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THE ROLE OF TEACHER-STUDENT RELATIONSHIP TOWARDS ANXIETY LEVEL AMONG HIGH SCHOOL STUDENTS GRADE XII IN MATHEMATICS LESSONS

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ABSTRACT

The essential role in learning mathematics is to develop problem solving abilities among students. However, the PISA 2018 results revealed that Indonesia got unsatisfactory rank in mathematics subject. This study aims to empirically evaluate the role of Teacher-Student Relations on Anxiety in Mathematics. This analysis used the independent variable, namely Teacher-Student Relations, while the dependent variable is Anxiety in Mathematics. Data was collected by using questionnaire distributed via google form link in one of the high schools in Tangerang Regency. Participants were science students in grade 12 with a total number of 109 participants. The student–teacher relationship measure (STRM) was used to measure Teacher-Student Relations, and the Mathematics Anxiety Rating Scale was used to measure Anxiety in Mathematics (Suinn, Taylor, & Edwards, 1988). Then the data was calculated by statistical method, namely Linear Regression Analysis, with hypothesis testing of the F statistic test. The results of this study indicate that there was an influence of the Teacher-Student Relationship variable on the Anxiety in Mathematics Variable with a contribution of 9.8%.

Keywords: *Teacher-student relations, mathematics anxiety, mathematics learning achievement*

1. PREFACE

Mathematics subject is included in the Minister of National Education Regulation No. 22 of 2006, which aims to develop problem solving skills among students, include the ability to understand problems, design mathematical models, complete models and interpret the solutions. According to Bell, solving mathematical problems was able to help students develop and apply their abilities to various situations.

However, based on data from the 2018 PISA report, the capability of Indonesian students in Mathematics was still low. Students at this level were able to solve straightforward math problems such as reading a value from a simple graph or table with the label on the graph or table which exactly similar with the question. However, they were not able to solve arithmetic calculation problems that did not use whole numbers or questions without clear and detail instructions.

In Indonesia, 71% of students fail to reach the minimum level of mathematics competence. This means that many students are struggling to deal with situations that require problem solving skills using mathematics. In terms of welfare, more than ¾ of Indonesian students felt positive emotions such as cheerful, happy, proud, full of enthusiasm, and happy, while, more than half of Indonesian students felt negative emotions such as sadness, worry, and anxiety. According to Wono [4] the main factors induce poor mathematics learning was inadequate quality of mathematics teachers. Therefore, it is needed to strengthen the quality of mathematics, which include the ability to establish relationships with students in the classroom.

Lestari, Fitriza, and Halen revealed that there were various factors which cause students have low ability in mathematical problem-solving abilities, including the low interest of students on

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mathematics itself; the assumption that mathematics is a difficult subject to learn and also a scary subject. This negative opinion can cause anxiety for students when dealing with mathematics, which known as mathematical anxiety. One of the affective factors that plays main role in mathematics learning achievement is math anxiety, which is defined as fear and worry related to mathematical stimulus and situations.

According to Ma, Du, Hau, and Liu [6], the supporting factor that affects academic performance among students was a positive classroom environment, because it can increase students' motivation and involvement in class. A positive classroom environment can be started from a positive relationship between teachers and students. This is supported by the statement of Barile (2012) that the teacher-student relationship is the most important aspect of the classroom environment correlated with learning outcomes. Several researchers have also focused on engagement theory and found that a supportive teacher-student relationship was positively related to student performance in mathematics from grades 1 to grade 9.

Studies conducted by Allen et al., and Mikami et al., revealed that MyTeachingPartner has been proven to be effective in increasing interactions and relationships between students and teachers. We recorded that this study cumulatively demonstrates the importance of Teacher-Student Relations on mathematics achievement, especially in early grades.

Teacher-Student relationships also related to the achievement of subject, particularly in math (Rimm-Kaufman, Baroody, Larsen, Curby, & Abry,), which increased intimacy, decreased conflict, and had a positive effect on math achievement. In further study, Rimm-Kaufman et al. found that students in the fifth grade who learned mathematics were reported to have higher levels of academic engagement associated with teachers with positive relational qualities. These studies proved that the role of teacher and student relations in influencing mathematics learning outcomes. Although according to Hughes & Kwok, the relationship between teachers and students is an important variable that affects student learning outcomes, however the mechanism is still unclear. Because student learning outcomes are also influenced by students' special skills in mathematics.

Considering the importance of teacher-student relationship in improving student performance in learning mathematics in the classroom, the researcher believe that it is needed to carry out research related to the teacher-student relationship on mathematics anxiety.

Based on the results which had been described above, the researcher determined the hypothesis in this study, namely the existence of a relationship between the Teacher-Student Relationship Variables on the Mathematics Anxiety Variable.

Teacher-Student Relationship

In this study, teacher-student relation is the social and academic relationship between teachers and students. This is strongly influenced by a personal characteristic of teachers (such as: level of concern, trustworthiness, and the ability to create a safe learning environment); and instructional characteristics (eg, taking into account different student learning styles, implementing management styles, and motivating students). These aspects help establish positive cognitive, behavioral and social outcomes.

Multiple literature and educational researches that have been generated recently focused on academic factors that positively influence student learning, adjustment and outcomes such as high achievement scores, academic engagement, learning motivation, and self-concept and social such

as personal and school adjustment, reducing delinquency, and gaining social skills. Many studies agree that STR is one of the most influential factors on student learning, as well as their academic and social life.

Factors Affecting Teacher-Student Relations

The teacher-student relationship was closely related to interrelation theory. Although this process showed simple, there were several factors that influenced how and when teacher-student relationships developed, including: (a) Opportunities for interrelation: Children without primary nurturing figures, such as orphaned children, may fail to develop the trust needed to establish relationships with teachers; (b) Qualified teachers: When teachers responded quickly and consistently, children learned that they can depend on people in charge of their study, which is an important foundation for building relationships. This is an essential factor.

Relationship Pattern

There are 4 styles of interrelation, namely: (a) ambivalent interrelatio; (b) interrelation avoidant; (c) Disorganized interrelation; (d) Secure interrelation.

First, Ambivalent interrelation. These students become very depressed when the teacher is not present. Ambivalent attachment styles are considered uncommon, affecting approximately 7-15% of US children. As a result of poor teacher availability, teachers do not care about the whereabouts of their students. Students cannot depend on teachers when they need them.

Second, Interrelation avoidant. Students with avoidant attachments tended to avoid teachers, showing no preference for their teachers at school. This attachment style may be caused by rude or negligent teachers at school because they tend to punish when students make mistakes.

Third, Disorganized interrelation. Students with disorganized attachment display a mix of bewildering behavior, appearing confused, absent-minded, or confused. They may avoid or fight the teacher. The lack of a clear pattern of attachment may be related to the teacher's inconsistent behavior with a rule.

Forth, Secure interrelation. Students who can depend on their teacher show joy when the teacher's class begins. Students feel confident that they will have the support they need when they encounter difficulties while studying at school.

Mathematics Anxiety

Mathematics anxiety is a feeling of pressure and nervousness that interferes with manipulating numbers and solving broad mathematical problems, both in everyday life and during learning (Ranjan and Gunendra Chandra,). According to George Brown College, math anxiety is a feeling of depression that affects math skills, negative attitude towards math or feeling less confident about math. Researchers concluded that mathematics anxiety is a feeling of depression, worry, anxiety, restlessness, dislike, or someone's fear of everything related to mathematics.

Anita defines math anxiety as a feeling of tension, fear, or anxiety that hinders math performance. Students experiencing math anxiety tend to avoid learning and doing math. Meanwhile, according to Richardson and Suin, math anxiety includes tension and anxiety that arises during situations involving math problems in real life and academics. Not only student involvement in mathematics lessons at school academically, but whatever forms of problems in daily life while related with numbers, students will feel anxious and tense. Peker defines mathematics teaching anxiety as

feelings of anxiety and depression experienced by teachers or prospective teachers when teaching mathematical formulas, theories, concepts, or problem solving. This aspect of anxiety is different from the general aspect of mathematics anxiety. If mathematics anxiety is generally associated with a person's anxiety in connection with a lack of mathematical knowledge and confidence in mathematics. In contrast, the anxiety of teaching mathematics an individual's anxiety is related to his ability to teach mathematics.

Cooke and Hurst stated that mathematics anxiety affected student teacher in two ways. First, through the desire of prospective teachers to develop their mathematical competence and second, through their desire to apply their knowledge through teaching activities in the classroom. Dzulfikar who adapted from Cooke, suggested that mathematics anxiety indicators consist of 4 components, namely mathematics knowledge / understanding, attitude, cognitive, and somatic. The detail explanation as follows: (a) Mathematics knowledge/understanding relates to the assumption that they have poor understanding about math. (b) Somatic related to changes in the physical condition of individual, for example sweats or fast heart beats. (c) Cognitive relates to changes in a person's cognitive when dealing with mathematics, such as not being able to think clearly or forgetting things that he can usually remember. (d) Attitude related to attitudes that arise when a person has math anxiety, for example, someone felt nervous and did not confident to do things that were asked or reluctant to do them. These aspects and domains in the study were indicators for developing mathematical anxiety instruments for prospective mathematics teacher students.

2. RESEARCH METHOD

In this study, the independent variable was the Teacher-Student Relationship, and the dependent variable was Mathematics Anxiety.

Participants was obtained by purposive sampling. Participants were science students in grade 12 with a total number of 109 participants. The 12th grade students were selected because they had experienced a long learning process while being students at school and had experience relating to mathematics teachers.

The design of this research was quantitative correlation, because this research was conducted to provide a more in-depth description of a symptom or phenomenon. The final result of this research was in the form of typologies or patterns regarding the phenomenon being discussed. Data was collected using a questionnaire that includes: teacher student relationship and mathematical anxiety.

Teacher-Student Relationship

The S-TRM was chosen after reviewing the relevant literature. This instrument includes 25 items distributed over two dimensions (AR and SR) each consisting of 15 items and 10 items respectively. Examples items for the AR dimension are as follows: “My teacher expects me to participate effectively in the classroom,” and “My teacher shows remarkable enthusiasm during teaching the subject.” Meanwhile, the SR dimension includes: “My teacher listens to me,” and “My teacher help me trust in myself, my ability and my talents.” Using a 5-point Likert scale (1 = Does not apply; 2 = Somewhat applies; 3 = Applies sometimes; 4 = Applies often; 5 = Definitely applies), students rated to what extent they agreed with each statement [10].
The scale had a high internal consistency reliability (Cronbach’s $\alpha = 0.92$) in the current sample. Cronbach’s Alpha values were good for each of the dimensions (AR Cronbach’s $\alpha = 0.90$ and SR Cronbach’s $\alpha = 0.87$).

Mathematics Anxiety

The original math anxiety scale that has been tested has a total of 120 items. We created a shorter version of the scale that has 36 items appropriate for brief group administration. The original scale development was based on the Mathematics Anxiety Rating Scale – Elementary Form (Suinn, Taylor, & Edwards,), which captures the emotional aspect of math anxiety. This shorter version were developed to systematically address two psychological components (cognitive and affective), six mathematical settings (teacher, learning in class, studying with the mathematics textbook, test, applying mathematics concepts in everyday life, and doing mathematics homework) that have been identified across previous studies (e.g., Baloğlu & Balgalmiş,; Chiu & Henry; Lukowski, DiTrapani, Jeon, Wang, & Schenker, in press; Roick, Gölitz, & Hasselhorn), and four mathematical content areas (arithmetic, geometry, and stochastic, word problems and magnitudes) as well as general mathematics.

Cognitive math anxiety (18 items, $\alpha = 0.94$) relates to the concerns about negative expectations when dealing with mathematical problems (Liebert & Morris,). Subjects indicated the degree to which they agree with each statement on a 4-point Likert-scale (1 = does not apply at all, 2= somewhat applies, 3= partially applies, 4= fully applies). Affective math anxiety (18 items, $\alpha = 0.89$) relates to the anxiety generated when dealing with mathematical problems and was ranked using 4-point Likert scale (1 = not nervous, 2= somewhat nervous, 3= rather nervous, 4= very nervous).

3. RESULT AND DISCUSSION

There were 2 requirements in carrying out correlation test with linear regression testing between the Teacher-Student Relationship variables on the Mathematics Anxiety Variable. Both variables must be normally distributed, and it should have a linear relationship between the two variables.

First, the researcher conducted a test using the Kolmogorov-Smirnov Test to find out whether the Teacher-Student Relations variable and the Mathematics Anxiety Variable were normally distributed. The residual value was calculated through the SPSS application and obtained the significance value of 0.200 (> 0.05), which means that the residual value was normally distributed.

Next, researcher conducted linearity testing. The results of the linearity test obtained a significant value of 0.737 (> 0.05), which means that there was a linear relationship between the independent variable and the dependent variable.

Then, based on the results which showed that independent variable and dependent variable were normally distributed and there was a linear relationship, the researcher conducted a linear regression test to find out whether there was a correlation between the Teacher-Student Relationship variable and the Mathematics Anxiety Variable.

After that, based on the output it was also obtained the calculated F value = 11.642 with a significance level of 0.001 (< 0.05), then the regression model can be used to predict the Teacher-Student Relationship variable or in other words there was an influence of the independent variable on the dependent variable.

Finally, it obtained the value of correlation / relationship (R) of 0.313. From the output, the coefficient of determination (R Square) was 0.098 which implies that the effect of the independent variable on the dependent variable was 9.8%.

4. CONCLUSIONS AND RECOMMENDATIONS

The results of this study concluded that there was a significant contribution of the Teacher-Student Relationship variable to the Mathematics Anxiety Variable. The research hypothesis can be accepted. In other words, the Teacher-Student Relationship variable predicted the Mathematics Anxiety variable by 9.8%. This proved that the relationship between teachers and students has an important role in reducing students' anxiety about mathematics. It is expected that the results of this study provided a deeper insight for people to have awareness about the relationship between teachers and students which needs to be built properly so that students can be more motivated in learning and obtained academically achievement, especially in mathematics.

Teachers need to respond to their students quickly in the learning process in the classroom. When teachers respond quickly and consistently, children learn that they can depend on someone in charge of their study, which is an important foundation for building relationships.

Warm and supportive relationships will help students feel more responsible for their studies. They will feel that the development process is accompanied by competent adults who are willing to accept their situation. This condition certainly has positive impact for the learning process at school.

Students also need to attempt in establishing relationships with teachers. Because warm relations will not be realized if there is only the effort of one party.

It is expected that all parties aware that anxiety towards mathematics subject needs to be overcome. Considering the impact that has been mentioned about the important role of mathematics in human life. One of them is problem solving ability. So that Indonesian next generation has the ability to master and excel mathematics subject.

It is recommended that further research be undertaken with a larger size of samples to obtain maximum results and cover entirely grade of students, not only limited for studendts in grade 12.

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REFERENCE

Aldhafri, S., Alhadabi, A., The Psychometric Properties of the Student–Teacher Relationship Measure for Omani Grade 7–11 Students. Front. Psychol, 2019, 10:2283. doi: 10.3389/fpsyg.2019.02283

Allen, J. P., Pianta, R. C., Gregory, A., Mikami, A. Y., & Lun, J., An interaction-based approach to enhancing secondary school instruction and student achievement. Science, 2011, 333(6045), 1034–1037. https://doi.org/10 .1126/science.1207998

Anita, I. W., Pengaruh Kecemasan Matematika (Mathematics Anxiety) terhadap Kemampuan Koneksi Matematis Siswa SMP. Infinity Journal, 2014, 3(1), 125-132.

Ashcraft, M. H, Math Anxiety: Personal, Educational, and Cognitive Consequences. Current Directions in Psychological Science Volume 11, Number 5, october 2002, 181-185.

Baloğlu, M., & Balgalmiş, E., The adaptation of the mathematics anxiety rating scale-elementary form into Turkish, language validity, and preliminary psychometric investigation. Educational Sciences, 2010, Theory & Practice, 10, 101–110.

Bowlby J. Attachment and Loss: Retrospect and Prospect. Am J Orthopsychiatry. 1982;52(4):664-678. doi:10.1111/j.1939-0025.1982.tb01456.x

Bowlby, J., Attachment and loss, (OKS Print.) New York: Basic Books, 1969.

Cooke, A., Cavanagh, R., Hurst, C., & Sparrow, L., Situational Effects of Mathematics Anxiety in Pre-Service Teacher Education, in 2011 AARE International Research in Education Conference, Hobart.

Da Zhou, Xiaofeng Du, Kit-Tai Hau, Haifeng Luo, Pingting Feng & Jian Liu, Teacher-student relationship and mathematical problem-solving ability: mediating roles of self-efficacy and mathematical anxiety, Educational Psychology, 2019, DOI: 10.1080/01443410.2019.1696947

Dzulfikar, A., Studi Literatur: Pembelajaran Kooperatif Dalam Mengatasi Kecemasan Matematika Dan Mengembangkan Self Efficacy Matematis Siswa. Seminar Nasional Matematika dan Pendidikan Matematika FMIPA UNY, 9 November 2013, (pp. 45-54). Yogyakart.

Lestari, H., Fitriza, R., Halen, A., Pengaruh Kecemasan Matematika (Mathematics Anxiety) Terhadap Kemampuan Pemecahan Masalah Peserta Didik Kelas VII MTs. Math Educa Journal 4(1) (2020): 103-113

Liebert, R. M., & Morris, L. W., Cognitive and emotional components of test anxiety: A distinction and some initial data. Psychological Reports, 1967, 20, 975–978. http:// dx.doi.org/10.2466/pr0.1967.20.3.975.

Pendidikan Indonesia Belajar Dari Hasil PISA 2018. (2019). PUSAT PENILAIAN PENDIDIKAN BALITBANG KEMENDIKBUD.

Rimm-Kaufman, S. E., Baroody, A. E., Larsen, R. A. A., Curby, T. W., & Abry, T., To What Extent Do Teacher–Student Interaction Quality and Student Gender Contributeto Fifth Graders' Engagement in Mathematics Learning? Journal of Educational Psychology.Advance online publication, July 2014, http://dx.doi.org/10.1037/a0037252

Siaran Pers Nomor: 397/Sipres/A5.3/XII/2019 (Jakarta, 3 Desember 2019, Biro Komunikasi dan Layanan Masyarakat, Kementerian Pendidikan dan Kebudayaan)

Suinn, R. M., Taylor, S., & Edwards, R. W., Suinn Mathematics Anxiety Rating Scale for elementary school students (MARS-E): Psychometric and normative data. Educational and Psychological Measurement, 1988, 48, 979–985. http://dx.doi.org/10.1177/ 0013164488484013.