

## **Students Mathematics Learning Achievement from Mathematics Teacher Performance and Principal Managerial Competencies Point of View**

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### **Abstract**

Principals and teachers are two important elements that must be at the forefront of improving the quality of students in the school. Do these two things affect learning achievement? It is what the researchers answered in this study. Therefore, this study aims to describe the influence of mathematics teacher performance and principal managerial competence on student mathematics learning achievement. The approach in this study is a quantitative (survey). The population was all mathematics teachers and public high school students in Central Lombok, about 793 people. Using the purposive sampling technique obtained a sample of this study were all mathematics teachers in one of the public high schools in Central Lombok, totaling 187 people. The instruments used were mathematics teacher performance and principals managerial competency questionnaires, and computer-based national exam tests to measure student mathematics learning achievement. Data analysis was performed using a regression test, namely the t-test and the F-test, to see the effect of mathematics teacher performance and principal managerial competence (individually and together). The results showed that mathematics teacher performance affected mathematics learning achievement with a t-value of 16.295, and principal managerial competence affected mathematics learning achievement with a t-value of 18.831. Furthermore, mathematics teacher performance and principal managerial competence influence student mathematics learning achievement of public senior high school students in Central Lombok with an F-value of 211.482.

**Keywords:** mathematics teacher performance, principal managerial competence, student mathematics learning achievement

### **INTRODUCTION**

Education consists of several elements that work together and form a unity. These elements include teachers, students, principals, curriculum, facilities and infrastructure, and so forth (Carmichael et al., 2017; The Georgia Vision Project, 2017). When one element works poorly, the cumulative quality of education becomes poor. However, when all elements work optimally, education quality will certainly run optimally and obtain a quality of education output. The teacher and students are two of the many elements that play a crucial role in determining education quality. This is because teachers are the primary implementers of education regulations and interact directly with

students, while students are the input and output of education itself (Block et al., 2012; Unicef, 2007; Wegner et al., 2013).

Many things must be owned by the teacher in carrying out the main tasks and functions as a teacher. Teachers must be able to optimize all the competencies they have so that they are ready to guide students to have better competencies than before. A good teacher deft in answering questions and must be deft in explaining how to answer students' questions. Teachers cannot only explain how to answer questions but also be an example for their students, both in terms of personality and interacting with others. Teachers in Indonesian terms 'Guru' are often given the

term 'digugu' and 'ditiru'. That is, the teacher must be able to behave well in his daily life so that he can be a role model for the students he guides (Cochrane & McGettigan, 2019; Jan, 2017; OECD, 2008).

Teachers in their operationally have four competencies: professional competence, pedagogical competence, personal competence, and social competence. A teacher must possess all these competencies to carry out the main tasks and functions as a teacher. These four potentials affect the quality of performance performed by the teacher. In other words, the four competencies are the leading indicators of teachers said to have good performance, including mathematics teachers (ACTEQ, 2003; Bertschy et al., 2013; Gulevska & Atanasoska, 2015; Ilanlou & Zand, 2011; Nessipbayeva, 2012; Selvi, 2010).

Besides teachers, the principal is also one of the education elements that play a vital role in education. The principal is the leader who can manage the school and all school elements to act under regulations. All regulations made by the government always prioritize students as the primary consideration variable in making policy. However, the government's regulations are usually still in the form of an abstract framework so that teachers and students have difficulty implementing them. Therefore, we need a school principal who can become a bridge and supporter so that teachers and students can implement government regulations by applicable regulations (Farah, 2013; Krasnoff, 2015; NASSP, 2013; Pont et al., 2010).

Teachers and students cannot interact directly with related education authorities in implementing a regulation. Therefore, it is the principal who has to carry out this. Teachers and students cannot run all the rules without adequate facilities and infrastructure at school. Instead, it is the principal who carries out the task. Teachers and students are not able to provide direct input to the government, but it is the principal who has the task (Al-Safran et al., 2000; Pont et al., 2010).

Like the teacher, the principal also has a burdensome duty in the school, especially in regulating and controlling all the human resources, facilities, and infrastructure to work optimally. The principal has the main task, namely as a manager. In other words, a school principal must have good managerial competence as necessary capital to become a good school principal. The principal's primary goal must have good managerial competence is to bring the school to produce quality graduates. It means that students who are educated in a school led by the principal must be able to become qualified students who have the required competencies, both for the need to continue their studies and work and social needs (The Wallace Foundation, 2013).

Principals and teachers are two important elements that must be at the forefront of improving the students' quality in the school. If it is associated with learning mathematics, then the principal and the mathematics teacher are intended in this case. Mathematics is one of the most important disciplines. Even mathematics is said to be the queen and servant of other disciplines. Mathematics as a queen is defined as mathematics is the basis for the birth of other disciplines, such as computer science. Mathematics as a servant is interpreted as mathematics as a tool used by other disciplines in helping their work, such as the disciplines of physics, chemistry, and engineering (Forman & Steen, 1999; Schmidt, 2004; Shapiro, 2009).

Based on the description above, it is fascinating to study mathematics teacher performance and principal managerial competence toward student mathematics learning achievement. Therefore, the purpose of this study is to describe: (1) the effect of mathematics teacher performance toward student mathematics learning achievement; (2) the effect of principal managerial competence toward student mathematics learning achievement; and (3) the joint effect of mathematics teacher performance and principal managerial competence toward students mathematics learning achievement. It is

expected that this research will be able to add to the treasury of knowledge related to teacher performance, principal managerial competence, and student mathematics learning achievement. Besides, this research is expected to compare and a starting point for future researchers to carry out research.

## METHOD

The research approach used in this study is quantitative. This type of research is a survey with the correlational method (Lord 1973). This study seeks to find a causal relationship between independent variables (mathematics teacher performance and principal managerial competence) and dependent variables (student mathematics learning achievement).

This study's populations were all teachers and students of state high schools in the city of Central Lombok, totaling 793 people. This study's sample was all mathematics teachers and students in class XII of a public high school in Central Lombok, amounting to 187 people using purposive sampling techniques. This research was conducted in July 2018.

The instruments used in this study were the teacher performance questionnaire and the managerial competency questionnaire for school principals. The instrument used to obtain achievement data was a computer-based national exam. Proof of instrument validity is done by testing the content validity and item validity. Mathematics achievement and validity instruments were not tested for validity and reliability because they used the standardized instruments issued by the Ministry of Education and Culture of the Republic of Indonesia.

Content validity is done by asking the opinions of two experts in mathematics education and concluded that the instrument had fulfilled content validity with several revised statements. After 120 teachers and item analysis trials, information was obtained that 44 statement items for the teacher's performance

questionnaire were declared valid. The principal's managerial competency questionnaire information was obtained that 27 statements were valid. Furthermore, based on the trial results also obtained Cronbach Alpha scores for teacher performance questionnaires of 0.726 and principals managerial competency questionnaires obtained information that Cronbach Alpha scores of 0.688. Because all the questionnaire values are above 60%, it can be concluded that the instrument is reliable (Ghozali, 2009).

Furthermore, this study's prerequisite tests include several tests, namely multicollinearity test, autocorrelation test, heteroscedasticity test, normality test, and homogeneity test. Using the SPSS program, each test's values are as follows (Osborne & Waters, 2003). Based on the multicollinearity test results using SPSS, information is obtained that the Tolerance value is 0.228 and the VIF is 4.394. Because the Tolerance value is greater than 0.10 and the VIF value is less than 10, it can be concluded that there is no multicollinearity between teacher performance variables with the principal's managerial competence.

The Durbin-Watson data value in this study amounted to 1.746. Therefore the value is greater than the upper limit of 1.6971, and then it can be concluded that there was no autocorrelation in the formed regression model.

Based on Figure 1, the data that spreads above and below 0 on the Y-axis spread evenly so that it can be concluded that there was no heteroscedasticity in the regression model created. The significant value of the Levene test obtained was 0.525. Because the significance value is greater than 0.05, then it can be concluded that the data is homogeneous. The value of Kolmogorov-Smirnov Z was attained at about 0.942 with a significance is greater than 0.05 so that it can be concluded that the data are normally distributed.

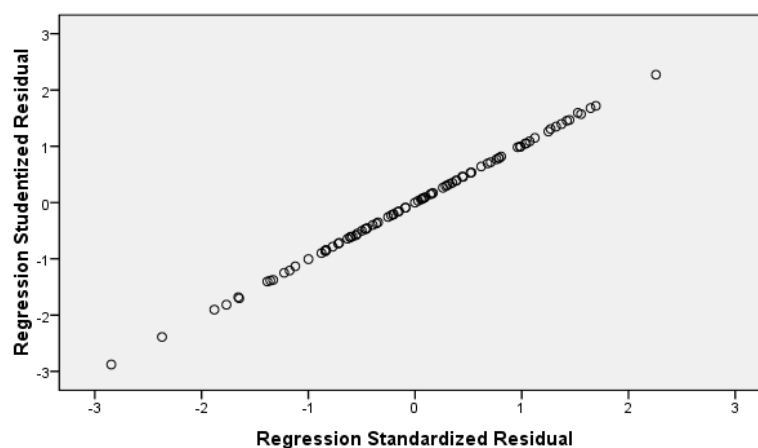


Figure 1. Scatter Plot

The hypothesis of this research are as follows.

1. Effect of mathematics teacher performance toward student mathematics learning achievement of public senior high school students in Central Lombok.

$H_{01}$ :  $ryx1 = 0$  (mathematics teacher performance does not affect student mathematics learning achievement).

$H_{a1}$ :  $ryx1 > 0$  (mathematics teacher performance affects student mathematics learning achievement).

2. The influence of principal managerial competence toward student mathematics learning achievement of public senior high school students in Central Lombok.

$H_{02}$ :  $ryx2 = 0$  (principal managerial competence does not affect student mathematics learning achievement).

$H_{a2}$ :  $ryx2 > 0$  (principal managerial competence influences student mathematics learning achievement).

3. The effect of mathematics teacher performance and principal managerial competence toward public senior high school students' mathematics learning achievement in Central Lombok.

$H_{03}$ :  $ryx1 = ryx2 = 0$  (mathematics teacher performance and principal managerial competence do not affect the student mathematics learning achievement).

$H_{a3}$ :  $ryx1 = ryx2 \neq 0$  (mathematics teacher performance and principal managerial competence jointly affect student mathematics learning achievement).

Data analysis was then performed using the regression test with the t-test (for hypotheses 1 and 2) and the F-test for hypothesis 3. The value of R Square was used as a complement to the regression test. The t-test and F-test criteria are when the significance value is less than 0.05, then  $H_0$  is rejected (Ghozali, 2009).

## RESULT AND DISCUSSION

### Descriptive Statistics

Based on Table 1, the average performance of mathematics teachers is 72.1653, the average of principal managerial competence is 75.8944, and the average mathematics learning achievement of students is 75.4364. If the three averages are compared, the principal's managerial competence is classified as the highest, followed by student mathematics learning achievement and mathematics teacher performance.

Table 1. Descriptive Statistics

Aspects	N	Min	Max	Mean	SD
TC	62	187.50	72.1653	7.39106	61.93
PMC	57	93.52	75.8944	8.38278	57.41
SA	60	92.59	75.4364	7.81260	60.19

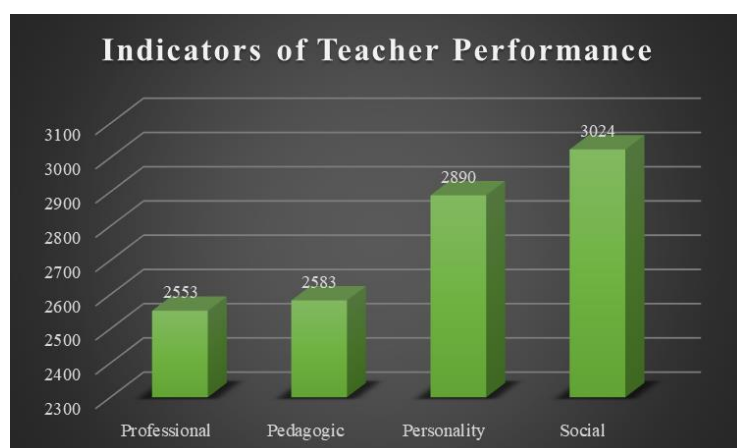


Figure 2. Distribution of Mathematics Teacher Performance Indicators

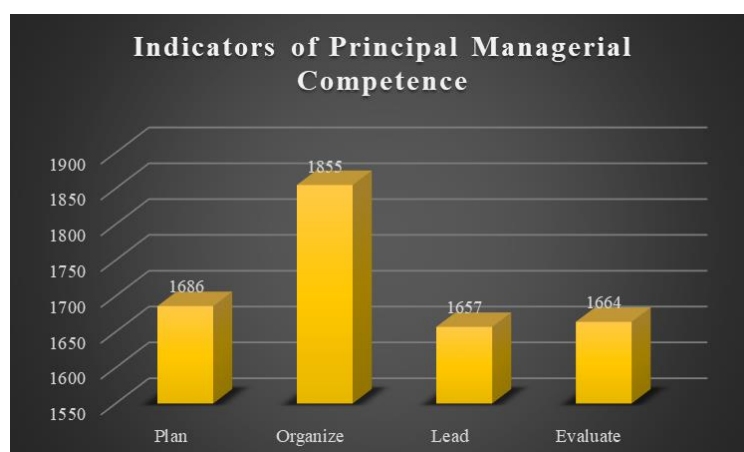


Figure 3. Distribution of Principal Managerial Competency Indicators

#### ***Distribution of mathematics teacher performance indicators***

Figure 2 above obtained information that social competencies, which are the highest indicators of teacher competencies, followed personal competencies, pedagogical competencies, and professional competencies. The difference between social competence and personality competence with pedagogical and social competence is also huge (distribution of the questionnaire's definition is proportional to all indicators).

#### ***Distribution of principal managerial competency indicators***

Figure 3 obtained information that the most important organizing indicator followed planning, evaluating, and leading (the distribution of questionnaires is proportional to all indicators).

#### **Inferential Statistic**

##### ***The effect of mathematics teacher performance toward student mathematics learning achievement***

Based on Table 2, mathematics teacher performance can explain student mathematics learning achievement by about 75.7%.

Table 2. Model Summary Mathematics Teacher Performance

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.870 <sup>a</sup>	.757	.754	3.87159

Table 3. Coefficients Mathematics Teacher Performance

Mod.	Unstd. Coef. B	Stand. Coef. Beta	t	Sig.
1 Cons.	9.055	-	2.210	0.03
TP	0.920	0.870	16.295	0.00

Table 3 showed that the t-value about 16.295 with a significance of 0.000. Therefore, the significance value less than 0.05; then  $H_{01}$  is rejected. Student mathematics learning achievement is significant towards a public senior high school student mathematics learning achievement in Central Lombok. The regression model that formed is:

$$Y = 9.055 + 0.920X_1 \quad (1)$$

When mathematics teacher performance values 0, then the mathematics learning achievement value of 9.055, and when mathematics teacher performance values 1, then student mathematics learning achievement of students increases about 0.920, and so on.

#### ***The effect of principal managerial competence toward student mathematics learning achievement***

Based on Table 4, principal managerial competence can explain mathematics learning achievement of public high school students by about 80.5%. Based on Table 5, the value of t is 18.831 with a significance of 0.000. The significance value of t is less than 0.05.  $H_{02}$  is rejected. Therefore, principal managerial competence is significant for a public high school's student mathematics learning achievement in Central Lombok. The regression model that formed is:

$$Y = 11.975 + 0.836X_2 \quad (2)$$

That is when the principal's managerial competency value is 0. The value of student mathematics learning achievement is 9.055, and when the principal's managerial competency value is 1, then the mathematics learning achievement of students increases by 0.920, and so on.

Table 4. Model Summary Principal Managerial Competence

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.897 <sup>a</sup>	0.805	0.803	3.47032

Table 5. Coefficients Principal Managerial Competence

	B	SE	Beta	t	Sig.
1 (Cons.)	11.975	3.408	-	3.513	0.001
MTP	0.836	0.045	0.897	18.831	0.000

#### ***The joint effect of mathematics teacher performance and principal managerial competence toward student mathematics learning achievement***

Table 6 obtained information that mathematics teacher performance and principal managerial competence can jointly explain public high school student mathematics learning achievement about 83.4%. Table 7 shows that the F-value obtained was 211.482 with a significance of 0.000. It indicates that  $H_{03}$  is rejected because the significance value is less than 0.05. Therefore, it can be concluded that mathematics teacher performance and principal managerial competencies influence student mathematics learning achievement of public senior high school students in Central Lombok. The regression model that formed is (based on Table 8):

$$Y = 6.908 + 0.542X_1 + 0.379X_2 \quad (3)$$

That is when the value of mathematics teacher performance and principal managerial competence is 0. The value of student mathematics learning achievement is 6.908. When the value of the two independent variables is 1, then students' mathematics learning achievement will increase by 0.542 and 0.379, and so on.

Table 6. Model Summary of Jointly Effect

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.913 <sup>a</sup>	0.834	0.830	3.21778

Table 7. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4379.414	2	2189.707	211.482	.000 <sup>a</sup>
Residual	869.746	84	10.354		
Total	5249.160	86			

Table 8. Coefficients of Jointly Effect

Model	Unst. Coef. B	Std. Error	Stan. Coef. Beta	t	Sig.
1 (Cons.)	6.908	3.423	-	2.018	0.047
MTF	0.379	0.098	.359	3.856	0.000
PM	0.542	0.087	.582	6.249	0.000

## Discussion

### *The effect of mathematics teacher performance toward student mathematics learning achievement*

The study results obtained information that the performance of mathematics teachers affects mathematics learning achievement. It is because teachers who have good pedagogical competencies tend to be able to convey material or assist students in constructing concepts more efficiently so that student competencies become better (Ada & Azisah, 2016; Hakim, 2015; Sun & Wu, 2016).

In addition to pedagogical competence, professional competence also plays an important role in shaping students' mathematics learning achievement. When a math teacher has an excellent ability to solve math problems, the teacher will easily explain how to solve these problems to students (Drovnikov et al., 2016). The teacher can try all of the variations to solve the test so that students can easily choose which way is easier to follow. Automatically, this will have an impact on increasing students' mathematics learning achievement in school (Mizambaeva & Baimyrzaev, 2019; Nabila, 2016).

Personality competence also plays a similar role. In fact, in this study, personality competencies accounted for a greater percentage than professional and pedagogical competencies. Teachers who have good personalities are better at students and tend to be more authoritative to be role models for students. The teacher will more easily control students because students tend to listen to the teacher's words (Kheruniah, 2013; Wardoyo, 2015).

Furthermore, social competence is the most significant indicator in this study. Social competence is the highest indicator of teacher performance indicators (if related to the social environment). Teachers who have good social competence will establish good relations with all school elements, especially students, during the learning process. During the learning process, teachers who have good social competence will also care for their students outside of learning hours (Gedvilienė, 2015).

The teacher will provide input and assistance when students have difficulty in learning. The teacher will not hesitate to give additional hours to students who do not understand the material. The teacher might contact student guardians when learning problems cannot be solved at school. It then positively impacts the development of students' mathematics learning achievement in a better direction (Taniredja & Abduh, 2016).

### *The effect of principal managerial competence toward student mathematics learning achievement*

Based on the study results, the principal's managerial competence significantly influences students' mathematics learning achievement. It is because the principal who has good managerial competence will be able to make plans, organize plans, lead the implementation of plans, and evaluate the results and processes that have been implemented by the school properly (Igomu et al., 2013; Ozmen & Muratoglu, 2010; Victor, 2017). In connection with the computer-based national exams, principals with good managerial competence have prepared in advance what are needed to carry out the national exams and how the student get good results or grades. The school principal will prepare all the facilities and infrastructure needed, such as the school principal preparing computers, internet networks, and space for conducting examinations that are conducive for students. The principal asks the teacher to provide

additional material and additional enrichment to students so that students' national exam scores would be better. Students are also given motivation and direction so that the spirit of learning becomes better and national examinations are obtained. The school principal invited the cleric to carry out praying activities to implement the national exams, and exam results would be better (Gloria, 2016; Mustamin & Yasin, 2012).

The principal always plans and carries out simulation tests, tryouts at the school level and the city level. The principal always asks the teacher to learn from the results of previous national examinations by trying to provide additional material, especially on material that is a weak point for students. In essence, the principal will always be praying and looking for ways to effort until the end so that the results of the national examination of students reach the school's target (Ozmen & Muratoglu, 2010; The Wallace Foundation, 2013). Therefore, it is not strange when the principal's managerial competence positively and significantly affects students' mathematics learning achievement (Al-Safran et al., 2000; Krasnoff, 2015). It is also supported by Jamali & Prasoj (2013) research, which revealed that the managerial competence of school principals effectively contributed to the improvement of high school students' learning achievement in Yogyakarta City.

***The joint effect of mathematics teacher performance and principal managerial competence toward student mathematics learning achievement***

The study results obtained information that school principals' mathematics teacher performance and managerial competence jointly have a significant effect on student achievement. The two school elements, namely the teacher and the principal, are two critical figures in student success. The principal is the policymaker, and the teacher is the policy implementer. Principals with good managerial competence will be able to work well with teachers who have good performance. All

instructions desired by the principal are carried out properly by the teacher (Arhipova et al., 2018; Bredeson & Johansson, 2000; Habibi, 2015).

When the principal asks to make improvements to learning, the teacher will improve the learning done. When the principal asks the teacher to increase professional competence, the teacher will try to improve his professional competence well (Al-Safran et al., 2000; Ozmen & Muratoglu, 2010). The principal will try to organize training activities to improve teacher competency to follow the activity carefully. This is what is automatically able to improve student mathematics learning achievement (The Wallace Foundation, 2013). Teachers and school principals who have good competence will be able to work together to plan, implement, and evaluate policies that are carried out to establish good student mathematics learning achievement (Fauzi & Rokhmat, 2018; Gloria, 2016; Harahap, 2017).

## CONCLUSION

Based on the results of research and discussion, it can be concluded that: (a) Mathematics teacher performance affects student mathematics learning achievement of a public senior high school in Central Lombok (a t-value of 16.285 was obtained with a significance of 0.000), (b) principal managerial competence affects student mathematics learning achievement of public senior high school students in Central Lombok (a t-value of 18.731 was obtained with a significance of 0.000), and (c) mathematics teacher performance and principal managerial competence jointly affect student mathematics learning achievement of a public senior high school in Central Lombok (an F-value of 211.482 was obtained with a significance of 0.000).

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