

HASIL CEK_Correlation Between Teaching Readiness with Math Anxiety of Primary Pre-Service Teacher

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Correlation Between Teaching Readiness with Math Anxiety of Primary Pre-Service Teacher

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Abstract— The purpose of this study was to find out: 1) Readiness to teach mathematics of primary pre-service teacher in semester 6 of the academic year 2017/2018, 2) level of math anxiety of primary pre-service teacher in semester 6 of the academic year 2017/2018, and 3) is there a relationship between student teaching readiness towards math anxiety?. This research is correlation research. The population of this study was 6th-semester students at the primary preservice teacher of Ahmad Dahlan University. The population of this study was 300 students with a sample of 169 students. The determination of the number of samples refers to the krejcie table. The sample is taken by simple random sampling technique. Data collection was done using the math anxiety questionnaire and the microteaching assessment sheet. Data were analyzed by the Spearman Correlation test. The results of this study indicate that: 1) Readiness to teach mathematics of primary pre-service teacher is at a low level, 2) level of math anxiety of primary pre-service teacher is at a high level, and 3) There a negative relationship between the level of math anxiety and the level of mathematics teaching readiness of primary pre-service teacher with a value of $r = -0,677$.

Keywords—math anxiety, mathematics, teacher

I. INTRODUCTION

The teacher in the learning field takes an important role. The teacher is the one that designed learning and developing the talents and potential of the student so it will create the output which has quality resources. The professional teacher is a teacher who has competences as a teacher dan has full of dedication to the profession.

The professional teacher has good teaching readiness before teaching the students. The teaching readiness is needed in order to prepare the teacher and the learning media before teaching the students. According to Ariyani (2014) in a planning process, the obstacles experienced by the teacher are in the arranging of a lesson plan, developing of a lesson plan, and difficulties in the preparing learning media. The problems which often happen in the arranging lesson plan is the difficulties in the preparing learning media which appropriate with the standard process accommodate the students to exploration, elaboration, and confirmation (Utami: 2012). In the learning process, the obstacles experienced by the teacher are difficulties to get the student's interest to ask, limited time, complicated preparation, management class

of the teacher, many students who late in submitting the task. Whereas in the evaluation activity the obstacles experienced by a teacher are in arranging the learning outcomes assessment instrument and the mechanism for evaluating student learning outcomes (Ningsih: 2012).

Besides that, difficulties, in fact, not every teacher has a teaching readiness. It can be seen from the unsatisfactory results of teacher competency tests. The average competency test results of each province can be interpreted in figure 1.

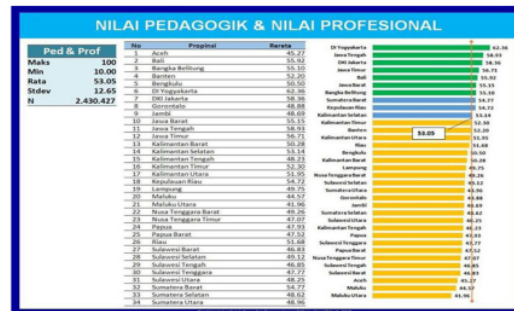


Fig. 1. Teacher Competency Test result in 2015

Department of Primary School Teacher Education (PGSD) students are a pre-service teacher who prepared to be a primary school teacher. The primary school teacher is not an easy profession. In the learning process, the teacher must have a good quality, ways, or teaching method, management, and mastery of material, physical appearance, and personality. The knowledge or mastery and management material are learned in university. It is must be mastered for the PGSD students before teaching the primary students so they can deliver the material in an appropriate way or method. One of the materials they have to master is mathematics. But in fact, they are still many PGSD students which unmastered the Math material. It can be seen according to the results of the final exam in the advanced mathematics course. More than 50% of the students got a score under 60.

Besides the material aspects, the students also have difficulties in preparing the learning process. it can be shown from the lesson plan result product of the students in the advanced mathematics course in primary school.

More than 30% of students still find difficulties in determining the indicator of defined KD (*Basic competencies*). More than 60% of students still find the difficulties in determining the appropriate method of the material, and also difficulties in the implementation of the learning step of the chosen method.

The unreadiness of the students in teaching from the material or learning sides is caused by many factors. One of the factors is math anxiety. Math anxiety is nervous or afraid of mathematics. Math anxiety is defined as a depressed feeling and worries when someone is related to numerical manipulation and solving mathematical problems in daily life and academic purposes (Tobias, 1993). Math anxiety is a feel of students' fear in facing mathematics (Sintawati, 2016). Math anxiety the situation faced by someone when encountering mathematical problems (Wahid, Yusof, & Razak, 2014).

Math anxiety is found not only in school students but also in a college student at university. Khatoon & Mahmood (2010) states that Math anxiety mathematics was found in students since elementary schools, high schools, to college level. It can happen due to the increasing difficulty of the mathematics material had been studied.

Math anxiety is also experienced by students who will teach mathematics. It can be shown in the Boyd, etc research, which give the conclusion that 40% of the students feel worried when teaching mathematics (Boyd, Foster, & Smith, 2014). The same results were also obtained in Brown & Moyer's study, which gave the conclusion that teacher mathematics anxiety consistently shows that pre-service primary school teachers have a higher anxiety level than students in other departments (Brown & Moyer-Packenham, 2011).

Math anxiety in the pre-service teacher is interpreted by Dzulfikar as a worry of students when they face a mathematics test, when do in the mathematics group and when teaching mathematics (Dzulfikar, 2016). While Peker defined Math anxiety as an anxiety feel and depressed which experienced by the teacher or pre-service teacher when they teach about the concept, theory, formula, or mathematical problem solving (Peker, 2009). Moreover, Math anxiety also can cause pain in the body. Lyons & Beylock find that Math anxiety has an effect as equal as a pain experienced by our body for other reasons (Lyons & Beilock, 2012)

Cooke etc states that Math anxiety can be identified from 4 aspects: mathematics knowledge/understanding, somatic, cognitive, dan attitude (Cooke, Cavanagh, Hurst, & Sparrow, 2011). Mathematics knowledge aspect is related to the knowledge of mathematics theory, such as the thought that they unmastered the mathematics theory or material. Somatic aspects are related to changes in body / physical condition, such as the appearance of feeling tense, stomachache, sweating, trembling or rapid heartbeat. Cognitive aspects are related to changes in a person's cognitive when dealing with mathematics, such as not being able to think clearly or forgetting things that they can usually remember. Attitude aspects relate to attitudes such as the emergence of an insecurity sense to do what is asked or reluctant to do so. These aspects are

indicators for developing mathematics anxiety instruments for students as a pre-service mathematics teacher. Mahmood and Khatoon mention the indicators of mathematics anxiety experienced by someone, that is: (a) Difficult to be instructed to do mathematics test, (b) avoiding math classes, (c) feeling some physical pain, dizziness, fear, and panic, (d) unable to do math exercises (Mahmood & Khatoon, 2011). Furthermore, Paul classifies math anxiety in four categories that are high math anxiety, moderate math anxiety, low math anxiety, and having no math anxiety (Paul, 2014).

Based on the math anxiety understanding, it can be concluded that math anxiety in pre-service elementary school teachers is anxiety feeling, tension, or nervous in teaching mathematics that can be identified into four aspects, namely knowledge, somatic, cognitive, and attitude.

Math anxiety toward students has a negative impact when they are teaching. It is based on research conducted by Cooke & Hurst which gives the conclusion that math anxiety can cause inactivity of students to develop their competencies and tend to avoid mathematics activities (Cooke & Hurst, 2012). The same thing was expressed by Choppin who says that teachers who have math anxiety tend to do learn by relying on textbooks that focus on basic skills and minimal conducting class discussion activities (Choppin, 2011). Research conducted by Cooke & Hurst (2012) states that math anxiety affects student candidates in two ways. First, through the desire of pre-service teachers to develop mathematics competencies and second, through their desire to apply their knowledge through teaching activities in the classroom. This math anxiety can cause inactivity of students as a pre-service teacher to develop their competencies and tend to avoid mathematics activities. This math anxiety can also influence their success in math tests or exams. Choppin (2011) found that teachers with math anxiety relatively relied on textbook-based teaching that focuses on basic skills and minimal class discussion activities.

The research related to mathematics anxiety has consistently shown that pre-service primary school teachers have a higher level of anxiety than students in other majors (Brown & Moyer., 2011). Based on the research conducted by some of these researchers, it shows that math anxiety plays a role in the students' readiness in teaching, therefore this study is conducted to determine the relevance of math anxiety to the students' readiness in teaching because there is no research conducted among primary school education in knowing the relevance of math anxiety toward students' readiness.

II. RESEARCH METHODS

A. Teaching Readiness

This research is a correlative study. In this study, the researcher wants to know the relationship between the variables studied, namely the variable of math anxiety level with the readiness to teach mathematics among primary school education UAD students.

The completing result of the math anxiety questionnaire and the teaching readiness assessment sheet are analyzed as a whole as well as each aspect based on

the assumption of a normal curve, i.e. compared with the ideal score. The criteria for an ideal assessment of math anxiety and teaching readiness can be seen in Table I.

TABLE I. LEVEL FOR ASSESMENT

No	Score Range	Criteria
1	$X > (M_i + 1.SD_i)$	Very High/Very Ready
2	$M_i < X < (M_i + 1.SD_i)$	High/ Ready
3	$(M_i - 1.SD_i) < X < M_i$	High Enough/ Ready Enough
4	$X < (M_i - 1.SD_i)$	None/Not ready

information :
X = total score of student,
Mi = ideal average,
SDi = ideal standard deviation

Before testing to answer the problem statement, there are several assumption tests that must be fulfilled first. Test assumptions that must be done are normality test and linearity test. After the classical assumptions are fulfilled, then the hypothesis is tested to answer the problem statement. To test the hypothesis, a correlation analysis between math anxiety level variables was performed with the mathematics teaching readiness variable using the Spearman test. This data analysis technique is used to test the hypothesis using the help of IBM SPSS Version 24 by looking at p-value. The hypothesis is accepted if the p-value is less than 0.05.

III. RESULT AND DISCUSSION

A. Teaching Readiness

Based on the data analysis of all aspects of students' readiness in teaching mathematics, it is found that the average score of mathematics teaching readiness among primary school education UAD students are 189, and it is in the medium readiness level. The description of teaching readiness data for pre-service primary school teachers is presented in Table II.

TABLE II. DESCRIPTION OF TEACHING READINESS

Description	Ideal score	Empirie score
Average	185,09	189
Standard Deviation	12,82	42
Maximum	315	214
Minimum	63	148

Furthermore, every aspect of mathematics teaching readiness is analyzed to find out which aspects included at very high, high, medium, low and very low levels. The assessment of teaching readiness is assessed from two aspects, lesson plan, and microteaching. The result of the lesson plan and Microteaching assessment are presented in Table III.

TABLE III. RESULTS OF ASSESSMENT OF ASPECTS OF TEACHING READINESS

Aspects	level
Lesson plan	Moderate
Microteaching	Low

Based on the table, the students' readiness in preparing lesson plans is on the ready criteria, while the students' readiness in implementing microteaching is at a low level.

It indicates that the lesson plan prepared by students is good enough and can be used for teaching, but the ability to teach students in the elementary school must still be improved.

Table IV presents a quantitative descriptive data of students' readiness in teaching mathematics in terms of the ability to prepare lesson plans.

TABLE IV. RESULTS OF ASSESSMENT OF ASPECTS OF TEACHING READINESS

Component	Level
Indicator	moderate
Learning objectives	moderate
Development of learning material	Low
Method/strategy	moderate
Activities	Low
Learning resources	Moderate
Evaluation	Moderate

Based on Table IV, it is known that the indicator component is at a moderate level. It shows that students are able to develop indicators according to KI / KD and use operational verbs, and can adjust the allocation of learning time well. The component of learning objectives is at the moderate level. It shows that students can formulate learning objectives according to indicators that are developed, observable, and operational. The component of the development of learning material is at a low level. It shows that students have not been able to develop mathematics learning material that supports the achievement of KD or is not theoretically correct.

In this study, it was found that there are some students who did not develop their own materials or teaching materials, they only use the existing textbooks. In addition, there are students who develop inappropriate materials with learning indicators. The component of the learning method is at a moderate level. It means that students are able to use varied methods and can apply the scientific approach to learning. Component activities are at a low level. It means that the learning steps developed by students are inappropriate with the method used. The stages of the chosen approach have not been seen in the learning steps. The component of learning resources is at a moderate level. It means that students use varied learning resources and the learning resources are appropriate to support the achievement of KD. Component evaluation is at a moderate level. It shows that students can develop assessment tools and guideline according to the indicators.

Based on the data analysis, the result of microteaching practice assessment is at a low level. Table V presents the quantitative descriptive data of student mathematics teaching readiness in terms of microteaching practices

Based on Table V, it is known that the introduction, material mastery, the use of language, and closing components are at a moderate level. In the introduction, students can convey apperception and provide motivation and associate learning material that will be taught with the previous material, ask challenging questions, convey the benefits of well-learned material, convey the abilities to be achieved, and deliver plans for learning activities correctly. The materials mastery component shows that

students can associate material with other relevant or real-life knowledge, present material systematically, and master the material well. The Correct and Appropriate-Used of Language in Learning shows that students can use spoken and written language well, clearly, and correctly. The closing component shows that students can make reflections or draw conclusions, give tests orally or in writing, and carry out the follow-up.

TABLE V. MICRO TEACHING PRACTICE ASSESSMENT RESULT

Components	Level
<i>Introduction</i>	Moderate
<i>Materials Mastery</i>	Moderate
<i>The Implementation of Learning Strategy</i>	Low
<i>Doing Varied Activities</i>	Low
<i>The Used of Learning Media/Learning Source</i>	Low
<i>Student Involvement in Learning</i>	Low
<i>The Correct and Appropriate-Used of Language in Learning</i>	Moderate
<i>Closing</i>	Moderate

Based on Table V, it is known that the implementation of learning strategies, doing varied activities, the use of learning media and the involvement of students are at a low level. The implementation of learning strategies shows that students have not been able to carry out coherent learning, mastering classes, facilitating activities that contain the stages of the approach or strategy chosen in the lesson plan, and implementing learning that enables positive habits to grow. The use of learning source/media and the involvement of students in learning shows students are not yet skilled in using learning source or learning media, involving students in utilizing learning sources and media, and fostering active participation of students. These results are relevant to Nurdiansyah's research (2017) which shows that students have used appropriate learning sources but not all students use learning media when doing the microteaching. The variation activities show that students have not used many variations of movement or sound in the learning process. There are still some students who only teach in front of the class, not going around the class to facilitate the students.

B. Math Anxiety

Based on the data analysis of the overall math anxiety aspects of students, it is found that the average math anxiety score of PGSD UAD students is 52.42. The score is at a high level. The description of student mathematics data can be seen in the following Table VI.

TABLE VI. MATH ANXIETY SCORE

Description	Ideal score	Empiric score
<i>Average</i>	45	52,42
<i>Standard Deviation</i>	10	5,46
<i>Maximum</i>	75	64
<i>Minimum</i>	15	35

The data distribution of students' math anxiety that is very high, high, medium, low and very low levels can be seen in Table VII. Furthermore, the descriptive quantitative math anxiety students' data in terms of the four math anxiety aspects can be seen in Table VIII.

Reviewed from each aspect in table VIII, it is known that the knowledge aspect has 15.29 average score and it is at a high level. The result indicates that knowledge of mathematical concepts that students have has an impact on student anxiety levels. High levels of math anxiety on the knowledge aspect also show that students are not sufficiently mastered mathematics material or that there is mathematics material in elementary schools that are not mastered by students. This is thought to be the cause of the students' grades in mathematics courses that are less than satisfactory. This is in line with the opinion of Wondinu et al who states that anxiety in the face of mathematics will affect mathematical abilities and achievements (Wondimu, Alexander, K, & V.D.W, 2012).

TABLE VII. DISTRIBUTION OF MATH ANXIETY DATA

Math Anxiety Level	F	%
<i>Very High</i>	22	13,02
<i>High</i>	97	57,39
<i>Medium</i>	21	12,43
<i>Low</i>	23	13,61
<i>Very Low</i>	6	3,55
Total	169	100

TABLE VIII. DISTRIBUTION OF MATH ANXIETY DATA

Aspect	Average Score	Level
<i>Knowledge</i>	15,29	High
<i>Somatic</i>	13,50	High
<i>Cognitive</i>	10,6	High
<i>Attitude</i>	13,01	Moderate

The second aspect is the somatic aspect which has 13.50 average score and it is at a high level. It shows that students often feel several changes in their body such as heart palpitations, nervousness, tension, or have a stomachache when teaching mathematics. The cognitive aspects have 10.60 average scores and it is at a high level. It shows that students often forget math material or have difficulty to focus while they are teaching. In addition, students suddenly forget the learning syntax or skip some stages of learning even though the syntax is already in the lesson plan. The attitude aspect has 13.01 average score and it is at a moderate level. It shows that students sometimes are not confident in teaching mathematics material and sometimes choose to teach subjects other than mathematics.

From the results and discussion, it is known that students still have mathematics anxiety when they are teaching mathematics. It requires special attention because students who have math anxiety can pass it on to other students. As expressed by Sparks that teachers who have math anxiety, contribute to growing math anxiety to their students (Sparks, 2011).

C. The Relationship Between Math Anxiety and Teaching Mathematics Readiness of PGSD UAD Students

Before analyzing the research data, the research data must be tested for feasibility analysis first. The results of the normality test and linearity test are as follows:

a) Normality and Linearity Test

The normality test result using the Kolmogorov Smirnov test with the help of SPSS presents the following output.

TABLE IX. KOLMOGOROV SMIRNOV TEST OUTPUT

		math anxiety	The readiness to teach math
N		171	171
Normal Parameters ^a	Mean	36.07	179
	Std. Deviation	4.411	4.445
Most Extreme Differences	Absolute	.067	.068
	Positive	.064	.068
	Negative	-.067	-.065
Test Statistic		.067	.068
Asymp. Sig. (2-tailed)		.057 ^c	.054 ^c
a. Test distribution is Normal.			
b. Calculated from data.			
c. Lilliefors Significance Correction.			

The result of the math anxiety data normality test in Table IX shows that p-value = 0.057, which means p-value > 0.05. So, based on these calculations it can be stated that the sample comes from a population that is normally distributed.

The result of the normality test of students' readiness in teaching mathematics in table 8 shows that p-value = 0.054, which means p-value > 0.05. So, based on these calculations it can be stated that the sample comes from a population that is normally distributed.

b) Linearity test

The linearity test using the Ramsey test presents Fcount that is 0,000147. Based on the comparison of Fcount and Ftable, obtained Ftable = 3.021 > Fcount = 0,000147 which is 0.325 then the form is a linear model.

c) Hypothesis test

After the sample data were analyzed using Spearman correlation test using SPSS 17.0, p-value = 0,000 which is showed that there is a relationship between the math anxiety level and the readiness in teaching mathematics of PGSD UAD students. r value is -0,677, it indicates a strong level of relationship. And there is a negative sign (-), showing the nature of the relationship in the opposite direction, which means that if the level of readiness in teaching mathematics of PGSD UAD students rises, the math anxiety level falls, whereas if the level of readiness in teaching mathematics of PGSD UAD students falls, then the math anxiety level rises. The result of the correlation test using SPSS can be seen in Table X.

TABLE X. CORRELATION TEST RESULT

Correlations			
		teaching readiness	math anxiety
Spearman's rho	teaching readiness	Correlation Coefficient	1.000
		Sig. (2-tailed)	.000
	N	169	169
math anxiety	Correlation Coefficient	-.677**	1.000
		Sig. (2-tailed)	.000
	N	169	169

** . Correlation is significant at the 0.01 level (2-tailed).

The negative sign indicates the relationship in the opposite direction, which means that the higher the teaching readiness, the lower the math anxiety experienced by students in teaching. This is in line with the research conducted by makur & prahmana (2015) which states low understanding of the lessons causes math anxiety.

The level of math anxiety on the knowledge aspect is at a low level indicating that students still do not master math material, therefore students need to read a lot and practice working on elementary school math questions. This is needed so that math anxiety in their students can be reduced and does not prevent students from becoming professional teachers. Research conducted by Juhrani and Faisal (2016) also shows that teacher anxiety in teaching mathematics decreases based on teaching experience.

IV. CONCLUSION

From the result and discussion of this study, it can be concluded that: The mathematics teaching readiness among primary school education UAD students as a whole is at a moderate level. The readiness to teach mathematics of PGSD UAD students in terms of two aspects, that are the ability of students in preparing mathematics learning RPP and the practice of teaching mathematics. the ability of students to develop mathematics learning RPP is at a moderate level while the practice of teaching mathematics is at a low level. Overall, students have high levels of math anxiety. Three aspects are at a high level, that our knowledge, somatic, and cognitive aspect. The attitude aspect is at a moderate level. There is a negative relationship between the level of math anxiety students and the readiness to teach mathematics of PGSD UAD students with r value is -0.677.

Considering the importance of mathematics in Elementary Schools, students need to be given provision of mathematics material mastery in Elementary Schools, as well as the opportunity to practice teaching mathematics both at university and directly in Primary Schools. The level of math anxiety on the knowledge aspect is at a moderate level indicating that students still cannot master the math materials, therefore students need to read a lot and practice doing the exercises. It is very necessary, so the students' math anxiety can be reduced and it does not inhibit the students to become a professional teacher.

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