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The Implementation Of Multiple Intelligences Based Learning To Improve Students' Learning Activities, Response, And Learning Outcome In Mathematics

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Abstract

The fundamental basic theory of this study comes from Howard Gardner, who introduced a theory of human intelligence known as the Multiple Intelligences Theory. This theory concludes that there are eight types of intelligence which belongs to each person. The purpose of this study was to find out the implementation of multiple intelligences based learning to improve students' learning activities, response, and learning outcome in mathematics. This research was conducted in SMP PGRI 1 Ciputat in academic Year 2009/2010. This research used Classroom Action Research, which consists of four stages research procedures were planning, action, observation, and reflection. The instruments of collecting data were using observation sheet activities, daily student journals, interview, and test. The result of the research revealed that the implementation of Multiple Intelligences based learning can enhance mathematics learning activities, giving a positive response towards mathematics and to improve student learning outcomes.

Key Words: *Multiple intelligences based learning, learning activities, response, learning outcome*

I. INTRODUCTION

1. Background

Mathematics as one of the main lessons on the educational unit plays a very important development of students potential and character, because mathematics is a method of logical thinking, critical, creative, order, art, and language that not only help the development of science and technology, but also for the formation of perseverance, personality and character. Through education, it plays an important role for the preparation of human resources and can develop their potential either intellectual, physical, emotional, mental, social, moral or ethics. In this case then, the math becomes one of the main subjects that must be learned by every student at every level of education. Mathematics is formed as a result of human work-related ideas, processes, reasoning, and art. Moreover, mathematics has the values to develop the children's intelligent.

Gardner (1983), introduced a theory of human intelligence known as the Multiple Intelligences Theory. This theory concludes that there are eight types of intelligence which belongs to each person. such (1) linguistic intelligence, (2) logical-

mathematical intelligence, (3) visual-spatial intelligence, (4) bodily-kinesthetic intelligence, (5) musical intelligence, (6) Interpersonal intelligence, (7) intrapersonal intelligence, (8) naturalist intelligence. Gardner believes not on "what smart as you?" But "How do you smarter?" This requires the teacher to not only question the extent to which their students how to develop intelligent but intelligence potential learners.

According to Peter (1989) a person learns 10% of what he read, 20% of what he heard, 30% of what he saw, 50% of what he saw and heard, 70% of what he says, and 90% of what he said and did. Futhermore, Dierich (Rohani, 2004: 9) classified learning activities as follows 1) Visual activities, 2) Orally activities, 3) Listening activities, 4)Writing activities, 5) Drawing, 6) Motor activities, 7 Mental activities, and 8)Emotional activities,

This means that in learning activities in class most students acquire knowledge on what he said and did. The flow of constructivism the view that to learn mathematics, the important thing is how to establish the sense in children. Activities undertaken during the learning of students can make them understand what is learned, how to learn and what it is benefits in everyday life. Teachers are required to be able to selectively choose various models, approaches, strategies, and methods that can be implemented and in accordance with the objectives, materials, or materials, and evaluation in accordance with the potential intelligence of children. Thus, teachers should understand the differences in intelligence that each individual, so with characteristic precision of a way to teach children are able to facilitate various kinds of intelligence that has implications for increasing students' learning activities of students in math. In this context, researchers conducted a study on school-based learning by applying multiple intelligences to enhance the activity, response, and mathematics student learning outcomes.

2. Restrictions and research problem

To clarify and give proper direction in the formulation of the problem in this study, the researchers provides restrictions in accordance Multiple Inteligences based learning which is the learning by emphasizing the eight types of intelligences based on Gardner's theory. While learning the observed activity is the 6 types of learning activities are: visual activities (attention to the teacher's explanations or friend), oral

activities (explaining, asking, and asking the opinion), drawing activities (drawing), motor Activities (make model or experiment), mental activities (recall and solve problems), and emotional activities (interest / enthusiasm and feelings of pleasure).

Based on the restrictions above, the researchers formulate the problems as follows:

a. Is the application of multiple intelligences-based learning can enhance the activity of learning mathematics?
b. How do students respond to multiple intelligences-based learning?
c. Is the application of multiple intelligences-based learning can improve students' mathematics learning outcomes?

3. The objectives of the research

Based on the formulation of the problems, the study aims to:

a. Studying mathematics learning activities based on learning multiple intelligences.
b. Analyzing student responses to learning based on multiple intelligences.
c. Reviewing the results of students' mathematics learning is based on the application of multiple intelligences-based learning.

4. Benefits of the Research

The benefits of the research are provided as follows:

a. For teachers, the results of the research into theoretical and practical foundation in improving the professionalism of teachers to determine alternative mathematical learning model that can accommodate the characteristics of learners, especially the potential of a compound owned students' intelligent.
b. For students, multiple intelligences-based learning model is a model of home study to enhance mathematical activities (doing math), positive attitudes towards mathematics and mathematics learning outcomes.
c. For schools, as a material for designing and evaluating the effectiveness of learning mathematical model of process quality and learning of mathematics by considering the potential of diverse learners inteligence.
d. For advanced researchers, the results of this study can provide inspiration to develop a range of learning designs that can shape our values and strong character-based intelligence that has the potential of learners.

II. METHODOLOGY OF THE RESEARCH

1. Design Research

This research used Classroom Action Research (CAR). The main purpose of the study of this class action is to improve and enhance the practice of mathematics learning. This study begins with a preliminary observation (pre-study). Based on the mapping and discovery of the problem root of pre-compiled research activities in the cycles I, covering the four stages, namely: Planning, Acting, Observing and Reflecting. In more detail the research design is drawn as follows (Arikunto, 2006: 16).

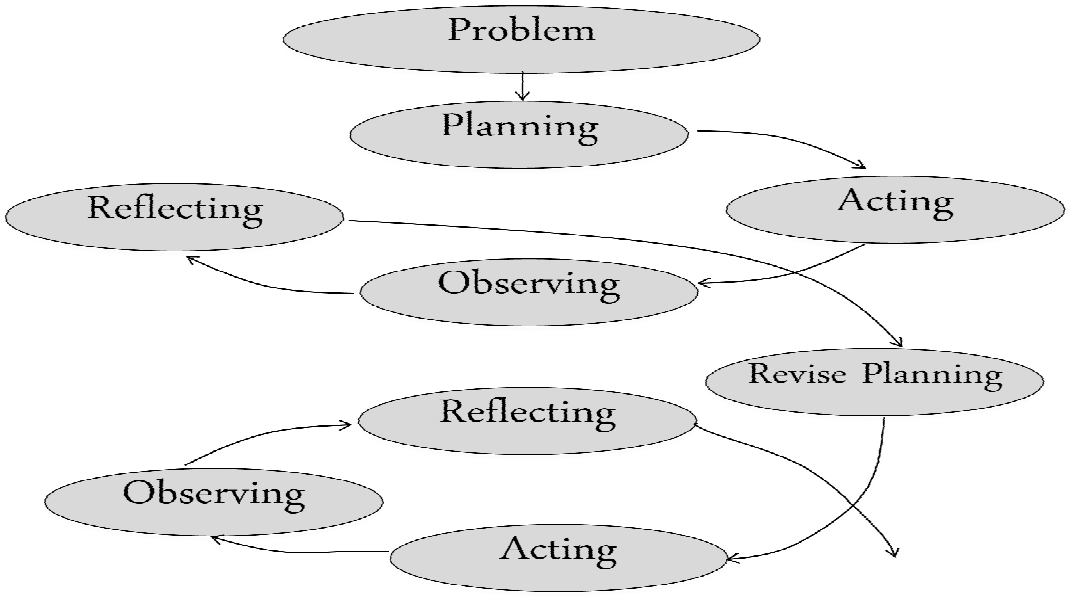

Chart 1: Design of Classroom Action Research

2. The subject of the Research

The subjects of this study were all students in grade VIII-6 junior PGRI 1 Ciputat in academic year 2009/2010 (February-May), and VIII-6 teacher as a collaborator and observer. The role of researchers in this study were as perpetrators of the research while mathematics teachers as collaborators and observers where as a collaborator is working with researchers in making the design of learning, reflection and determine actions at the next cycle. As an observer is to give an assessment of the application of multiple intelligences-based learning and observing students'

mathematics learning activities.

3. Research Procedures

a. Draft action (Planning)

This stage contains the determination of the design of multiple intelligences-based learning and the types of learning activities which will be observed, making the learning plan, set benchmarks, determine collaborators as partners in the learning process in class, and make the observation sheet, field notes, interview sheets and test questions for final cycles .

b. Implementation (Acting)

This stage is the implementation or application of the contents of the draft have been made, namely multiple intelligences-based learning.

c. Conducting Observations (Observing)

In this stage the researchers make observations on the implementation of multiple intelligences-based learning process along with collaborators (class teacher). This observation is intended to explore, and document all the indicators that occurred during the research process.

d. Doing Reflection (Reflecting)

This stage is to evaluate the activity, analysis, reflections on the implementation of multiple intelligences-based learning process that has been done. The results obtained from the observations collected and analyzed together researchers and observers, to learn whether the activities have been implemented already achieved goals (benchmarks) are expected or still needs improvement. This stage is implemented to improve the activities of the previous cycle, which will be applied in subsequent cycles.

4. Research Instruments

The instruments used to collect data in this study consisted of two types of test instruments and non-test instruments.

a. Test Instruments

Test instruments used were formative tests conducted at the end of each cycle. This test aims to analyze the yield increase student learning and completeness of all

material that has been given as the implications of the action.

b. Non Test Instruments

1) Observation of individual activity sheets were used to determine students' mathematics learning activities. Observation sheet is also used to analyze and reflect on each cycle to improve learning in the next cycle.
2) Sheet observation group activities was used to determine the development activities of each group of students studying mathematics.
3) Interview sheet

   Researchers interviewed teachers and students to learn directly the condition of students as well as an overview of the implementation of learning and the problems encountered in the classroom.

d. Daily student journals

Daily Journal of the student is made to study the response of students in the learning process based on multiple intelligences at each meeting.

5. Data Analysis Techniques

Data analysis was performed on all data has been collected, namely in the form of interviews, the results of questionnaires, observations, test results and record students' observer's comments on the observation sheet. All data were analyzed using descriptive analysis. Before performing data analysis, researchers re-examine the completeness of data from various sources. Data analysis begins by presenting the overall data obtained from various sources, read the data, then held a recapitulation of the data and compare it with benchmarks (criteria) and concluded the findings obtained.

III. RESULTS AND DISCUSSION

1. Research Results

a. The activities of Learning Math

Description of data related to the activity of research findings, responses and learning outcomes after the implementation of the mathematics learning based on multiple intelligences-based learning cycle I and cycle II is presented as follows.

Tabel 1. Recapitulation Percentage of Student Activity Cycle I and II

No	Activities	Indicators	cycle I	cycle II
1	*Visual activities*	Pay attention to the teacher/other students' material explaining	(56%)	(75%)
	The average of visual activities		**56%**	**75%**
2	*Oral activities*	Giving continuation when group discussion time is taking place	(56%)	(70%)
		Asking question	(52%)	(70%)
		To react the teacher/student reason when the discussion is taking place	(68%)	(75%)
	The average of oral activities		**58,67%**	**71,67%**
3	*Drawing activities*	Drawing	(72%)	(80%)
	The average of drawing activities		**72%**	**80%**
4	*Motor activities*	Making a model/doing experiment	(68%)	(75%)
	The average of motor activities		**68%**	**75%**
5	*Mental activities*	To remember the previous material	(64%)	(80%)
		Doing the tests	(68%)	(80%)
	The average of mental activities		**66%**	**80%**
6	*Emotional activities*	interest/students' enthusiasm during learning process	(68%)	(90%)
		enjoy in learning	(72)%	(90%)
	The average of emotional activities		**70%**	**90%**
The average of total activities			**65,11%**	**79,45%**

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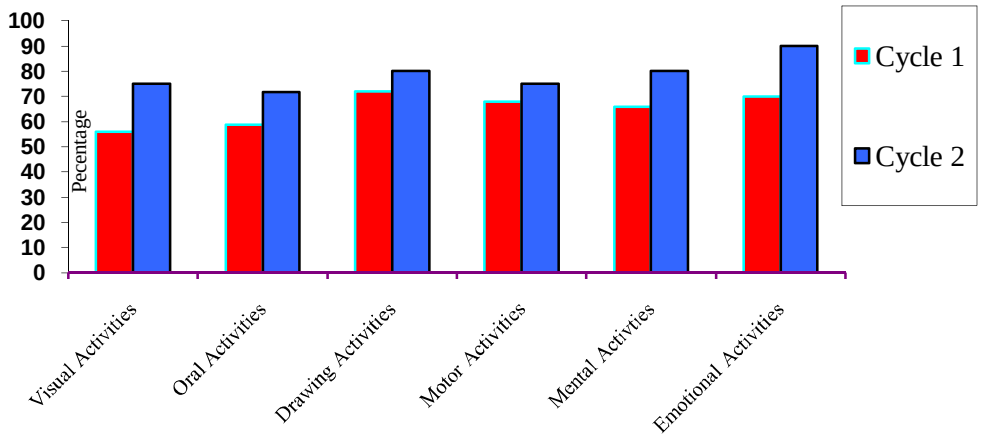
The Comparing of students learning activities percentage may show in the diagram cycle I and II, as below:



activities aspect

Figure 1. Student Activity Diagram

Based on the analysis in table and chart above shows that the average percentage of the learning activities of students increased by 14.34%, ie 65.11% in cycle I to 79.45% in cycle II. The average percentage of activity in cycle II has reached of indicators (benchmarks) that have been established, namely by 75%.

The application of multiple intelligences-based learning can enhance students' activities because of this learning principle is to give students an opportunity to channel eight basic potential it has. Distribution potential is facilitated by the teacher to implement the learning through activities that accommodate the development potential of these students. The study's findings reveal that the average percentage increase student learning activity, from 65.11% in cycle I to be 79.45% in cycle II, is the impact or implications of the application of multiple intelligences-based learning. This gains supported Peter's learning activities determining Peningkatan ini mendukung aktivitas belajar yang dikemukakan oleh Peter (1989) that a person learns 10% of what he read, 20% of what he heard, 30% of what he saw, 50% of what he saw and heard, 70% of what he says, and 90% of what he said and did.

b. Response Against Student Learning

The average percentage of positive responses to students' multiple intelligences-based learning increased, from 64.55% in cycle I to 88.96% in cycle II. While the average percentage of negative responses of students declined from 15.61% in cycle I to

11.04% in cycles II and no longer respond to students who are neutral on the cycle II. Visually the improving positive response and a decrease in negative responses to learning presented in the following figure.

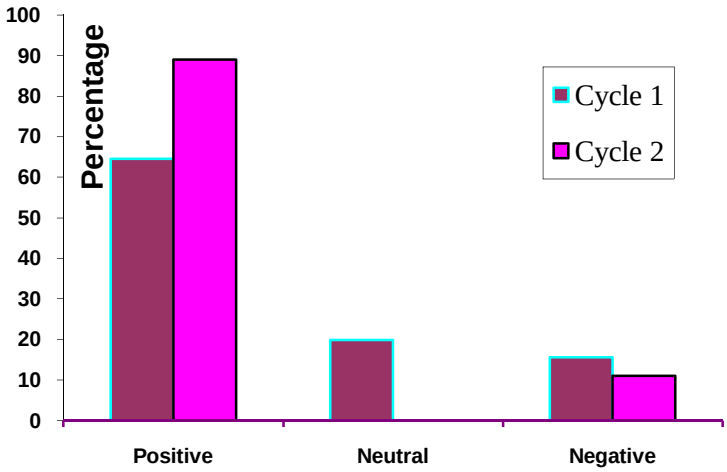


Figure 2. Student Response Diagram

This finding is similar to the findings of the study Wifqi (2009) who reported that the application of multiple intelligences-based learning (multiple intelligences) can foster the spirit and liveliness of students in learning mathematics because it provides a fun new learning atmosphere for students to pay attention to all potential students have basic. Other findings from this study reveals there has been an increase in positive responses and decrease in negative responses to the multiple intelligences-based mathematics learning. This was seen in cycle I and cycle II, the percentage of positive responses of students increased, from 64.55% to 88.96%, while the percentage of negative responses of students was reduced from 15.61% to 11.04%. Thus the application of multiple intelligences-based learning can improve non-cognitive aspects of students towards learning mathematics.

3. Mathematics Learning Outcomes

The results of studying mathematics after learning multiple intelligences in cycle I and cycle II, presented in the following table.

Tabel 2. The result of mathematics learning cycle I and cycle II

Statistic	cycle I	cycle II

The number of students	42	42
The Maximum	93	100
The Minimum value	53	66
average	68,3	77,5

Based on the table above, shows increasing average mathematics learning outcomes are quite large from cycle I to cycle II. Improved results of learning mathematics has been defined success criteria, which reached an average value of 70 and no students who scored below 65.

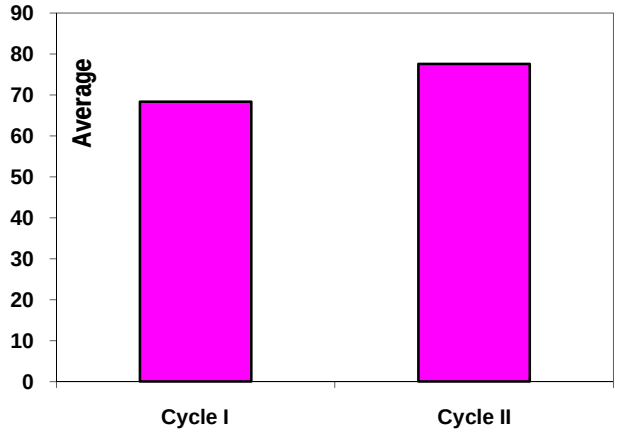


Figure 3. Learning Outcomes in Mathematics Diagram

These findings could inspire efforts to enhance positive attitudes and build self confidence on students towards learning mathematics. According to Spangler (1998) who stated that mathematics may be manifested classroom activities to ask, answer questions, solve problems, and with a new approach mathematical tasks. Along with the increased activity of learning and students positive response to the application of multiple intelligences-based learning model were the findings also revealed that students' mathematics learning outcomes also increased, amounting to 68.3 to 77.5 in cycle I to cycle II. This indicates that the increasing of students' activity and responses in mathematics learning has implications for the improvement of mathematics learning outcomes. Thus the application of multiple intelligences-based learning model can enhance the activity, response, and mathematics student learning outcomes.

IV. CONCLUSION AND SUGGESTIONS

1. Conclusion

Based on the data description and discussion, the researchers can conclude that as follows:

a. The application of multiple intelligences-based learning can enhance the activity of learning mathematics. Aspects of activities that can be enhanced through multiple intelligences-based learning activities that consider the teacher's explanations/ friends, give explanations, ask questions, respond to questions of teachers and friends, drawing, model making/experimenting, reviewing the material, solve problems, enthusiastic and happy during the learning process . Some creative ideas or skills that students develop during learning, namely the ability of students to imagine a visual image, students 'ability in making the rhythm of the song, and students' ability to frame up the space.
b. Student responses to the application of multiple intelligences-based learning in learning mathematics is very good, an increase positive responses and decrease in negative responses towards learning mathematics from cycle I to cycle II.
c. Multiple intelligences-based learning may Increasing students' mathematics learning outcomes. The results obtained studying mathematics students have exceeded ideal exhaustiveness criteria. This can be seen from the average math student learning results in cycle I of 68.3 and 77.5

2. Suggestions

a. The math teachers should involve the students in learning math by using learning model to facilitate the students' intelligence. So, the multiple intelligence-based learning models can be used as the main purpose either cognitive aspect, affective, or psychomotor for perfectionist further.
b. From this research result, the students are able to use the math tasks in learning by using multiple intelligences-based learning in improving their math intelligence and appreciate the way how to create the math's tasks as a model of autonomous learning.
c. The affectivity in applying multiple intelligences-based learning to the whole of learning math result needs the teachers' creativity, so the teachers must on math training of multiple intelligences level.

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