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THE ELEMENTARY SCHOOL TEACHERS' ABILITY OF IN INTERPRETING AND ORDERING FRACTION

Hongkie Juli
University ....
Email: ....

ABSTRACT

The purpose of this study was to describe the elementary school teachers' mathematical skills on the numbers, especially fractions after they have participated in a workshop. The abilities of teachers would be described in this study were the ability to interpret a fraction, to order some fractions, to add and subtract two fractions, to interpret the multiplication and division of two fractions, and to multiply and divide two fractions. In this paper, the author just only would describe the teachers' mathematical skills in interpreting what was the meaning a fraction, and ordering some fractions. This capability was described by the results of test given to teachers after they have attended the workshop. Research subjects in this study were 17 elementary school teachers at Yogyakarta. Fifteen teachers could interpret fractions as part of a whole, six teachers could interpret fractions as a result of the division, two teachers could interpret fractions as the measurement results, two teachers could interpret fractions as ratios, and there were no teachers who could interpret fractional as operators. There were sixteen teachers used equating the denominator strategies to order some fractions, there was one teacher who used the strategy to change fractions into decimal fractions to order some fractions, and there was one teacher who could not to order some fractions.

Keywords: *workshop – mathematical abilities – interpreting and ordering fraction*

According to Patricia F. Campbell et al. (2014), mathematical skills and pedagogy abilities of primary teachers were directly and positively related to achievement of students taught by them. There was a significant relationship between the teachers' perception with the knowledge achieved by the students. The teachers' perception in this study was defined as (1) the teachers' paradigm on mathematics teaching and learning process, and (2) teachers' care to the tendency of students' math skills. Teachers' care to the tendency of students' mathematical skills related with the mathematical knowledge of teachers. Teachers' paradigm on the settlement of mathematical models and organize learning supported teacher mastery of the mathematics knowledge and the pedagogy. So, one of the things that need to be enhanced to improve students achievement was teachers' mathematical abilities.

Kanisius Demangan elementary school want to increase student achievement in mathematics. Based on the research results of Patricia F. Campbell et al. (2014), which has been described before, the one effort that could be done to meet the expectations of Kanisius Demangan elementary school was to improve math skills of the teachers. The effort was made by researchers to improve the mathematical skills of teachers in Kanisius Demangan elementary school was to provide mathematics workshops for teachers in that school. Teachers' math skills would be upgraded divided into four areas, namely: numbers, geometry, measurement, and statistics. In this paper, the author would be presented only a small part of the research results obtained in this study. The study's result would be presented in this paper only related with the teachers' ability in numbers, especially interpreting and ordering fractions after teachers attend workshops.

One of the research questions this research was how the math skill profiles of elementary school teachers about the numbers at the primary school level after following the workshops? The purpose of this study was to describe the elementary school teachers' mathematical skills on the numbers, especially fractions after they have participated in the workshops. The abilities of teachers would be described in this study were the ability to interpret a fraction, to order some fractions, to add and subtract two fractions, to interpret the multiplication and division of two fractions, and to multiply and divide two fractions. In this paper, the author just only would make description about the teachers' mathematical skills in interpreting what was the meaning a fraction, and ordering some fractions. This capability was described by the author base on the results of a test given to teachers after they have attended the workshop.

According to Neisser, 1967 (in Solso 1991), the term cognition refers to the entire process in which the sensory input was changed, reduced, interpreted, stored, retrieved and used. According Matlin (2009), the term cognition referred to the process of receiving, storing, changes, and using of knowledge. According Marpaung (1987), cognition

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was defined as something that is internal: something that could not be observed directly. According Marpaung (1987), cognition process meant a process going on in one's mind from receiving the data, then process it, storing in the form of information in memory, and recalling from memory when needed in order to further data processing. From the above explanation could be concluded that the process of cognition was a process that occurs in a person's mind when they accepted and processed data, stored information in memory and recalled from memory when needed in order to further data processing and cognition was information held by a person in his or her mind about something.

Skemp (2009) argued that mathematics was how to use the human mind that would increase the power of the human way of thinking. Therefore, according Skemp (2009), mathematics should be taught in ways that allow students to use their intelligence and not just rote learning. Skemp (2009) found that mathematics could be taught in ways that allow students to use their intelligence, there were two principles that need to be considered in the study of mathematics, namely: (a) The mathematics concept on a higher level than that of the students could not be communicated to them by giving a definition, but to provide a sample set accordingly; (b) Because in mathematics such examples almost always need another concept, the teacher must ensure that another concept that has been formed in the minds of learners first.

In 2002, Sutarto Hadi developed a professional development model for junior high school teacher. The model was developed by Sutarto Hadi in his study were as follows: (a) to conduct workshops for junior high school teachers who would be the subject of the research; (b) to conduct classroom practice; (c) to make a reflection.

From his research, Sutarto Hadi (2002) concluded that the development model of teacher professionalism developed in this study was a good model for the professional development of mathematics teachers in Indonesia, in particular to introduce a new approach in teaching mathematics.

Lortie-Forgues, Tian and Siegel (2015) suggested that students' understanding of the fractions was very important in the study of mathematics further and was also used in many professions, but according to Lortie-Forgues, Tian and Siegle (2015) and MA (1999), many students had great difficulty in understanding it. Furthermore, according to Ma (1999), the difficulty was not only the difficulties experienced by students in learning fractions, but also the difficulties experienced teachers to teach the concept of fraction. There were several studies that have been done related to fractions which explains why fractions into one material that is difficult to understand by students, namely:

According to Lamon (2001, in Ayunika, 2012), the development of the students' understanding about the meaning of fractions in the teaching-learning process was a complex process because the concept of fraction had a number of interpretations, namely (1) fraction as a part of the whole, (2) fraction as the result of a measurement, (3) fraction as an operator, (4) fraction as a quotient, and (5) fraction as a ratio.

According to Ross and Case (1999 in Shanty, 2011), on the teaching learning process about fractions, teachers often emphasized on how to do the operation procedure than on the meaning of the operation. Stafylidou and Vosniadou (2004 in in Shanty, 2011) stated that one of the reasons why the mathematical idea of fractions were systematically misinterpreted by students was an inconsistency with the principles of arithmetic used in operations involving natural numbers. For example in the operation of multiplication of natural numbers, if the two natural numbers multiplied, then the multiplicative result was a natural number greater than or equal to two natural numbers were multiplied. It was not always the case if the two fractions multiplied.

According Streefland (1991), in many textbooks the instruction of fractions was characterized by: (a) towards the concept of fraction; (b) there were not meaningful contexts both as sources and domains for the application of fractions., (c) the isolated use of models and patterns, which never extends to serve the process of algorithmization or mathematization; (d) there were not connections with mathematically domains, such as decimal fractions, ratios, scale, and percentages (Vergnaud, 1981) towards the algorithms.

METHODS

The type of this study was the qualitative study, because this study seeks to uncover a phenomenon that occurs in a natural situation, ie the teachers' mathematics ability to interpret a fraction, and to order some fractions after they followed the workshop. Broadly, the steps were carried out by the researcher in building teachers' ability profiles above were as follows: (1) the researcher held a workshop about interpreting and ordering fractions; (2) the researcher made some problems about interpreting and ordering fractions which were done by the teachers after they attended a workshop; (3) the researcher made the description about the material presented in the workshop on interpreting and ordering fractions; (4) the

researcher made a description of how the process of the workshop happen; (5) the researcher created the teachers' mathematics ability profiles on interpreting and ordering fractions.

RESULTS AND DISCUSSION

Description about The Workshop Material And Activities

The material presented in this workshop was about interpreting and ordering fractions as follows: (1) The meaning of fractions, namely (a) fractions as part of a whole, (b) fractions as a result of the division, (c) fractions as a measure, (d) fractions as ratios, and (e) fractions as operators; (2) The definition of the simplest fractions, the equivalent fractions, the namesake fractions, and the mixture fractions; (3) The definition of less than in fractions; (4) The ordering fraction techniques, ie (a) by equating the denominator of the fractions were sequenced, and (b) by transforming the fractions to decimal number.

Activities that occur in the workshop were as follows:(1) The facilitator asked what the definition of fractions; (2) One of the participants answered a fraction was form, where a was an integer, and b was an integer and not equal to zero; (3) Facilitator limited a definition of fractions as followed a fraction was a form, where a was a natural number and was called the numerator, and b were a natural number and was referred to as the denominator; (4) The facilitator explained the reason why a and b were natural numbers, namely: for the first phase, a fraction was limited to natural numbers. Only in the later stages, fractions expanded to integers; (5) The facilitator asked what means; (6) One of the participants answered means that there were 3 of 4 parts; (7) Another participant answered means the result of 3 divided by 4; (8) The facilitator explains the others meaning of , ie as size, as the ratio, and as operator; (9) The facilitator asked what the simplest fractions; (10) One of the participants answered a fraction called the simplest fraction if there were no more numbers could be used to divide the numerator and denominator of the fraction; (11) The facilitator clarified the participant explanation and provided confirmation about the simplest fraction.; (12) The facilitator asked what the equivalent fractions; (13) One of the participants answered the equivalent fractions were the fractions that have the same value; (14) The facilitator provided reinforcement on the definition of the equivalent fractions; (15) The facilitator asked what the namesake fractions; (16) One of the participants answered the namesake fractions were fractions that have the same name; (17) The facilitator clarified the participant explanation and provided confirmation of the namesake fractions; (18) The facilitator asked what the mix fractions; (19) One of the participants answered a fraction referred to as the mixture fractions if the numerator of the fractional value was greater than the denominator of the fraction; (20) The facilitator provides reinforcement on the definition of the mixture fractions; (21) The facilitator asked what the meaning less than on fractions; (22) The participants were difficulty to answer the facilitator questions; (23) The facilitator explained about what was the meaning of less than on fractions; (24)The facilitator asked how to order some fractions; (25) One participant explained how to order fractions was by equating the denominator of the fraction to be ordered. After all fractions had same denominator, then the next step was to order the fractions based on the numerator. The smallest fraction was the fraction that had the smallest numerator. The biggest fraction was the fraction that has the biggest numerator; (26) The facilitator asked if there were other ways to order some fractions; (27) One of the participants answered each fraction was converted to decimal fractions. Once in the form of a decimal fraction, it could be ordered according to the ordering rules on decimal fractions; (28) The facilitator clarified and provided reinforcement how to order some fractions by transforming to decimal number.

The Teachers' Mathematics Ability Profiles On Interpreting And Ordering Fractions

There were two problems about interpreting and ordering fractions that were given to teachers after the they attended the workshop. The problems were given to teachers as follows: (1) Explain what does the meaning of !; (2) Which one the smallest fractions and the biggest fractions for these fractions and ? Explain how to get the answer!

The indicator of the first question was the teacher could define a fraction as (1) part of the whole; (2) the result of the division; (3) size; (4) ratio; and (5) operator. The indicator of the second question was the teacher could explain how to order some fractions.

The teachers' mathematics ability profiles on interpreting and ordering fraction from this research as follows: (1) 15 teachers of 17 teachers had ability to explain the meaning of fractions as part of a whole; (2) 6 teachers of 17 teachers had ability to explain the meaning of fractions as a result of the division; (3) 2 teachers of 17 teachers had ability to explain the meaning of fractions as a measure; (4) 2 teachers of 17 teachers had ability to explain the meaning of fractions as ratios; (5) No teacher of 17 teachers had ability to explain the meaning of fractions as operators; (6) 15 teachers of 17

teachers had ability to explain how to order some fraction by equating the denominator of the fractions were ordered.; (7) One teacher of 17 teachers had ability to explain how to order some fraction by transforming the fractions to decimal number.

One teacher of 17 teachers did not have ability to explain how to order some fraction by equating the denominator of the fractions were ordered and by transforming the fractions to decimal number

CONCLUSION

There were two conclusions obtained from this research process related to the ability profile of teachers in interpreting and ordering fractions, namely: (a) The meaning of fractions which was the most able to understand by the teacher was the fraction as part of the whole. The meaning of fractions which was the most able not to understand by the teacher was the fraction as operators, (b) The ordering fractions technique which was the most able to understand by the teacher was by equating the denominator of the fractions were ordered. The ordering fractions technique which was the most able not to understand by the teacher was by transforming the fractions to decimal number.

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