The Effort to Increase the Student's Motivation in Mathematics Learning with Some Teaching Aids in Junior High School 5 Wates, Kulon Progo, Yogyakarta, Indonesia

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ABSTRACT

One of the teacher's efforts in increasing the student's motivation in mathematics learning in Junior High School is by making mathematics teaching learning processes become enjoyable, interesting fro it's connected to daily needs. Maximizing (optimalizing) the use of some teaching aids and tools for demonstration is expected to be able to help the process of student's abstraction, which covers student's difficulty in learning.

The research aims at overcoming the problem found at classroom of the 2nd grade of Junior High School 5 Wates, Kulon Progo of Yogyakarta, Indonesia; in the first three-quarter for academic year 2001/2002. The approach of the study is to select and use teaching aids, which used as learning model in teaching learning mathematics through classroom action research. The teachers takes the action research in her own schools. The objective of the research is to select and use some teaching aids used as a model of mathematics learning in order to increase the student's motivation.

The results of the research showed that action research using some teaching aids such as nailed board, hand-rubber, playing card, students worksheet paper node, transparency paper, sipat thread, three wood blades could be used as a model in mathematics teaching learning processes to increase students' motivation in learning mathematics. It was shown that students' activeness in doing worksheet increased in the session of answer-question and discussion; there were so many students arose their hands and also happened when they were outside classroom.

Regarding to the result of the research, the researcher suggested the mathematics teachers in junior high school in their teaching-learning process should use variation method to motivate students and to avoid students' boring and use teaching aid optimally to facilitate their students to learn the concept, idea, definition or the certain mathematics procedure.

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A. Introduction

The success of teaching-learning process in Mathematics is not away from the teacher's role as informator, communicator, and facilitator. The teaching method used by teacher can intervene the interaction between teacher, students, and the learning achievement. Up to now, we still hear many students who complained that mathematics is seen as a frightening subject, uninteresting, and difficult to do, also not related much to daily needs. It is proved by the grade of the National Examination score, which is still lower than expected, even though there are, still many students who like mathematics shown with good achievement.

One of the teacher's efforts in increasing the student's motivation in mathematics learning in Junior High School is by making mathematics learning become enjoyable, interesting fro it's connected to daily needs. By maximizing (optimalizing) the use of some teaching aids and tools for demonstration it is expected to be able to help the process of student's abstraction, which covers student's difficulty in learning.

B. Theoretical Review

Student's attitude is influenced by two factors, that is internal and external (Winoto Putro, 1993:33). Alike the student's activity in the teaching-learning process is also influenced much by two factors above. In external factor in students, teacher must have to motivate students related to the guidance schema of Ki hajar Dewantoro words "Ing Madyo Mangun Karso" which means that teacher should encourage the student's motivation (Mugiharso, 1993). Or it implies that teacher should be creative in increasing the student's motivation.

Students of Junior High School are in the age between 12 – 15 years old. Based on the cognitive development from Peaget, this age belong to formal operation. The acquisition in this level emerges from the ideas to compare, discuss and to make conclusion. There is a change to intellectual function from concrete thinking to abstract (Suardiman, 1986:36). Teaching aids are able to help the abstraction process of the students.

It is very effective to use game-cards in teaching mathematics (Bell, 1986). There is a discussion both among individuals and among groups, which related to the words of Ki Hajar Dewantara "Tut Wuri Handayani" which means the teacher must keep standing behind and let the students to find out their own way, but still giving correction if necessary.

C. The Research Methodology

1. The Context of the Research

The research is a classroom action research for it aims at overcoming the problem found at classroom. The researcher conducted it collaboratively with the mathematics teachers in Kulon Progo district. The research is conducted in class IIa Junior High School 5 Wates, Kulon Progo in the first three-quarter for academic year 2001/2002. The research data is about the special events occurred in classroom and the questionnaire sheets are taken from students concerning with motivation in teaching-learning process or in discussion.

2. Plan of Implementation

Short Cycle

A short cycle ran in every meeting for two hours containing planning, implementation, observation, and reflection. Based on the teaching structure in mathematics, every meeting consisted of some stages, such as introduction, development, application, and closing. Each stage of development and application used mathematics model optimally, both inside and outside classroom.

Long Cycle

A long cycle is an accumulation of the short cycles in every learning topic. The result from short cycles is considered as the basic way to develop plan for the further long cycle. There are three long cycles used in this research, which covered three topics below:

1) Square and square root
2) Parallel lines
3) Pythagoras theorem

3. **Technique of collecting the data**

A researcher is to collect the qualitative data to find out the increasing rate of student's motivation in teaching-learning process. The observation sheets used the form which enables students to write down the hidden problem uncovered yet on the exist aspect.

4. **Indicator**

Classroom action research is considered be success if there is an increasing rate of student's activeness in every teaching-learning process. It is not referred to the acquisition of NEM score even though it will go into the increase of the learning achievement.

D. Research Finding and Analysis Data

Before starting the 1st cycle, teacher divided the class into groups of 5 students of each and also appointed the chief of each group. It is chosen the students with heterogeneous ability and closer seats to ease the group in discussion. Teacher also prepared mathematics model in every meeting and provided the item card including the answer sheets.

1st Cycle

Topic: Square and Square root

(a) In each stage of development, the item/question is shown to all groups.
(b) Teacher provided the teaching-learning process to discuss about square and square root of a demonstrated number, which used nail board and hand-rubber, and then students started to do their work sheet, nodded paper individually.
(c) In implementation using the card, firstly, teacher gave explanation about how to play the game.
(d) Each group was given one set of item card mixed and shared equally by the chief of the groups and the students finished the questions in their own exercise books. Whenever finished, they exchanged their tasks with the others inside the group, which already finished their tasks until all the item cards expected to finish by students in ± 20 minutes were out.
(e) Teacher distributed the key answer sheets. The play was begun by opening the key answer sheet one by one up down. Students who got similar answer with key answer would get score and were noted in a score sheet, ever after until finished. The students who got highest score would be the winner.

The questions, which were not answered yet would be discussed in their own group, if failed it was brought to classroom discussion guided by the teacher. At every

play, teacher always asked the students about their impression toward the benefit of using such play. At last, It was known that students were interested much and became enthusiastic, enjoy and able to have discussion.

Furthermore, in last ten minutes, teacher would guide the students to make conclusion from the learning process and give the other tasks.

The result of the 1st cycle

During the teaching-learning process can be noted and observed some following matters:
(1) Students are enthusiastic, felt getting new play, which never applied yet.
(2) Every student of the group was able to bring out their own opinion.
(3) To use students' work sheet dotted was good enough to help students in comprehending the concept of square and square root.
(4) The use of nailed board and encouraging certain motivation to students.
(5) There was a question how it worked on the decimal numbers by using nail board and hand-rubber, was brought into classroom.

2nd cycle

In the discussion of Pythagorean theorem, at first teacher prepared:
(a) A demonstration tools like nailed board, hand-rubber, and students' work sheets paper dotted.
(b) To develop a group consisting of 4 students at maximum who have heterogeneous ability.
(c) For implementation, it was prepared sipat thread, stake, sticks, and measurement tools as many as the group number.

In this cycle, teaching-learning process was started from Pythagoras model, students were asked to show how was the large of an angle, in hypotenuse side of the right triangle, and other students to other right angles. Experiment was done many times with different triangle. At last, students took a note in the students' work sheet's paper dotted.

Students were guided to make conclusion about the correlation of large angle in hypotenuse side and the large of an angle in its right angles. From the experiment, it concluded about Pythagorean theorem and found the formula of Pythagoras from Pythagoras theorem.
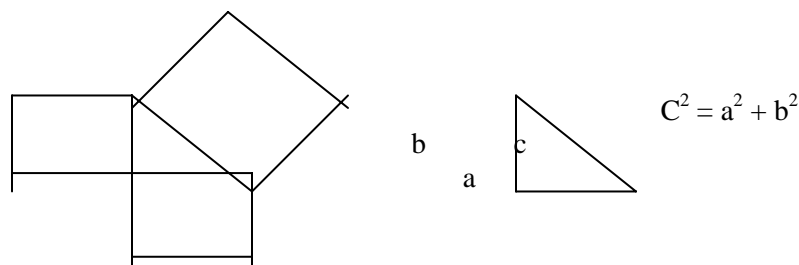
$$C^2 = a^2 + b^2$$

Figure 1.

In implementation stage, teacher gave the example of the use of Pythagorean theorem in daily life. The problems in daily life were considered related to Pythagorean theorem. Take an example is that the wall around classroom crossed upright to the floor? How was a sculpturer made two sipat threads crossed upright each other at the ground whenever wanted to build a building.

Thus, students were taken outside classroom (outdoor mathematics) in groups to measure high reached out by the stick lent into the wall and to measure the distance of the stick from the wall. One of the students in the group took a note and then counted whether the square of stick's long was similar or not to the square amount of the wall's height which reached out it and also the distance of the stick's edge to the wall's base. It proved whether the wall and floor were upright or not.
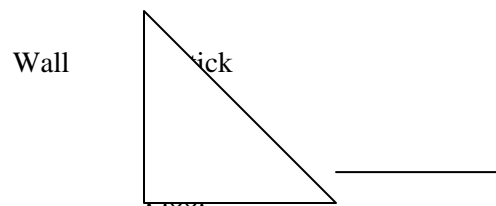
Wall   ick

Floor

Figure 2.

To make two threads were upright each other is that one of the threads, all edges were tied on the pole, while other thread was stretched and one of its edge was tied on the pole, and also other edge was held on by the student. Other students took measurement using measurement tool to fulfill the Pythagorean triple.
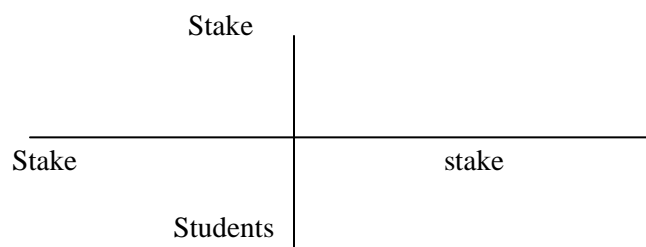
Stake

Stake   stake

Students

Figure 3.

From the result of observation, it could be concluded that:
(1) The use of nailed board and hand-rubber were very effective to implement the concept of Pythagoras theorem.
(2) In outdoor experiment, all students were so eager and interested much in it, nobody seemed playing himself.

3rd cycle

This cycle was done in the topic of parallel lines. At first, teacher prepared Aids covered nail board, hand-rubber, a pairs of triangle ruler, transparency paper, students' worksheet paper dotted, three blades of wood or hard paper as line model in development level, while for implementation, teacher prepared thick thread and clapper also a protractor.

In subtopic about the definition of parallel lines, teacher started to begin to make lines using hand-rubber on the nail board from the horizontal to vertical and then hypotenuse. Students were asked to make other lines, which were parallel to the lines made from hand-rubber.

In order to understand more about the parallel lines, students were asked to make unparallel and parallel lines on the students' worksheet's paper dotted. From the observation, all students were able to finish their task and furthermore it was discussed classically about the definition of parallel lines and how to draw parallel lines using a

pairs of triangle rulers. There were still found three students who failed in finishing the task. Here, teacher guided them individually.

In development stage for the subtopic about angles, which might occur if two parallel lines were cut by other line, using two wood blades as the model of line, which was hung on board, and the 3rd blade was crossed to the two lines. In stages, it was discussed about the inner, outer, and angles, which might occur such as: one-face angle, cross inner angle, unilateral inner angle, unilateral outer angle. Then, if the two lines were parallel and upright as the picture below:
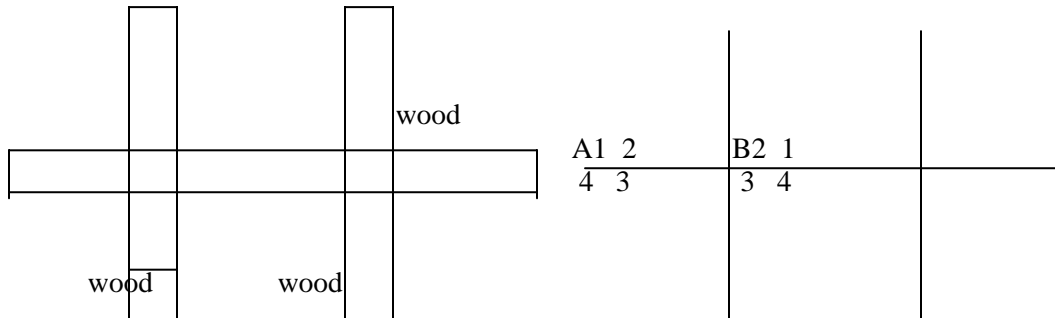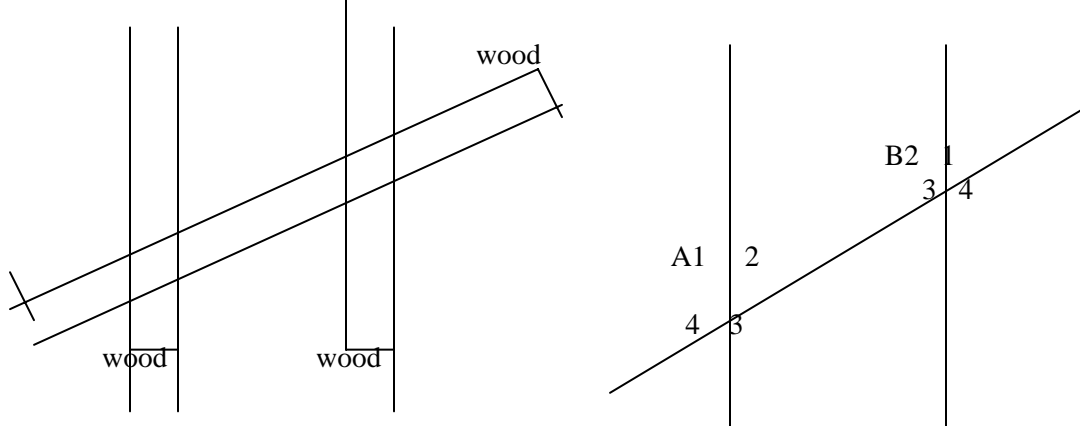
Figure 4.

Students were asked to mention the one-face angles, crossed inner and outer angle, unilateral inner angle, and unilateral outer angle. Then, two wood blades were still kept in parallel, the 3rd blade changed its position so that it cut each other and not upright, next teacher draw it in the board.

Next, to know the correlation among the angles of two parallel lines which were cut by other lines, teacher distributed transparency papers and asked each student to prove that the one-face angles were quite similar, the inner angles were 180° and outer angles were 180° by around moving or moving a little the transparency paper.

For implementation in daily life, students were brought outside classroom in a group of 4 members. Each group tied the string on the metal trellis fence which were paralleled tighten and also concerned with the angles would occur. Furthermore, students were given task of problem solving that each group should tie the thread to two poles, which were upright and parallel loosely. And, then to the string was hang on a clapper, so that it formed angle (see picture below). If the large of A & B angles were known, how to count the large of C angle was.
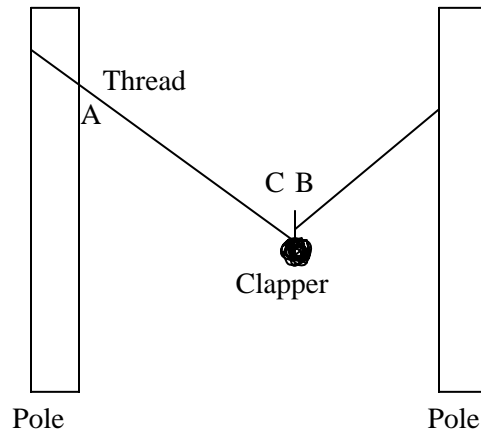
Figure 6.

The result of observation taken during the teaching-learning process was run seemed that the students' interest in it was very high. It was shown that students' activeness in doing students worksheet when the session of answer-question, in discussion, there were so many students arose their hands and also happened when they were outside classroom.

E. Conclusion

The results showed that action research using some teaching aids such as nailed board, hand-rubber, playing card, students worksheet paper node, transparency paper, sipat thread, three wood blades could be use as a model in mathematics teaching to increase students' motivation in teaching-learning process. Regarding to the result of the research, the researcher suggested the mathematics teachers in junior high school in their teaching-learning process should use variation method to motivate students and to avoid students' boring and always use demonstration aid optimally to explain the concept, idea, definition or the certain procedure.

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