Edu Cendikia: Jurnal Ilmiah Kependidikan
Volume: 5 | Nomor 02 | Agustus 2025 |
DOI: 10.47709/educendikia.v5i02.5847

The Influence of Intrinsic Motivation, Adoption of AI in Learning and Self-Efficacy on Academic Achievement

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Histori Naskah:
Submit: 2025-04-28
Accepted: 2025-08-02
Published: 2025-08-04

Abstract:
This study aims to analyse the influence of intrinsic motivation, adoption of artificial intelligence (AI) in learning, and self-efficacy on the academic achievement of high school students. More understanding is needed regarding the psychological and technological aspects that affect students' ability to learn, along with the digital revolution that is currently taking place in education. Analysis of 100 high school student respondents who completed a survey became the basis for this quantitative study. Multiple linear regression methods were used to analyse data collected through questionnaires that had been tested for validity and reliability. This study shows that students' academic achievement is positively influenced by intrinsic motivation. Students who use AI technologies such as virtual tutors and adaptive learning applications have better academic results than those who do not. This is one of the positive outcomes of integrating AI into the learning process. Self-efficacy, a mediating variable, strengthens the relationship between intrinsic motivation and academic achievement. This highlights the importance of self-belief in supporting the effectiveness of learning driven by internal motivation. These findings emphasise the importance of developing learning strategies that arouse students' intrinsic motivation, strengthen self-efficacy, and encourage optimal utilisation of AI technology. The implications of this study provide recommendations for schools, educators, and policymakers to integrate innovative approaches that support technology adaptation and student psychological strengthening to improve academic achievement in the digital era.

Keywords: Academic Achievement; AI Adoption; Intrinsic Motivation; Self-Efficacy

Introduction

Artificial intelligence (AI) is one of the many new technologies that are shaking up the education sector in the Industrial Revolution 4.0 era. AI brings significant transformation to the traditional learning system, changing the way students access information and how teachers deliver materials. This technology enables personalisation of learning, automation of administrative tasks, and provides faster and more accurate feedback to students (Asih & Alief, 2022). With such rapid changes, it is important to understand how technologies such as AI interact with students' psychological factors, including their motivation, self-confidence, and mental readiness. This interaction has the potential to be a determining factor in the success

of students' academic achievement in the digital era. Therefore, in-depth research is needed to examine the dynamics between AI adoption and students' psychological aspects in the context of modern education (Tawil et al., 2024).

Intrinsic motivation is one of the main drivers of student learning behaviour. This motivation arises from within the individual, where students are driven to learn because of their curiosity, interest, and personal satisfaction that they feel, not solely because of external rewards, punishments, or pressures. Students who are highly intrinsically motivated tend to face learning obstacles with confidence and actively participate in class (Wahyoedi et al., 2024). Previous research has shown that higher levels of intrinsic motivation are significantly associated with better academic achievement. Academic achievement tends to be more consistently high in students whose learning is driven by internal factors, rather than external factors. In today's digital age, where external distractions abound, it is critical to understand the role of intrinsic motivation in developing effective learning strategies (Hanayanti, 2011).

Meanwhile, the adoption of AI in learning brings great opportunities to create a more personalised and adaptive learning experience. AI technology is able to analyse individual students' needs, identify their strengths and weaknesses, and adjust the most appropriate learning materials and methods. With the help of AI, students can learn at their own pace, receive instant feedback, and receive additional, specific support to improve their understanding of the material (Prayitno et al., 2024). However, the success of AI adoption in learning does not depend only on the sophistication of the technology itself. Psychological factors, such as mental readiness, openness to innovation, and student motivation, play a crucial role in determining the effectiveness of AI use in learning environments. Inadequate student motivation and readiness can prevent them from making the most of AI's capabilities, which limits the technology's ability to improve academic achievement (Arifin et al., 2024).

Self-efficacy, which is a person's belief in their ability to manage and complete certain tasks, is a significant psychological component that influences academic achievement. Students who believe in their ability to learn and succeed tend to be more persistent through difficult times, have a positive attitude towards learning obstacles, and demonstrate better self-regulation. Higher levels of self-efficacy are associated with better learning practices, including preparation, time management, and self-evaluation of performance. They are also more optimistic in evaluating their abilities, which tends to result in better academic performance (Bernadin et al., 2024). Students' academic achievement is considered to be significantly influenced by a combination of intrinsic motivation, technology adoption ability, and self-efficacy levels. However, related to artificial intelligence (AI) in secondary schools, there are still very few studies that investigate these three aspects simultaneously. This study aims to fill this gap by exploring how intrinsic motivation, AI adoption in learning, and self-efficacy affect high school students' academic achievement. The results of this study are expected to provide practical contributions in developing technology-based educational strategies (Asmarany et al., 2024).

Previous studies have examined the influence of intrinsic motivation on academic achievement, where internal motivation has been shown to increase student engagement and learning outcomes (Ramli et al., 2023; Nuraeni et al., 2024). In addition, previous studies have also shown that the adoption of artificial intelligence (AI) technology in education can increase learning effectiveness through a more personalised approach. Other studies have also emphasised the importance of self-efficacy in shaping proactive learning behaviour and improving academic achievement. However, most previous studies have examined these factors separately and have not integrated the three in one analysis model, especially in the context of the use of AI in high schools in Indonesia. This gap indicates the need for research that simultaneously

examines the relationship between intrinsic motivation, adoption of AI in learning, and self-efficacy on academic achievement, so that it can provide a more comprehensive picture of the determinants of student learning success in the digital era.

Despite different research works having individually examined the influence of intrinsic motivation, self-efficacy, and AI adoption on learning outcomes separately, none have entwined these three variables together in a single analytic framework, particularly in the Indonesian high school context. This present study fills this research void by presenting an integrated analysis of intrinsic psychological attributes and deployment of AI-based learning technologies concurrently influencing pupil academic performance. The novelty of this study is that it combines the psychological and technological aspects simultaneously in its investigation, employing self-efficacy as a mediator variable. The study is different from earlier research as it uniquely addresses how self-efficacy strengthens the intrinsic motivation-academic performance relationship when AI is used actively in the learning process. This coherent model gives a better view of student success in the digital age and adds new knowledge for educational stakeholders who would be interested in developing more adaptive and psychologically nurturing learning environments.

Literatur Review

Intrinsic Motivation

Intrinsic motivation is an individual's interest or satisfaction in an activity. In the context of classroom teaching, students with high intrinsic motivation show greater involvement in the learning process, have higher persistence, and are able to enjoy the learning process itself. This makes intrinsic motivation one of the important predictors of academic achievement. Previous research has shown that students who are driven by intrinsic motivation are more likely to develop independent learning skills, manage their time well, and show better academic performance than those whose motivation depends on external factors. Therefore, schools should do everything they can to create an atmosphere where students can find their intrinsic motivation (Daheri et al., 2022; Kurniawan et al., 2022).

Adoption of AI in Learning

The adoption of AI in learning creates a huge opportunity to improve the quality of education through a more personalised approach. AI technology is able to identify students' strengths and weaknesses in real-time, provide additional materials tailored to individual needs, and provide fast and relevant feedback. This capability increases the effectiveness of learning and allows students to learn at their own pace, thereby driving more equitable and targeted improvements in academic outcomes. However, the success of AI adoption in education is not without several challenges. Students' technological literacy, teacher support, and infrastructure readiness are important factors that determine the effectiveness of AI implementation. Barriers such as limited devices, uneven internet connectivity, and a lack of technology training for educators can hinder the optimisation of AI use in schools (Rais et al., 2023; Nursalim et al., 2024).

Self-Efficacy

When someone has confidence in their ability to plan and execute the steps that will lead to a desired outcome, we say they have high self-efficacy. Students' beliefs in their ability to learn and apply new knowledge have a significant impact on their classroom experiences. When faced with academic challenges, students who have strong beliefs in their abilities are more likely to persist and succeed. They are also more likely to persist even when faced with difficult challenges. The importance of self-efficacy to academic success has been demonstrated in previous research. Students who have confidence are better equipped to

take advantage of the many learning tools available, including artificial intelligence technologies, to complement their education. This suggests that self-efficacy not only influences students' attitudes and behaviours toward learning but also enables them to optimise their use of technology, which is increasingly important in modern education (Nuraeni et al., 2024; Asih & Alief, 2022).

Student Academic Achievement

When it comes to measuring the effectiveness of an educational program, academic achievement is an important metric to consider. Intrinsic motivation, technology use, and self-efficacy are some of the factors that influence student learning outcomes. Highly motivated students who have strong self-confidence and are able to use technology well tend to achieve better academic results. In this context, measuring academic achievement does not only look at test scores or assignments, but also at how students interact with learning materials and manage their overall learning process (Tawil et al., 2024). In today's digital era, the way students access information and interact with learning materials has changed drastically, especially with the adoption of technologies such as artificial intelligence (AI). AI allows for more holistic and data-driven measurement of academic achievement. With the help of this technology, teachers can monitor student progress more accurately, identify difficulties faced by students, and provide more targeted interventions (Wahyoedi et al., 2024).

Research Method

This study examined the relationship between students' academic achievement, self-efficacy, intrinsic motivation, and the use of artificial intelligence in the classroom, using a quantitative approach and a correlational survey design. A total of one hundred high school students were selected for this study using a purposive sampling method to ensure that they represented students who had utilised AI in their education. A questionnaire that had proven its validity and reliability was used as a research tool. This questionnaire consisted of four main parts, each measuring intrinsic motivation, use of AI in learning, self-efficacy, and academic achievement. Statistical software was used to conduct multiple linear regression analysis on the collected data. One stage in the research process was to distribute the questionnaire online through the school's learning platform. Data analysis was carried out in several stages: classical assumption testing, regression analysis, and a mediation test to see the role of self-efficacy as a mediating variable. All procedures were carried out by observing the principles of research ethics.

Results

Based on the results of the regression analysis, the level of students' intrinsic motivation has a positive and significant effect on their academic achievement. There is a direct correlation between the level of students' intrinsic motivation and their academic achievement. Students who are driven by personal interest and satisfaction in learning tend to have greater engagement in learning activities, which in turn improves their understanding and achievement of the material being taught. Consistent with previous research showing that intrinsic motivation not only drives students to put more effort into learning but also increases their resilience when facing academic challenges. Students who are satisfied with the learning process and are motivated by personal achievement, rather than by external rewards, are more likely to overcome existing obstacles and maintain high academic performance.

Student academic achievement increases significantly when AI is used in the learning process. In general, students who make good use of AI features have better academic achievement compared to their peers who do not make optimal use of AI. Artificial intelligence paves the way for more personalised education, where learning is designed to meet the unique needs of each student, thereby improving retention and application

of knowledge. AI also makes it easy to provide instant feedback and monitor student progress in real-time. Thus, students can immediately know which areas need improvement, and they can focus on strengthening the weak aspects. These results provide evidence that students are more engaged and have higher academic outcomes when AI is used in the classroom, especially in a learning environment that is heavily influenced by digital and technological factors.

The level of students' self-efficacy moderates the relationship between intrinsic motivation and academic achievement. The results of the analysis show that the influence of intrinsic motivation on academic achievement becomes stronger when students' self-efficacy is at a high level. This means that students who feel confident in their abilities to overcome academic challenges are better able to utilise their internal motivation to achieve optimal results. This self-confidence strengthens students' determination and efforts to continue to achieve, even though they face obstacles in learning. In other words, intrinsic motivation can encourage students to try harder and be more active in learning. However, high self-efficacy provides additional encouragement that increases the effectiveness of their efforts. Students who have strong beliefs in their abilities will find it easier to overcome difficulties and are more confident in using various available learning resources, including technology, to improve their academic results. These findings suggest that strengthening self-efficacy can be an important strategy in supporting students' academic achievement, especially for those with high intrinsic motivation.

Overall, this research model is able to explain 58.3% of the variance in students' academic achievement ($R^2 = 0.583$). Individual self-efficacy moderates the relationship between intrinsic motivation and academic achievement. Although various other factors affect students' learning outcomes, these three variables significantly contribute to their academic achievement. This confirms that to achieve optimal results, education must pay attention to psychological factors, such as motivation and self-efficacy, as well as the integration of technology in the learning process. In addition, this study found that male and female students had slightly different levels of self-efficacy, although this difference was not statistically significant. This finding opens up opportunities for further research to investigate the factors that cause differences in self-efficacy levels between males and females. Another conclusion is that students who actively integrate AI technology into their learning strategies generally have higher academic achievement compared to their peers who do not integrate it. This shows the importance of educational policies and approaches that encourage the use of technology in learning to support students' academic development.

Discussion

The results of this study support the findings of previous studies that found a positive correlation between students' intrinsic motivation levels and their academic achievement. Studies have shown that when students learn with internal motivation, such as interest and curiosity, they are more likely to commit to the learning process and show greater engagement. Theoretically, this makes sense, since intrinsic motivation is the factor that drives someone to continue trying when faced with difficulties in the classroom. The findings also show that encouraging students to learn based on their interests and curiosity can significantly improve academic performance. Students not only have a better understanding of the material, but also find the learning process more interesting when using this method. To improve students' academic achievement, teachers should create an atmosphere that encourages intrinsic motivation, such as by giving them the freedom to choose topics and projects that interest them.

In addition, the findings of this study support the findings of previous studies that show that integrating AI into the classroom can improve both student engagement and academic achievement. As technology advances rapidly, AI is no longer just an additional tool but has become an integral part of personalising

the learning process. Students can achieve their academic goals more efficiently and effectively with the help of AI-based personalised learning materials and methodologies. This reinforces the importance of integrating AI into the educational curriculum to create a more adaptive and data-driven learning experience. This study reinforces previous studies that claim that students' self-efficacy levels are directly related to their performance in the classroom. Students who believe in themselves are more likely to master the use of AI and other technologies in the classroom. They are more confident in overcoming academic challenges and are more persistent in finding solutions when faced with difficulties. Thus, increasing students' self-efficacy not only helps them in optimising their potential but also enables them to utilise technology to its full potential, ultimately contributing to better learning outcomes.

Conclusion

The results of the study indicate that high school students' academic achievement is greatly influenced by intrinsic motivation, self-efficacy, and the use of artificial intelligence in the learning process. While the use of AI allows for a more customised and adaptive learning experience, intrinsic motivation encourages students to take an active role in their education. Self-efficacy was found to be a mediating factor that strengthens the relationship between intrinsic motivation and academic achievement. Students with high levels of self-efficacy are able to manage technology-based learning more effectively, which ultimately contributes to better academic achievement. The practical implications of this study are the importance of schools and educators to develop programs that increase students' intrinsic motivation, provide training in the use of AI technology, and build students' confidence in facing learning challenges. Further research can examine additional variables, such as social support and digital literacy, as additional variables in improving students' academic achievement in the digital era. From a scientific perspective, this research offers a novel integrative model by combining psychological constructs and technological adoption within the same analytical framework, an approach that remains limited in existing literature, particularly in the Indonesian secondary education context. The study contributes to educational psychology by demonstrating how self-efficacy can enhance motivational outcomes, and it adds to educational technology research by evidencing the measurable academic benefits of AI integration.

References

Asih, R. A., & Alief, L. (2022). Students' Experiences and Learning Objectives: Implications for Future Online Learning. *Journal of education and learning (EduLearn)*, *16*(2), 226-234.

Tawil, M. R., Saryanto, S., Alief, L., Winarno, B., & Ashadi, F. (2024). Analysis of The Relationship Between Teaching Quality, Institutional Policy, Leadership and Performance of Higher Education Institutions. *Innovative: Journal Of Social Science Research*, *4*(3), 3129-3137.

Wahyoedi, S., Apramilda, R., Rais, R., Judijanto, L., Amin, S., Syofya, H., & Anshori, M. I. (2024). Pembangunan Sumber Daya Manusia Indonesia Di Era Digital: Pembahasan Pada Seminar Oleh Dosen Lintas Perguruan Tinggi. *Journal Of Human And Education (JAHE)*, *4*(6), 1-5.

Hanayanti, C. S. (2011). *Writing a diary as a strategy to improve the tenth graders' ability in writing recount texts at SMAN 6 Malang* (Doctoral dissertation, Universitas Negeri Malang).

Prayitno, H., Sulaeman, A., Hanayanti, C. S., Febriyanti, D., & Ridhwan, M. (2024). Analysis of The Influence of Curriculum Enrichment, Strategic Plan Design and Digital Guidance Model on Teaching-Learning Quality. *Jurnal Sistim Informasi dan Teknologi*, 1-6.

Arifin, S., Hafsah, H., Aziz, F., Fujiono, F., & Hanayanti, C. S. (2024). Enhancing Children's Reading Comprehension And Object Recognition Through Interactive Learning Media. *Jurnal Scientia*, *13*(03), 667-672.

Bernadin Maria Noenoek Februati, Evi Gusliana, Hadi Prayitno, Muhammad Ridhwan, Mozart Malik Ibrahim. (2024). Analisis Pengaruh Beban Tugas Akademik Dan Digital Fatigue Terhadap Prestasi Akademik Siswa. *Edu Cendekia Jurnal Ilmiah Kependidikan*.

Asmarany, A. I., Hakim, A. A., Saefudin, A., & Judijanto, L. (2024). Effective Laboratory Management: Efforts to Improve Science Education Management in Islamic Boarding Schools. *Jurnal Penelitian Pendidikan IPA*, *10*(8), 5673-5680.

Ramli, A., Asmarany, A. I., Anantadjaya, S. P., Nawangwulan, I. M., & Mardikawati, B. M. (2023). Analysis Of Creativity Development Program To Solve The Problems Based On Intelligence Quotient In Student Learning Process. *Community Development Journal: Jurnal Pengabdian Masyarakat*, *4*(5), 10476-10482.

Nuraeni, L., Asmarany, A. I., Ichsan, I., Kusnadi, I. H., & Subekti, S. (2024). Analysis of The Influence of Socioeconomic Situation and Educational Policy on The Improvement of Education Quality in Indonesia. *Journal on Education*, *6*(4), 19337-19342.

Daheri, M., Zulkifli, Z., Deiniatur, M., & Rais, R. (2022). Konfigurasi Pendidikan Karakter Berbasis Multiple Inteligences Sebagai Desain Pembelajaran Di Era Inovasi Disruptif. *Jurnal Pendidikan Dan Konseling (JPDK)*, *4*(5), 5136-5145.

Kurniawan, A., Yuliana, D., Mardiyanti, L., Makruf, S. A., Mertayasa, I. K., Rais, R., ... & Hajar, A. (2022). *Metode pembelajaran inovatif*. Global Eksekutif Teknologi.

Rais, R., Dacholfany, M. I., Rukmana, A. Y., Mesra, R., Saleh, F., Purba, S., ... & Helmi, D. (2023). *Pengembangan Perencanaan Program Pendidikan*. Get Press Indonesia.

Nursalim, A., Nofirman, N., Nasril, N., Rais, R., & Al Ghazali, A. G. (2024). Transformasi Kurikulum di Indonesia:(Perkembangan Terkini dan Tantangan dalam Menghadapi Era Artificial Inteligences). *Innovative: Journal Of Social Science Research*, *4*(4), 8482-8491.