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# Determinants of Student Success

**Najiris Saleh Siregar[1]*, Toyib Daulay[2]**
Universitas Pembangunan Panca Budi, Indonesia
***Correspondence:** siregarnaziril@gmail.com

**Abstract**
This study aims to determine and test the influence of: (1) principal leadership affects teacher performance; (2) Does principal leadership affect school infrastructure; (3) Does principal leadership affect student learning achievement; (4) Does teacher performance affect student learning achievement; and (5) Does infrastructure affect student learning achievement. The population of the study was students at SMA Negeri 1 Sunggal, North Sumatra Province with a sample of 235 students. The research method is a quantitative method with Smart-PLS analysis. The results of the study concluded: (1) principal leadership affects teacher performance by 51.8%; (2) principal leadership has an influence on school infrastructure by 47.8%; (3) principal leadership affects student learning achievement by 22.4%; (4) teacher performance affects student learning achievement by 24.7%; and (5) school infrastructure affects student learning achievement by 47.5%. Overall, the results of the study indicate that student learning achievement is influenced by principal leadership which is moderated by teacher performance and school facilities and infrastructure by 53.4%; while the remaining 46.6% is determined by other factors.

**Keywords:** principal leadership, teacher performance, school infrastructure, student learning achievement.

## INTRODUCTION

Student involvement both physically and mentally is a form of student learning experience that can strengthen students' understanding of learning concepts. Teachers as professional educators are expected to be able to choose and use learning strategies that are appropriate to the subject matter so that they can develop students' critical thinking skills. Teachers have an important role in the learning process, because when teaching, it is not only about delivering subject matter, but the process of changing student behavior according to the expected goals. During the learning process, teachers must be examples for students, guide students, train students' intellectual and motor skills, and shape students who have innovative and creative abilities. The use of learning media is a creative and systematic effort to create experiences that can help students learn so that in the end educational institutions will be able to produce quality graduates. In accordance with Hamalik's opinion (2003) that learning media is a supporting element in the teaching and learning process so that it is carried out smoothly and effectively. Efforts to improve the quality and quantity of educational programs are by improving the quality of learning. Learning is a process of interaction between students and learning resources, but the learning process which in reality is mostly centered on teachers, where the ideal quality learning process is learning that can help and facilitate students to develop their potential optimally, and be able to achieve the goals set effectively, by orienting themselves to the interests, needs, and abilities of students. The duties and roles of teachers include mastering and developing subject matter, planning and preparing daily lessons, controlling and evaluating student activities. The teacher's

duties in the teaching and learning process include pedagogical tasks and administrative tasks. In a learning situation, the teacher is the person who leads and is fully responsible for the leadership carried out. He does not carry out instructions and does not stand under the instructions of other humans except himself, after entering the classroom situation. The achievement of educational goals is expected to be met with teaching and learning activities that run well in accordance with government instructions and school quality demands. Teaching and learning activities in schools are learning activities that are a determining factor in the quality of education. To achieve these expectations, a good learning system must be created by referring to educational goals according to the type and level of education in an educational institution. The learning system created is not a concept, but the most important thing is how to apply the concept in real life.

## LITERATURE REVIEW

### Learning Achievement

Learning achievement is the result achieved or shown by students as a result of their learning, either in the form of numbers or letters and actions that reflect the learning outcomes achieved by each child in certain behaviors. Achievement is also a measure of success from the results of learning activities that have been carried out, although this assumption still needs to be questioned.

### Indicator Learning Achievement

1. Internal factors (factors from within the student), namely the physical and spiritual condition of the student, include two aspects, namely:
   a. Physiological Aspects
   b. Psychological Aspects
2. External factors (factors from outside the student), consist of environmental factors and instrumental factors as follows:
   a. Environmental Factors
   b. Instrumental Factors

### Principal Leadership

The principal is responsible for educational management which is directly related to the learning process at school (Wahjosumidjo, 2011).

### Indicator Principal Leadership

a. The principal must act wisely, wisely, fairly, so that no party is defeated or favored.
b. Subordinates really need suggestions or suggestions in carrying out their duties.
c. In achieving its goals, every organization requires support, funding, advice and so on.
d. The Principal acts as a catalyst in the sense that he is able to inspire and motivate the enthusiasm of teachers, staff and students in achieving the goals that have been set.
e. A sense of security is one of the needs of every person, both individually and in groups.

f. A Principal as a leader will be the center of attention, meaning that all views will be directed at the principal as the person who represents school life wherever and whenever an opportunity arises.
g. The principal is essentially a source of inspiration for teachers, staff and students.
h. Every person in organizational life, both individually and in groups, if their needs are considered and fulfilled

**Teacher Performance**

Performance is the result of a person's work seen from the aspects of quality, quantity, work time and cooperation to achieve the goals set by the organization.

**Teacher Performance Indicators**

a. The quality produced explains the number of errors, time, and accuracy in carrying out tasks.
b. Quantity produced relates to how many products or services can be produced.
c. Working hours, explaining the number of absences, lateness, and length of work that the individual has completed, and
d. Cooperation explains how individuals help or hinder the efforts of their co-workers.

**METHOD**

This research is a quantitative research of the Path Analysis type. According to Riduwan (2008), path analysis is used to analyze the pattern of relationships between variables with the aim of determining the direct or indirect influence of a set of independent variables (exogenous) on the dependent variable (endogenous).

This research was conducted at SMA Negeri 1 Sunggal, North Sumatra Province, and the research period was from January 2022 to August 2023.

According to Sudjana (1992) stated that population is the totality of all possible values, results of calculations or measurements, quantitative and qualitative about certain characteristics of all members of a complete and clear group to study its properties. In this study, the population was all students of class XII at SMA Negeri 1 Sunggal, North Sumatra Province in the science department with a total of 208 students.

According to Arikunto (2000) if the research subjects are less than 100, then it is better to take all of them, so that the research is a population study. Furthermore, if the subjects are large, they can be taken between 10% - 15% or 20% - 25% or more. Observing Arikunto's opinion, because the population is more than 100 people, the sampling in this study uses random sampling. Meanwhile, the technique for determining the number of samples uses the Slovin formula in Riduwan (2021) with the formula:

$$n = \frac{N}{(1+N)d^2}$$

Information:
n = Sample size n = Population
d = Error rate

Based on Slovin's formula, for a population of N = 208, and an error rate of d 0.05, the number of samples obtained is:

$$n = \frac{208}{1+(208x0,052^2)}$$

$$n = \frac{208}{2,425}$$

= 144

Based on the formula above, the number of research samples obtained was 144 people.

## RESULTS AND DISCUSSION

### Descriptive Statistics

Descriptive statistics provide an overview or description of key metrics including average, standard deviation, variance, minimum, sum, range, kurtosis, and skewness for each variable. (Ghozali, 2015) The analyzed variables are Principal Leadership (X1), Teacher Performance (X2), School Infrastructure (X3), and Student Learning Achievement (Y).

**Descriptive Statistics Table**

| Statistic | Principal Leadership (X1) | Teacher Performance (X2) | School Infrastructure (X3) | Student Learning Achievement (Y) |
|---|---|---|---|---|
| N | 235 | 235 | 235 | 235 |
| Missing | 0 | 0 | 0 | 0 |
| Mean | 59.02 | 56.14 | 82.41 | 67.03 |
| Median | 60 | 57 | 83 | 68 |
| Mode | 74 | 68 | 83 | 65 |
| Standard Deviation | 11.712 | 10.012 | 14.073 | 10.052 |
| Minimum | 32 | 32 | 48 | 41 |
| Maximum | 80 | 75 | 110 | 92 |
| **Total** | **13869** | **13194** | **19366** | **15752** |

Based on the table above, the following details summarize the statistics of each variable:

1. Principal Leadership: Sample size of 235, minimum score of 32, maximum score of 80; Mean = 59.02, Median = 60.00, Standard Deviation = 11.712.
2. Teacher Performance: Sample size of 235, minimum score of 32, maximum score of 75; Mean = 56.14, Median = 57.00, Standard Deviation = 10.012.
3. School Infrastructure: Sample size of 235, minimum score of 48, maximum score of 110; Mean = 82.41, Median = 83.00, Standard Deviation = 14.073.

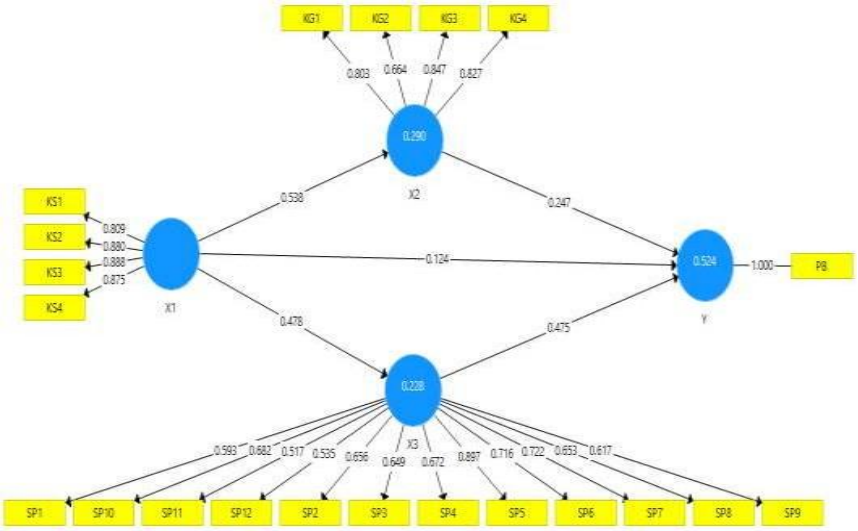
4. Student Learning Achievement: Sample size of 235, minimum score of 41, maximum score of 92; Mean = 67.03, Median = 68.00, Standard Deviation = 10.052.

## PLS SEM Test Results

### External Model Analysis

### Convergence Validity

The convergence validity test evaluates the consistency of each measuring instrument for the research constructs. Instruments are deemed valid when the loading factor values are appropriate. The loading factors for each instrument are shown in the following figure.




The figure confirms that all loading factor values exceed 0.5, validating that the instruments used for the construction variables are appropriate.

**Average Variance Extracted (AVE) Analysis Results Table**

| Variables | AVE | Information |
|---|---|---|
| X1 – Key Leadership | 0.746 | Reliable |
| X2 – Teacher Performance | 0.622 | Reliable |
| X3 – School Infrastructure | 0.943 | Reliable |
| Y – Student Learning Achievement | 1 | Reliable |

*Source: Data processed from research results, 2023*

### Discriminant Validity

The discriminant validity test assesses whether instruments measuring one variable differ from those measuring others. Below are the results of this analysis.

**Fornell-Larcker Approach Discriminant Validity Test Table**

| | X1 – Key Leadership | X2 – Teacher Performance | X3 – School Infrastructure | Y – Student Learning Achievement |
|---|---|---|---|---|
| X1 – Key Leadership | 0.863 | | | |
| X2 – Teacher Performance | 0.538 | 0.789 | | |
| X3 – School Infrastructure | 0.478 | 0.565 | 0.666 | |
| Y – Student Learning Achievement | 0.484 | 0.582 | 0.674 | 1 |

*Source: Data processed from research results, 2023*

This table shows that the correlation value for each construction variable is greater than that of the others, indicating strong discriminant validity.

**Cross-Loading Approach Discriminant Validity Test Table**

| Instrument Code | X1 – Key Leadership | X2 – Teacher Performance | X3 – School Infrastructure | Y – Student Learning Achievement |
|---|---|---|---|---|
| KG1 | 0.435 | 0.803 | 0.457 | 0.458 |
| KG2 | 0.373 | 0.664 | 0.42 | 0.377 |
| KG3 | 0.441 | 0.847 | 0.528 | 0.542 |
| KG4 | 0.446 | 0.827 | 0.372 | 0.447 |
| KS1 | 0.809 | 0.399 | 0.38 | 0.404 |
| KS2 | 0.88 | 0.437 | 0.441 | 0.399 |
| KS3 | 0.888 | 0.462 | 0.371 | 0.406 |
| KS4 | 0.875 | 0.547 | 0.45 | 0.457 |
| SP1 | 0.192 | 0.297 | 0.593 | 0.37 |
| SP2 | 0.283 | 0.369 | 0.656 | 0.491 |
| SP3 | 0.292 | 0.336 | 0.649 | 0.386 |
| SP4 | 0.386 | 0.341 | 0.672 | 0.477 |
| SP5 | 0.44 | 0.49 | 0.897 | 0.613 |
| SP6 | 0.401 | 0.445 | 0.716 | 0.485 |
| SP7 | 0.37 | 0.485 | 0.722 | 0.502 |
| SP8 | 0.271 | 0.309 | 0.653 | 0.397 |
| SP9 | 0.33 | 0.356 | 0.617 | 0.402 |
| SP10 | 0.25 | 0.366 | 0.682 | 0.424 |
| SP11 | 0.203 | 0.34 | 0.517 | 0.36 |
| SP12 | 0.295 | 0.319 | 0.535 | 0.397 |
| PB | 0.484 | 0.582 | 0.674 | 1 |

*Source: Data processed from research results, 2023*

The table above displays the cross-loading values of each instrument for their respective construct as well as their correlation with other constructs. According to the Fornell-Larcker Criterion, if the instrument's cross-loading value is greater for its corresponding variable than for other constructs, it indicates a high level of discriminant validity.

## Composite Reliability

Composite reliability examines the overall consistency of the instruments used for each construction variable. The following table presents the test results:

**Cronbach Alpha and Composite Reliability Test Table**

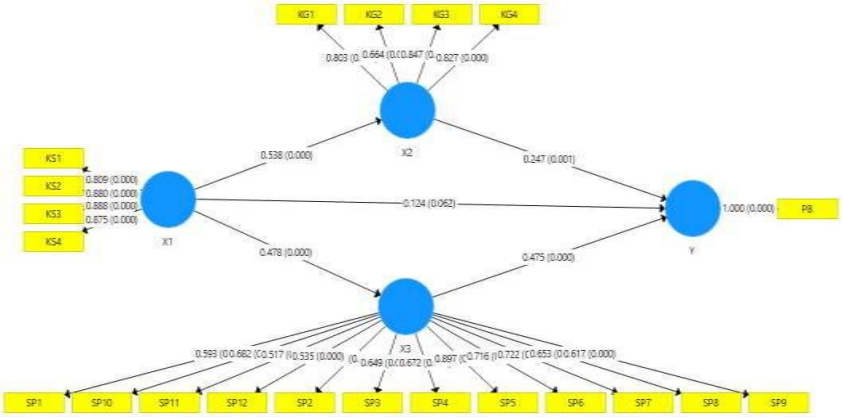
| Building Variables | Cronbach's Alpha | Composite Reliability | Conclusion |
|---|---|---|---|
| X1 – Key Leadership | 0.886 | 0.921 | Reliable |
| X2 – Teacher Performance | 0.794 | 0.867 | Reliable |
| X3 – School Infrastructure | 0.883 | 0.903 | Reliable |
| Y – Student Learning Achievement | 1 | 1 | Reliable |

*Source: Data processed from research results, 2023*

The table indicates that both Cronbach's Alpha and Composite Reliability values exceed the established thresholds, confirming that all instruments demonstrate acceptable reliability.

## Hypothesis Testing Analysis

### Intervariable Effect Testing




This section analyzes the influences and their magnitudes between exogenous and endogenous variables. The influence direction indicates how exogenous variables affect endogenous variables. The results of the hypothesis testing are summarized in the following table:

**Table of Results of Path Coefficient Testing Between Variables**

| Building Variables | Influence (O) | T Statistics | P Value | Conclusion |
|---|---|---|---|---|
| Principal Leadership (X1) → Teacher Performance (X2) | 0.538 | 9.535 | 0 | Significant Positive |
| Principal Leadership (X1) → School Infrastructure (X3) | 0.478 | 7.285 | 0 | Significant Positive |
| Principal Leadership (X1) → Student Learning Achievement (Y) | 0.224 | 2.069 | 0.022 | Significant Positive |

| Building Variables | Influence (O) | T Statistics | P Value | Conclusion |
|---|---|---|---|---|
| Teacher Performance (X2) → Student Learning Achievement (Y) | 0.247 | 3.383 | 0.001 | Positive |
| School Infrastructure (X3) → Student Learning Achievement (Y) | 0.475 | 6.232 | 0 | Significant Positive |

*Source: Data processed from research results, 2023*

The table shows the hypothesis testing outcomes between exogenous and endogenous variables. The results indicate that Principal Leadership positively and significantly influences Teacher Performance with a p-value of 0.000, which is less than 0.05. The influence amount of Principal Leadership on Teacher Performance is 0.538 (53.8%). This suggests that Principal Leadership has a noteworthy positive impact on Teacher Performance, which, in turn, affects Student Learning Achievement.

**Moderation Effect Testing**

This analysis aims to evaluate the indirect effects in the SEM-PLS model of the study. The results of the moderation effect hypothesis testing are presented below.

**Moderation Effect Path Coefficient Test Results Table**

| Building Variables | Influence (O) | T Statistics | P Value | Conclusion |
|---|---|---|---|---|
| Principal Leadership (X1) → Student Learning Achievement (Y), moderated by Teacher Performance (X2) | 0.227 | 5.77 | 0 | Moderate |
| Principal Leadership (X1) → Student Learning Achievement (Y), moderated by School Infrastructure (X3) | 0.133 | 3.2 | 0.001 | Moderate |

*Source: Data processed from research results, 2023*

The table shows the results of testing the influence hypothesis with moderation formed from this research model. The first test shows that there is a significant influence of Principal Leadership on Student Learning Achievement if moderated by Teacher Performance. This conclusion is seen from the significance value of 0.000 which is smaller than 0.05. Judging from the magnitude of the influence, it is known to be 0.227 or equal to 22.7%. This means that Teacher Performance significantly moderates Principal Leadership on Student Learning Achievement.

Furthermore, the results of the hypothesis testing of influence with moderation are formed from this research model. The first test shows the results that there is a significant influence of Principal Leadership on Student Learning Achievement if moderated by School Infrastructure. This conclusion is seen from the significance value of 0.001 which is smaller than 0.05. Judging from the magnitude of the influence, it is known to be 0.133 or equal to 13.3%. This means that School Infrastructure significantly moderates Principal Leadership on Student Learning Achievement.

## CLOSING

### Conclusion

1. Principal leadership has an influence on teacher performance at SMA Negeri 1 Sunggal. The magnitude of the influence given by the principal leadership variable on teacher performance is 53.8%.
2. Principal leadership has an influence on school facilities and infrastructure at SMA Negeri 1 Sunggal. The magnitude of the influence given by the principal leadership variable on school facilities and infrastructure is 47.8%.
3. Principal leadership has an influence on student learning achievement at SMA Negeri 1 Sunggal. The magnitude of the influence given by the principal leadership variable on student learning achievement is 22.4%.
4. Teacher performance has an influence on student learning achievement at SMA Negeri 1 Sunggal. The magnitude of the influence given by the teacher performance variable on student learning achievement is 24.7%.
5. School facilities and infrastructure have an influence on student learning achievement at SMA Negeri 1 Sunggal. The magnitude of the influence given by the school facilities and infrastructure variable on teacher performance is 47.5%.

### Suggestion

a. Principal leadership influences teacher performance at SMA Negeri 1 Sunggal. The influence given by the principal leadership variable on teacher performance is 53.8%.
b. Principal leadership has an influence on school infrastructure at SMA Negeri 1 Sunggal. The influence of the principal leadership variable on school infrastructure is 47.8%.
c. Principal leadership influences student learning achievement at SMA Negeri 1 Sunggal. The influence given by the principal leadership variable on student learning achievement is 22.4%.
d. Teacher performance affects student learning achievement at SMA Negeri 1 Sunggal. The influence of teacher performance variables on student learning achievement is 24.7%.
e. School infrastructure affects student learning achievement at SMA Negeri 1 Sunggal. The influence of school infrastructure variables on teacher performance is 47.5%.

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