The Enhancement of Primary Students' Mathematical Connectionsand Habits of Mind Abilities Using REACT Strategy

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Abstract: This study aims to improve primary students' mathematical connections and habits of mind abilities by using REACTstrategy. This research is a quasi-experimental study conducted in 003 Peranapelementary schoolin the even semester of 2017/2018. The subjects of this study were class V students. Based on the results of data analysis and findings obtained in the study, it can be concluded that there are significant differences in abilities improvement between classes that use REACT strategies and general learning with the influence of 52%. This is proved by an enhancement of students' mathematical connections ability in the experimental class,by the average of initial testis 54.96 to 79.13 and in the final test with an average enhancement of 0.54 included in the medium category. Whereas the control class has an enhancement in the average of initial test from 55.67 to 64.33, and in the final test with the mean of 0.05.Meanwhile, students' habits of mind abilities which include self-regulation, critical thinking, and creative thinking ability can appear in the experimental and control class even though these abilities do not appear in all students.

Keywords: mathematical connections, habits of mind, primarystudents, REACT strategy.

1. Introduction

Every individual in his life will definitely deal with problems, both in the school, family, and community. Sometimes, a small problem becomes big because of an error in addressing a problem. Then, it is no wonder that there is the number of students' brawl, which starts with a very trivial problem. These problems occur when someone does not know how to respond to a problem, so to deal with it requires intelligent behavior. Intelligence here is not only related to one's knowledge about the information of the problem but also related to what appropriate action is to solve the problem.

The ability of intelligent behavior is referred to habits of mind (Costa &Kalick, 2000a). In response to the problems occurred, the government conducts preventive efforts, one of the efforts undertaken by the government is to require character-based learning at all levels of school through the Ministry of National Education.

According to Rusman in Fendrik(2016: 173) "so far learning is still dominated by the view that knowledge as a fact to be memorized. Basically, knowledge is not just theoretical, but how that

knowledge becomes a learning experience that can solve the actual problems that occur in our environment that must be sought ways to overcome them. "

Based on Rusman's opinion in Fendrik above, he mentioned that conventional mathematics learning activities, usually teacher-centered learning activities, always use the lecture method (chalk-and-talk).It makes questions from students rarely appeared and class activities are dominated by written activities that make students become passive and less able to read questions so that they are misinterpreted the purpose of the problem.

This is in line with Wardhani and Rumiati's statements in Fendrik (2018), "that Indonesian students are less able to read questions caused by the inadequate reading of questions, misinterpretation or transferring questions to mechanical processes."

Learning can run optimally if the teacher with the main goal is to develop students' mathematical connection and habits of mind understandingof fundamental concepts in the curriculum. Therefore, a learning strategy is needed to motivate students to develop themselves, one of which is by linking classroom learning with the real world.

In accordance with the view above, to create meaningful mathematics learning, the REACT strategy is the right choice. REACT strategy is a series of students' activities in linking material with everyday life, experiencing, applying, collaborating, and transferring the knowledge that has been obtained to solve problems in their real life. This strategy can generate students' enthusiasm and motivation in learning, concepts learned will make activities more meaningful and enjoyable.

REACT Strategy according to Trianto (2010), is a contextual learning strategy designed to stimulate 5 (five) basic forms of learning used during the learning process, namely: (1) Relating, (2) Experiencing, (3) Applying, (4) Cooperating, and (5) Transferring. Where this strategy involves students actively in learning, it is expected that it will be more fun for students, more meaningful and theywill more understand the concepts learned and their memories of the concept last longer.

Kusumah (2008) revealed that mathematical connections can be interpreted as the interrelationship between mathematical concepts internally, which are related to mathematics itself or external relations, namely mathematics with other fields, both with other fields of study and with everyday life. Byenhancing mathematical connection abilities, students' ability to think and insight into mathematics can be more widespread and robust and does not have a narrow view of mathematics.

Habits of mind ability isan intelligent behavior that arises when humans face problems or answers that are never found (Anwar, 2005). Habits of mind are formed when students respond to answers or questions or problems whose answers are not immediately known to them so that we can observe not only how students remember a knowledge but also more on how students produce a knowledge. Human intelligence is not only seen from the knowledge it has, but also seen from how individual acts (Costa &Callick, 2000).

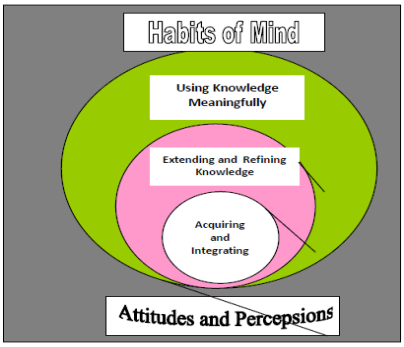

Figure 1.Marzano*'sDimensions of Learning*

The steps in this dimension of learning begin with students' first task by*Acquiring and Integrating Knowledge* in the second dimension. Through this dimension, students must be able to integrate new knowledge and skills that they have known. There is a subjective process in the form of interaction between old and new information. Then in the process of time, students develop their new knowledge through activities that help them expand and refine their knowledge (Extending and Refining Knowledge) in the third dimension, and at the end of the learning objectives, they can use knowledge in a meaningful way (Using Knowledge Meaningfully) in the fourth dimension. As shown in Figure 1, the second, third and fourth dimensions work interrelated, where each other is inseparable (Sriyati, 2011).

Furthermore, Marzano (1993) divides habits of mind into three categories, namely self-regulation, critical thinking, and creative thinking. Self-regulation includes: (a) being aware of students' own thoughts, (b) making plans effectively, (c) realizing and using necessary sources of information, (d) being sensitive to feedback and (e) evaluating the effectiveness of actions. Critical thinking includes: (a) being accurate and looking for accuracy, (b) being clear and looking for clarity, (c) being open, (d) refraining from impulsivity, (e) being able to place yourself when there is a guarantee, (f) being sensitive and knowing his friend's abilities. Creative thinking includes: (a) being able to involve students in a task even though the answers and solutions are not immediately apparent, (b) doing business to the maximum of your ability and knowledge, (c) making, using, improving evaluation standards made by themselves, (d) producing new ways to see the situations that are different from the usual ways applied in general.

If we look at the discussion of habits of mind by Marzano (1993) and Costa and Kallick (2000), it appears that these indicators equip individual in developing mental habits that are important educational goals so students can learn about whatever they want and need to know related to their life. Even Costa and Kallick and Campbell in Sriyati (2011) claim habits of mind as the highest characteristics of intelligent thinking behavior in solving problems and the indicators of success in academic, work and social relations.

2. Methodology

This research was carried out using quantitative experimental methods. In this study, there were two groups of research subjects, namely the experimental group that used REACT strategies and the control group that used conventional learning. Both groups were given pretest and posttest

using the same test instrument. Sudjana and Ibrahim (2009) stated that quasi-experimental research is a study that seeks the influence of certain variables on other variables in conditions that are not tightly controlled or full, the control is adjusted to the existing conditions (situational). In this study, there are two variables, namely independent variables, and dependent variables.

3. Results and Discussion

This research is a quasi-experimental study conducted in 003 Peranap elementary school in the even semester of 2017/2018. The subjects of this study were class V students consisting of two classes, namely VA and VB classes. VA class was chosen as a control class with 24 students and VB class as an experimental class with 23 students. The instruments used in this study arethe test and non-test instruments. The test instrument consists of students' mathematical connection ability test in the form of description questions. While non-test instruments consist of students' habits of mind scale and observation sheets.

First of all, the researchersprepare learning tools in the form of syllabi, lesson plans, student worksheets, and evaluations for both the experimental class and control class which are adjusted to the learning strategies used. In addition, the researchers also make preliminary test questions (pretest) and final test questions (posttest) consisted of 25 multiple choice questions. This test had been validated by trying it out to the fifth-grade students of 003 Peranap elementary school, which would later be used to determine the initial ability (pretest) and ability after students get treatment (posttest).

The next step is giving different treatment to both classes. The control class is taught by using general learning which consists of exploration, elaboration, and confirmation activities, while the experimental class is taught using REACT (Relating, Experiencing, Applying, Cooperating, Transferring) strategy. Before conducting the treatment, both classes were given an initial test which aimed to find out their initial abilities (pretest).

Learning activities in the experimental class and the control class were held four times. After the learning activities are complete, then the final test (posttest) is conducted to both classes with the aim to determine the enhancement of students' mathematical connection ability and habits of mind of 003 Peranapelementary schoolafter being given treatment.The initial test results of the two research classes can be seen in table 1 below:

Table 1.Pretest Data on Experimental and Control Class

Class	Number of students (n)	Mean ($\bar{x}$)	Standard Deviation (s)	Variance (s^2)	Minimum Score	Maximal Score
Experimental	23	54.96	13.55	183.60	28	80
Control	24	55.67	13.85	191.82	32	80

Source: processed scores of Microsoft Excel, 2010

Based on the data above, it can be seen that there are differences in the mean scores of pretest in the control and experimental class. While the final test is a test given to students after getting the treatment. The treatment in the experimental class is learning using REACT strategy. While the treatment in the control class is learning by using general learning method.

The purpose of giving the posttest is to find out whether or not the influence of the learning strategy given to students. Besides, to determine whether the difference in the mean posttest score of both classes is significant or notso that the score is tested using the two means difference test (t-test). The posttest results of the two research classes can be seen in table 2 below.

Table 2.Posttest Data on Experimental and Control Class

Class	Number of students (n)	Mean ($\bar{x}$)	Standard Deviation (s)	Variance (s^2)	Minimum Score	Maximal Score
Experimental	23	79.13	10.44	108.99	60	92
Control	24	64.33	11.73	137.59	36	84

Source: processed scores of Microsoft Excel, 2010

Gain is an enhancement of students' learning outcomes before and after the application of treatment to both research classes. Gain is used to find out the extent of students' learning outcomes after applying REACT strategy in the experimental class and general learning in the control class.

Normalized gain categories consist of low, medium, and high. Table 3 below shows the percentage of students' mathematical connections enhancement based on the gain index score.

Table 3.The Percentage of Gain Index Criteria Score for Mathematical Connection

Class	Categories		
	Low	Medium	High
Experimental	8.7%	69.6%	21.7%
Control	62.5%	20.8%	0%

Source: processed scores of Microsoft Excel, 2010

Based on table 3 above, it is known that there is an enhancement of students' learning outcomes in the experimental class,it can be seen from 21.7% of 23 students with high gain index scores and 69.6% of 23 students with medium gain index scores, then 8.7% of 23 students with low gain index scores. Meanwhile,in the control class, it can be seen from 0% of 24 students with high criteria gain index scores and 20.8% of 24 students with medium criteria gain index scores, then 62.5% of 24 students with low criteria gain index scores. Generally, it is concluded that the enhancement of students' understanding in the experimental class is higher than that of the control class.

In accordance with the purpose of calculating the gain index score, which is to determine the enhancement ability of students' learning outcomes after learning, the gain index score is tested to find out the mean difference and the index score is obtained from the pretest and posttest results of the control and experimental class. Descriptive statistics of the gain index scores for the experimental and control class are as follows:

Table 4.Descriptive Statistics Gain Index Score of Control and Experimental Class.

Class	N	$\bar{X}$	Standard Deviation	X Max	X Min	Categories
Experimental	23	0.54	0,.17	0.80	0.11	Medium
Control	24	0.05	0.16	0.53	0.00	Low

Description: N = number of students, x max = highest gain, x min = lowest gain
Source: processed scores of Microsoft Excel, 2010

From table 4 above, it can be seen that the mean gain index score of the control and experimental class has a difference that is 0.54 for the experimental class which is in the medium category and 0.05 for the control class which is in the low category. From these data, it can be concluded that the enhancement ability of the experimental class students is better than that of the control class.

The next analysis is to find the determination coefficient. The determination coefficient test is used to determine the effect and the influence percentage of REACT strategy on students' mathematical connection ability in understanding the material. The correlation of the test results are as follows:

Table 5.The Determination Coefficient of Test Results

N	The Mean of Pretest	The Mean of Posttest	Mean of Gain	r	KD
23	54.96	79.13	0.54	0.718	52%

r: Correlation coefficient
KD: The determination coefficient
Source: processed scores of Microsoft Excel, 2010

Based on the results above, it is known that the correlation of 0.718 effects strong enough with 52% coefficient of determination. This shows that REACT strategy has a strong enough influence on students' mathematical connection ability, especially in the geometry material with the influence of 52% while 48% coefficient of determination is influenced by other factors.

Based on the observations during ongoing learning activities, it can be seen that generally fifth-grade students of 003 Peranapelementary schoolalready have a fairly good habit of mind ability. The indicators of students' habits of mind ability that arise during learning activities include self-regulation, critical thinking, and creative thinking.

Based on the researchers' observations, the indicators of this ability appears when students listen to the directions and questions from the teacher, work on worksheets in groups, and listen to the teacher's explanation of the material that has been learned. In apperception, problem-solving, and concepts, as well as reflection activities, there is self-regulation ability which contains students' ability to realize their own thoughts, think about what must be thought (metacognitive), and realize and use the necessary sources of information.

The analysis results of listening to the teacher's direction, students' work, and paying attention to the teacher's explanation show that almost all students do not experience any difficulties in realizing their own thoughts, thinking about what must be thought (metacognitive) and realizing and using the necessary sources of information.

In addition to being illustrated by those students' ability, the researchers also refer to their observations results, audio-video recordings, and field notes. From the results, researchers obtainan illustration that this ability arises when students ask questions in apperception, problem-solving and concepts, class discussion, and reflection activities, especially when they conclude the material discussed in the closing activity. Then from the field notes, the data

obtained reveal that some students actively participate in the question and answer activities both with the teacher and fellow students during the learning process.

Some of the data collected above can prove that students' ability to realize their own thoughts, think about what to think (metacognitive), and realize and use the necessary sources of information can be said to be quite good even though it does not appear in all students. Thus, it can be concluded that the indicator of students' habits of mind in self-regulation has been said to be good enough for fifth-grade students in 003 Peranapelementary school.

The critical thinking activity of the habits of mind indicator is the discussion activity shown by students during the learning activities. From the field notes, it was obtained an illustration that students' collaboration and activities while discussing in their groups was good enough.This proves that students' critical thinking abilities that include the ability to question and find problems, be opened,respond with admiration and astonishment to a problem, and work and learn with other people in a group are good enough.

Based on the results of observations and field notes, this ability did not appear in most students and only some of them could create habits of mind abilities with this creative thinking indicator. This is evidenced by the number of students answering the questions given by the teacher in acommon way.

Besides how students answer the questions, this indicator also includes students' skills in using their efforts as much as possible according to their abilities and knowledge to answer questions from the teacher. This is illustrated by students' activities when they answer the questions and their activities when explaining the results of group discussions on the presentation. Following is a figure of the student's activity:

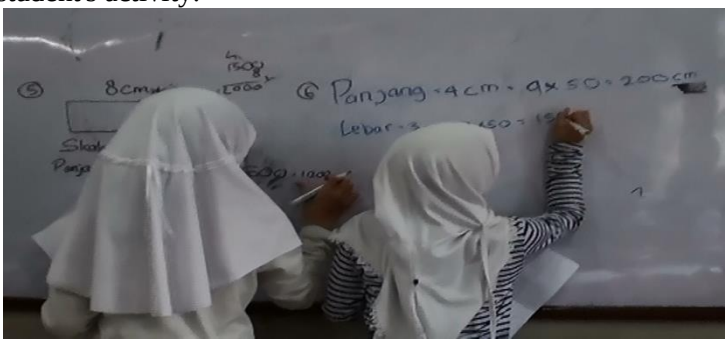

Figure 2. Students' Presentation Activity in Front of Class

The illustration above is students'presentation activity in front of the class while giving an explanation of their group discussions results. Thus, it can be concluded that the two figures above show the existence of students' habits of mind ability in developing creative thinking skills.

According to some of the descriptions above, it can be summarized that the indicators of habits of mind ability arise in fifth-grade students of 003 Peranap elementary school during the learning activities.Those indicators are self-regulation, critical thinking, and creative thinking ability.

The results discussion of this study is based on analysis and findings in the field. The data analysis produces several findings along with the discussion including the results of pretest and

posttest, the magnitude of the effect on experimental class, and an enhancement of students' ability scores in the control and experimental class.

Before using REACT strategy in the learning process, the activity can be said too monotonous because students only listen to the teacher's explanation. This is different from the learning activities that use REACT strategy. Students actively link, experience, implement, collaborate, and transfer knowledge so that they can remember material in the long term. This is in line with Wahyudin's opinion (2012),he stated that by emphasizing mathematical connections, teachers can help students build a disposition to utilize the connections in solving mathematical problems, instead of looking at mathematics as separate concepts and skills that are not related.

From the data, it is obtained that the majority of students (more than 75%) bring up the indicators of mathematical connections and habits of mind abilities and they also look enjoyed during learning. It means that fifth-grade students of 003 Peranap elementary school are successful, especially in developing mathematical connections and habits of mind abilities. This is supported by the opinions expressed by Sutardi and Sudirjo (2007: 4) that students are said to be successful in learning activities if they are active and confident following the learning, even their mental, and social show high enthusiasm.

4. Conclusion

Based on the results of data analysis and findings obtained, it can be concluded that there are significant differences in ability enhancement between classes that use REACT strategy and general method, with a significance level of 0.05. This is supported by students'enhancement of mathematical connections and habits of mind abilities of 003 Peranap elementary school. In the experimental class, the mean score of initial test (pretest) is 54.96, and it becomes 79.13 in the final test (posttest) with the mean enhancement (gain) 0.54 (including medium category). While the control class has the mean score enhancement of initial test (pretest) from 55.67 to 64.33 in the final test (posttest), with the mean enhancement (gain) is 0.05 (including the low category). This shows that there are significant differences between both classes with the influence of 52%.

Whereas students' habits of mind abilities that include self-regulation, critical thinking, and creative thinking ability can appear in the experimental class or in the control class even though these abilities do not appear in the fifth-grade students of 003 Peranap elementary school by using REACT strategy.

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