



The Effect of Mathematics Teacher Performance and Student Attitude to Mathematics Teacher toward Student Mathematics Reasoning Ability

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Abstract. The low of mathematics reasoning ability is one of student problem. This is caused by mathematics teacher performance and student attitudes to mathematics teacher. Therefore, this study aims to describe the effect of mathematics teacher performance and student attitudes to mathematics teachers toward student mathematics reasoning ability. This type of research is ex-post facto. The population of this study was all mathematics teachers and students public junior high school on east praya about 264 people with a sample of all mathematics teachers and students at 3rd east praya public junior high school about 72 people (purposive random sampling). The instruments used in this study were teacher performance questionnaire, student attitude questionnaire, and mathematics reasoning ability test. The statistical test used to analyze the data is a regression test (F-test and t-test). Based on the research results obtained information that t about 42,574 with a significance of 0,000 (H01 rejected); t about 40,243 with a significance of 0,000 (H02 rejected); and F about 1,763 with a significance of 0,000 (H03 rejected). Therefore, it can be concluded that mathematics teacher performance and student attitude to mathematics teacher have a significant effect on student mathematics reasoning ability (individually and together).

Keywords: mathematics teacher performance, student attitude to mathematics teacher, student mathematics reasoning ability

INTRODUCTION ~ Mathematics is one of the core subjects at school. All levels of education and all majors must study mathematics. This is because mathematics is a very important subject for student development in school. Mathematics is learned in order to prepare students to become human beings who are able to survive with the times and the necessities of daily life. Mathematics is studied as a form of preparing students to live life and continue their studies. Mathematics is a supporter of other disciplines, such as computer science, physics, and chemistry. Therefore, learning mathematics is important and must be learned in school (Kislenko, Grevholm, & Lepik, 2005).

Given the importance of mathematics, schools as institutions that teach mathematics are then expected to be able to develop mathematical competencies students have. However, the facts at school give negative results. Most students experience problems in terms of low mathematical abilities of students. Various surveys, such as TIMSS and PISA provide almost the same results for the assessment of mathematics student learning outcomes in Indonesia. Indonesia was ranked in the bottom five of the survey. In fact, it was mentioned that school students in Indonesia tend to only be able to solve routine problems procedurally and tend to experience difficulties when dealing with problems



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related to daily life or story problems (Priyani & Ekawati, 2018; Stacey, 2011).

Furthermore, this indicates that the mathematical competence of students in Indonesia is classified as very low, including the low ability of students' mathematical reasoning. In fact, mathematical reasoning ability is one of the core competencies that school students must possess, especially in the era of the industrial revolution 4.0 and society 5.0. The ability of mathematical reasoning is one of the competencies students must have in order to prepare themselves in facing the digital era, making it easier for students to make reasoning on all life problems experienced. In addition, if it is associated with the mathematical ability standards listed in the NCTM, mathematical reasoning ability is one of the standards that must be mastered by students in learning mathematics in school. If it is related to the core competencies and basic competencies listed in the 2013 (revised) curriculum, mathematical reasoning ability is one of the core competencies that students must have regarding the mathematical skills that must be possessed (Kementerian Pendidikan Dan Kebudayaan, 2016).

Mathematics reasoning ability is defined as the ability of students to do the thinking process which is realized in the form of providing a description or explanation of the processes and solutions produced when solving a mathematical problem. The description must then be based on

valid arguments or in accordance with mathematical concepts in drawing conclusions. In general, mathematical reasoning can be divided into two, namely inductive reasoning and deductive reasoning. Inductive reasoning starts with conducting certain mathematical experiments and then generalizes the concept of these experiments, while deductive reasoning is defined as students using mathematical concepts that are generally applicable to then make conclusions that apply specifically (Cohen, 2005; Ramdani, 2012).

Basically, anyone can do reasoning. However, not all reasoning belongs to mathematical reasoning. A reasoning is said to be mathematical reasoning if it contains several indicators, such as: (1) drawing logical conclusions, (2) making explanations using mathematical concepts, (3) estimating solutions and the process of getting solutions, (4) using patterns and relationships in analyzing problems, (5) construct and prove the conjecture, (6) examine the validity of arguments, (7) construct valid arguments, and (8) arrange direct, indirect proof, and use the principle of mathematical induction. But keeping in mind the limitations of this study, the indicators of Mathematics reasoning ability in this study include: (1) making explanations using mathematical concepts (MEMC), (2) using patterns and relationships in analyzing problems (UPRAP), (3) checking the validity of arguments (CTVA), and (4)



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construct valid arguments (CVA) (Hidayat, 2017; Sumartini, 2015).

Students' mathematical reasoning abilities must then be developed by the teacher and the school. This can be done by accustoming students to always think about why and how, carry out thinking activities consistently, and use a variety of contexts (mathematics and daily life) to solve a problem. The teacher is the main element that plays the most role in developing students' mathematical reasoning abilities. This is because the teacher has a high intensity of interaction with students. Nearly, 80% of student time at school is done with teachers. Therefore, a teacher must be able to utilize all the competencies that he has so that students' mathematical reasoning abilities develop optimally. Or in other words, a teacher must have good competence when he wants to develop student competencies well. This competence then leads to the performance of teachers in schools.

Teacher performance is defined as all the work that is shown by the teacher as a form of manifestation of its competencies. Whether or not the teacher's performance can also be seen from whether or not the competency of the student's guidance. Therefore, between teacher performance with students' mathematical reasoning abilities is very closely related. Teacher performance will automatically affect the way teachers convey or construct a mathematical concept in class. Teachers who have good performance will tend to

have good preparation in learning so that the implementation of learning will be better. Teachers who have good performance will try to pay attention to the competencies and learning experiences that students have before. Teachers who have good performance will try to optimize all mathematical competencies that students must have in order to prepare students to become qualified individuals (Muralidharman & Sudararaman, 2009; Taylor & Tyler, 2012).

Operationally, teacher performance consists of several indicators, namely: professional competence, pedagogical competence, personal competence, and social competence. Professional competence is related to the ability of teachers to understand the concepts (mathematics) taught. Pedagogical competence is related to the ability of teachers to convey or construct concepts (mathematics) they have so that students can easily understand or construct these concepts (mathematics). Personal abilities related to the ability of teachers to form good personalities in themselves. A good personality will then be able to reflect the noble character of the teacher in daily life so that the teacher is able to be an example or role model for students. Social competence is defined as the ability of teachers to interact with each other (peers, school principals, students, and other social elements) (Depdiknas, 2008).

Besides being influenced by the teacher (external factors), students' mathematical



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reasoning abilities are also influenced by internal factors. That is, there are several factors within the students themselves who are able to develop their mathematical competencies, such as students' attitudes towards the mathematics teacher. When the teacher's performance is good, students tend to give a positive attitude to the teacher. Vice versa. This is because students' attitudes toward mathematics teachers are interpreted as students' tendencies in responding (positive or negative) to the mathematics teacher. This tendency will then have a direct impact on increasing students' mathematical reasoning abilities (Akin & Kurbanoglu, 2011).

When students' positive attitudes arise towards the teacher, students tend to give a positive response to the teacher. This is what will then facilitate the establishment of collaborative cooperation or interaction between teachers and students. Instructions given by teachers during learning tend to be followed by students well. Learning experiences presented by the teacher will be easily carried out by students when positive student attitudes are formed towards the teacher. Therefore, the quality of learning implementation becomes more conducive and better. The teacher will be easier to give direction to students when a positive attitude is formed. This is what will automatically have an impact on the development of mathematical reasoning abilities of students to the maximum

(Gunderson, Ramirez, Levine, & Beilock, 2012; Pyzdrowski et al., 2013).

Students' attitudes toward mathematics teachers then consist of several indicators, such as cognitive (ideas), affective (feelings), and propensity to act. Cognitive is defined as ideas or general ideas of students regarding mathematics teachers. Affective is defined as positive (happy) or negative (upset) feelings of students towards the mathematics teacher, while the tendency to act is interpreted as the tendency of students to act when given instructions by the mathematics teacher. The three indicators then form a unit called the students' attitude towards the mathematics teacher (Gunderson et al., 2012).

Based on the description above, it is expected that the performance of mathematics teachers and students' attitudes towards mathematics teachers will affect the students' mathematical reasoning abilities at school. Therefore, the purpose of this study is to describe the effect of the performance of mathematics teachers and students' attitudes toward mathematics teachers on the Mathematics reasoning ability of state junior high school students in East Praya District, both individually and together.

METHOD

This type of research is ex-post facto. The population of this study was all mathematics teachers and students of public junior high school on east praya



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about 264 people with a sample of all mathematics teachers and students at 3rd east public junior high school about 72 people. The sampling technique used was purposive random sampling because the schools selected were classified as having a medium category and from a number of schools that were categorized as being randomly selected one of the schools as a research sample. This research was conducted in March to April 2019. The instruments used in this study were teacher performance questionnaire, student attitude questionnaire, and mathematics reasoning ability test. The statistical test used to analyze the data is a regression test. There are several statistical tests used in the regression analysis, such as: F-test and t-test. R-Square is used to ascertain how much percentage of the independent variable is able to explain or predict the dependent variable, t-test is used to determine whether certain independent variables affect the related variables, and F-test is used to determine whether all independent variables influence together towards dependent variable. The test criteria used were H01, H02, and H03 were rejected when the significance values of t (H01 and H02) and F (H03) were smaller than 0.05. However, before conducting a statistical test, the classical assumption test of the data obtained is first performed. The classic assumption tests include: multicollinearity test, autocorrelation test, heteroscedasticity test, normality test, and homogeneity test.

RESULTS

Based on the results of the study obtained information that the average performance of mathematics teachers was 82.26; while the percentage distribution for each indicator is 28% for professional competence; 24.8% for pedagogical competence; 23.99% for social competence; and 23.21% for personality competence. Or in other words, of the four indicators of teacher performance, professional competence plays the most significant role in shaping teacher performance. For more details, see Figure 1 below.

In connection with student attitudes toward teachers obtained information that the average attitudes of students towards mathematics teachers amounted to 85.25 with the percentage distribution of indicators of tendency to act as indicators that most influence attitudes, which amounted to 36.35%; followed by affective indicators at 33.47%; and at least cognitive indicators, which is 30.18%. For more details, see Figure 2 below.

Referring to the results of research on students' mathematical reasoning abilities, information was obtained that the average Mathematics reasoning ability of junior high school students in the East Praya District was 67.65 with an indicator distribution of 34.75% for the UPRAP indicator; 28.65% for the MEMC indicator; 20.15% for the UPRAP indicator; and 16.45%

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for the CVA indicator. For more details, see

Figure 3 below.

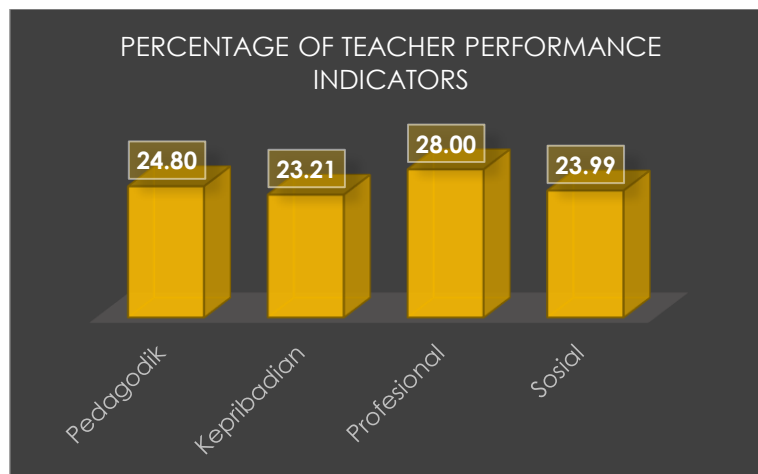


Figure 1. Percentage of Teacher Performance Indicators

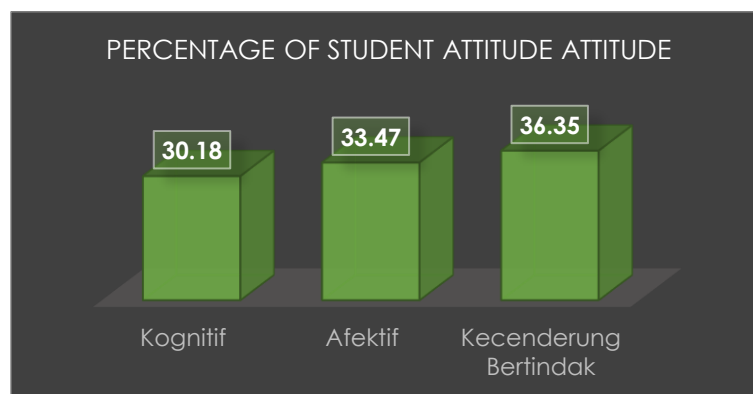


Figure 2. Percentage Indicators of Student Attitudes in Mathematics Teachers

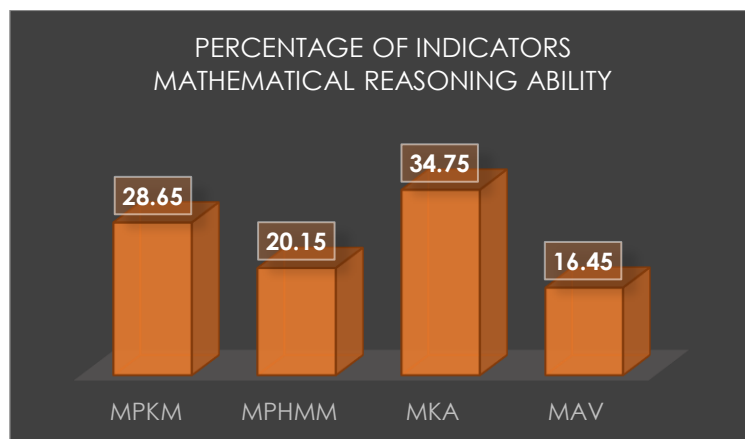


Figure 3. Percentage of Mathematical Reasoning Capability Indicators

DISCUSSION

After the above research data were analyzed statistically, information was obtained that H₀₁ was rejected. This is because the t value obtained is 43,527 with a significance of 0,000. Or in other words, information is obtained that the

teacher's performance significantly influences the Mathematics reasoning ability of state junior high school students in East Praya District. This is in line with the opinion raised earlier that teacher performance affects the development of students' competencies, including the



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students' mathematical reasoning abilities. This is caused because teacher performance consists of several indicators that have a significant effect, such as professional competence. Based on Figure 1 above, information is obtained that teacher professional competence is the most influential factor followed by pedagogic competence. The combination of the two competencies will then produce a positive influence on the development of students' mathematical reasoning abilities (Hidayat, 2017; Taylor & Tyler, 2012).

Although, the average Mathematics reasoning ability of students in this study is low but in the regression model, the performance of mathematics teachers has a positive effect on the Mathematics reasoning ability of junior high school students with professional and pedagogical competencies as the main supporting factors. As an amplifier, the results of previous studies also revealed that teacher performance will have a positive effect on the development of students' mathematical competencies, including mathematical reasoning abilities (Purnamasari, 2013).

Hypothesis test results for H02, obtained information that the value of t obtained was 40,243 with a significance of 0,000. Or in other words, H02 is rejected so that it can be concluded that the attitude of students in mathematics teachers has a significant effect on the Mathematics reasoning ability of state junior high school

students in East Praya District. This is because attitude is a predisposition or student's tendency to act in something. That is, when students have good ideas towards teachers, students tend to be more easily facilitated by the teacher. In addition, when students have positive feelings (happy) towards the mathematics teacher, students will find it easier to accept input and instructions from the teacher. This will then affect student behavior towards mathematics teachers and will automatically affect the development of students' mathematical abilities, including mathematical reasoning abilities (Gunderson et al., 2012; Hidayat, 2017).

For example, the indicator checks the validity of an argument on the ability of mathematical reasoning is an indicator with the highest percentage in this study in contributing to the ability of mathematical reasoning. Just imagine, when students are asked to check the validity of the argument by the teacher but students do not have a good attitude towards the teacher (not cooperative or do not want to do the instructions well), then automatically the students' Mathematics reasoning ability scores will be reduced. Therefore, it can be concluded that students' mathematical reasoning abilities are strongly influenced by students' attitudes towards mathematics teachers.

In connection with H03, after a regression analysis obtained information that the F value obtained was 1,763 with a



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significance of 0,000. Or in other words, the performance of mathematics teachers and student attitudes towards mathematics teachers together have a significant effect on the Mathematics reasoning ability of state junior high school students in East Praya District. As explained earlier, good teacher performance supported by positive student attitudes will greatly affect students' mathematical reasoning abilities. This is because there will be a synergy between mathematics teachers and students. Students will act more cooperatively with the teacher when the attitude they have towards the teacher is positive. The pedagogical competence of the teacher becomes more trained when students have ideas, feelings, and tend to act better when the teacher provides learning experiences. Learning experiences provided by the teacher will automatically be very useful when students' attitudes are positive. This is what will then automatically affect the development of mathematical reasoning abilities of state junior high school students in East Praya District.

CONCLUSION

Based on the research results obtained information that t about 42,574 with a significance of 0,000 (H_0 rejected); t about 40,243 with a significance of 0,000 (H_0 rejected); and F about 1,763 with a significance of 0,000 (H_0 rejected). Therefore, it can be concluded that mathematics teacher performance and student attitude to mathematics teacher

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