Improvement of Students’ Activities and Learning Outcomes in Mathematics through Comics-Based on Student Worksheets of Seventh Grade Islamic Junior High School in Padang

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Abstract. Students need critical, systematic, logical, innovative thinking skills and effective collaboration in the learning process. Students want math learning that is fun, relaxed, easy to understand and the material displayed in a colorful book so it is fun to read and it can be presented in comic form. The classroom action research conducted aims to see the use of comic worksheets. Mathematics learning using comic worksheets can improve learning activities, understanding concepts and can improve students' mathematical problem solving. Students feel happy if the mathematics material can be presented in comic form because it is easier to understand, presented in the form of pictures and series of stories that can lead in the discovery of concepts so that it is clearer and easier to understand, adds enthusiasm in learning and does not create a tense atmosphere of learning.

1. Introduction
Mathematics is needed in improving human resources, because mathematics as a means of logical thinking and is very instrumental in the progress of science and technology. The rapid development of science has a major influence on the challenges faced in the future. Students’ need critical, systematic, logical, innovative thinking skills and effective collaboration in the learning process. Progress in thinking like this can only be developed through learning mathematics, because mathematics has a very important role in daily life.

To achieve the above expectations, mathematics learning must be more student-centered, where students must be able to discover their own problem-solving processes on the material being studied and interact actively with other students. Interactions that occur during the process of learning mathematics can provide great potential to improve students’ understanding of the material being studied.

The fact that the writer found in Islamic junior high school in Padang, especially students’ of seventh grade still has a lack of activity in learning. Students’ who study in seventh grade are students’ who have lower ability than other grades. Based on the results of the interviews of the authors with students’ of seventh grade Islamic junior high school in Padang obtained information that students’ do not like mathematics, because mathematics is considered a difficult subject, consisting of many formulas and steps in finding convoluted and incomprehensible, unattractive, unattractive formulas and less liked. Some students’ often shift their activities to other things that are not related to the
lesson such as play activities, interfere with other friends and there are students’ who draw during grade hours.

Students’ tend to get bored and feel bored in learning because they are not able to do the problems correctly. When students’ are given problem solving problems they are not able to understand the problem well. Students’ often do not carefully read and understand sentences and determine what is known in the problem, then how to solve the problem right and right. The low ability of students’ to understand problems, plan problem solving, carry out solving and re-examine the calculation process resulted in students’ ability to solve mathematical problems is very low. This results in the still low students’ mathematics learning outcomes, as shown by the results of the semester test, of 49 educated participants, only 15 people whose mastery of understanding concepts and problem solving reached the Minimum achievement criteria (KKM) of 75.

Based on the results of the writer's interview with students’ of grade VII4, they want to learn mathematics that is fun, relaxed, easy to understand, the material is displayed in colorful books so that they are happy to read, displayed in as much detail as possible. Hearing the explanation the writer offers what if the mathematical material is displayed in the form of dialogue accompanied by steps that can guide in the discovery of concepts. This can be presented in the form of comics and around 39 students’ said they liked comics (79.6%) while those who did not like comics were around 10 students’ (20.4%). Students’ feel happy if the mathematics material can be presented in the form of comics because it is easier to understand, presented in the form of pictures and a series of stories that can lead in the discovery of concepts so that they are clearer and easier to understand, increase enthusiasm in learning and do not create a tense atmosphere of learning.

2. Method
This type of research in this study is a grade room action research which is a series of cyclic research conducted in order to solve a problem until the problem is solved. In this grade room action research is conducted by the teacher concerned who aims to improve the learning process that is his responsibility. This research is expected to offer new ways and procedures to improve and improve teacher professionalism in the learning process by looking at various indicators of success and improving the learning process and outcomes. This research was conducted in seventh grade Islamic junior high school in Padang with 49 students’ consisting of 22 male students’ and 27 female students’.

Based on the type of research carried out, the research procedures are packaged in a repetitive cycle. This study consists of several cycles that are in accordance with the information needs of the data, where the cycle will be terminated after an increase in students’ learning activities is seen in accordance with the desired indicators and an increase in students’ concept ability and problem solving abilities. Broadly speaking, the cycle in this study consists of 4 stages, namely: planning, action, observation and reflection. We can see in Figure 1.
3. Research Result

3.1. Cycle I Students’ Activities

Based on the analysis of the observation sheet, it can be revealed the activities carried out by students’ during cycle I. Each of these activities is expressed in percentages that can be seen in the following Table 1:

| Meeting to (%) | Average (%) | Category |
|----------------|-------------|----------|
| 1          | 2         | 3       | 4     | Well     |
| 42^{a}     | 57^{a}    | 52^{a}  | 65^{a} | 72       | Well     |
| 35^{a}     | 43^{b}    | 46^{b}  | 54^{b} | 59.33    | Enough   |
| 28^{c}     | 43^{c}    | 52^{c}  | 65^{c} | 62.67    | Well     |
| 26^{d}     | 30^{d}    | 50^{d}  | 48^{d} | 51.33    | Enough   |
| 30^{e}     | 33^{e}    | 38^{e}  | 57^{e} | 52.67    | Enough   |
| 35^{f}     | 39^{f}    | 42^{f}  | 54^{f} | 56.67    | Enough   |

- ^{a} Doing the activities in the student worksheets in the form of comics seriously
- ^{b} Actively participate in group discussions
- ^{c} Willing to present the results of the discussion to the front of the grade
- ^{d} Ask relevant questions
- ^{e} Express opinions in grade discussions
- ^{f} Take notes of conclusions

![Figure 1. Kurt Lewin's Class Action Research in Arikunto [3]](image-url)
The results of observations in Table 1 can be illustrated in the form of the Figure 2 bar charts.

![Figure 2. Bar Diagram of Students’ Learning Activities Cycle I](image)

3.1.1. Learning Outcomes

To see students’ learning outcomes in the first cycle, the authors provide a test consisting of six item essays with a category of understanding problems and problem solving abilities. Based on the test results obtained by the number of students’ who completed the understanding of the concept of 29 students’ (73% of 40 students’) with an average grade of 84.75 and students’ who completed the problem-solving ability of only 13 students’ (32.5% of 40 students’) with an average of 63.30. From the analysis of students’ answers it appears that the ability to understand concepts better than the ability to solve problems.

In addition to observing students’ learning activities, the writer along with the observer provides an assessment of the worksheet which is the result of group discussions. The following illustrates the group worksheet values for cycle I in the form of graphs in Figure 3 below.

![Figure 3. Group Student Worksheets Value in Cycle I](image)
Based on information from students’ obtained information on many weaknesses (students’ complaints) in the learning cycle I. Students’ feel time is very limited in completing worksheets and test questions, so it is not possible to complete all assignments and questions given. In this case the writer should better manage the learning time / test for the implementation of the next cycle so that the achievement of learning objectives looks better.

3.1.2. Reflection Cycle I
After completing the first cycle, the writer and the observer reflect. The data that has been obtained are analyzed and evaluated to find out the extent of the success of the actions in achieving the objectives. This reflection is done to see what learning activities have been successful in Cycle I or vice versa.

Based on the results of reflections on students’ activities in Cycle I, the researcher and the observer concluded that there are still indicators of the success of students’ learning activities and mathematical abilities that have not been achieved.

Based on daily tests at the end of the first cycle there are still 19 students’ who have not yet completed the understanding of the concepts and 27 students’ who have not completed the problem solving skills. This shows the level of understanding of the concept almost meets the value of completeness while and students’ problem solving abilities are very low. This condition occurs because in understanding concepts and problem solving, students’ have not used complete stages or procedures. As a result students’ have not been able to fully understand the concept or problem and naturally produce incorrect answers.

3.2. Cycle II Students’ Activities.
The results of observing students’ activities during learning in cycle II can be seen in the following Table 2:

| Meeting to (%) | Average (%) | Category |
|---------------|-------------|----------|
| 1             | 2           | 3        |
| 78 \(^a\)     | 77 \(^a\)   | 83 \(^a\) | 79.33    | Well     |
| 70 \(^b\)     | 91 \(^b\)   | 88 \(^b\) | 83       | Very well|
| 76 \(^c\)     | 86 \(^c\)   | 83 \(^c\) | 81.67    | Very well|
| 54 \(^d\)     | 68 \(^d\)   | 79 \(^d\) | 67       | Well     |
| 54 \(^e\)     | 73 \(^e\)   | 73 \(^e\) | 66.67    | Well     |
| 76 \(^f\)     | 86 \(^f\)   | 88 \(^f\) | 83.33    | Very well|

\(^a\) Doing the activities in the student worksheets in the form of comics seriously  
\(^b\) Actively participate in group discussions  
\(^c\) Willing to present the results of the discussion to the front of the grade  
\(^d\) Ask relevant questions  
\(^e\) Express opinions in grade discussions  
\(^f\) Take notes of conclusions

The results of observations in Table 2 can be illustrated in the following diagram form:
3.2.1. Learning Outcomes

To see students’ mathematical abilities in Cycle II in Figure 4, researchers and teachers gave 4 essay items consisting of 40 minutes cycle II material with the categories of concept understanding and problem solving. Students’ learning outcomes for the second cycle based on tests obtained that the number of students’ who completed the understanding of the concept of 39 students’ (82.97% of 47 students’) with an average grade of 88.01 while the ability to solve problems was only 37 students’ (78.72% of 47 students’) with an average of 76.82. From the results of the analysis of students’ answers it appears that the understanding of concepts is also better than the ability of problem solving.

From the results of reflection for the student worksheets assessment the results of the students’ group discussion are shown in Figure 5 below:

![Figure 4. Diagram of Students’ Activity Bars in Cycle II](image)

![Figure 5. Cycle Worksheet II Value](image)

3.2.2. Reflection Cycle II

After completing the second cycle, the writer and observer reflect. This reflection is done to see what activities have been successful or vice versa. The results of reflection on students’ activities can be seen:

1. All students’ activities have reached the indicators of success previously established. But the authors also must pay attention to learning activities by making learning innovations, especially at the end of the lesson meeting.
2. The author sees that students’ have begun to dare to ask questions, discuss with friends respond and express reasons, students’ are not afraid and are not shy anymore to explain to friends, by discussing students’ more confident to appear present the results of the discussion. Moreover, the activity of recording conclusions, researchers no longer need to ask students’ because students’ already know the benefits of recording the conclusions of the material that has been learned. In addition, with the use of comic worksheets in mathematics learning has a positive impact on students’, students’ begin to be happy with mathematics because the material is presented in the form of illustrated stories.

Based on daily tests in cycle II, it was found that 39 students’ had completed the ability to understand concepts and 37 students’ had completed the problem-solving ability of 47 students’. Means for students’ learning outcomes are very satisfying. The attitude of students’ in learning mathematics is getting better, students’ really like learning mathematics by using comic worksheets.

Based on the results of reflection in the second cycle, the writer and observer agreed to stop the action until the second cycle. This is because all the indicators of success previously determined have been met.

4. Discussion

The use of comic worksheets can increase students’ activity in learning mathematics. The increase in students’ activity turned out to have a positive impact on the ability to understand concepts and solve mathematical problems in seventh grade Islamic junior high school in Padang students’. For more details, these improvements are discussed in the following description:

4.1. Increased students’ activity

Based on Table 1 and Table 2 can be seen an increase in students’ activity from cycle I to cycle II. Students’ activities in working on existing activities in the worksheet seriously increased from cycle I to cycle II by 18%. This is because students’ begin to enjoy the stories in the worksheet in the form of comics.

Active students’ in group discussion increased by 34%. Students’ activities in presenting the results of group discussions increased. 18%. Students’ activities to ask relevant questions from the end of the first cycle to the end of the second cycle increased by 31%, this shows that more and more students’ are trying to understand the lesson by encouraging themselves to ask questions. In cycle II students’ were excited and competed in completing the worksheets. Means in learning mathematics, interaction between students’ has increased more.

The activity of making conclusions has increased quite a lot, namely 34%, this is because the motivation given by the teacher continuously makes students’ more enthusiastic in participating in learning.

From the discussion above it can be interpreted that the increase in students’ activity in learning mathematics is caused by the use of comic worksheets in seventh grade Islamic junior high school in Padang.

4.2. Learning Outcomes

4.2.1. Concept Understanding

The author measures the understanding of students’ concepts in accordance with the indicators described earlier, such as students’ being able to write concepts, identify concepts, recognize sequence of procedures and draw conclusions. From the analysis of the results of students’ learning outcomes test shows that the understanding of students’ concepts increases. At first students’ sometimes are still hesitant in determining the properties of squares and rectangles, determining the circumference formula and area of squares and rectangles. Learning with this comic student worksheets approach makes students’ happy because students are helped by comic stories that lead them in the discovery of formulas. Students are not afraid to ask discussion partners who are quicker to understand the story.
presented and the writer gives an opportunity to ask. Students do not feel afraid of being wrong to answer questions because every students’ answer is always considered positive and students’ feel valued.

**4.2.2. Problem solving skill**

In problem solving skills, the authors see that students’ have been able and no doubt in determining the properties of squares and rectangles and calculate the area of squares and rectangles and solve problems related to everyday life. Thus students’ can improve their independence by finding something new in solving a problem.

From the improvement of this mathematics test ability test, it can be seen that the comic student worksheets approach can increase activities, understanding concepts and problem solving abilities, and does not rule out other abilities increasing. In other words, if students’ learning activities are good, the ability to understand concepts and solve mathematical problems is also good.

5. Conclusion and Suggestions

**5.1. Conclusion**

Based on the results of research and discussion on research on improvement of students’ activities and learning outcomes in mathematics through comics-based on student worksheets of seventh grade Islamic junior high school in Padang, it can be concluded as follows: Mathematics learning using comic worksheets can improve learning activities, understanding concepts and can improve students’ mathematical problem solving.

**5.2. Suggestions**

Based on the conclusions of learning mathematics by using comic worksheets, some suggestions can be made as follows: Researchers only see the ability to understand concepts and problem solving and other abilities should be noted/improved as well so that students are able to deal with further mathematical problems.

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