations, where population members are selected randomly to participate in the study (Noor et al., 2022). This study uses simple random sampling by determining 125 students who are studying the Scientific Writing course. The students who served as respondents in this study comprised 39 students of the 6th-semester Geography Education and 86 students of the 4th-semester Educational Technology.

The data collection technique in this study was the distribution of questionnaires. This instrument contained a series of questions or statements used to gather data from respondents (Jailani, 2023; Saglam, 2024). The distributed instrument was measured using a 4-point Likert scale, namely strongly agree, agree, disagree, and strongly disagree (Alhassn et al., 2022). The data sources, consisting of questionnaire results and literature studies, constituted additional information from the research results. The research instrument table is presented Table 1.

Table 1 Research instrument

Variable	Indicator	Item Number	Quantity	Total
The use of Artificial Intelligence (P)	The frequency of the use of AI	1,2	2	2
Learning Motivation (M)	Interest	1,2,3	3	17
	Enthusiasm	4,5	2	
	Sense of enjoyment	6,7,8	3	
	Note-taking related to materials	9,10,11	3	
	Paying attention to instruction	12,13,14	3	
	Curiosity	15,16,17	3	
Creativity (K)	The ability to create unique works	1,2,3	3	16
	Alternative ideas in creating works	4,5,6	3	
	Self-confidence in creating works	7,8	2	
	Developing ideas into works or elaboration	9,10,11	3	
	Originality of work	12,13	2	
	Authentic work	14,15,16	3	

The distributed questionnaire was divided into 3 variables, namely the AI utilization variable consists of 1 indicator divided into 3 statements; the learning motivation variable consists of 7 indicators divided into 21 statements; and the creativity variable consists of 6 indicators divided into 18 statements. The total number of statements distributed at the beginning of the study was

42 statements. However, based on the validity test results, values below 0.5 are classified as invalid (Alfiatunnisa et al., 2022). After the validity test, the statements used remained at 35 items, while 7 items were discarded. Further testing on reliability results using Cronbach's Alpha stipulates that $\alpha < 0,5$ indicates low reliability, $0,5 < \alpha < 0,8$ indicates moderate (acceptable) reliability, and $\alpha > 0,8$ indicates high (good) reliability (Ekolu & Quainoo, 2019).

The data analysis technique in this study utilizes Partial Least Square Structural Equation Modeling (PLS-SEM) analysis (Xie et al., 2025). The SEM analysis was performed using SmartPLS 3. The analysis consists of descriptions of F-Square and R-Square values. The F-Square value is considered the correlation between variables, where an F-Square value of 0.02 is categorized as a small effect, a value of 0.15 is categorized as a medium effect, and a value of 0.35 is categorized as a large effect (Wicaksana, 2022). R-square is also called the coefficient of determination, which explains how far the dependent data can be explained by the independent data (Indartini & Mutmainah, 2024). Furthermore, in the HTMT Test, if the variable value is <0.9, then the HTMT discriminant validity value is considered fulfilled (Puspita et al., 2024).

RESULTS AND DISCUSSION

Data analysis was conducted using the PLS-SEM approach through SmartPLS 3 software. The initial stage performed was testing the measurement model (outer model) to ensure that each indicator is capable of representing the latent constructs validly. One of the main criteria in this test is the loading factor value, which indicates the level of contribution of an indicator to the measured variable (see Table 2).

Table 2 Latent variable

Indicator	The use of AI	Motivation	Creativity
P1	0.818		
P2	0.881		
M1		0.583	
M2		0.671	
M3		0.752	
M4		0.593	
M5		0.609	
M6		0.684	
M7		0.656	
M8		0.633	
M9		0.537	
M10		0.577	
M11		0.635	
M12		0.529	
M13		0.628	
M14		0.507	
M15		0.632	
M16		0.652	
M17		0.741	
K1			0.635
K2			0.636
K3			0.739
K4			0.715
K5			0.669
K6			0.685
K7			0.507

Indicator	The use of AI	Motivation	Creativity
K8			0.558
K9			0.600
K10			0.670
K11			0.656
K12			0.609
K13			0.568
K14			0.514
K15			0.693
K16			0.586

Based on the data obtained from the latent variables in Table 2, analysis was conducted by observing the outer loading value of each indicator against its construct, namely AI Utilization, Learning Motivation, and student Creativity. An indicator is declared valid if it has a loading factor value above 0.5 and is ideal if it is above 0.7. The AI Utilization variable (P1 and P2) shows values of 0.818 and 0.881; therefore, it can be stated as valid in representing the construct. The Learning Motivation variable (M1-M17) mostly shows construct values above 0.5. However, they remain within a moderate range, so they are reasonably viable to be retained. The Creativity variable (K1-K16) mostly has construct values above 0.5, and several show values above 0.7 (ideal), contributing strongly to the creativity construct. Overall, these results are declared to possess sufficiently good validity to be used in subsequent analysis. The next stage is analyzing the reliability test results using the Cronbach's Alpha metric (Table 3).

Table 3 Reliability test

Variable	Cronbach's Alpha	rho_A	Composite Reliability
Creativity	0.898	0.903	0.913
Learning Motivation	0.903	0.908	0.916
Utilization of AI	0.618	0.633	0.838

Based on the reliability test data processing using Cronbach's Alpha values (Table 3) for each variable, it is known that the creativity and learning motivation variables obtained values of 0.898 and 0.903. Both have values above 0.7, indicating very high reliability and strong internal consistency between statements. However, the AI utilization variable has a value of 0.618, which is still above the minimum threshold of 0.6, so it remains categorized as reliable. Overall, all constructs in this study meet the reliability criteria and are suitable for further analysis. The next analysis concerns the influence between variables (see Table 4).

Table 4 Inner model of causal relationships between variables

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
The use of AI -> Learning motivation	0.436	0.452	0.066	6.623	0.000
The use of AI -> Creativity	0.112	0.107	0.082	1.370	0.171
Learning motivation -> Creativity	0.649	0.666	0.065	9.958	0.000

The data presented in Table 4 display the inner model results aimed at testing the causal relationships between variables in this study. The table shows the p-value as the basis for hypothesis decision-making. The relationship between AI utilization and student learning motivation has a p-value of 0.000 (<0.005); thus, it is declared to have a positive and significant influence. Next, the relationship between AI utilization and student creativity shows a p-value

of 0.171 (>0.005); therefore, it is classified as non-significant or indirectly has no effect. However, the relationship of learning motivation toward student creativity has a p-value of 0.000 (<0.005), so it can be proven that learning motivation has a positive and significant influence on student creativity.

The structural model in the form of a path diagram (Figure 1) illustrates the relationships between latent constructs along with their indicators. The AI utilization variable acts as a dependent variable that attempts to influence the independent variables (learning motivation and creativity). However, motivation also plays a role in influencing student creativity.

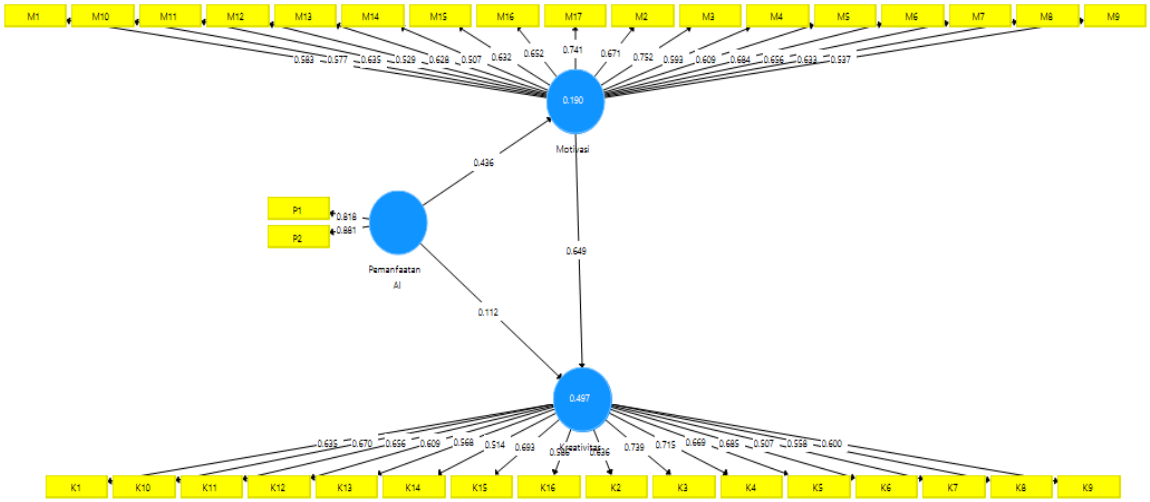

Figure 1 The model of AI utilization on student motivation and creativity

The coefficient shown by each arrow indicates the strength of the influence between variables, which is consistent with the results in Table 5. Additionally, the R-Square value of the independent variables (learning motivation and creativity) indicates the magnitude of the capacity of these variables to explain the dependent variable. Overall, this model indicates that AI utilization influences student creativity more indirectly through the enhancement of learning motivation, compared to the direct influence, which is non-significant.

Table 5 Test results of R-square and adjusted R-square

	R Square	**Adjusted R-Square**
Creativity	0.497	0.489
Learning Motivation	0.190	0.183

Table 5 shows the R-Square and Adjusted R-Square values used to observe the capacity of independent variables to explain dependent variables in the research model. The Creativity variable has an R-Square value of 0.497, which means that 49.7% of student creativity can be explained by the AI Utilization and Learning Motivation variables, while the remainder is influenced by other factors outside the study. Meanwhile, the learning motivation variable has an R-Square value of 0.190, which indicates that 19% of learning motivation can be explained by AI utilization. The Adjusted R-Square value, which is close to the R-Square value, indicates that the research model has a fairly good level of consistency in explaining the relationships between variables. The results of the F-square test are listed in Table 6.

Table 6 Test results of F-square

	Creativity	**Motivation**
Creativity		
Learning Motivation	0.678	
The Use of AI	0.020	0.234

Table 6 shows the F-Square test results used to determine the magnitude of the influence between variables in the structural model. The influence of Learning Motivation on Creativity

has a value of 0.678, which is included in the strong influence category, so learning motivation contributes greatly to increasing student creativity. Conversely, the influence of AI utilization on creativity is only 0.020, which indicates a very weak influence. Meanwhile, the influence of AI utilization on learning motivation has a value of 0.234, which is included in the medium influence category, meaning that AI contributes sufficiently to increasing student learning motivation. The results of the heterotrait-monotrait ratio (HTMT) test are listed in Table 7.

Table 7 Test results of HTMT

	Creativity	**Motivation**
Creativity		
Learning Motivation	0.745	
The Use of AI	0.518	0.567

Table 7 shows the results of the HTMT test used to measure discriminant validity between variables in the research model. The HTMT value for the relationship of Learning Motivation toward Creativity is 0.745, while the HTMT values for the relationship of AI Utilization toward Creativity and Motivation are 0.518 and 0.567, respectively. All these values are below the stipulated threshold of 0.90, thereby indicating that each construct in the study possesses good discriminant validity and can be clearly distinguished between variables. Thus, the variables of AI Utilization, Learning Motivation, and Creativity are declared free from problems of high correlation or overlapping constructs within the research model.

The PLS-SEM data analysis results show that AI utilization influences learning motivation, but indirectly does not influence student creativity. However, the independent variable of learning motivation influences student creativity. Specifically, the influence of AI utilization on student learning motivation indicates that the ability to utilize AI technology is capable of enhancing attendance, interest, enthusiasm, sense of enjoyment, note-taking related to materials, paying attention to instruction, and curiosity. This is aligned with previous research, where AI used by students in the learning process provides an increase in enthusiasm, effectiveness in understanding lecture materials, and self-confidence (Tarumasely et al., 2026). The AI platforms frequently used by students are ChatGPT, Gemini AI, Perplexity AI, and Blackbox AI, which assist students in obtaining materials quickly and precisely. Furthermore, AI provides an adaptive learning experience for students, helping them feel more confident in their understanding of the material. Therefore, the utilization of AI holds a crucial role in driving learning motivation in the digital era.

Furthermore, the research results indicate that AI utilization does not directly influence student creativity. Although many prior studies state that AI utilization influences student creativity, in this study, it does not exert a direct influence. Creativity requires higher-order cognition, such as originality, flexibility, and elaboration, which do not solely depend on technology but must be accompanied by contextual learning experiences (Shubina & Kulakli, 2019). In fact, students who rely too heavily on artificial intelligence make everything feel instant, thereby becoming more dependent on the creative thinking process itself. This condition indicates that AI tends to function as an information provider and an accelerator for task completion, rather than as a primary vehicle for building processes of reflection, idea exploration, and student originality development. Theoretically, this finding reinforces the view that creativity is not only determined by the availability of technology, but is also influenced by internal factors such as motivation, learning experiences, social interaction, and divergent thinking abilities.

The presence of AI is not necessarily capable of generating creativity if its usage remains reproductive and has not been directed toward exploration-based learning. Approaches such as project-based learning, problem-based learning, and collaborative learning assisted by AI become essential to implement so that technology does not merely increase learning efficiency, but is also able to foster student creativity more optimally. Therefore, AI becomes a strategy to stimulate creativity, not just a tool to complete assignments.

Other analysis results indicate that learning motivation influences student creativity. This finding shows that students with high motivation tend to be more proactive in exploring ideas and developing creative and innovative ideas. Theoretically, motivation is the primary driver of strong cognitive processes, including creativity (Utami et al., 2024). Students who possess strong motivation have more complex capabilities and are bolder in taking intellectual risks, trying new approaches and methods, and developing unique and original solutions. Enhancing learning motivation is key to optimizing students' creative potential in the learning process.

AI utilization indirectly influences creativity through increased motivation as a mediating variable. This indicates that students can enhance their creativity by first increasing their motivation to learn. This finding is in line with the concept of mediation in structural models which states that intervening variables can strengthen the relationship between main variables (Alwiyah et al., 2018). Therefore, AI does not directly shape creativity, but serves as a facilitator that enhances motivation, which eventually impacts creativity. Ultimately, the integration of AI in learning is imperative to be designed to encourage active student engagement.

CONCLUSION

This study demonstrates that the utilization of AI has a positive and significant influence on student learning motivation, indicating that AI can drive student attendance and curiosity in learning. Nevertheless, the utilization of AI does not have a direct significant influence on student creativity, meaning that the presence of AI technology does not necessarily stimulate creative thinking skills without the support of other factors. On the other hand, learning motivation shows significant results and directly influences student creativity, thereby confirming that motivation is the primary factor in driving student innovation. In addition, the findings in this study indicate that motivation is a mediating variable that bridges the relationship between AI utilization and student creativity. Thus, the relationship between variables shows that enhancing student creativity is more effectively achieved by increasing motivation facilitated by the use of AI.

The researcher suggests that educators and educational institutions optimize the utilization of AI as an interactive and adaptive learning medium to increase student learning motivation. Furthermore, the application of project-based learning, problem-based learning, and collaborative learning methods is required so that AI can be capable of driving student creativity more optimally. Students are also recommended to utilize AI wisely as a means to explore ideas and develop concepts, rather than merely as an instant tool for completing academic tasks. For future researchers, it is recommended to employ longitudinal, experimental, or mixed-methods research designs and to develop innovations over the long term.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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