

Application Model Learning Creative Problem Solving (CPS) Math Learning To Improve Results Class VIII SMPN 3 Pekanbaru

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ABSTRACT

Mathematical problem solving is one of the five basic processes in the NCTM, in addition to communication, reasoning and proof, connections and representation. Besides solving the problem is one of the goals of learning mathematics in the curriculum. Development of mathematical problem solving can equip students to think logically, analytically, systematically, critically and creatively. Unfortunately, the process of learning mathematics at the junior level of education in solving this problem has not shown satisfactory results. One way that can be done to overcome the weaknesses of students in problem solving is to apply the learning model of the CPS. This study aims to improve learning outcomes through the application of mathematical models of learning fractions CPS on the material in class VIII SMPN 3 Pekanbaru the school year 2012/2013. This study is a collaborative classroom action research that consists of two cycles. The subject of this study were students in grade 3 Pekanbaru VII₁ SMP with 34 people the number of students (17 male and 17 female students). Data were collected using observation sheets and test results to learn mathematics. Based on the results of data analysis and discussion can be concluded that the application of the Creative Problem Solving model of learning can improve student learning outcomes in mathematics in grade material fractions VIII SMPN 3 Pekanbaru the school year 2012/2013.

Keywords: Creative Problem Solving, Mathematics Learning Outcomes

A. INTRODUCTION

Learning mathematics is closely related to the activities and processes of learning and thinking. It is closely related to the characteristics of mathematics as a science and human activity, namely adalag mathematical thinking, organize evidentiary logical pattern, which uses a defined term is defined carefully, clearly and accurately. Therefore, without increasing the learning of mathematics and relying on a quality that lead students to want to think, it would be difficult to achieve the results of mathematics achievement of good learning. Aktiviti and thought process will occur if an individual is confronted with a situation or an urgent and challenging problems and can lead to think in order to obtain clarification or response to issues raised in the situation. This is consistent with the purpose of learning math is to train students to develop skills in making inferences, creative, able to solve problems, communicate ideas and organize thinking and math skills formation to change the behavior of students (BSNP, 2006). Changes in student behavior will be seen during the process of learning refers to learning outcomes. Learning outcomes are influenced by students' ability and effectiveness of a learning process.

According Djamarah and Zain (2006) in teaching and learning activities, there are two things that helped determine the success, namely the setting process of learning and

teaching itself. Both have a symbiotic relationship with each other. Ability to manage the learning process that will either create situations that allow students to learn, so it is a starting point for teaching success. Sardiman (2008) adds that the learning process will result in learning outcomes. The expected outcome is the result of learning mathematics learning that reach exhaustiveness. Students are said to be thoroughly studied mathematics if the value of learning mathematics student has achieved the Minimum Criteria exhaustiveness (KKM) which has established schools (BSNP, 2006).

Based on data obtained from grade math teacher VIII SMPN 3 Pekanbaru only 19 of 34 students or 55.88% grade students on subject matter VIII integer achieve specified KKM school is 70. This shows that there are many students in grade VIII ie 44.12% of students who have not finished in learning mathematics. The low student mathematics learning outcomes are caused by several factors ie the factors in the student and external factors. To find the cause of low learning outcomes derived from self-students, researchers asked students about the problems they face in learning. Investigators interviewed several students in the class VIII randomly. From interviews obtained information that students find it difficult when faced with questions that contain the problems in it. Students used to memorize the steps in problem solving Yeng previously discussed to answer the same types of problems that arise when teachers provide practice. However, students will have difficulty when faced with a situation or question about containing the problem.

According to Cooney in Sadiq (2004) a question would be a problem if the question is a question that suggests the existence of a challenge that can not be solved by a routine procedure. They are difficult to determine what steps they would do to resolve the question or questions. They are not used to formulate what the problem and make mathematical modeling of the problem that is given.

The low student mathematics learning outcomes are also caused by external factors, one factor the teacher. To that end, researchers observed directly when teachers teach. In the implementation of teachers providing materials, giving example problems and step resolution. Then the students copy the example of the problem. To test and increase students' understanding, the teacher gives practice questions types are not much different from the examples given problem. There was no attempt to explore teachers 'students' problem-solving abilities through the questions of different types and contain the problem in it.

One model of learning that can be applied to overcome these problems is a model of learning the Creative Problem Solving (CPS). According Pepkin (2004) model of CPS is a learning model that centers on problem-solving skills, followed by strengthening creativity. When faced with a situation of question, students do problem-

solving skills to select and develop a response. Osborn (in Pepkin, 2004) states that the

CPS had 3 procedures, namely: (1) Finding facts, involving the portrayal of the problem, collect and examine data and information is concerned, (2) Finding ideas, relating to display and modify ideas about solving strategies problems, (3) Finding a solution, namely the evaluative process as a top problem-solving. Next Pepkin (2004) states there are 4 steps (stages) of learning CPS, can be seen in Table 1 below.

Table 1. Steps Learning Creative Problem Solving (CPS)

Step	Behavior Teacher
Clarification	Teacher directs the students about the issues raised, so that students can understand about the expected completion
Disclosure of the idea	Teacher directs students express their ideas freely dg about various problem-solving strategies
Evaluation and Selection	Teacher directs students to evaluate ideas that they had argued for the idea further selected a more appropriate and suitable for a given problem
Evaluation and Selection	Teacher directs students to apply the ideas that have been chosen to solve the given problem

Sources: Pepkin (2004)

By getting students to use creative measures to solve problems at CPS this learning model, is expected to help students overcome difficulties in learning mathematics, so that student learning outcomes will increase.

Based on the above, researchers interested in doing research with applied learning models of the Creative Problem Solving (CPS) to enhance student learning outcomes math class VIII SMP Negeri 3 Pekanbaru on the subject matter of fractions. The formulation of the problem presented in this study is: Does the application of the learning model the Creative Problem Solving (CPS) can improve learning outcomes VIII grade math students SMP Negeri 3 Pekanbaru in matter of fractions?

B. METHOD OF RESEARCH

Implementation of the research conducted in the classroom VIII SMP Negeri 3 Pekanbaru in odd semesters of the school year 2010/2011 starts September 27, 2010 to January 5, 2011.

Form of this study was classroom action research (PTK) collaborative. According Wardani (2002) PTK is the research conducted by the teacher used in the classroom through self-reflection in order to improve its performance as a teacher,

so that increased student learning outcomes. The research was conducted by researchers, whereas grade math teacher VIII SMP Negeri 3 Pekanbaru as observers during the learning process takes place. Actions in this study is the application of the

learning model the Creative Problem Solving (CPS) on the subject matter fractions. The research was conducted in two cycles. Each cycle consisted of three meetings and one-time daily tests.

The subject of this research is VIII grade students of SMP Negeri 3 Pekanbaru as many as 34 people consisting of 17 male students and 17 female students.

Instrument in this study consisted of:

1. Learning device

The device consists of learning to use the syllabus, learning implementation plan, student worksheets, and worksheets about the daily tests

2. Instrument Data Gatherer

The instrument consists of collecting data observation sheet and test learning outcomes. Observation sheet is intended to observe the activities of students and teachers during the learning process takes place. Tests learning outcomes (daily tests) were used to determine student achievement of competence and success of measures drawn up refers to the lattice result of learning.

Data Collection Techniques in this study consisted of: (a) observation technique; Observations conducted to observe the activities undertaken by teachers and students during the learning process for every meeting by filling out the observation sheet provided. (B) Mechanical tests; mathematics student learning outcome data were collected through tests learning outcomes that include subject matter fractions by conducting daily tests 1 and 2 daily tests.

Data analysis is descriptive statistical analysis, aimed at describing the data about the activities of students and teachers during the learning process and achievement of students' competency data at the material fractions. Analysis of data about student learning outcomes in mathematics subject matter fractions carried out by looking at the value of individual learning outcomes gained from the daily tests, then compared with the KKM established school that is 70. KKM data analysis on the achievement of material is done by comparing the fractional number of students who reach the KKM on the basis of scores and the number of students who achieve KKM on learning outcomes by implementing a learning model that is the daily tests CPS (UH) I with UH II. In this study students are said to have reached a predetermined KKM school when learning the results obtained ≥ 70 . Action is successful if the frequency of students who achieve scores KKM increased from base to UH UH I and from I to II, UH. To determine the success of the action can be seen from the frequency distribution table.

C. RESULT AND DISCUSSION

1. RESULT

a. Analysis of Results Actions

The data analyzed in this study were teacher and student activity data during the learning process, learning mathematics achievement of KKM results for each indicator and successful action. To determine the activity of teachers and students in the application of the learning model the Creative Problem Solving (CPS) conducted observations of the activities of teachers and students during the learning process takes place.

From observations at the first meeting, the learning process has not been in accordance with the planning. Students' learning activeness in following the still low. Attention given to the student teachers are also not evenly distributed. Students also have not been brave and have the confidence to express ideas. Many students who do not dare to ask questions or ask for guidance from the teacher when experiencing difficulties. Only less than 10 students who dared to ask the teacher about things they do not understand every step of progress the student worksheet (LKS). For the formulation of the problem, there are 50-10 students who can write what is known and what is the problem on a given issue. When disclosure of the idea of students are less enthusiastic. There are some students who are wrong in running the idea. But with the guidance of teachers students can execute his ideas. There are still students out of class. Even some students who walk or just to annoy his friend to borrow stationery. Time used is also not effective, so the teacher can not require students to infer the material together. At this first meeting that concluded just the teacher a lesson.

At the second meeting, the deficiencies are corrected at the first meeting. At the beginning of the learning is still a lot of students are tired and not concentrating. This is because they just finished the gym. But this did not last long. More efficient use of time and teachers more equitably in providing direction and attention to students while working on LKS-2. At this meeting, there are 5-7 students rewrite the problem in full at the time of formulation of the problem. Teachers are providing support to students in expressing ideas. Students had dared to ask the teacher about the difficulties they have not understood.

At the third meeting, active students increased. This is evident from the enthusiasm of students in expressing ideas and in resolving LKS-3. Interaction between teachers and students are also well established so that students no longer afraid to ask the teacher about the difficulties they face. Implemented in accordance with the

planning of learning.

At the fourth meeting, students are already active in learning, although there are still students who are not serious about LKS. Students are waiting for the work of a friend nearby. Learning activities take place smoothly in accordance with the planning. Students active in express ideas and discuss with friends nearby. In carrying out the idea there are still some students who are mistaken. However, under the guidance of teachers that students can run the idea.

At the fifth meeting, learning activities are going well although there are students who still are not enthusiastic in learning. There are students who are busy with themselves. Overall the learning process goes smoothly according to plan. Students and teachers interact well during the learning process. At the sixth meeting, learning activities are going well. LKS well students are doing. Students seemed enthusiastic in expressing ideas. The learning process goes smoothly and according to plan.

b. Analysis of Success Measures

1). Analysis of Indicators of achievement of KKM

The number of students who reach the KKM indicators (achieving the value 70 for each indicator) on the daily tests I, can be seen in the following table.

Table 2. Indicators on the Achievement of KKM Daily I Deuteronomy

No	Indicators of Achievement	Number of Students Achieving KKM Indicator	% KKM Students Achieve
1	Using the concept of fractional worth to solve the problems given	34	100
		27	79,41
2	Using the concept of fractions in problem-solving sort	31	91,18
3	Using the concept of mixed fractions in problem solving	31	91,18
4	Using the concept of decimal fractions in solving problems	26	76,47
5	Using the concept of percent in problem solving	20	58,83
6	Using the concept of permil in problem solving	18	52,94

From the table above KKM visible indicators of achievement of the fifth and sixth have not been satisfactory. The mistake that many students do in solving problems on the fifth indicator is wrong in interpreting the questions, so the resolution is not as expected. The mistake many students do when solving problems on the six indicators are not

understanding the problem and errors in calculation. Mistakes made by students on indicators 2, 3 and 4 are less precise in the calculation.

The number of students who reach the KKM indicators (achieving the value 70 for each indicator) on the daily tests II can be seen in the following table.

Table 3. KKM Indicators on the Achievement of Deuteronomy Daily II

No	Indicators of Achievement	Number of Students Achieving KKM Indicator	% KKM Students Achieve
1	Using the properties of addition operations in problem solving fractions	32	94,11
2	Using the operating properties of fractional reduction in problem solving	27	79,41
3	Using the properties of fractional multiplication operation in problem solving	30	88,24
4	Using the properties of fractional division operation in solving the problem	34	100
5	Write down the numbers into the form of raw	7	20,59
6	Assess the results of arithmetic operations of fractions	25	73,53

Based on Table 3, the mistakes made by students in solving problems on indicators 1 and 2 are less thorough in resolving problems causing errors in calculations. Students make errors in equating the denominator in the fraction of berpenyebut not the same. Mistakes made by students in solving problems on two indicators of students' wrong in doing ordinary fraction calculation with the form of raw numbers, resulting in a complete calculation of fractional reduction is also experiencing an error. On indicator 3 students much mistaken in interpreting or understanding the problem. In the five indicators of the student errors can not be made up of decimal fractions exactly one decimal point as expected. In the six indicators most students solve problems without using the concept of fractional arithmetic operations interpret.

2). Analysis KKM achievement of Learning Outcomes and Frequency Distribution

Achievement of minimum completeness criteria on the overall fraction of material presented in the following table

Table 4. Student achievement of KKM

	Basic Score	Daily I Deuteronomy	Daily II Deuteronomy
Number of Students Achieving KKM	19	26	30
Percentage (%)	55,88	76,47	88,24

From the table above shows an increase in the number of students who achieve a score of KKM basic to daily tests I and an increasing number of students who achieve KKM daily tests of daily tests I to II. Thus the action is successful.

To determine students' scores increased VIII class SMP Negeri 3 Pekanbaru before and after the action can be viewed at the following frequency distribution list.

Table 5. Frequency Distribution List Values Learning Outcomes

Interval	Frequency of Students		
	Basic Score	Value UH I	Value UH 2
30 – 39	1	0	0
40 – 49	0	3	0
50 – 59	7	3	1
60 – 69	7	2	3
70 – 79	12	6	4
80 – 89	6	5	9
90 - 100	1	15	17
Σf	34	34	34

Based on Table 5, the frequency of students who achieve KKM (≥ 70) increased. The number of students who achieve KKM before the action is on the basis of scores totaled 19 students, while the number of students who achieve KKM after the action is at UH I numbered 26 people and at UH II amounted to 30 people. It can be concluded that the action was successful or in other words, the application of learning models Creative Problem Solving (CPS) can improve learning outcomes VIII grade math students SMP Negeri 3 Pekanbaru.

2. DISCUSSION

During the research process there are several constraints, including the process of learning takes place is still a lot of activities conducted on school hours, such as checking the completeness of student uniforms. It takes quite a lot because there are some students who are not disciplined. Issued clothing, not wearing a belt, tie and sebagainya. Students are still some are out of the classroom. When working LKS is still poorly controlled because many students are asking for is less understood. Besides learning the application of the Creative Problem Solving model also less than the maximum, in this case the students are less creative in expressing ideas.

In LKS, there are several shortcomings, among others, reading materials provided incomplete. Changing decimal fractions into common fractions to decimal fractions just described that can be used in the form of ordinary berpenyebut fraction 10, 100, 1000 onwards. Researchers did not explain how to convert recurring decimals into fractions usual. This is because researchers focus on the required text books at school.

There are also shortcomings in the observation sheet. Observation sheet activities of

teachers and students during the learning process takes place can not be used as a material reflection for improvement at the next meeting because not contain weaknesses during the learning process takes place.

For the success of the action, in general math scores of students learning outcomes has increased. Mathematics student learning outcomes are better than the result of learning on the previous material. From the data analysis results obtained studying the fact that an increase in the number of students who achieve KKM of prior actions by the number of students who achieve KKM after the action of daily tests daily tests I and II. On the basis of the number of students who score reached KKM is 19 people with a percentage of 55.88%. After the action is on the daily tests I the number

of students who achieved KKM is 26 students with a percentage of 76.47%. In daily tests II the number of students who reach the KKM is 30 students with a percentage of 88.24%.

D. CONCLUSION AND SUGGESTION

1. Conclusion

Based on the results of research and discussion can be concluded that the application of learning models of the Creative Problem Solving (CPS) can improve learning outcomes in mathematics of students in the class material fractions VIII SMP Negeri 3 Pekanbaru in the school year 2010/2011.

2. Suggestion

Based on the conclusions and discussion of results of research in the ATS, the researchers propose some suggestions to researchers who intend to follow up this research, among others.

1. Implementation of Learning Creative Problem Solving (CPS) not only to solve the problem, but also for the discovery of patterns, and derive a formula generalizing in mathematics, and therefore the CPS learning that emphasizes these aspects need to be pursued in future research
2. Teachers should be more organized this time with more effective learning, so that all phases of learning can work well, as planned.
3. Teachers should be more actively to encourage students to express ideas as much as possible so that the application of CPS to maximize learning model.

E. REFERENCES

Arikunto, Suharsimi, dkk, 2008, *Penelitian Tindakan Kelas*. Bumi Aksara. Jakarta
BSNP, 2006, *Standar Isi KTSP*, Jakarta

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- Dimiyati dan Mudjiono, 2006, *Belajar dan Pembelajaran*, Rhineka Cipta, Jakarta
- Djamarah dan Zain, 2006, *Strategi Belajar Mengajar*. Rineka Cipta, Jakarta
- Pepkin K.L, 2004, *Creative Problem Solving in Math*, Tersedis di:<http://hti.math.uh.edu/curriculum/units/2000/02/00.02.04.pdf>
- Sabandar, Jozua., 2008, *Berpikir Reflektif*, Prodi Pendidikan Matematika Sekolah, Pascasarjana UPI, Bandung.
- Sagala, S, 2005, *Konsep dan Makna Pembelajaran*, Alfabeta, Bandung
- Sardiman, AM, 2008, *Interaksi dan Motivasi Belajar Mengajar*, Raja Grafindo Persada, Jakarta
- Shadiq, Fajar, 2004, *Pemecahan Masalah, Penalaran dan Komunikasi*, Widyaswara PPG Matematika, Yogyakarta.
- Slameto, 2003, *Belajar dan Faktor-faktor yang Mempengaruhinya*, Rhineka Cipta, Jakarta.
- Sugiyono, 2007, *Metode Penelitian Pendidikan*, Alfabeta, Bandung.
- Suherman, E, 2001, *Strategi Pembelajaran Matematika Kontemporer*, JICA-UPI, Bandung.
- Suyanto, 1997, *Pedoman Pelaksanaan Penelitian Tindakan Kelas*, Dikti Depdikbud, Yogyakarta.
- Wardani, I.G.A.K, 2003, *Penelitian Tindakan Kelas*, Pusat Penerbitan Universitas Terbuka, Jakarta