

The Effect of The Use of Artificial Intelligence and Blended Learning on Student Learning Motivation

Siti Shofiyah¹, Agus Susilo¹

¹Accounting Education Program, Universitas Muhammadiyah Surakarta, Surakarta,
Indonesia

Corresponding author e-mail: a210220027@student.ums.ac.id

Article History: Received on January 9, 2026 , Revised on January 14, 2026, Published on
January 14, 2026

Abstract: This research is conducted to comprehensively examine how the application of artificial intelligence together with blended learning contributes to variations in student learning motivation among university students located in Surakarta, utilizing a quantitative methodological framework supported by a correlational survey model that engaged 76 undergraduate participants, with empirical data gathered through a structured five level Likert scale instrument and statistically processed using multiple linear regression techniques supported by SPSS software version 26. The empirical findings demonstrate that artificial intelligence and blended learning significantly enhance student learning motivation when evaluated individually as well as collectively, with artificial intelligence emerging as the factor exerting a stronger statistical contribution to motivational improvement. These findings suggest that the integration of adaptive learning technology and well-planned blended learning can support more flexible and engaging learning environments, thereby enhancing student learning motivation in higher education.

Keywords: *Artificial Intelligence, blended learning, learning motivation, university student, higher education*

A. Introduction

The rapid advancement of digital technology has substantially transformed instructional methods and academic learning practices within higher education institutions, reshaping how knowledge is delivered and experienced by students. Universities are beginning to integrate artificial intelligence-based technology as part of efforts to increase the effectiveness and relevance of the learning process in the digital era (Zawacki-Richter et al., 2020). The integration of educational technology is intentionally aimed at stimulating active student participation so that the learning experience becomes more meaningful, interactive, and cognitively engaging (Bond et al., 2020).

Learning motivation represents a crucial determinant of academic success, as students who possess strong learning motivation generally demonstrate higher levels of academic engagement, sustained effort, and more optimal achievement outcomes (Hendrilia et al., 2025). Within the framework of self-determination theory, learning motivation develops when students feel autonomy, competence, and adequate support in the learning environment (Ryan & Deci, 2020).

Despite the increasing adoption of learning technology, student motivation to learn continues to encounter multiple obstacles, particularly following the COVID 19 pandemic and during the post pandemic adjustment phase, where abrupt shifts in learning patterns have led many students to experience boredom and heightened academic pressure (Zhao, 2021). This condition also contributes to the emergence of learning confusion which has an impact on declining student motivation (Zhai, 2021).

Within the Indonesian higher education context, issues related to student learning motivation continue to be highly relevant and remain a persistent concern for academic institutions. Empirical studies in the Surakarta region show that only 58% of students feel that they remain enthusiastic about attending lectures, while some others experience academic boredom and stress (Howard et al., 2021). These findings confirm that improving the quality of learning is not only related to the cognitive aspect, but also the affective aspect of students.

In line with these circumstances, the application of artificial intelligence in educational settings has shown a noticeable and substantial rise. Research in Indonesia shows that students are starting to utilize AI technology to support material understanding and completion of academic assignments (Kasneji et al., 2023). In the Surakarta local context, the utilization of generative AI technologies including ChatGPT has been reported to enhance student productivity and improve overall student learning productivity (Sari & Yudhanto, 2025).

The implementation of artificial intelligence within learning environments holds strong potential to positively influence student learning motivation, as AI technology enables personalized and adaptive learning processes that align with the unique needs and characteristics of individual students (Mohamed et al., 2024). A positive student perception toward the use of AI is closely associated with higher levels of creativity and greater confidence when carrying out academic tasks (Mariyanti & Wahyudi, 2025). Furthermore, the utilization of AI is viewed as a supportive factor in the development of self regulated learning, which significantly contributes to the formation and strengthening of student learning motivation (Viberg et al., 2020).

Beyond the rapid growth of artificial intelligence driven systems, Blended learning has emerged as a dominant instructional model within universities, as it deliberately integrates direct classroom interaction and digitally mediated instruction to allow learners greater adaptability in managing their academic activities (Istemic, 2024). Within accounting study programs, the implementation of a Learning Management System within Blended learning practices has demonstrated a significant contribution to improving learning effectiveness by organizing instructional content and academic communication in a more structured and controlled manner (Amelia & Suranto, 2025).

Findings from earlier empirical investigations indicate that Blended learning is capable of strengthening student learning motivation when its instructional structure is carefully planned and aligned with the learning context (Bernard, 2020). However, the effectiveness of blended learning is greatly influenced by the quality of learning design and the readiness of lecturers in managing the integration of online and offline learning (Kintu et al., 2021).

Without careful planning, blended learning has the potential to cause learning confusion and reduce its impact on student motivation (Lodge et al., 2021).

Moreover, the implementation of collaborative learning strategies represents a crucial element in strengthening the quality of technology oriented education, as the peer tutoring model has been empirically validated to improve students' information literacy that supports learning motivation and autonomous learning behavior (Syah et al., 2023).

A review of earlier academic literature indicates that investigations concerning artificial intelligence and Blended learning are predominantly conducted as independent studies rather than being examined in an integrated manner. Research that integrates these two approaches in a single analysis model, especially those that examine their influence on students' learning motivation in local contexts, is still relatively limited (Purba et al., 2025). Accordingly, this research was undertaken to examine how the utilization of artificial intelligence together with Blended learning affects student learning motivation among learners located in the city of Surakarta.

B. Methods

This research adopts a quantitative methodological framework employing a survey-based correlational design, aimed at identifying relationships among variables without experimental intervention or the intention to establish cause-and-effect relationships. The population of this study consists of undergraduate program (S1) students enrolled in several universities in the Surakarta City area. The selection of research locations is based on the diversity of study programs and the availability of adequate technology-based learning infrastructure. A total of 76 students were selected as samples through purposive sampling techniques, with the aim of ensuring that respondents have direct experience in blended learning and the use of artificial intelligence-based applications in learning activities.

Respondent criteria include active students who have been engaged in blended learning for at least one semester and have experience using artificial intelligence tools to support the learning process. Although this purposive sampling technique may limit the representativeness of the population, it is considered appropriate to achieve the specific objectives of the study and ensure the relevance of the data to the variables being studied. Data were gathered through a structured questionnaire employing a 5 level Likert scale from 1 strongly disagree to 5 strongly agree, with instrument items adapted from relevant prior studies and modified to align with the characteristics of students in the city of Surakarta.

The variables of artificial intelligence use (X_1) are measured through indicators of the frequency of use of AI applications in learning activities, the level of personalization of learning, and the experience of students in receiving automated feedback. The Blended learning variable (X_2) was operationalized through an extensive evaluation of adaptive learning arrangements, the depth and intensity of virtual academic communication, systematic utilization of the Learning Management System, and the overall success of combining classroom instruction with digital learning environments. At the same time, student learning motivation (Y) was assessed by examining learners' perceived academic

capability, self directed learning behavior, and the degree of participatory engagement demonstrated throughout instructional activities.

Data acquisition was implemented through the dissemination of structured questionnaires to participants who satisfied predetermined inclusion requirements. Questionnaire delivery was conducted using digital platforms as well as direct distribution depending on situational feasibility and respondent accessibility. Prior to completion, participants received a comprehensive explanation regarding research objectives along with formal assurance related to data privacy. Subsequently, all responses were systematically summarized, classified, and organized to support quantitative analysis.

Quantitative data processing was conducted utilizing Statistical Package for the Social Sciences version 26 as the primary analytical tool. The preliminary analytical phase emphasized verification of instrument accuracy and consistency in order to confirm that the measurement tool met methodological standards. Instrument consistency was examined through Cronbach coefficient alpha, applying a minimum acceptance threshold exceeding 0.70. Subsequent analytical steps involved evaluation of classical statistical assumptions, incorporating a distribution normality assessment through the Shapiro Wilk approach and identification of heteroscedasticity by examining residual dispersion patterns displayed graphically.

The core analytical technique applied was multiple linear regression designed to evaluate the effect of artificial intelligence (X_1) implementation and Blended learning (X_2) practices on student learning motivation (Y). The mathematical representation of the regression relationship was developed as the foundation for empirical testing:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Significance testing was carried out at a confidence level of 95% ($\alpha = 0.05$), where the results of the analysis were declared significant if the probability value (p) was less than 0.05. All stages of analysis are carried out systematically so that this study allows it to be replicated in similar contexts and conditions.

C. Results and Discussion

Results

The objective of this research is to investigate how the application of artificial intelligence together with Blended learning affects student learning motivation. Empirical testing was conducted through multiple linear regression involving 76 student participants located in Surakarta.

Instrument Feasibility Test

Validity testing outcomes indicated that every questionnaire item measuring artificial intelligence usage (X_1), Blended learning (X_2), and student learning motivation (Y) exceeded the critical Pearson correlation benchmark of 0.226 while satisfying the required significance threshold below 0.05. Thus, all instrument items are declared valid. The reliability examination produced Cronbach's Alpha coefficients reaching 0.888 for the measurement of artificial intelligence usage, 0.886 for the Blended learning variable, and 0.792 for student learning motivation, all of which clearly exceed the required threshold of

0.70, indicating that the questionnaire items demonstrate strong internal consistency and can be confidently applied in subsequent stages of statistical evaluation.

Classic Assumption Test

The normality assessment revealed that the Asymp Sig value for two tailed testing reached 0.200, a figure that exceeds the 0.05 significance criterion and confirms that the residual data follow a normal distribution, while the multicollinearity evaluation yielded a tolerance level of 0.614 alongside a VIF score of 1.628 for all predictors, demonstrating that intercorrelation among independent variables is not problematic, and the heteroscedasticity analysis further supported this conclusion by presenting significance values higher than 0.05, thereby validating the suitability of the regression model.

Analysis of the Regresi Linier Berganda

Findings from the multiple linear regression procedure indicate that the implementation of artificial intelligence together with Blended learning contributes significantly to changes in student learning motivation by exerting a measurable and statistically meaningful influence.

Table 1. Results of Multiple Linear Regression Analysis

Variabel	Coeffivient (B)	t-value	Sig.
Constant	9,963	7,240	0,000
Use of Artificial Intelligence	0,376	5,186	0,000
Blended Learning	0,201	2,763	0,007

Description: The dependent variable is student learning motivation

The partial hypothesis testing reveals that artificial intelligence has a positive and statistically significant effect on students' learning motivation, as indicated by a probability value of 0.000. Similarly, blended learning demonstrates a substantial positive influence, supported by a significance level of 0.007. The study's outcomes highlight a positive and significant association between the application of artificial intelligence, blended learning, and students' learning motivation. Nevertheless, these results should not be viewed as establishing a direct causal relationship, owing to the correlational design of the research. Simultaneous testing results indicate that when artificial intelligence and Blended learning are evaluated collectively, they produce a statistically significant influence on student learning motivation, as evidenced by an F statistic of 42.606 and a significance value of 0.000.

Table 2. Simultaneous Test and Coefficient of Determination

R	R²	Adjusted R²	F-value	Sig.
0,734	0,539	0,526	42,606	0,000

The coefficient of determination R² equal to 0.539 indicates that 53.9% of the observed variance in student learning motivation is accounted for by artificial intelligence and Blended learning, whereas the other 46.1% arises from external variables not incorporated into the proposed research framework.

Discussion

Overall study findings confirm that artificial intelligence positively and significantly enhances student learning motivation, aligning with prior scholarly evidence which emphasizes that AI supported learning environments improve motivation by enabling personalized content delivery, increasing instructional efficiency, and providing adaptive academic support based on individual learner characteristics (Al-Emran et al., 2023). The availability of artificial intelligence driven tools enables learners to receive immediate and context sensitive academic support which gradually builds their self assurance and stimulates stronger willingness to participate actively throughout instructional activities.

The outcomes of the present research are reinforced by empirical evidence indicating that favorable student attitudes toward artificial intelligence significantly enhance academic involvement and strengthen intrinsic motivation to learn (Zhai, 2021). Furthermore instructional systems powered by artificial intelligence are widely recognized for their capacity to assist learners in organizing and controlling their own study activities which plays a crucial role in developing strong learning motivation (Chen et al., 2020). Artificial intelligence technologies including generative artificial intelligence demonstrate substantial capability in facilitating individualized learning pathways that promote deeper understanding and more meaningful educational experiences (Kasneci et al., 2023).

The strong impact of artificial intelligence utilization identified in this research can be interpreted through the theoretical framework of self regulated learning. AI technology acts as a support tool that helps students in planning, monitoring, and evaluating their learning process more effectively (Viberg et al., 2020). The results of this research correspond with systematic investigations reporting that artificial intelligence based technologies and learning analytics effectively enhance student self regulation and subsequently lead to higher learning motivation (Howard et al., 2021). Learning approaches grounded in self regulation principles have been proven to significantly increase student engagement and motivation across online and Blended learning contexts (Broadbent, 2021).

Besides the application of artificial intelligence Blended learning has been empirically shown to exert a substantial effect on student learning motivation supported by research highlighting its ability to offer temporal flexibility spatial adaptability and enhanced academic interaction (Bernard, 2020). The integration of digital instruction with in person classroom learning enables students to modify their learning approaches in ways that reflect personal needs learning styles and academic preferences.

The findings of this study support the results of a meta-analysis that states that blended learning is more effective than traditional learning in increasing student motivation and learning engagement (Yu et al., 2023). The variety of learning methods applied in blended learning also contributes to increasing students' interest and enthusiasm in attending lectures (Schmid, 2023). The concept of flexibility in blended learning is one of the important factors that supports student learning motivation in higher education (Hrastinski, 2021).

Despite its advantages the success of Blended learning is highly dependent on the standard and structure of instructional design used in its implementation. Previous research has shown that blended learning that is not systematically designed has the potential to cause learning confusion that negatively impacts student motivation (Zhai, 2021). Consequently the active involvement of lecturers in systematically planning and organizing the integration of online and offline instruction represents a critical determinant of Blended learning success (Wang & Hannafin, 2021). Thorough and well structured Blended learning planning is consistently highlighted as a fundamental requirement for achieving successful technology driven educational implementation (Graham, 2020).

The in general, the outcomes generated by this research strongly support earlier academic studies which explained that the deliberate incorporation of adaptive learning technology together with an appropriate instructional framework contributes significantly to the improvement of student learning motivation within the context of higher education institutions (Zhao, 2021). The integrated application of artificial intelligence alongside Blended learning has empirically demonstrated its capacity to establish an academic environment that actively adapts to diverse student requirements while simultaneously addressing the evolving expectations of higher education in the digital era (Zhao, 2021). The ongoing shift toward technology oriented learning systems corresponds directly with post-pandemic higher education policy frameworks that prioritize instructional flexibility and encourage continuous innovation in academic practices (Means, 2020).

While artificial intelligence offers notable benefits in boosting student motivation within higher education, its adoption also introduces challenges that merit careful scrutiny. Overreliance on AI-driven tools could diminish opportunities for students to hone critical thinking and independent problem-solving abilities. Moreover, sustained dependence on automated feedback systems may impede reflective learning processes unless they are counterbalanced by proactive instructional support. Thus, the deployment of artificial intelligence in educational contexts should be supported by pedagogical frameworks that promote critical engagement, ethical awareness, and active student participation.

Limitations and Future Research

While this research produced meaningful insights, it is important to acknowledge several limitations. The study's sample of 76 students may constrain the applicability of the findings to wider student demographics. Nevertheless, this sample size is deemed appropriate within correlational studies utilizing multiple linear regression, especially in preliminary investigative scenarios. Additionally, the correlational methodology restricts the capacity to establish causal links between the variables under investigation. Data collection relied on self-administered questionnaires, which could be susceptible to biases such as response inaccuracies or tendencies toward socially desirable answers.

The assessment of learning motivation treated it as a broad concept, without differentiating between intrinsic and extrinsic forms, potentially reducing the granularity of the motivational examination. The investigation omitted exploration of potential moderating or mediating factors, including students' digital proficiency, learning preferences, or instructor support, which might affect the interrelations among the variables. Conducted exclusively in Surakarta City, the study may hinder direct comparisons with populations in other locations or educational environments. Future inquiries are advised to incorporate

larger samples and encompass diverse institutions and regions to bolster the external validity of the results.

D. Conclusions

Drawing from empirical findings and analytical discussion, this study concludes that the application of artificial intelligence and Blended learning exerts a positive and statistically significant influence on student learning motivation in the city of Surakarta through both individual and combined effects, with artificial intelligence demonstrating a stronger contribution that highlights the essential role of adaptive learning technology in fostering learner autonomy self confidence and active engagement. Meanwhile, blended learning also makes a positive contribution through flexibility and variety of learning strategies. The results of this study validate that a systematically designed integration of artificial intelligence and Blended learning functions as an effective strategic approach for enhancing student learning motivation within higher education institutions.

E. Acknowledgement

The author sincerely expresses appreciation to the supervisor for consistently offering valuable direction constructive feedback and academic guidance throughout the entire research process. The author also expressed his gratitude to the University of Muhammadiyah Surakarta for providing permits and facilities in supporting the implementation of this research. In addition, the author would like to thank all respondents who have been willing to participate in this study.

References

- Al-Emran, M., Mezhuyev, V., & Kamaludin, A. (2023). Artificial intelligence and learning motivation in higher education. *Education and Information Technologies*, 28(4), 5301–5320. <https://doi.org/10.1007/s10639-022-11431-4>
- Amelia, P., & Suranto, S. (2025). Transformasi pendidikan akuntansi melalui platform e-learning: Peran LMS dalam meningkatkan efektivitas belajar mahasiswa. *Cetta: Jurnal Ilmu Pendidikan*, 8(1), 236–247. <https://doi.org/10.37329/cetta.v8i1.3947>
- Bernard, R. M. (2020). Effects of blended learning on student engagement and motivation. *Journal of Educational Psychology*, 112(4). <https://doi.org/10.1037/edu0000380>
- Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic review. *Frontiers in Education*, 5. <https://doi.org/10.1186/s41239-020-00194-8>
- Broadbent, J. (2021). Comparing online and blended learner's self-regulated learning strategies. *The Internet and Higher Education*, 48, 100790. <https://doi.org/10.1016/j.iheduc.2020.100790>
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, 75264–75278. <https://doi.org/10.1109/ACCESS.2020.2988510>
- Graham, C. R. (2020). Current research in blended learning. *British Journal of Educational Technology*, 51(2), 355–358. <https://doi.org/10.1111/bjet.12829>
- Hendriana, Y., Salamah, S., Judijanto, L., Nuryenda, E. Y., & Fauzi, M. S. (2025). Learning Motivation as a Predictor of Academic Success: A Literature Review in Educational

- Psychology. *TOFEDU: The Future of Education Journal*, 4(6), 1841–1846. <https://doi.org/10.61445/tofedu.v4i6.697>
- Howard, J. L., Bureau, J. S., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-analysis. *Educational Psychology Review*, 33, 1. <https://doi.org/10.1007/s10648-020-09581-9>
- Hrastinski, S. (2021). What do we mean by blended learning? *TechTrends*, 65(5), 564–569. <https://doi.org/10.1007/s11528-021-00575-5>
- Istemic, A. (2024). Blended learning in higher education: the integrated and distributed model and a thematic analysis. *Education and Information Technologies*, 3(1), 165. <https://doi.org/10.1007/s44217-024-00239-y>
- Kasneci, E., Sessler, K., & K{"u"}bler, T. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kintu, M. J., Zhu, C., & Kagambe, E. (2021). Blended learning effectiveness. *International Journal of Educational Technology in Higher Education*, 18(1), 1–20. <https://doi.org/10.1186/s41239-021-00254-3>
- Lodge, J. M., Kennedy, G., Lockyer, L., Arguel, A., & Pachman, M. (2021). Understanding difficulties and resulting confusion in blended learning environments: Implications for student motivation. *The Internet and Higher Education*, 49. <https://doi.org/10.1016/j.iheduc.2021.100794>
- Mariyanti, P., & Wahyudi, T. N. (2025). Student' perception of the use of artificial intelligence (AI) technology in student creativity completing academic tasks. *Didaktika: Jurnal Kependidikan*, 14(1), 1–10. <https://doi.org/10.58230/27454312.1442>
- Means, B. (2020). Digital learning in higher education. *Review of Educational Research*, 90(3). <https://doi.org/10.3102/0034654320919090>
- Mohamed, A. M., Tahany, S. S., Bakry, S. H., Guillén-Gámez, F., & Strzelecki, A. (2024). Empowering the Faculty of Education Students: Applying AI's Potential for Motivating and Enhancing Learning. *Innovative Higher Education*, 50, 587–609. <https://doi.org/10.1007/s10755-024-09747-z>
- Purba, S., Lubis, D. B., Purba, G. B. S., & Simarmata, J. (2025). Pengaruh Penggunaan Teknologi AI terhadap Motivasi Belajar Mahasiswa. *Jurnal Pengabdian Masyarakat Dan Riset Pendidikan (JERKIN)*, 3(3). <https://doi.org/10.31004/jerkin.v3i3.402>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Sari, D. E., & Yudhanto, R. (2025). Analisis dampak penggunaan ChatGPT terhadap produktivitas belajar siswa di Kota Surakarta. *Pedagogia: Jurnal Pendidikan*, 14(1). <https://doi.org/10.21070/pedagogia.v14i1.1843>
- Schmid, R. F. (2023). Effectiveness of blended and flipped learning. *Computers & Education*, 190, 104600. <https://doi.org/10.1016/j.compedu.2022.104600>
- Syah, M. F. J., Suranto, S., Karima, A. K., & Widyasari, D. A. (2023). Model pembelajaran moving peer tutoring untuk meningkatkan literasi informasi mahasiswa. *Jurnal Pendidikan Ilmu Sosial*, 31(2), 95–107. <https://doi.org/10.23917/jpis.v31i2.15011>
- Viberg, O., Khalil, M., & Baars, M. (2020). Self-regulated learning and learning analytics: A systematic review. *Computers & Education*, 159, 104000. <https://doi.org/10.1016/j.compedu.2020.104000>
- Wang, Z., & Hannafin, M. J. (2021). Designing blended learning environments to support

- motivation and self-regulated learning. *Educational Technology Research and Development*, 69(2), 1039–1063. <https://doi.org/10.1007/s11423-020-09848-4>
- Yu, Q., Yu, K., Li, B., & Wang, Q. (2023). Effectiveness of blended learning on students' learning performance: a meta-analysis. *Journal of Research on Technology in Education*. <https://doi.org/10.1080/15391523.2023.2264984>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2020). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education*, 17(1), 39. <https://doi.org/10.1186/s41239-019-0171-0>
- Zhai, X. (2021). Artificial intelligence education and student motivation. *Computers & Education*, 168, 104192. <https://doi.org/10.1016/j.compedu.2021.104192>
- Zhao, Y. (2021). Blended learning and student motivation: A meta-analysis. *Educational Research Review*, 33, 100387. <https://doi.org/10.1016/j.edurev.2021.100387>