IMPROVING STUDENTS INDEPENDENCE AND LEARNING ACHIEVEMENT IN MATHEMATICS TEACHING THROUGH PROBLEM BASED INSTRUCTION (PBI) ON THE TOPIC OF CIRCLE
(CAR of Mathematics Learning in Grade VIIIA of SMP Al Islam 1 Surakarta Academic Year 2012/2013)

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(CAR of Mathematics Learning in Grade VIIIA of SMP Al Islam 1 Surakarta Academic Year 2012/2013)

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ABSTRACT

This research aims to know the improving of learning independence and student achievement in mathematics learning through Problem Based Instruction (PBI) on the topic of the circle. This research uses a qualitative approach by the design of Classroom Action Research (CAR), which is implemented in three cycles. Researcher and mathematics teacher of grade VIIIA SMP Al Islam 1 Surakarta as the subject of the action given. While students of grade VIIIA by the number 32 students is the subject receiving the action. Data collection method used are observation, field notes, tests, documentation. The data analyzed by descriptive qualitative use flow method which are data reduction, data presentation and data verification. Based on the research results, it can be concluded that the application of Problem Based Instruction (PBI) can increase independence learning and students achievement in mathematics learning of students at grade VIIIA. It can be seen from several indicators: 1) the student's courage in expressing opinions/questions increases from 22.59% to 70.00%, 2) the student's ability to solve the problems independently in a group increases from 32.26% to 76, 66%, 3) the student's ability to work in group by teamwork increases from 38.71% to 76.66%, 4) the student's confidence in solving individual problems increases from 48.39% to 83.33%, 5) the student's ability to achieve test scores based on KKM standardized increases from 38.71% to 86.67%.

Keywords: Mathematics learning; Learning independence; Students achievement; Problem Based Instruction (PBI)

INTRODUCTION

Education becomes one of the benchmarks of a nation whether the nation can be said to be advanced or not. The better of the nation education, the better of the people quality. That is the general assumption of a nation's education programs. Factually formal education or school is described as group activities such as teacher and student. The activity occurs during the learning process either inside or outside the classroom.

The learning process in the classroom is an important factor to provide optimal results of learning itself. The optimal learning outcomes not only seen from the learning process, but also be seen from the results after the learning as well as in daily life. Each learning process is given in the classroom should be reflected in the character and personality of the students either at home, school and community. In essence, the learning process should be accompanied with character education.

Reality on the field shows that the majority of learning in the classroom is only oriented to student achievement (achievement oriented), without regard of the character planting to the students. This is certainly contrary to one of the contents of the Graduate Competence Standard (SKL), which have been mentioned above.

One of the characters that must be built is the attitude of independence. This is due to the lack of independent attitude of students in learning. Some indications of the lack of independent attitude of students are: 1) not convident, 2) do not dare to express ideas, 3) lack of sense of responsibility, 4) always depends on others, 5) do not have the motivation to excel, indicated by students achievement is low.

Muhammad Mustari (2011: 93) independence is a trait that must be established by parents in developing their children personality. Independent child is an active child, independent, creative, competent and spontaneous. By this it appears that properties exist in the child who is confident. However, the independent has a broader concept than confident. It refers to the confidence that people have in the sources that was in him to faced with any situation.

Rusman (2011: 354) explain the independence in study according Werdemeyer (1983) needs to be given to students so that they have the responsibility to regulate and to be discipline and to develop the ability to learn on their own.

Based on the observations result that have been conducted by researcher in SMP Al-Islam I of Surakarta grade VIIIA, finds some fundamental issues related to the independence of students in learning such as: 1) the student's courage in expressing opinions/questions (22.59%), 2) the student's ability to solve the problems independently in a group (32.26%), 3) the student's ability to work in group by teamwork (38.71%), 4) the student's confidence in solving individual problems (48.39%). Meanwhile, for the first conditions of student achievement, the student ability to achieve test scores based on KKM standardized increases 38.71%. It shows the attitude of independence and student achievement in learning need to be improved.

Many different models, methods, strategies and teaching approaches can be used to develop student's independence attitude. To develop the attitude of the student's independence, we can use learning model Problem Based Instruction (PBI). Problem Based Instruction (PBI) learning models is a learning model based on the existing problems. In this case, students are required to learn through problem given by the teacher.

According to Arends (2008), problem based teaching is a learning approach where students work on authentic problems in order to construct their own knowledge, develop inquiry and thinking skills, develop independence and confidence. Through this learning model expected students are able to learn independently in each of the learning process, so it will be a better understanding of the subject matter.

Based on the explanation, there needs to be improvement in the learning process to the student's attitudes. One of effort that concern teacher is learning method that used, because it will affect to the students activities in learning. To increase the activity of students, mathematics teacher should need to use the

learning methods more cooperative. Through the implementation of PBI in learning, expected can improve studen that less-active and lower achievement.

The purpose of this research is to improve the independence attitude and learning achievement of mathematics in grade VIIIA SMP Al Islam 1 Surakarta by PBI. Besides that, in general can be a reference for teachers in the use of learning methods

LEARNING METHODS

Type of research that used is Classroom Action Research (CAR). According Arikunto (2008: 58) action research is conducted with the aim of improving the quality of teaching practice. CAR conducted by researcher, teacher and principal in the classroom or in the school where teacher teach with an emphasis on the improvement or enhancement of the learning process.

Mathematics teacher and researcher in this research acts as a subject that provides a class action. Meanwhile, students of SMP Al-Islam 1 Surakarta grade VIIIA in Academic Year 2012/2013 by the number is 32 students, consist of 13 boys and 19 girls is the subject of research that receives the action. In this research, besides acts as an observer, the researcher also served diagnose, make a concept and action design with mathematics teacher.

This research is collaboratively research conducted by researcher, teacher and students. These three elements work together to get optimal results, so as are able to solve the problem. The steps that conducted in this research are as follows: 1) First dialogue, 2) Action Planning, 3) Implementation of the action, 4) Observation and monitoring, 5) Reflection, 6) Evaluation, and 7) Conclusion the result of increased learning mathematics process, namely improving the independence learning and student achievement.

Techniques of data collection is used main method, included: 1) observation method, 2) test method; and help method, included: 1) field notes, 2) documentation. Techniques of data analisys conducted by descriptive qualitative. Data analysis conducted on each data collected by either quantitative data or

qualitative data. Quantitative data analyzed by using a simple quantitative, that is by the percentage (%) and qualitative data analyzed by making qualitative assesments (category). Qualitative analysis conducted by the flow method is analyzed of data during the learning actions conducted, developed during the learning process.

Qualitative data analysis is conducted through three stages, namely data reduction, exposure data and inference. Data reduction is a simplification process conducted through selection, focusing and abstraction of raw data into meaningful information. Exposure data is the simplify appearance process of data in the form of narrative exposure, tabulation representation including in matrix format, graphical representation, and so on. Inference is the process of taking the essence of the presentation of data that has been organized in the form of a statement sentence and/or a brief and concise formula, but contains a broad understanding.

RESEARCH RESULT AND DISCUSSION

The effort to increase the student's independence in learning mathematics is conducted by improving the implementation of learning that has been done. Improvement process is conducted between researcher and teacher through the implementation of learning model Problem Based Instruction (PBI) on the topic of the circle.

The learning process by PBI is learning based on the problem. PBI as one of technique to deliver the subject matter so the students more easily understand. In learning PBI students are gives a main problem or an exercise related to the subject matter to be resolved by group or individual without the help of the teacher, so the teacher will give the answer at the end of learning. Learning by PBI also guides the students to dare to ask questions or express opinions that given. The characteristics of PBI strategy, according to Baron (2003:1) in Rusmono (2012:74) are: a) using problems in real-world, b) learning is focused on problem solving, c) the purpose of learning is determined by student, and d) the teacher act as facilitator.

The teacher in learning PBI acts as a facilitator, providing motivation and guides the students if there is a problem that unclear. The goal in order to the learning process can be directly centered to student, such that improving independence attitude and student achievement in mathematics learning.

Improving the independence and student achievement in this research, can be observed through observations from before the action up to after the action cycle III. The result of introduction obeservation up to the cycle III can be presented in the following table:

Table 1 Independence and Student Achievement before and after research

No.	Indicator	Before Research	After Research		
			Cycle I	Cycle II	Cycle III
1.	Student's independence in learning				
	a. Be able to express idea/questions	7 students (22,59%)	9 students (33,33%)	15 students (51,72%)	21 students (70,00%)
	b. Be able to solve the problems independently	10 students (32,26%)	11 students (40,74%)	16 students (55,17%)	23 students (76,66%)
	c. Be able to work in groups by teamwork	12 students (38,71%)	14 students (53,85%)	17 students (58,62%)	23 students (76,66%)
	d. Having convidence in solve the individual test	15 students (48,39%)	16 students (59,24%)	19 students (65,52%)	25 students (83,33%)
2.	Student's achievement, get score $\geq$ 70	12 students (38,71%)	12 students (44,44%)	22 students (75,87%)	26 students (86,67%)

From the data obtained, looks the low of student's independence in learning before given an action. Lack of student's independence in learning mathematics can be caused from internal conditions of students are less interested in learning mathematics because it considers as a problem. In addition to these factors, it can

also be influenced by the conventional way of teacher in delivering the material, thus making student's motivation to learn is less.

The attitude of the student's independence in learning has increased after the implementation of learning model Problem Based Instruction (PBI). Increasing student's independence can be seen from the observation during the learning process. Based on the action data from the cycle I, shows that student's independence have not improved, there are many students who are still passive. It can be caused by students who are still in the process of adjustment to the new method is applied by the teacher with PBI. The teacher is not mastery to the implementation of PBI impact on student's lack of understanding in solving the problems.

Based on the action data from the cycle II, shows that the student's independence are increased. The student looks enthusiastic follow the mathematics learning and group discussion. In addition, students begin to dare to ask of the problems that have not been understood. The class action results in the cycle III, shows significant improvement. Students are familiar with PBI learning, so students are directly active in solving any problem.

Increasing student's independence can be clearly seen in the cycle III. The learning process of the cycle III shows the attitude of students who can be controlled through learning activities by the teacher. Conditions that impacts to increases the student motivation in solve the problems independently, courage in expressing opinions and teamwork in a group discussion. There is a stable progress, so that the target is expected to be achieved.

Meanwhile, for the student's achievement is the result of the evaluation after the matter is given. Achievement as a benchmark used by teacher to determine the level of understanding of material previously provided.

In this research, learning achievement is measured by evaluations or tests where student can be said to have a good level of understanding when able to reach the KKM. Minimal mastery criteria (KKM) specified for mathematics at the SMP Al Islam 1 Surakarta are 70. So that, the indicators of success the student achievement if test scores ≥ 70.

The result of research shows that by using PBI strategy in learning mathematics, student's achievement increase. It can be observed based on the test which is always done in the end of cycle. The data shows that the number of students who scored above the passing grade increase from the first cycle up to the third cycle. Increasing student's achievement of each cycle, occurs because students can understand better of the material presented through different methods of before action.

Research related to learning achievement one of conducted by Reri Nurlimasari (2008) concluded that learning by applying the model of Problem Based Learning Instruction (PBI) can improve learning outcomes (cognitive) mathematics of SMA students. Beside that, also can improve student's affective. Rhisty Utami Frida (2012) conducted a research same with researcher, which concluded that PBI learning can improve student achievement.

Baron (2003:1) in Rusmono (2012:74) said that, the problem in PBI is an open issue. That is, the answer to these problems is uncertain. Objectives the PBI should achieve is the ability of students to think critically, analytically, systematically and logically to find alternative of problems solving through the exploration of empirical data in order to develop scientific attitude.

Based on the description of the data that has been described above, the application of the learning model Problem Based Instruction (PBI) in mathematics learning in grade VIIIA SMP Al Islam 1 Surakarta obtained the result that an increase in independence and student's achievement. It can be concluded that the hypothesis is accepted and supported by action research. The hypothesis is also supported by the responses mathematics teacher grade VIIIA which said that independence and student achievement increased.
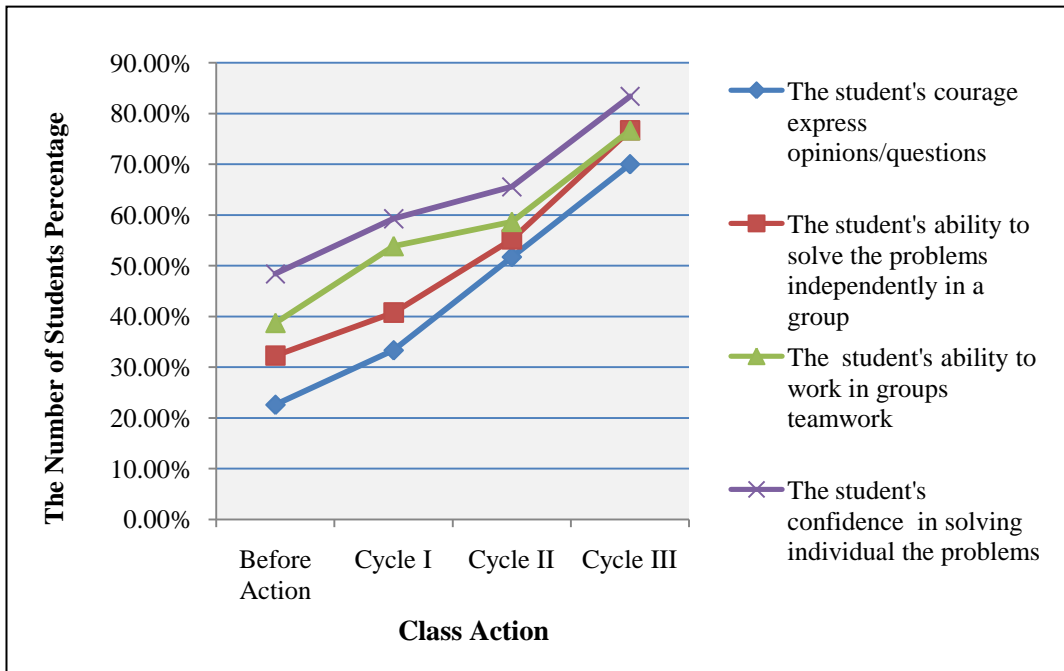
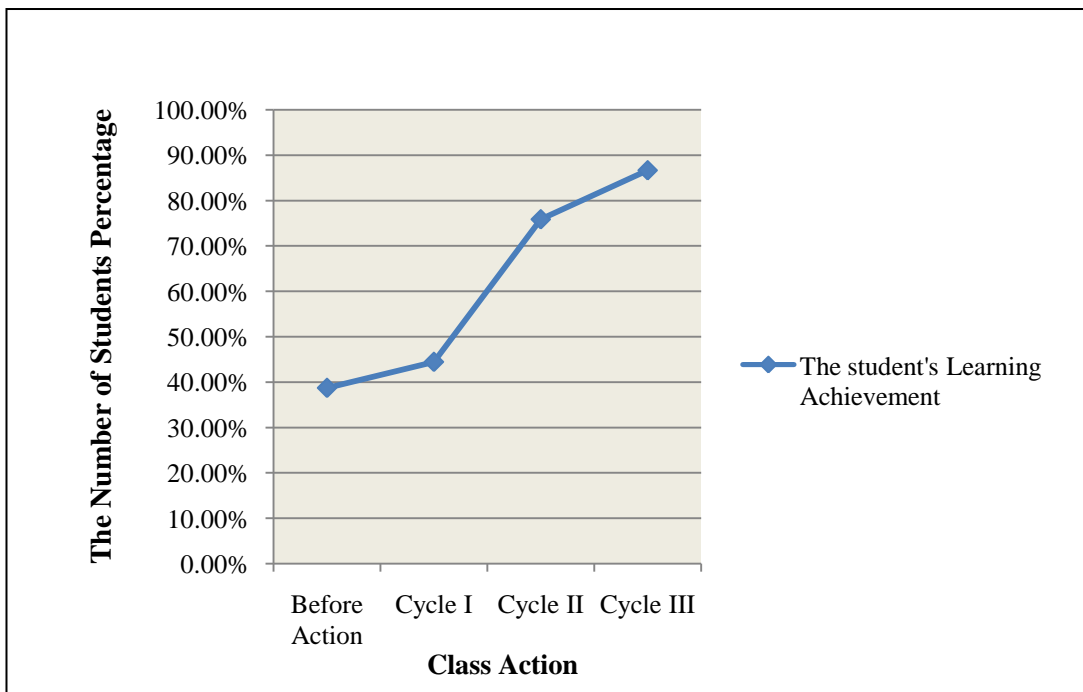Figure 1 Graph of Improving Student Learning Independence Before and
After Action

Figure 2 Graph of Improving Student Achevement Before and After Action

CONCLUSION

After a given action through PBI, independence and student achievement can be improved. From the results of the research can be conluded as follows:

1. Student's independence in learning mathematics on the topic of the circle be increase. Indicators are taken: 1) The student's courage in expressing an opinion/questions, before the action are 7 students (22.59%), in the cycle I reaches are 9 students (33.33%), in the cycle II reaches are 15 students (51.72%), the cycle III reaches are 21 students (70.00%). 2) The student's ability to solve the problems independently in a group. Before the action are 10 students (32.26%), in the cycle I reaches are 11 students (40.74%), in the cycle II reaches are 16 students (55.17%), in the cycle III reaches are 23 students (76.66%). 3) The student's ability to work in group by teamwork. Before the action are 12 students (38.71%), in the cycle I reaches are 14 students (53.85%), in the cycle II reaches are 17 students (58.62%), in the cycle III reaches are 23 students (76.66%) . 4) The student's confidence in solving individual problems. Before the action are 15 students (%), in the cycle I reaches are 16 students (59.24%), in the cycle II reaches are 19 students (65.52%), in the cycle III reaches are 25 students (83.33%).

2. Student's achievement in mathematics learning on the topic of the circle can be increase. Increasing student achievement can be seen from the results of test given before action up to the action giving the cycle III. Observation test result are 12 students (38.71%), the cycle I reaches are 12 students (44.44%), the cycle II increases to 22 students (65.87%), the cycle III increases to 26 students (86.67%).

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