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DEVELOPMENT MATHEMATICAL CREATIVE THINKING ABILITY PROBLEMS ON THE TOPICS OF FRACTIONS FOR 7 GRADE STUDENTS

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Abstract

This research aims to generate mathematical creative thinking ability in material fractions for 7th grade students of SMP valid and practical. This research is formative evaluation type of development research. The subjects research is 7th grade students of SMP. The technique of collecting data which is used in this research are walkthrough in order to constructively know the content validity of this questions and the terminology; and document is to ascertain the practicality of this questions. Based on the result of the data analysis, it concluded this research has produced a product mathematical creative thinking ability questions in material fractions for 7th grade students of SMP valid and practical. The validity is reflected from result of validator's assessment which stated that the questions have already been good in content (it is based on the curriculum and mathematical creative thinking ability indicators), in construction (develop mathematical creative thinking ability, rich of concepts, based on the level of the 7th grade students), and in language (based on the correct spelling of EYD, no double interpretation of questions, the limitation of questions and clear answers). It is practically shown from the trial test result to one-to-one and small group students where most of students can understand the questions well.

Keywords: *mathematical creative thinking ability, material fractions, the development of questions*

INTRODUCTION

Preliminary

Learning math is one of the lessons given to students started from elementary to college. Through the mathematics learning, students are expected to have ability to think logically, analytically, systematically, critically, and creatively, and have ability to work together (Depdiknas, 2004). Mathematics learning goals are described in detail as follows.

Practicing how to think and reason in drawing conclusions, for example through investigation; exploration; experiments, similarities, differences, consistency and inconsistency.

Developing creative activity involving imagination, intuition, and the discovery by developing divergent thinking, original, curiosity, make predictions and expectations, as well as trial and error.

Developing problem-solving ability.

Developing the ability to convey information or to communicate ideas among others, through verbal speech, graphs, maps, and diagrams (Mahmudi, 2010).

From the above, it can be concluded that the main goal of learning mathematics is to develop mathematical creative thinking ability. It means, in mathematics learning, students must be given the mathematical creative thinking ability questions in accordance with the purpose of learning mathematics, so students get used to working on the mathematical creative thinking questions.

Based on the field facts are, most of mathematics books which are studied by students, difficult to find practice questions that lead to many solving answers, give many examples or statements related to a particular mathematical concept or situation, and also the authenticity of the answer. Questions use a variety of problem-solving strategies, provide various examples, statements about certain concepts or mathematical situations, and use strategies that are new, unique, or unusual to resolve the problem. These statements are an indicator of the mathematical creative thinking ability.

Mathematical creative thinking ability questions need to be developed so that learners are familiar with such questions. With frequent practice learners with creative questions that the students would be smart learners or gifted. Learners are smart or talented have ability to recognize the relationship between ideas or concepts and then make strategic planning to solve the problem in short, and can have originality/novelty answer. This is consistent with the results of Mann (2005) which shows that mathematics learning achievement, reflecting intelligence, is one of the significant predictor for creativity.

Creativity needs to be developed because with inability students have to think creatively so students can solve problems in many different ways or divergent thinking. Guilford (Park, 2004) termed the creativity as the production of divergent (divergent production) or often to be referred as divergent thinking. Divergent Production has four components, namely (1) fluency is the ease of generating ideas or solving problems, (2) flexibility, its features are generating ideas, answers, or questions varied; able to see a problem from different point of view; seek alternatives or many different directions; able to change the approach or way of thinking, (3) originality, its features is able to generate unusual ideas, could produce a new and unique expressions , thinking of unusual ways to express themselves, be able to make an unusual combination of parts or elements, and (4) elaboration, its features are able to enrich and develop an idea or product , by adding or specifying the subject, idea, or situation more detail so that it becomes more attractive.

The ability to think creatively is one of the capabilities from the six dimensions of cognitive processes, and the sixth-dimensional thinking are: knowledge, comprehension, application, analysis, evaluation, and creative (Anderson & Krathwohl, 2001: 67-68). The ability to think creatively is the highest cognitive thought processes as well as the learning objectives of mathematics. The learning processes that facilitate the development of creative thinking ability train the students to develop the maximum potential of thinking. In fact the process of mathematics learning is still not pursuing the formation of this ability on students.

The problem is how to develop mathematical creative thinking ability questions in material fractions by exploiting the context of problems in daily life which are valid and practical.

Research Methods

The method that is used in this research is the development research. The development research in this term is the development of mathematical creative thinking in the material fractions by exploiting the context of problems in daily life.

The development stages of mathematical creative thinking questions in SMP material fractions refers to two main stages of development research are the preliminary study stages (the preparation and development stages of questions) and the formative study stage (the evaluation and revision stages).

Research Design

Research development begins with an analysis of the math curriculum development for junior high school class VII and mathematical creative thinking questions designing. The design on this product is called the prototype, the product is validated on three characteristics, namely: content, construct, and language. Djaali (2004) proposed an instrument has good content validity if it is able to measure the mastery of material that should be controlled accordance to the learning content specified in curriculum. While the instrument has good construct validity if it is able to measure what is actually measured based on the constructs, concepts, or conceptual definition which has been settled.

Practicality according Akker (1999) met if (1) the experts and practitioners claim that what is developed can be applied and (2) reality show that has developed can be applied. Practicality mathematical creative thinking ability is seen from observations on small group test, which is given to small groups of students, that is consisted of five students. In this research mathematical creative thinking ability questions expressed practical, it can be called good if it is suitable with established criteria, namely (1) in accordance with the mindset of students, (2) the students know the context given, and (3) easy to read and does not cause diverse interpretations.

RESULTS AND ANALYSIS

The results of pre-development, the initial prototype devices produced about the mathematical creative thinking ability and settlement alternative. The result of prototype development stage is questions and alternative settlement, based on self-evaluation, expert judgment (expert reviews), based on the criteria which has been settled, and one to one (low resistance to revision) (Tesmer, 1993).

More details development stages disclosed are (1) self-evaluation at this stage produced seven questions from the researcher, according to researcher they are in conformity with indicators mathematical creative thinking ability that have been determined. The result of designing is called prototype 1. (2) Expert reviews, at this stage the result of prototype 1 is validated by four experts, namely Dr. Yusuf Hartono, Dr. Somakim, Novi, S. Pd, and Drajat, S.Pd. Validation includes the validation of content, construct, and language. (3) One-to-one (low resistance to revision), at this stage about the mathematical creative thinking ability questions tested on students, class VII SMPN 9 Palembang and YAPTEKA Tempirai, then requested comments and suggestions on the matter. From the results of student work, the researchers conclude about the ability to think creatively can find mathematical students.

The following results were obtained for answers to the students are:

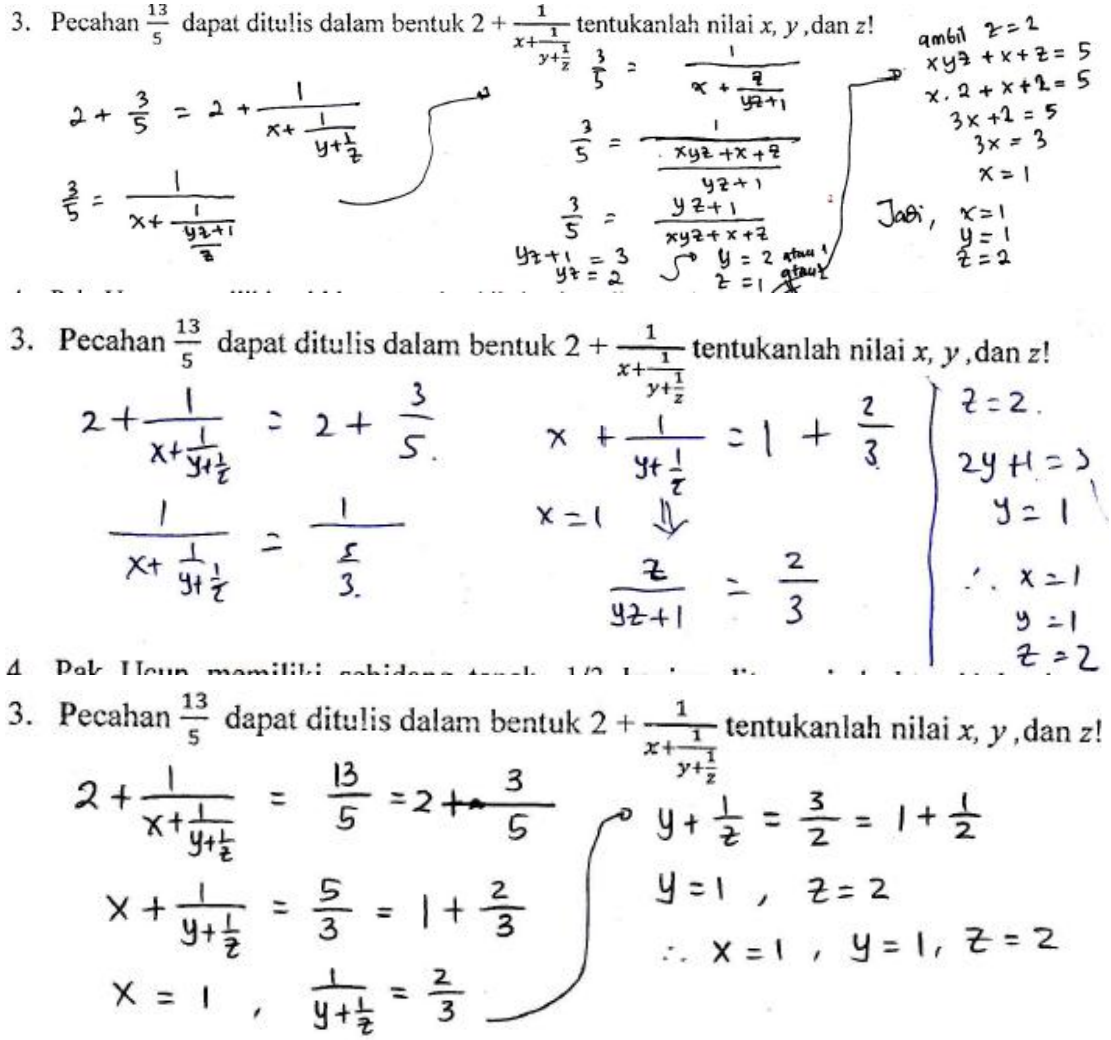

Figure 1. Students' answers

In accordance with the advice of experts and investigators' analysis of the test results one-to-one the questions that have been developed to be repaired. Results repairs called prototype 2.

Discussion of Research Findings

Improving the quality of mathematics education is in mathematics learning objectives. Efforts can improve the quality of mathematics education one of which is continually being improved teaching and learning outcomes. Related the learning outcomes in this study are about mathematical creative thinking ability.

Stages of development of the ability to think creatively about the mathematical, the preliminary phase of the study (the preparation stage, the stage of development of matter) and the formative stage study (phase evaluation and revision phase), it is obtained the mathematical creative thinking ability questions valid and practical. These issues consist of 6 essay questions.

After going through the development process starting from the validation process to revise gained the ability to think creatively about the mathematical material considered valid and practical fractions. About the ability to think creatively about six of which are categorized as difficult / difficult, it is in accordance with the opinion of Anderson & Krathwohl (2001: 67-68) states that a dimension of creative cognitive process or the sixth highest.

The sixth dimensions of thought are: knowledge, comprehension, application, analysis, evaluation, and creative. The ability to think creatively is the thinking process and also the highest cognitive learning process that facilitates the development of creative thinking skills to train the students to develop the maximum potential of thinking.

Validity of the assessment results reflected validator, all validators expressed about the ability to think creatively products mathematical fractions made materials are good, based on the content (matter in accordance with the basic competencies and indicators), construct (according to the theory and mathematical creative thinking abilities indicator), and language (in accordance with the applicable rules of Indonesian language and EYD.

The results of the analysis indicate that the question of the practicality of mathematical creative thinking ability that are developed to meet the criteria of practicality, both conceptually theoretically and empirically test results. Empirical test result is seen from the observation trials smallgroup. Questions given to students to be used according to their mindset, easy to read and does not give rise to diverse interpretations.

CONCLUSION

This research has resulted in a product is mathematical creative thinking ability questions in material fractions for 7th grade students of SMP. Based on the results of research and discussion, it can be concluded that mathematical creative thinking ability in material fractions are developed valid and practical the ability to think creatively about the mathematical material developed fractional categorized valid and practical. Illustrated qualitatively valid assessment validator, where almost all the validators declared either by the content, construct, and language. Practical drawn from the test results, which students can use the device properly question (context is identified, did not result in a double interpretation, and in accordance with the flow of thought students).

Suggestion

Based on the findings and conclusions, the researchers were able to suggest the following.)

- For math teachers can use mathematical creative thinking ability question the material fractions in an effort to train students familiar with the creative thinking questions.
- Teachers are advised to practice making mathematical creative thinking questions based indicators of mathematical creative thinking ability skills to develop students' mathematical creative thinking abilities.

- For other researchers, to develop mathematical creative thinking ability question for other materials in order to create a lot of questions to determine the ability to think creatively junior high students in Indonesia.

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