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Analysis of Mathematical Ability of Mathematics Students As Candidate of Teachers in Solving Mathematical Problem

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Abstract. The purpose of this study to determine the level of mathematics ability of mathematics teacher candidate in math problem solving SBMPTN. This research was conducted on Mathematics Education Study Program of Pattimura University of Ambon. Subjects in this study as many as 19 students of mathematics teacher candidates semester 3 years 2017. Instruments used in this research is the Mathematics Ability Test (TKM) to classify the level of mathematical knowledge of the subject of research with the steps as: 1) arrange the instrument; 2) determine the subject of research 3) carry out the research 4) perform data analysis of data collection; 5) formulate the results of research and discussion. The results of the legibility test state that the instrument is suitable for use in research. Empirical validity results show 70% valid and have high reliability. The results showed that: 1) 5.26% of mathematics teacher candidates had high math ability level 2) 10,53% student of teacher candidate have medium math ability level and 3) 81,21% student of mathematics teacher candidate has low level of mathematics ability .

Keywords: Mathematical Ability, Student as Candidate of Teachers, Solving Mathematical Problems.

INTRODUCTION

Ability is the capacity of an individual to perform various tasks in a job. Ability is a recent assessment of what one can do (Robbins et al, 2008). Further mentioned there are two kinds of abilities, namely intellectual ability and physical abilities. Intellectual ability is the ability needed to perform various mental activities-thinking, reasoning and problem solving. While the physical ability is the ability of tasks that demand stamina, skills, strength, and similar characteristics. Based on this opinion, the ability as a set of intelligent full of responsibilities owned by a person as a condition to be considered capable by the community in performing tasks in the field of work or potential owned by a person in completing the task quickly and accurately, effectively and efisein in accordance with the method or a defined standard.

In general, in the world of education**,** the ability developed is the intellectual ability which includes three domains, namely cognitive, affective, and psikomotorik. The results of the study of educators and psychologists stated that these three abilities are factors that affect the effectiveness of student problem solving skills (Pimta et al, 2009).

Amabile (1998) explains that one can have the ability (higher or lower degree) to produce new and appropriate works of the field, so that they can be said to be more or less capable. The process of thinking and behavior may produce more or less new works according to the field, so they are said to be more or less capable. This explanation shows that in a certain field, can be said someone has a different level of ability according to the work produced.

Soedjadi (2007) says that in mathematics learning, in addition to orientation on the objectives of a formal and material, must also expressly refer to the capabilities that can be transferred. Transferable abilities include: (1) the ability to apply and use mathematics in other fields, (2) analytical and synthetic thinking ability, (3) ability to work hard, concentrate and independent, (4) ability to be open, and (5) problem solving skills well. Thus in learning mathematics in school other than expected to form attitudes and personality, also form the ability of mathematics.

The ability to solve a mathematical problem is an ability that refers to the material value of mathematical learning. while the ability to think logically, critically, creatively, systematically, and so forth is the ability that refers to the formal values of learning mathematics. so the formal value of mathematics learning is more focused on the organization of reason and one's attitude.

The mathematical ability mentioned in this research is the ability of the mathematics student candidate in completing the standardized problems. The standardized math problem used is taken from the question of Joint Selection of State Universities (SBMPTN). the question of the selected standard is used to know the subject's mathematical ability.

The assessment used is the benchmark reference assessment (PAP) which is a norm specified absolute by the lecturer / teacher or problem maker by considering: (1) the number of questions, (2) the weight of the problem, (3) the required ruling. The researchers then grouped into three groups, those with high mathematics skills if the TKM score was ≥75, the moderate mathematical ability group with 60≤ score <75, and the low mathematics ability group if the score <60.

According to Slavin (2009) standardized tests describe uniform tests in content, organization and assessment criteria so that test results may be allowed across classes, schools, and schools. Standardized tests measure a person's ability based on predetermined norms for students in other classes, other schools, or even between regions. The standard test scores can be used for: (1) selection and placement, (2) diagnosis and improvement, and (3) evaluation of learning strategies.

One component component to determine the quality of an evaluation is the quality of the evaluation tool used. An evaluation tool including a good test instrument is determined by the validity test and reliability test, an evaluation tool is said to be valid if the tool is capable of evaluating what should be evaluated, while an evaluation tool is said to be reliable if the evaluation tool gives relatively consistent and consistent results.

RESEARCH METHOD

1. **Type of the Research**

The type of research used in this study is descriptive qualitative. Qualitative descriptive research is one of the types of research included in this type of qualitative research. The purpose of this study is to reveal the events or facts, circumstances, phenomena, variables and circumstances that occur when research takes place by presenting what really happened. This study interprets and describes the data concerned with the current situation, attitudes and views that occur within a society, the contradiction between two or more circumstances, the relationship between variables that arise, differences between existing facts and their effects on a condition, etc. . The purpose of this research is to know the level of math kemmapuan owned by students of mathematics teacher candidate of mathematics education program FKIP unpatti Ambon 2017.

2. **Research Subject**

The subject of this research is the student of mathematics teacher candidate who is studying in the mathematics education program of FKIP Unpatti. Students selected as research subjects are students of the third semester, as they have studied the subjects of school math studies. Where, in the subjects of school mathematics studies, students have understood and mastered the concepts and skills of school mathematics and able to convey (translate) in mathematics learning. Students of the third semester also have adequate knowledge and skills based on the breadth and depth of mathematics material they have learned. In addition, the third semester students are generally experienced in studying the main subjects such as Calculus, Geometry, Algebra, Theory of Numbers and Statistics.

3. **Data Analysis Method**

Data analysis is performed during and after data collection. Data analysis at the time of data collection is intended to sharpen the focus of observation and deepen the issues that are thought to be important and relevant to the research problem. The analysis after the data collection was related to the mathematics ability test result of the mathematics teacher candidate.

RESULTS AND DISCUSSION

1. Development of Research Instrument

The instrument used in this research is the test of mathematics ability (TKM). Before the instrument is used, it has been consulted with Lecturer and then validated. Validation is done by asking for suggestions, comments and ratings from supervisors and validators.

Mathematical ability test is an instrument used to determine the subject of research. The Mathematical Ability Test (TKM) is a test used to classify the level of mathematical knowledge of the research subjects. TKM contains 10 items taken from a collection of questions of Joint Selection of State Universities (SBMPTN). The SBMPTN issues are assumed to have good test validity and test reliability. The reliability of

a mathematics ability test consists of questions that contain structured answers using certain mathematical knowledge and skills so that the results reflect the true level of mathematical ability. Instrument validation results from 3 orng validator stated that the instrument is feasible and can be used in research.

2. Instrument Test Results

The research instrument holds an important role in quantitative research because the quality of data used in many ways is determined by the quality of the instrument used. That is, the data concerned can represent and or reflect the state of something measured on the subject of research and the owner of the data.

a. Validity

Validity is a measure that indicates the validity of a test. A test is said to be valid if the test measures what it wants to measure. The test has high validity if the result matches the criteria, in the sense of having alignment between the test and the criteria. To test the validity of each item, the scores on the item in question are correlated with the total score. Score of each item is stated X score and total score is expressed as score Y, with the obtained index of validity of each item, it can be seen which items are eligible from the validity index. From the test of valitas test obtained that 7 questions are said to be valid or obtain sig <0,05, while 3 questions are said to be invalid or get sig value> 0,05. Overall 70% validity of valid instrument results.

b. Reliability

The reliability of the test is the level of the consistency of a test, ie the extent to which a test can be trusted to produce a relatively unchanged score despite being tested in different situations. The reliability of a test is the extent to which a test is able to demonstrate the consistent measurement results shown in the stages of determination and accuracy of the results. Reliable test is related to the test result determination. Reliability test results using Cronbach's Alpha formula obtained value of 0.7016, then this value is assessed with the criteria it can be concluded that this test has a high degree of reliability.

1. Level of Math Ability

The results of TKM work are used to classify the mathematical abilities of research subjects into 3 categories, namely subjects of high mathematics, subject of moderate mathematics, and subjects with low math skills. The grouping of mathematics abilities of the research subjects was based on the scores obtained in working on TKM by using one of the most widely used conversion terms. Method of grading in summative evaluation from Bloom, Madaus & Hastings (Ratumanan and Laurens, 2006), namely: very high category if score kategori 90, high category if 80 <scorers, medium category if 70≤skore <80, low category if 60 <70 scores and very low category if score <60. According to Ratumanan and Laurens (2006) this reference is too strict for mathematics subjects because most students may score below 70. They then set a reference that can be used for mathematics subjects: very high if the score ≥90, high if 75 <scores <90, while if <60 <scores, low if 40≤skor <60 and very low if the score <40.

Based on the description then the grouping of subject mathematics ability in this research use high mathematics ability category when subjects get score ≥75, moderate math ability if subject get 60≤skor <75, and low math ability if subject get score <60.

To get subjects with different levels of mathematical ability of mathematics candidate students who are capable of high mathematics, moderate math skills and low math skills. Before the TKM was conducted, the researcher asked the colleague's consideration to choose the candidate subject that is the student of mathematics teacher candidate for the 3rd semester. Furthermore, the student of mathematics teacher candidate is given Mathematics Capability Test (TKM) and followed by 19 students of the candidate subject. Mathematics Test (TKM) was assessed using score (x) from 0 to 100. From the Mathematics Test (TKM) test result, there was 1 (one) mathematics teacher candidate (5,26%) who got score 80 <x ≤100 (high ability), 2 students of mathematics teacher candidate (10,53%) get score 60 <x≤80 (medium ability) and 16 students of mathematics teacher candidate (84,21%) who get score 0≤x ≤60 (low-ability).

CONCLUSION

Based on the results of research and discussion it can be concluded as follows:

1. The result of validity test shows that 70% instrument is valid and reliability test indicates that the test has high reliability
2. The level of mathematics ability of the students calaon the mathematics teacher of the education study program Mathematics FKIP Unpatti ambon has low math ability, this is caused by the classroom environment, the readiness in the test implementation and the ability of each student candidate for math teacher itself.

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