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The Effect of E-Learning Intensity on the Academic Achievement of STIM SUKMA Students

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A R T I C L E I N F O

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A B S T R A C T

This study aims to determine the effect of e-learning usage intensity on the academic achievement of students at STIM Sukma Medan. The background of this research is based on the rapid development of information technology, making the use of e-learning one of the key strategies in supporting students' learning processes. The method used in this research is quantitative with a causal associative approach. The sample consisted of 40 students selected using purposive sampling based on specific criteria, namely active students who regularly use e-learning at least twice a week. The research instruments were questionnaires and academic records (GPA). Data were analyzed using simple linear regression with the help of SPSS software. The results showed that the intensity of e-learning usage has a positive and significant effect on students' academic achievement, with a significance value of 0.008 and a coefficient of determination (R^2) of 0.312. This means that 31.2% of the variation in academic achievement can be explained by the intensity of e-learning usage. These findings indicate that the more actively students engage with e- learning platforms, the higher their academic performance tends to be. This research is expected to serve as a reference for educational institutions to optimize the use of e-learning in the teaching and learning process.

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INTRODUCTION

The rapid development of information and communication technology has brought significant changes to higher education. One key implementation is e-learning, which enables teaching and learning to take place without the constraints of space and time. E-learning offers students flexibility to access learning materials, participate in discussions, and complete assignments online. However, its effectiveness in improving students' academic achievement is determined not merely by its availability, but also by the intensity of its use.

A study by Alimuddin, Rahamma, and Nadjib (2015) at Hasanuddin University found that the intensity of e-learning use as a learning medium contributed 8.1% to undergraduate students' learning outcomes. This result was obtained through simple linear regression analysis, which showed a positive effect of e-learning use intensity on student learning outcomes. Similarly, Rizki (2019) at Syiah Kuala University reported that the implementation of e-learning had a significant effect on the academic achievement of accounting students in the Faculty of Economics and Business, also using simple linear regression to test the effect of e-learning implementation on student achievement. At STIM SUKMA, e-learning has been integrated into the instructional process. Nevertheless, there has been limited research examining the extent to which students' intensity of e-learning use influences their academic achievement. Therefore, this study aims to analyze the effect of e-learning use intensity on the academic achievement of STIM SUKMA students.

Furthermore, the development of e-learning is not only a local phenomenon but also a global trend that has driven major transformations in higher education. E-learning is considered capable of addressing the challenges of space and time limitations, expanding access to education, and providing students with the flexibility to manage their own learning strategies. Numerous international studies have shown that the implementation of e-learning positively contributes to student independence, digital literacy skills, and academic outcomes. However, its effectiveness largely depends on the intensity of use, the quality of the platform, and the level of support provided by institutions and instructors.

On the other hand, although many studies on e-learning have been conducted in various universities, the results often vary, revealing a research gap particularly related to the level of student engagement. The intensity of e-learning use is a factor that has not been thoroughly examined in specific institutional contexts. Therefore, this study is important to be conducted at STIM SUKMA to provide empirical evidence on the effect of e-learning intensity on students' academic achievement. In doing so, the findings are expected to enrich the existing literature while offering practical recommendations for higher education institutions to optimize the implementation of e-learning in the teaching and learning process.

Problem Statement

The research questions for this mini study are as follows:

1. How intensive is the use of e-learning by STIM SUKMA students in the

learning process?
2. Is there a significant effect of e-learning use intensity on the academic achievement of STIM SUKMA students?
3. To what extent can the intensity of e-learning use influence improvements in the academic achievement of STIM SUKMA students?

Research Objectives

Aligned with the three research questions above, the objectives of this study are:

1. To analyze the level of e-learning use intensity among STIM SUKMA students in the learning process.
2. To determine whether there is a significant effect of e-learning use intensity on the academic achievement of STIM SUKMA students.
3. To assess the extent to which the intensity of e-learning use can improve the academic achievement of STIM SUKMA students.

Measuring the extent to which the intensity of e-learning use can influence improvements in the academic achievement of STIM SUKMA students

Research Benefits

1. To determine the level of e-learning use intensity among STIM SUKMA students.
2. To identify the effect of e-learning use intensity on students' academic achievement.
3. To provide evidence on the extent to which e-learning use can improve students' academic achievement.

LITERATURE REVIEW

E-Learning

a. Definition of E-Learning

According to Rosenberg (2001), e-learning is the use of internet technologies to deliver a broad array of learning solutions that enhance knowledge and performance. Munir (2009) defines e-learning as a learning system that employs information technology in the teaching–learning process.

b. Components of E-Learning

Darin E. Hartley (2001) highlights the following core components of e-learning: Digital content: instructional materials packaged in electronic formats. Learning Management System (LMS): A platform used to manage online learning activities. Online interaction: Communication between lecturers and students via forums, chats, or video conferences.

c. Intensity of E-Learning Use

The intensity of e-learning use can be measured by: Access frequency: How often students log into and use the learning platform. Usage duration: The amount of time spent on online learning activities. Engagement: Active participation in discussions, quizzes, assignment submission, and forums.

Academic Achievement

a. ***Definition of Academic Achievement***

Winkel (2009) defines academic achievement as the results attained by students after participating in the teaching–learning process, commonly expressed as grades or a Grade Point Average (GPA). Academic achievement is typically influenced by internal factors (e.g., motivation, ability) and external factors (e.g., learning environment, teaching methods, learning media).

Academic Achievement

a. ***Indicators of Academic Achievement***

Academic achievement can be measured through: Course grades, Semester Grade Point Average (SGPA/IPS), Cumulative Grade Point Average (CGPA/IPK) Grounded in constructivist theory (Piaget; Vygotsky), learning occurs actively through experience and direct engagement. Within an e-learning context, students who access and engage with the platform more frequently and more actively are likely to achieve deeper understanding of the material, which in turn supports higher academic performance. Prior research by Astuti (2020) indicates that the higher the intensity of e-learning use, the higher students' academic achievement tends to be. Contributing factors include broader access to materials, flexible study schedules, and interactive support features embedded in e-learning platforms.

METHODOLOGY

This study adopts a quantitative approach, utilizing numerical data analyzed statistically to test predefined hypotheses. Following Sugiyono (2019), the quantitative approach is rooted in the positivist paradigm, targets a defined population or sample, and collects data using research instruments for subsequent statistical analysis. The design is causal-associative, aiming to determine the effect of one variable on another—specifically, the intensity of e-learning use (independent variable, X) on students' academic achievement (dependent variable, Y). In Arikunto's (2013) terms, associative research seeks relationships between two or more variables; in Sugiyono's (2019) framing, causal research examines the influence of one variable upon another. Accordingly, this study is classified as quantitative causal-associative research, investigating whether the intensity of e-learning use significantly affects the academic achievement of STIM SUKMA students.

Type and Approach of the Study

This research is a quantitative, causal-associative study designed to estimate the magnitude of the effect of e-learning use intensity on the academic achievement of STIM SUKMA students. A quantitative approach is employed because the collected data will be analyzed statistically to test the relationships between variables.

Research Site and Period

This study was conducted at STIM SUKMA Medan during the even semester of Academic Year 2024/2025, from May to June 2025. This study employed a purposive sampling technique, selecting 40 STIM SUKMA students who met predefined criteria: Active STIM SUKMA students in the even semester of Academic Year 2024/2025. Actively using the campus e-learning platform at least twice per week. Willing to complete the questionnaire and provide their most recent GPA (IPK). A sample of 40 respondents is deemed adequate to describe the relationship between e-learning use intensity and academic achievement within the scope of this mini study.

Data Analysis Techniques

Collected data were analyzed using simple linear regression to test whether the intensity of e-learning use affects students' academic achievement. In addition, descriptive statistics were used to summarize respondent characteristics and the distribution of questionnaire responses.

Research Variables

Independent Variable (X): Intensity of E-Learning Use
Indicators: access frequency, usage duration, types of learning activities, user interaction.
Dependent Variable (Y): Students' Academic Achievement
Indicators: GPA (IPK), grades in e-learning–supported courses, grade consistency.

Research Instruments

E-Learning Intensity Questionnaire: items capturing frequency of access, duration of use, types of activities (e.g., content viewing, quizzes, assignments, forums), and interaction (with instructors/peers). Academic Achievement Form: documentation of latest GPA (IPK), course grades (especially for courses supported by e-learning), and consistency of grades across the semester. Respondent Profile Sheet: basic demographics and enrollment status to verify eligibility per inclusion criteria.

RESEARCH RESULTS

This study involved 40 STIM SUKMA students who actively used the campus e-learning platform during coursework. Data were collected via a questionnaire to measure the intensity of e-learning use and documentation of students' most recent GPA (IPK) as an indicator of academic achievement.

Descriptively, most respondents exhibited moderate-to-high usage intensity: students typically accessed the e-learning system 3–5 times per week, spending 30–60 minutes per session. The most common activities were reading course materials, completing assignments, taking quizzes, and interacting with lecturers and peers through discussion or comment features.

Inferentially, simple linear regression performed in SPSS yielded a significance value (p) of 0.008, which is below the α level of 0.05. This indicates a

significant effect of e-learning use intensity (X) on students' academic achievement (Y). The model's R Square (R^2) was 0.312, implying that 31.2% of the variance in academic achievement can be explained by e-learning use intensity, while the remaining variance is attributable to other factors beyond the scope of this study.

The findings of this study provide both descriptive and inferential insights into how the intensity of e-learning use influences student academic achievement. Descriptively, the data indicate that the majority of respondents demonstrated a moderate-to-high engagement pattern with the e-learning platform. Students commonly accessed the system three to five times per week, dedicating an average of 30–60 minutes per session. This consistent pattern of engagement suggests that students recognize e-learning as an integral part of their study habits rather than an optional supplement. Activities such as reviewing digital course materials, submitting assignments, participating in online quizzes, and engaging in discussions with lecturers and peers reflect diverse and active use of the platform's features.

From an inferential standpoint, the regression analysis reinforces the descriptive findings. The significant p-value ($0.008 < 0.05$) demonstrates that the relationship between e-learning intensity and academic achievement is not coincidental but statistically reliable. The R^2 value of 0.312 reveals that while e-learning use intensity explains a meaningful portion (31.2%) of the variance in academic performance, there remain other factors outside this model that substantially contribute to student outcomes. This highlights the multifactorial nature of academic achievement, where technology-enhanced learning interacts with elements such as personal motivation, study skills, and institutional support.

Moreover, the positive regression coefficient implies that each incremental increase in e-learning engagement corresponds with a tangible improvement in GPA and related performance indicators. This supports the view that structured and consistent interaction with digital learning environments reinforces comprehension, facilitates timely task completion, and enhances overall learning efficiency.

The evidence also suggests that e-learning platforms contribute not only to knowledge acquisition but also to the cultivation of essential academic behaviors. Students who are more active in the online environment may develop better self-regulation, time management, and academic discipline. These indirect benefits of e-learning could explain why higher engagement leads to better academic outcomes.

In summary, the results confirm that e-learning is not merely a passive tool for information delivery but functions as an active learning ecosystem. When students engage with it regularly and purposefully, the platform becomes a significant determinant of academic achievement, complementing traditional learning processes and expanding opportunities for student success.

Implementation Narrative for Higher Education Institutions

The results of this study reveal a significant and positive relationship between e-learning intensity and academic achievement, suggesting the need for practical measures that higher education institutions can adopt to optimize digital learning environments. To ensure institutional readiness and scalability, the following implementations are proposed.

First, institutions should establish *structured e-learning access requirements*. Regular participation is essential to cultivate sustainable learning habits. By mandating a minimum frequency of access—such as two to three sessions per week students can be encouraged to internalize the platform as an integral component of their learning experience. The inclusion of micro-learning activities (e.g., weekly polls, short quizzes, or reflection tasks) not only enhances student engagement but also provides lecturers with immediate feedback regarding students' comprehension levels. The institution may leverage learning management system (LMS) analytics to systematically monitor student logins and activity patterns, thereby identifying learners who require additional academic support.

Second, to strengthen the relevance of e-learning activities, institutions should integrate them into the grading system. Academic motivation is closely tied to assessment, and by allocating a proportion of final grades (approximately 10–20%) to e-learning participation, institutions provide a concrete incentive for students to engage meaningfully with digital tasks. To ensure fairness, rubrics should be designed to evaluate not only frequency but also the quality of contributions in online discussions, assignments, and quizzes. The automation of certain assessments, such as multiple-choice quizzes, may also reduce lecturer workload while maintaining academic rigor.

Third, lecturer engagement is a critical determinant of student participation. Institutions must therefore establish *lecturer engagement standards*. For example, lecturers should be required to post weekly announcements, initiate discussion prompts, and provide timely feedback—ideally within 48 hours of task submission. Active instructor presence creates an interactive online environment, signaling to students that their contributions are valued. Monitoring lecturer presence through LMS activity reports may also serve as a mechanism of accountability.

Fourth, capacity building in the form of *micro-training workshops* is vital. Digital literacy gaps among both students and lecturers often impede optimal use of e-learning systems. Monthly workshops, lasting between 30 to 60 minutes, could be conducted to address practical issues such as assignment submission, participation in discussion boards, or the use of video-based feedback. These workshops should be recorded and archived, thereby forming a repository of institutional knowledge that can be accessed by future cohorts. The involvement of digitally skilled students and lecturers as peer mentors may further enhance community-based capacity building.

Fifth, institutions should implement a systematic *feedback and analytics system*. At the conclusion of each semester, LMS data should be compiled into reports indicating student participation rates, time spent on the platform, and the

correlation between engagement levels and academic outcomes. These reports can be disseminated to program coordinators, enabling data-driven decision-making. On an individual level, students with low engagement rates can be provided with targeted interventions, such as academic counseling or digital skills training, to prevent underperformance.

Sixth, a *pilot model* should be adopted prior to campus-wide implementation. Select courses with high enrollment can be designated as pilot subjects, where structured requirements, grading integration, and enhanced lecturer engagement are introduced systematically. The outcomes of these pilots including student satisfaction, academic achievement, and lecturer workload should be carefully evaluated. Successful practices can then be scaled across other courses within the institution in subsequent semesters.

Finally, institutions should develop *incentive structures* to foster a culture of digital learning. Students who demonstrate exemplary engagement may be awarded digital badges or certificates that recognize their active participation. For lecturers, innovative use of e-learning platforms should be acknowledged through institutional awards or teaching performance appraisals. Public recognition of best practices for instance, through newsletters or academic seminars can further motivate stakeholders to integrate e-learning into their pedagogical routines.

Sustainability Research

The findings of this study demonstrate that the intensity of e-learning use has a significant effect on academic achievement. However, the scope and design of this research were limited, thereby providing several avenues for further investigation. To enhance the robustness and generalizability of the results, future studies should expand the research scope beyond a single institution. A multi-campus or cross-institutional approach would allow for comparative analysis and provide stronger evidence regarding the broader applicability of e-learning as a determinant of student achievement. In addition, future research should consider employing a larger and more diverse sample. The current study involved only 40 respondents, which, although adequate for exploratory purposes, restricts the ability to draw conclusions applicable to varied student populations. By increasing sample size and including students from different academic programs, genders, and levels of study, subsequent studies could achieve more representative findings.

Another important area for advancement lies in the incorporation of additional variables. This study was limited to the relationship between e-learning intensity and academic achievement. Yet, learning outcomes are influenced by multiple interacting factors, such as student motivation, digital literacy, technology acceptance, learning styles, and institutional support. Integrating these variables into future models could yield a more comprehensive understanding of how e-learning contributes to academic success.

Methodologically, the adoption of alternative research designs is strongly recommended. While this study relied on a quantitative, causal-associative framework, future studies could benefit from mixed-methods approaches.

Qualitative components, such as interviews or focus group discussions, would provide deeper insights into students' experiences, perceptions, and challenges when engaging with digital platforms. Similarly, longitudinal designs that track students over multiple semesters would allow researchers to capture changes in e-learning behavior and its sustained impact on performance, rather than relying solely on cross-sectional snapshots. Finally, further exploration into the pedagogical strategies embedded within e-learning systems is warranted. This study primarily measured the frequency and intensity of platform use. Future research should also investigate the effectiveness of specific features, such as interactive forums, gamification, collaborative projects, or lecturer feedback mechanisms, in shaping learning outcomes. Comparative studies across cultural and regional contexts, for example within ASEAN countries, may also shed light on how cultural learning orientations and institutional infrastructures mediate the relationship between e-learning engagement and academic achievement.
Taken together, these directions highlight the need for a more holistic, multi-method, and cross-contextual research agenda. By addressing these gaps, future studies will be able to provide richer theoretical contributions and more practical recommendations for optimizing e-learning in higher education.

DISCUSSION

The statistical results demonstrate that the intensity of e-learning use has a positive and significant effect on academic achievement among STIM SUKMA students. Learners who access and leverage the e-learning platform more frequently and actively tend to attain higher GPAs. These findings suggest that e-learning functions not merely as a content delivery channel, but also as a learning environment that fosters active engagement and self-directed learning. This pattern aligns with frameworks in technology-enhanced learning and self-regulated learning, wherein regular, structured use of digital platforms supports time management, deeper comprehension of materials, and timely completion of academic tasks. Moreover, the interactive affordances of e-learning—such as discussion forums and instructor feedback—appear to strengthen conceptual understanding. Consistent with prior evidence, these results indicate that consistent and active engagement with e-learning can enhance learning effectiveness. Accordingly, e-learning represents an effective instructional strategy when its adoption is purposefully guided, optimized, and integrated within the academic processes of the institution.

CONCLUSION

This study demonstrates that the intensity of e-learning use has a positive and statistically significant effect on the academic achievement of STIM SUKMA Medan students. In practical terms, students who more frequently access the e-learning platform and actively participate in digital learning activities such as reading course materials, completing assignments, and engaging in discussions tend to achieve higher GPAs and better course outcomes. Key aspects that support successful learning include access frequency, duration of use, and the types of activities performed on the platform. The simple linear regression

analysis produced a p-value of 0.008 ($\alpha = 0.05$) and an R^2 of 0.312, indicating that 31.2% of the variance in academic achievement is explained by the intensity of e-learning use, with the remaining variance attributable to factors outside the present model.

These findings may inform institutional decision-making to enhance e-learning systems optimizing design, guidance, and integration so as to improve overall learning quality and student achievement.

RECOMMENDATION

1. Enhancing E-Learning Utilization
   The institution should encourage students to make consistent and structured use of the e-learning platform. This can be achieved through clear guidelines on frequency of access, integration of digital tasks into course requirements, and continuous monitoring of student participation.
2. Improving Platform Design and Features
   To maximize learning benefits, the e-learning system should be optimized with user-friendly interfaces, interactive tools (e.g., discussion boards, real-time feedback), and varied multimedia content. This would not only increase engagement but also accommodate diverse learning preferences.
3. Strengthening Academic Support
   Lecturers and academic staff are advised to provide regular feedback, guidance, and encouragement through the e-learning platform. Active instructor presence has been shown to enhance student motivation and improve academic achievement.
4. Institutional Policy Development
   The management of STIM SUKMA should establish policies that integrate e-learning more fully into academic processes. This could include mandatory online components for each course, minimum participation requirements, and recognition of digital engagement in academic evaluations.
5. Capacity Building and Training
   Workshops and training programs should be provided to improve both student and lecturer digital literacy. By enhancing user competence, students can navigate the platform more effectively, while lecturers can design more interactive and engaging online learning activities.
6. Monitoring and Evaluation
   Regular assessment of e-learning usage patterns and academic outcomes is recommended. Feedback from students should be collected to identify challenges, and analytics should be used to monitor participation trends, thereby informing evidence-based improvements.

ADVANCED RESEARCH

A relatively small sample size (n = 40). Single-institution scope (STIM SUKMA Medan), limiting generalizability to broader student populations or other educational contexts. Exclusion of potentially influential variables such as learning motivation, technology proficiency, learning styles, and learning-environment support. Recommendations for Future Research Increase sample

size and broaden institutional coverage. Incorporate additional predictors that may affect academic achievement (e.g., motivation, digital competence, learning styles, environmental support). Employ mixed-methods designs (quantitative and qualitative) to yield deeper and more comprehensive insights.

Subsequent studies should employ larger and more diverse samples, include additional predictors such as motivation, digital skills, and learning styles, and consider mixed-methods approaches. This would provide a deeper understanding of how e-learning intensity interacts with other academic and personal factors.

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