# Profile of Student Mathematical Reasoning Ability in Making Proof

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## ABSTRACT

The purpose of this study is to describe how the students' mathematical reasoning profiles in making proof in the real analysis course. This research is a descriptive research. Techniques used to collect data is to provide tests to 25 students of semester V in Real Analysis courses. Data analysis is done by reducing data, presenting data, and make conclusions. The results showed that the students' ability in making proof includes four mathematical reasoning indicators: making guesses, doing mathematical manipulations, giving reasons/explanations, and drawing conclusions. The four mathematical reasoning indicators appear in high-ability students, while midle- ability students are mastering two to three indicators of mathematical reasoning, and low-ability students master one mathematical reasoning indicator.

**Key word**: profile, mahematical reasoning , making proof

## Introduction

Students of mathematics teacher candidate must have good mathematical reasoning ability. This can be seen from the way the students in preparing evidence when solving the problem. The researcher's experience in managing the Real Analysis course shows that students still have difficulty in compiling the evidence. Student difficulties in compiling evidence show that not many students are willing to use their reasoning. Some students are more likely to wait for answers made by their friends or answers given by lecturers on the board. In other words, some students prefer the problem / question that demands proof with the example given by the lecturer. This is in accordance with Sa'dijah (2006) which states that learners prefer to have problems / problems that are known or are told the procedure of solving the problem / problem. In the lecture, there are students who are able to arrange the evidence correctly and correctly. On the other hand there are students who can not compile the evidence correctly and correctly. Because to be able to compile evidence required mastery and development of mathematical reasoning ability in solving problems. Associated with problems (problems) according to Klurik, Rudnick, & Milou (2003):“ *a problem is situation quantitative or otherwise, that confronts an individual or group of individual, that requires resolution, and for which the individual sees no appearent or obvious means or path to obtaining the solution”*. This is similar to Hudojo (2005) which states that a question will be a problem only if it does not have certain rules / laws that can immediately be used to find answers to these questions. Based on the above explanation, a situation / question is a problem must have two things: (1) a situation / question is challenging the mind of the student, (2) the situation / question is not immediately known how to solve it. In this case it should be noted also that the problem given should be a problem that is affordable by the student's ability. Problems beyond the reach of students

will result in lower student motivation. The mathematical problem given in this study is a problem to prove. Furthermore, based on the above explanation then the mathematical reasoning is the ability of students to formulate conclusions or new statements based on several statements that the truth has been proved or assumed before. Mathematical reasoning in this study is when students perform activities such as: (1) making guess, (2) doing mathematical manipulations, (3) giving reasons and (4) making conclusions. From these indicators, then the characteristics of mathematical problems incorporated in the ability of mathematical reasoning are as follows.

(a) Problems require to making guess. Making guess is predicting possible problem resolution by involving limitations (NCTM, 2009)

(b) The problem reguire to doing mathematical manipulation. Manipulate is set in a clever way so that the expected goal is achieved (Nizar, 2007: NCTM 2009).

(c) Problems require to give reasons. Giving an excuse is solving the problem in their own way and they can be held accountable for the settlement.

(d) Problems require to draw conclusions. Drawing conclusions is the students' sharpness in determining the correctness of the problem solving presented.

## Methodology

This research is a qualitative-descriptive research with the aim of describing students' mathematical reasoning ability in preparing evidence. The instrument used in this research is a test of students' mathematical reasoning abilities in the formulation of evidence. The data analysis techniques in this study is to reduce data, present data and make conclusions. Reduce data that is summarizing, choosing the main things, focus on the things that are important to the contents of a data coming from the field. In this case the desired data is data about the students' mathematical reasoning in preparing the evidence with indicators such as: making allegations, performing mathematical manipulations, giving reasons and drawing conclusions. After the data is reduced, the next step is to present the data. By presenting the data, it will make it easier to understand what is happening, and plan future work based on what has been understood. The final step is the conclusion / verification. The results of the data obtained in further research activities are combined and summarized and tested.

## Results and Discussion

Based on the result of the research, the description of students' mathematical reasoning ability in preparing the evidence on the material of absolute value as follows

1. The ability of mathematical reasoning of high-ability students in preparing the evidence shows that: Students with high mathematics skills master the four indicators of mathematical reasoning ability, namely the ability to file allegations; ability to do mathematical manipulation; ability of member reason / explanation; and the ability to draw conclusions.
2. The ability of mathematical reasoning of capable students in preparing the evidence is as follows: Moderate students have not yet mastered the indicator of ability to file allegations; but indicators such as the ability to perform mathematical manipulation; ability to give explanations and ability to draw conclusions.
3. The ability of mathematical reasoning of low-ability students in preparing is as follows: Low-ability students have not mastered the indicators of mathematical reasoning ability, namely the ability to make allegations, the ability to give reasons / explanations, and the ability to draw conclusions. However, low-ability students only master one indicator of mathematical reasoning ability is the ability to perform mathematical manipulation.

## Conclusion

Findings from the results of this study can be concluded that:

1. The ability of mathematical reasoning of high-ability students in preparing evidence has mastered the four indicators of mathematical reasoning ability.
2. The ability of the mathematical reasoning of the capable students in preparing the evidence has not yet mastered the indicator of the ability to file a conjecture, the student with the ability to ed only master the three indicators of mathematical reasoning ability
3. The ability of mathematical reasoning of low-ability students in preparing the evidence has not mastered the three indicators of mathematical reasoning ability, namely the first, third and fourth indicators. Low-ability students only master an indicator of mathematical reasoning ability is an indicator of mathematical manipulation.

## References

Hudojo, H. 2005. *Pengembangan Kurikulum dan Pembelajaran Matematika*. Malang: Jurusan Pendidikan Matematika UM

Krulik, S.,Rudnick, J., & Milou, E. 2003. *Teaching Mathematic In The Middle School*. USA: Pearson National Council of Teachers of Mathematics (NCTM). 2009. *Focus in High School Mathematics*: *Reasoning and Sense Making.*Reston: VA Author

Nizar, A. 2007. Kontribusi Matematika dalam

Membangun Daya Nalar dan Komunikasi.

Jurnal Pendidikan Inovatif. *Maret 2(2). hal 1-8.*

Sa'dijah, C. 2006. Pengembangan Model Pembelajaran Matematika Beracuan Kontruktivisme untuk Siswa SMP. *Jurnal Mathedu*. Juli 2006. *I(2), hal 109-122*