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The influence of learning environment and motivation on student achievement: a case study

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ABSTRACT

This study examines the impact of the learning environment and motivation on student achievement, with productivity as an intervening variable. Using PLS-SEM for data analysis, the study surveyed 159 active students from Universitas Muhammadiyah Yogyakarta (UMY) and STIB Kumala Nusa, employing convenience sampling. The findings indicate that the learning environment and motivation significantly influence learning productivity. However, while the learning environment directly affects student achievement, motivation does not. Additionally, learning productivity does not mediate the effects of either the learning environment or motivation on achievement. These findings show that a supportive learning environment helps improve both learning productivity and achievement. Meanwhile, motivation enhances productivity but does not contribute to learning achievement.

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Introduction

Education is a major factor in human resource development. By understanding how learning environment and motivation affect academic achievement, educational policies can be better targeted. For a variety of reasons related to various aspects of education and individual and societal development, research on student achievement is important. Understanding the components that influence learning achievement can help in creating plans that support students' academic and personal growth (El-zeiny et al., 2023). These are examples of guidance, psychological support, and adequate learning resources. To increase the competitiveness of graduates in the international job market, good learning achievement is very important (Aporbo, 2023). This research ensures that graduates have the skills and knowledge necessary to compete at a global level (Ampa & Akib, 2019).

This research is important as many students struggle to stay motivated and adapt to different learning environments. Understanding how these factors influence academic achievement can help educational institutions develop more effective strategies to enhance learning quality and support student success.

Students' academic success is influenced by several key factors, including the learning environment, achievement motivation, and learning productivity. A supportive learning environment, both socially and physically, plays a crucial role in enhancing student engagement and academic performance (Ado, 2015; Marisa et al., 2023). Similarly, achievement motivation drives students to set clear goals, stay committed to their studies, and apply effective learning strategies (Pgri et al., 2020). Another important factor is learning productivity, which refers to how efficiently students manage their time, resources, and efforts to maximize learning outcomes. Student learning productivity is a term that refers to how effectively and efficiently students utilize the resources, time, and effort they have to achieve optimal learning outcomes (Aporbo, 2023).

The learning environment and learning motivation give rise to student innovation and creativity so that students can optimize their productivity. Productivity is the relationship between work results (output) and the work process (input). According to Saefullah and Tabroni (2021), motivation has a dominant influence on productivity in achieving goals. The greater the motivation among students, the more it will encourage students to produce good works so that this is a form of productivity produced by students in the process of achieving student achievement (Aporbo, 2023). Likewise, productivity plays an important role in increasing student learning achievement.

The influence of the learning environment, learning motivation, and learning productivity is an issue that is widely discussed by researchers (Cleopatra, 2015; Nolen, 2003; Rajagukguk et al., 2023). These three variables can improve student learning achievement. So, studies on the role of the learning environment, learning motivation, and learning productivity are important. Many studies explain that the learning environment and learning motivation can improve learning achievement (Daryanti, 2018; Hermawan et al., 2020; Pratama & Ghofur, 2021). Likewise, studies on the role of learning productivity can improve learning achievement (Nolen, 2003; Tambunan et al., 2020; Utami et al., 2017).

While previous studies have examined the links between the learning environment, motivation, productivity, and academic achievement, few have explored productivity as a mediating factor. This study fills that gap by investigating how productivity connects the learning environment and motivation to academic achievement. By introducing productivity as a key mediator, this research offers a fresh perspective not widely covered in previous literature. The findings aim to help universities develop more effective learning strategies and provide valuable insights for future research on the role of environment and motivation in academic success. Institutions can use this study's findings to improve both physical and digital learning environments, boosting student motivation and productivity. This includes creating comfortable study spaces, offering flexible learning systems, and integrating e-learning technology.

This study aims to provide empirical evidence on how the learning environment and motivation influence student achievement, with productivity as a mediating variable. Focusing on students in Yogyakarta, it examines case studies from Muhammadiyah University Yogyakarta and STIB Kumala Nusa.

Based on previous studies, the hypotheses that can be formulated are: H1: The learning environment has a positive effect on learning productivity, H2: learning motivation has a positive effect on learning productivity, H3: learning productivity has a positive effect on learning achievement, H4: learning environment has a positive effect on learning achievement, H5: learning motivation has a positive effect on learning achievement, H6: learning productivity is a mediating influence of the learning environment on learning achievement and H7: learning productivity is a mediating influence of learning motivation on learning achievement.

Method

The research method used in this research is quantitative. Respondents in this research were active students at Muhammadiyah University Yogyakarta and STIB Kumala Nusa. The number of respondents in this research was 159 students who were members of Muhammadiyah University Yogyakarta and STIB Kumala Nusa. The criteria for students taken are students who are still actively attending lectures. The sample consists of 60% UMY and 40% STIB Kumala Nusa, with UMY having a larger share due to its higher student population. This study occurs in Yogyakarta due to its strong academic environment,

diverse learning settings, and socio-cultural support, which enhance student motivation and productivity. These factors make the findings more relevant both in Indonesia and globally.

The sampling technique uses convenience sampling, which is a sampling technique based on convenience (Sugiyono, 2012). Convenience sampling is a sampling method because of convenience. The reason for using this sampling method is to make it easier to obtain the desired sample. Apart from that, the students used as samples were students who were easy to find and reach when data collection was carried out.

The data collection technique uses a questionnaire. The questionnaire used to collect data contains questions about the respondent's personal data and points related to the research variables. Research indicators to measure the learning environment are learning facilities, the learning environment's cleanliness, the study room's size, and environmental comfort. Research indicators for measuring learning motivation are responsibility, taking time into account, prioritizing goals, considering everything, liking feedback, perseverance, tenacity, and desire to achieve. Research indicators for measuring learning productivity include work quantity, work quality, and time constraints. Research indicators for measuring learning achievement consist of freedom of creativity, sufficient information, opportunity to adapt, and appreciation of work.

Instrument quality testing includes validity and reliability tests. Data analysis uses PLS-SEM, a variance-based structural equation modeling approach that tests measurement and structural models. PLS-SEM was chosen for its flexibility in handling complex relationships, including direct, indirect, and mediating effects, especially with small sample sizes (30 100) and non-parametric data. The process involves developing a conceptual model, data collection and processing, estimating measurement (outer) and structural (inner) models, testing mediation effects, and interpreting results.

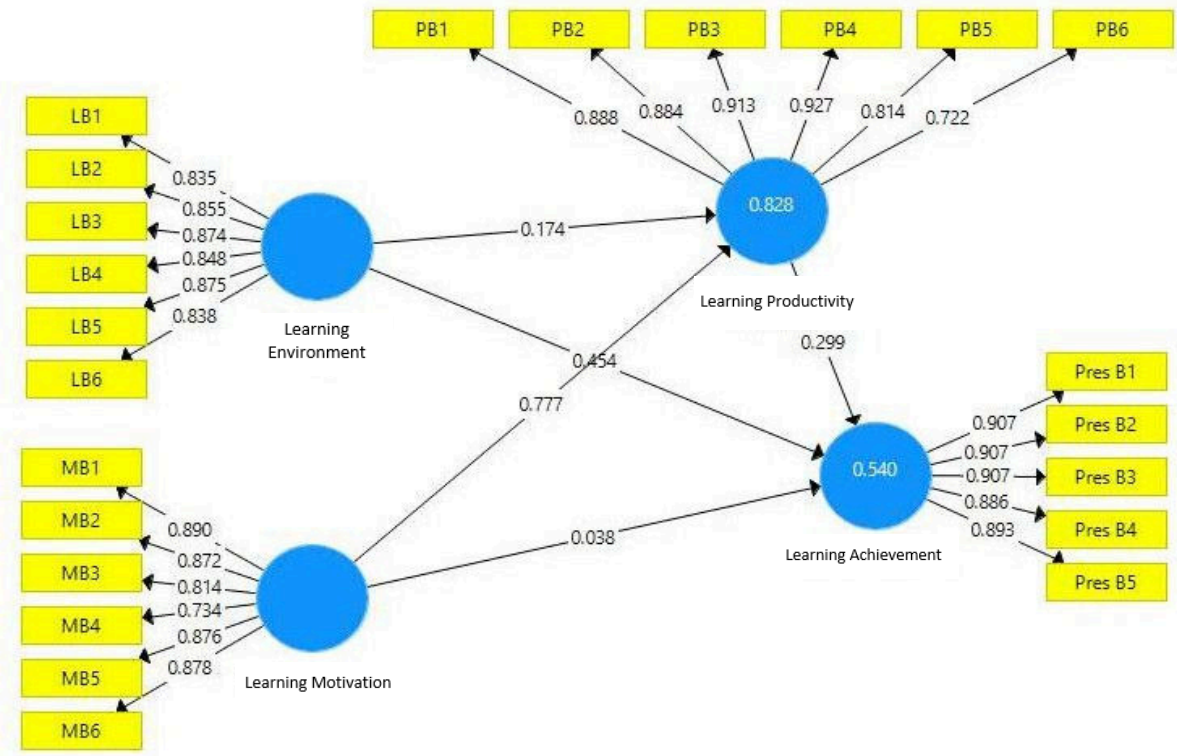

Figure 1 Research Conceptual Model.

Researchers using the PLS model will undergo two stages (Latan & Ghozali, 2012). Conduct a measurement model test by testing each indicator's construct validity and reliability. Carry out a structural model test to examine and determine whether there is an influence between variables between the constructs, which are measured using the t-test from PLS.

Partial Least Squares (PLS) is a strong analytical method and is often referred to as soft modeling because it eliminates the assumptions of OLS (Ordinary Least Squares) regression, such as data must

be normally distributed in a multivariate manner and there are no multicollinearity problems between exogenous variables. PLS tests weak theories and data, such as small sample sizes or data normality problems. Although PLS is used to explain whether there is a relationship between latent variables (prediction), PLS can also be used to confirm theories.

As a prediction technique, PLS assumes that all measures of variance are useful to explain so that the latent variable estimation approach is considered a linear combination of indicators and avoids the problem of factor indetermination (Ghozali & Latan, 2015). PLS analysis usually consists of two sub-models: a measurement model, often called an outer model, and a structural model, often called an inner model (Ghozali & Latan, 2015). The outer model is a measurement model to assess the validity and reliability of the model. Through the algorithm literacy process, measurement model parameters (convergent validity, discriminant validity, composite reliability, and Cronbach's alpha) were obtained, including the R2 value as a parameter for the accuracy of the prediction model. The research conceptual model is presented in Figure 1.

Results and Discussions

Respondent Characteristics

This research distributed the questionnaires at STIB Kumala Nusa and Universitas Muhammadiyah Yogyakarta. Respondent data were then analyzed based on gender, age, semesters, universities of origin, and study programs. The characteristics of these respondents can be explained in Table 1.

Table 1. Characteristics of Respondents

Characteristics	Category	Amount	%
Gender	Female	87	54.7
	Male	72	45.3
Age	18 years old	18	11.3
	19 years old	31	19.5
	20 years old	53	33.3
	21 years old	41	25.8
	22 years old	6	3.8
	23 years old	5	3.1
	24 years old	4	2.5
University	UMY	96	60.4
	STIB Kumala Nusa	63	39.6
Semester	Semester 1	42	26.4
	Semester 3	53	33.3
	Semester 5	62	39.0
	Semester 9	2	1.3
Study Programs	Sharia Economics	96	60.4
	Management	52	32.7
	Retail Management	11	6.9

Based on Table 1, the majority of respondents in this study were women, numbering 87 (54.7) people, while the number of male respondents was 72 people (45.3%). From Table 1 above, it can be explained that the majority of respondents in this study were 20 years old, totaling 38 people or 34.2%. Meanwhile, the average respondent was aged 17 to 24 years. Based on Table 1 above, 63 or 39.6% of respondents were from the STIB Kumala Nusa campus and 96 or 60.4% from the UMY campus. There are differences in numbers for each university because the UMY campus has a larger population, so the portion of respondents taken is more significant.

Based on Table 1 above, most respondents were in semester 5, with 62 people or 39.0%, while the fewest respondents based in semester 9 were 2 people or 1.3%. Based on Table 1 above, most respondents came from the Sharia economics study program, with 96 people or 60.4%. Meanwhile, 52 respondents came from the Management study program (32.7%), and 11 people came from the Retail Management study program (6.9%).

Convergent Validity

Convergent validity is a type of validity used to measure the extent to which a measurement instrument can measure the same construct as another. Research with a good level of convergent validity shows that the instrument used accurately and consistently measures the construct it wants to measure. Convergent validity can be determined using the loading factor value. The validity criterion is the factor loading value greater than 0.7. Based on Table 2, the results of the convergent validity analysis show that the loading factor value for each indicator is above 0.7, so all instruments are declared valid.

Table 2. Convergent Validity Analysis Results

Items	Learning Environment	Motivation to learn	Learning Productivity	Learning Achievement
LB1	0.835			
LB2	0.855			
LB3	0.874			
LB4	0.848			
LB5	0.875			
LB6	0.838			
MB1		0.890		
MB2		0.872		
MB3		0.814		
MB4		0.734		
MB5		0.876		
MB6		0.878		
PB1			0.888	
PB2			0.884	
PB3			0.913	
PB4			0.927	
PB5			0.814	
PB6			0.722	
Pres B1				0.907
Pres B2				0.907
Pres B3				0.907
Pres B4				0.886
Pres B5				0.893

Discriminant validity

Discriminant validity relates to the principle that measures (manifest variables) of different constructs should not be highly correlated. The way to test discriminant validity with reflexive indicators is by looking at the cross-loading value for each variable, which must be > 0.7. Another way that can be used to test discriminant validity is to compare the square root of the AVE for each construct with the correlation value between the constructs in the model (Ghozali & Latan, 2015).

In this section, the results of the discriminant validity test are presented. An indicator is declared to meet discriminant validity if the average variance extracted (AVE) value is above 0.5. If it meets these conditions, then the model is considered good. The next test is the composite reliability of the indicators that measure the construct. A construct is reliable if the composite reliability value is above 0.60. Apart from that, finding the reliability of the construct can be done by looking at its reliability, which is measured by looking at Cronbach's Alpha value. A construct is declared reliable if Cronbach's Alpha value is above 0.7. The results of the discriminant validity test for learning environment variables, learning motivation, learning productivity, and learning achievement are presented in Table 3.

Based on Table 3, the results of the discriminant validity test show that all research variables are declared reliable because they meet Cronbach's Alpha value above 0.7. Thus, the results of this test are considered acceptable as a measure of internal consistency (Hair et al., 2019). Next, based on the average variance extracted (AVE) value for each learning environment variable, learning motivation,

learning productivity, and learning achievement are above 0.5. These results can be explained by the fact that the construct is declared reliable, and each variable has high discriminant validity.

Table 3. Discriminant Validity Analysis Results

Variables	Alpha	rho_A	CR	AVE
Learning Environment	0.926	0.926	0.942	0.730
Learning Motivation	0.920	0.926	0.938	0.715
Learning Productivity	0.929	0.936	0.945	0.741
Learning Achievement	0.941	0.942	0.955	0.810

Meanwhile, based on the composite reliability (CR) value, each variable shows a constructed value above 0.60. These results indicate that each research variable has met composite reliability, so it can be concluded that all variables have a high level of reliability. Therefore, the indicators used in this research had high discriminant validity when compiling their respective variables.

Goodness of Fit (GoF) Assessment

At this stage, the structural model (inner model) is evaluated to ensure that the structural model built is robust and accurate. Goodness of Fit (GoF) validates the overall structural model. The GoF index is a single measure to validate the combined performance of the measurement and structural models. The GoF value ranges between 0 and 1, with interpretation of the values 0.1 (small GoF), 0.25 (moderate GoF), and 0.36 (large GoF). Based on data processing that has been carried out using the Smart PLS 3.0 program, the Model Fit values are obtained in Table 4.

Table 4. Model Fit

	Saturated Model	Estimated Model	Model
SRMR	0.054	0.054	Fit
d_ULS	0.811	0.811	Fit
d_G	0.599	0.599	Fit
Chi-Square	506.481	506.481	Fit
NFI	0.864	0.864	Fit

Smart-PLS offers matching measures, including SRMR and NFI. Standardized Root Mean Square Residual (SRMR) is the difference between the observed and implied correlations in the model correlation matrix, and values less than 0.10 or 0.08 are considered appropriate. The Normed Fit Index (NFI) was one of the first fit measures proposed in the SEM literature to conform to the index's norm. The range of NFI values is between 0 and 1. The closer the NFI is to 1, the better the fit. The calculation results show all criteria SRMR = 0.054 < 0.1 so that it meets the model suitability measure (Benitez et al., 2020) and NFI = 0.864> 0.8 still meets the requirements (Baumgartner & Homburg, 1996).

Hypothesis Testing

The next step in this analysis is to evaluate the latent construct hypothesized in this research. Hypothesis testing in this research was carried out by looking at the t-statistics and p-value. The hypothesis is accepted if the statistical t-value is > 1.96 and the p-value < 0.05. In Table 5 below, the results of the direct influence path coefficients are presented.

Table 5. Path Coefficients Direct Influence

H	Direct Influence	Original samples	Samples mean	Standard Deviations	T-statistics	P values
H1	LB □PB	0.174	0.174	0.050	3.486	0.001
H2	MB □PB	0.777	0.779	0.046	17.065	0.000
H3	PB □Pres B	0.299	0.286	0.184	1.626	0.105
H4	LB □Pres B	0.454	0.458	0.109	4.175	0.000
H5	MB □Pres B	0.038	0.050	0.177	0.215	0.830

LB: learning environment, MB: learning motivation, PB: learning productivity, Pres B: learning achievement

Based on the results in Tables 5 and 6, the results obtained show that the first hypothesis (H1) tests whether the learning environment positively influences learning productivity. The test results show

that the beta coefficient value of the learning environment on learning productivity is 0.174, and the t-statistic is 3.486. These results show that the t-statistic is >1.96 with a p-value of 0.001 <0.05. So, it can be stated that the first hypothesis is accepted. This proves that the learning environment is proven to have a positive influence on learning productivity.

Table 6. Path Coefficients Indirect Effects

H	Indirect influences	Original samples	Samples mean	Standard Deviations	T-statistics	P values
H6	LB □PB □Pres B	0.052	0.047	0.032	1.624	0.105
H7	MB □PB □Pres B	0.232	0.224	0.149	1.564	0.118

LB: learning environment, MB: learning motivation, PB: learning productivity, Pres B: learning achievement

The second hypothesis (H2) tests whether learning motivation positively influences learning productivity. The test results show that the beta coefficient of learning motivation on learning productivity is 0.777, and the t-statistic is 17.065. From these results, the t-statistic is >1.96 with a p-value of 0.000 <0.05. So, it can be stated that the second hypothesis is accepted. This proves that learning motivation is proven to have a positive influence on learning productivity.

The third hypothesis (H3) tests whether learning productivity positively influences learning achievement. The test results show that the beta coefficient of learning productivity on learning achievement is 0.299, and the t-statistic is 1.626. From these results, the t-statistic is < 1.96 with a p-value of 0.105 > 0.05. It can be stated that the third hypothesis is not accepted. This proves that learning productivity does not influence learning achievement. This outcome highlights that higher productivity does not always translate to better academic performance. A student may be highly productive, yet other factors, such as teaching methods, instructional quality, learning environment, cognitive abilities, and social or emotional influences, may affect achievement more. Learning productivity is often measured by study hours or completed assignments, but more time spent studying does not always lead to better understanding or higher achievement. Ineffective study methods can limit progress, regardless of effort.

The fourth hypothesis (H4) tests whether the learning environment positively influences learning achievement. The test results show that the beta coefficient value of the learning environment on learning achievement is 0.454, and the t-statistic is 4.175. From these results, the t-statistic is > 1.96 with a p-value of 0.000 < 0.05. So, it can be stated that the fourth hypothesis is accepted. This proves that the learning environment influences learning achievement.

The fifth hypothesis (H5) tests whether learning motivation positively influences learning achievement. The test results show that the beta coefficient of learning motivation on learning achievement is 0.038, and the t-statistic is 0.215. These results show that the t-statistic is < 1.96 with a p-value of 0.830 > 0.05. It can be stated that the fifth hypothesis is not accepted. This proves that learning motivation does not influence learning achievement. While motivation is important, its effect may not be statistically significant in this study. It suggests that factors such as study strategies, learning habits, and teaching quality may be more critical to academic success. Highly motivated students may aspire to excel, but without good time management, effective study strategies, or self-discipline, motivation alone does not improve achievement.

The sixth hypothesis (H6) tests whether learning productivity mediates the influence of the learning environment on learning achievement. The test results show a beta coefficient value 0.052 and a t-statistic of 1.624. From these results, the t-statistic is < 1.96 with a p-value of 0.105 > 0.05. It can be stated that the sixth hypothesis is not accepted. These results prove that learning productivity is not proven to mediate the influence of the learning environment on learning achievement. The learning environment can directly impact achievement without relying on productivity. Moreover, increased productivity does not always translate into better understanding or performance.

The seventh hypothesis (H7) tests whether learning productivity mediates the influence of learning motivation on learning achievement. The test results show a beta coefficient value 0.232 and a t-statistic of 1.564. From these results, the t-statistic is < 1.96 with a p-value of 0.118 > 0.05. It can be stated that the seventh hypothesis is not accepted. These results prove that learning productivity is not

proven to mediate the influence of learning motivation on learning achievement. High motivation does not necessarily lead to greater productivity. Without effective study strategies or time management, motivated students may still struggle with productivity. However, motivation can directly enhance academic performance by encouraging students to adopt better study methods and confidently approach academic tasks.

The Influence of the Learning Environment on Learning Productivity

The learning environment refers to all aspects that influence an individual's learning process (Kurniawan et al., 2022). This includes not only the physical environment, such as classrooms and educational facilities but also the psychosocial and cultural environments that influence the learning experience (Tambunan et al., 2020). According to Lewa (2005), the environment was created to build close relationships and work on factors that influence the environment. One factor that can influence increasing student learning achievement is creating a conducive learning environment. In this case, a conducive campus environment is where students carry out learning activities and socialize with others (Hermawan et al., 2020). Santoso & Oktafien (2018) also explained that the learning environment is a very important factor to support student learning achievement. According to Sedarmayanti (2012), lighting, air temperature conditions, hygiene, and safety are the following: Environmental indicators, including Communication, Facilities, Atmosphere, and Lighting. A positive and supportive learning environment is essential to achieving academic achievement. Each component of the learning environment plays a role in creating an enjoyable environment where students can learn, develop, and reach their academic potential (Rusticus et al., 2023).

The components of the learning environment are external to the learner. It is a safe, tranquil, and lovely environment with social order, harmony of life, and good environmental circumstances. The environment is the outcome of the unity of many entities, including power, a state, and other living thing, including people and their actions. within the framework of teaching. The environment is both something that exists inside and outside of a certain person (Hermawan et al., 2020). Based on the aforementioned interpretation, it can be inferred that environmental education serves as a platform for the environmental education process, specifically within the school setting (Pratama & Ghofur, 2021). Students receive an education to grow up to be well-behaved, clever, and talented citizens. In addition, the school plays a significant role in helping students' mindsets as they learn various scientific concepts and abilities.

The test results confirm that the learning environment significantly influences learning productivity, aligning with previous research (Rajagukguk et al., 2023; Tambunan et al., 2020). The learning environment has a positive impact on learning productivity because the learning environment has basic aspects that need to be presented in the campus environment to provide comfort for students. A well-structured learning environment enhances productivity through physical, social, technological, and psychological factors. Adequate lighting, ventilation, and a quiet atmosphere improve focus and comfort, while social support, interactive teaching methods, and a low-stress setting boost motivation and comprehension. Access to learning resources and technology facilitates learning, while disciplined study habits and a distraction-free environment further enhance concentration. Ultimately, an optimal learning environment supports both productivity and academic success. Studies on the influence of the learning environment on learning productivity are documented by Utami et al. (2017). The same results were also explained by Nolen (2003), who explained that learning productivity is determined by a conducive learning environment.

The learning environment is an important aspect that can support students to achieve their learning achievements. The better the learning environment created, the easier it is for students to achieve (Hermawan et al., 2020). His study expressed the same opinion (Daryanti, 2018), which explains that the learning environment can encourage student learning achievement.

The Influence of Learning Motivation on Learning Productivity

Student learning productivity is defined as effectiveness and efficiency in achieving learning goals. This includes how efficiently students use time, resources, and energy to acquire the knowledge, skills, and understanding expected in the educational program (Fauzi et al., 2023). Learning productivity also includes how well students can apply and utilize their knowledge to achieve desired goals. Several indicators measuring student learning productivity are time efficiency and resource utilization. Time

efficiency is how efficiently students use their time to study lessons, complete assignments, and prepare for exams. Resource utilization is how well students use resources such as textbooks, academic journals, libraries, and educational technology to help them learn. Student learning achievement is further achieved through learning productivity. Students with good learning productivity will produce students who excel (Khan et al., 2023). The more learning productivity a student produces, the greater the achievements they can produce (Fauzi et al., 2023).

The test results confirm that learning motivation significantly influences learning productivity, consistent with previous studies (Pgri et al., 2020; Fasya et al., 2023). Learning motivation impacts the formation of learning productivity because learning motivation is an aspect that must be fulfilled for learning productivity to be realized. The better the student's motivation in learning, the greater the potential for productivity generated. Motivation drives students to stay focused, disciplined, and goal-oriented, with higher motivation leading to greater productivity. Both intrinsic and extrinsic motivation enhance enthusiasm, persistence, and information retention, while low motivation results in passivity and poor comprehension. Clear goals, rewards, and external support help sustain motivation, ensuring long-term productivity. Therefore, maintaining student motivation through continuous engagement and stimulation is essential for maximizing learning outcomes.

The Influence of Learning Productivity on Learning Achievement

The test results show that learning productivity does not affect learning achievement. It explains that learning productivity does not impact the formation of learning achievement. This means that whatever the result of the learning process is, it does not impact learning achievement. The results of this study are not supported by previous research (Khan et al., 2023), which explains that learning productivity influences learning achievement. The differences in the results of this research indicate that the learning productivity produced by students does not make them successful. The same results were also obtained (Fauzi et al., 2023), explaining that learning productivity is not always a benchmark for students to create learning achievements. Learning productivity does not affect learning achievement because these two variables are impacts produced by learning environmental conditions and learning motivation. For students, these two variables are perceived as the same as the outcomes they produce. So even though students do not excel, they have been productive in producing something, shown in their learning productivity.

However, learning productivity does not always directly determine academic achievement, as other factors such as teaching quality, comprehension, intelligence, and environmental conditions also play a role. Students may spend considerable time studying but achieve poor results if their strategies are ineffective. Similarly, external factors like social support and teaching quality influence academic outcomes, highlighting that productivity alone does not guarantee success. Social support, including support from family, friends, and lecturers. Another factor that can influence this result is self-efficacy. Self-efficacy includes students' confidence in their ability to complete academic tasks, which can strengthen or weaken motivation's impact on achievement. These play a key role in maintaining student motivation. To sum up, A student may be highly productive, yet other factors, such as teaching methods, instructional quality, learning environment, cognitive abilities, and social or emotional influences, may affect achievement more.

The Influence of the Learning Environment on Learning Achievement

The test results show that the learning environment influences learning achievement. The results of this study are supported by previous research (Ado, 2015), which explains that the learning environment influences learning achievement. This means that the better the learning environment conditions, the greater the opportunities for achievement students can create. The same results were also obtained (Utami et al., 2017), which explains that the learning environment influences learning achievement. A good environment certainly provides calm, and a comfortable situation can stimulate anyone thinking about producing work. In this case, students need conducive support to produce creative ideas (Nurtamara et al.,2023). The learning environment also directly affects academic achievement by influencing comprehension and concentration. A well-structured physical environment enhances focus and retention, such as proper lighting and minimal noise. Social and psychological factors, including support from family, peers, and teachers and a stress-free atmosphere, further contribute to academic performance. Conversely, distractions or limited learning resources can hinder success, regardless of a student s potential.

Previous research has explored learning motivation as an intervening variable in this relationship. A study in Medan on Sukma Management College students found that lifestyle and environment significantly impact learning achievement. However, motivation does not mediate this relationship, as its t-count value is lower than other variables (Lubis, 2021). In contrast, a study in Cimahi on vocational students showed that the family environment and learning facilities positively influence motivation. While the family environment, directly and indirectly, affects achievement through motivation, learning facilities impact achievement only indirectly (Risa, 2021). These findings highlight that while the learning environment plays a crucial role in students' achievement, the role of motivation as a mediator varies depending on the context and influencing factors.

The Influence of Learning Motivation on Learning Achievement

The motivation that develops in society is often equated with 'passion,' and learning outcomes are a process that is carried out with effort with cognitive, affective, psychomotor, and mixed abilities so that an individual experiences a change and knowledge of what is observed both as a result (Fasya et al., 2023). Learning can be seen from the evaluation scores obtained by students. Motivation is the basis for students to determine the achievement of expected competencies. Learning motivation is the driving force within students, which gives rise to learning activities that ensure the continuity of learning activities. which provides direction to learning activities so that the goals desired by learning subjects are achievable (Margunayasa et al., 2024). The better student motivation to learn will encourage the achievements produced by students (Wati & Fatayan, 2023). Learning motivation is a factor that determines student learning productivity (Pgri et al., 2020). This statement is supported by a study conducted by (Pratama & Ghofur, 2021). The greater the student's learning motivation, the greater the student's learning productivity (Fauzi et al., 2023). Motivation is needed by anyone who wants to achieve. For students, they must have motivation if they want to excel. The greater the motivation they have, the greater the achievements they can achieve (Nolen, 2003). Their research (Pgri et al., 2020) explains that when students' learning motivation is high, it will encourage student achievement (Shao et al., 2024).

The test results show that learning motivation does not affect learning achievement. The results of this study are not supported by previous research conducted by (Fasya et al., 2023). In his research, it was explained that learning motivation influences learning achievement. These different research results show that high motivation in learning does not always impact the resulting learning achievement. This means that high student motivation to learn does not always end in achieving high learning achievement, but this high learning motivation can manifest in progress in learning (Havidz et al., (2023). Likewise, motivation alone does not always determine achievement, as factors like learning strategies, intelligence, and resource availability play a crucial role. A highly motivated student may struggle if their methods are ineffective, while a less motivated individual with strong support systems and intelligence may still excel. Thus, while motivation is important, it is not the only predictor of academic success, and its effect may not be statistically significant in this study. This suggests that factors such as study strategies, learning habits, and teaching quality may be more critical to academic success.

The Influence of the Learning Environment on Learning Achievement is Mediated by Learning Productivity

Learning achievement is expressed in symbolic form for each student in a certain period, and it can be stated that learning achievement results from the progress achieved through the learning process (Ningsih & Nurrahmah, 2016). Tohirin (2011) stated that student achievement or learning outcomes refer to cognitive (brain) activity, which involves knowledge, understanding, application, and judgment. Affective is a domain related to attitudes and values, including behavioral traits like feelings. Psychomotor is a domain related to skills or the ability to act. Syah (2015) suggested that aspects of learning achievement: The realm of creativity (cognitive): observation, memory, understanding, application, analysis, and synthesis. The realm of feeling (affective): acceptance, welcome, appreciation, internalization, characterization. The realm of intention (psychomotor): movement and action skills, verbal and nodal expression skills. Change is transitioning from previous conditions, such as thought patterns and behavior. The new behavior is something that has just been done. Maturity is a state or stage of achievement in growth or development.

In various previous studies, the learning environment and learning productivity impacted student learning achievement (Cleopatra, 2015; Nolen, 2003). In other studies, learning productivity is not only a predictor of learning achievement, but its role can mediate the learning environment's influence on learning achievement (Hikmah & Saputra, 2023; Malik & Rizvi, 2018). Many studies have explained that learning motivation and productivity predict learning achievement (Santoso & Oktafien, 2018). In other studies, it is explained that learning productivity is a mediating influence of learning motivation on learning achievement (Lomu & Widodo, 2018; Utami et al., 2017). High student learning motivation can increase learning achievement through learning productivity (Fasya et al., 2023; Malik & Rizvi, 2018).

The test results show that learning productivity does not mediate the influence of the learning environment on learning achievement. This research indicates that learning productivity does not impact the process of creating learning achievement. This means that learning achievement can be achieved because of support from a conducive learning environment (Tambunan et al., 2020). The better the learning environment conditions, the greater the potential for learning achievement (Malik & Rizvi, 2018). This research shows that good productivity is closely related to student learning achievement. So, to produce learning achievements in students, many things need to be produced through student activities so that the desired achievements will be easier to produce. Furthermore, the impact of the learning environment on achievement is not always mediated by productivity. A conducive condition, access to quality resources, and strong social support can directly enhance comprehension and performance without necessarily increasing study hours or effort. While productivity can contribute, it is not the only link between the learning environment and academic success.

The Influence of Learning Motivation on Learning Achievement is Mediated by Learning Productivity

The test results show that learning productivity does not mediate the influence of learning motivation on learning achievement. This research indicates that learning productivity does not support the process of creating learning achievement. This means that learning achievement can be achieved not because of the role of learning productivity but because there is a direct influence on learning motivation (Cleopatra, 2015). The higher the motivation to learn, the greater the potential for learning achievement (Wati & Fatayan, 2023). The resulting learning productivity greatly determines student learning achievement. So, it can be said that the better the students' motivation to learn, the more productive the students will be in producing quality learning, ultimately impacting their learning achievements. Similarly, if motivation influences achievement without being mediated by productivity, this suggests that students can perform well based on internal drives alone, regardless of study efficiency. In such cases, personal ambition and academic goals may have a stronger effect on performance than the time or effort invested in studying.

Limitation

A limitation of this study is the potential bias from convenience sampling, as respondents were selected based on accessibility. This may result in differences from the general population, affecting the reliability of the findings. This convenience sampling may not fully represent the broader population, leading to potential bias, especially when only easily accessible groups are included.

Conclusions

Based on the research results, it can be concluded that the learning environment influences learning productivity and learning achievement. While learning motivation influences learning productivity, it does not influence learning achievement. It can also be concluded that learning productivity is not a mediation in this research. This research indicates that creating a conducive learning environment can improve student learning achievement. Apart from that, learning motivation is also an important aspect that needs to be considered to improve learning achievement. The better the student's motivation to study, the easier it is for students to achieve.

This study expands motivation and learning theories, such as Self-Determination Theory (SDT), by introducing academic productivity as a mediating factor. The findings show that motivation influences achievement both directly and through increased productivity.

The suggestion for universities is to maintain student learning achievements by focusing on student needs, including creating a comfortable learning environment. Student learning motivation can be raised by giving rewards to students who excel. This is to provide a stimulus for other students who are in the process of achieving their achievements. Campuses can offer career development workshops to help students connect their studies to future goals. Scholarship programs based on achievement and motivation can encourage students to work harder.

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