THE APPLICATION OF PROBLEM-BASED LEARNING TO INCREASE THE STUDENTS' *SELF-EFFICACY* OF GRADE 5 ON MATHEMATICS LEARNING IN TERMS OF THE COGNITIVE STYLE

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ABSTRACT

This research was motivated by the low level of students' self-efficacy of grade *5* in learning mathematics, even though mathematics is a very important science for life and less attention to the cognitive style of each student. The purpose of this study was to increase the students' *self-efficacy* of grade 5 elementary school on mathematics learning in terms of cognitive style using the PBL learning model. The location of this research is in one of the public elementary schools in the South Jakarta area. The method used in this study is a quasi-experiment, for the population of this study is students of grade 5 with a sample of 19 students divided into two categories based on cognitive style, namely FI which amounts to 9 and FD 10 students. For data collection techniques using GEFT tests, questionnaires, observations and documentation. The study showed that there was a difference in N-gain scores between students classified FI and FD, which was 0.29 and 0.22 for homogeneous and normal data. Then the T test shows a score of 0.566. The results showed that there was no significant difference between the level of students' self-efficacy of grade 5 on mathematics learning in terms of cognitive style. During the study, researchers found several factors that made no difference in the level of students' self-efficacy of grade 5 in mathematics learning. Suggestions from researchers, PBL be more suitable for children with FD cognitive style because this PBL emphasizes group work and students must cooperate with each other but in this case the teacher can be able to combine learning models so that each student gets the expected results. Furthermore, please pay more attention to students' sense of comfort because this will greatly affect their desire to learn, teachers communicate intensely to all students.

Keywords: Cognitive Style, Problem Based Learning, Self-Efficacy

INTRODUCTION

Mathematics is the science and logic of thinking about forms, arrangements, magnitudes, and concepts that are interconnected with each other in large numbers and are divided into three parts, namely Algebra, Analysis, and Geometry which help students develop human thinking skills and can help in everyday life. Mathematics lessons have been taught from the lowest level of education to the highest level of education or can be called a university. At the elementary school level, mathematics emphasizes the concepts and processes of addition, subtraction, multiplication, division and other supporting concepts. However, many assume that mathematics is difficult for students, resulting in negative effects, namely fear, anxiety and student worry that not being able to complete assignments or exams given to students has an impact on low self-confidence or called low self-efficacy. Self-efficacy is a belief that students must have in order to succeed in the learning process. Therefore, every student must have good self-efficacy. Students who have higher self-efficacy tend to set higher goals and show more commitment to goal achievement. Self-efficacy helps a person make choices, their efforts to progress, the persistence and perseverance

they show in the face of adversity, and the degree of anxiety or calmness they experience when they maintain the tasks that pervade their lives. The results of Pintrich and Schunk's research (Sunaryo, 2017: 41) suggest the fact that students who have high self-efficacy are better able to master various mathematical subjects and reading tasks than students who have low self-efficacy. When associated with mathematics learning achievement, the assessment of students' self-efficacy towards mathematics subjects, can contribute to mathematics learning achievement. Based on this research, teachers must have a way to increase students' self-efficacy, especially in learning mathematics for grade 5 elementary school students. However, many studies conducted by Utami & Wutsqa (2017: 166) and Putra, Putri, Lathifah & Mustika (2018:48) show that the level of self-efficacy of students is still low, especially in mathematics lessons. To overcome this, there is one way, namely using the PBL model, based on the results of research by Peranginangin, et al, (2019: 265) and Bawa's research, (2019: 90) shows that PBL can significantly increase students' self-efficacy, especially in mathematics subjects. There is one thing that must be considered is the cognitive style of students, because this will affect the way they do the worker assignment. The purpose of this study is to find out the difference in increasing self-efficacy in field independent students with field dependent in grade 5 using the PBL model, and to find out how big the difference in increasing self-efficacy in field independent students with field dependent students in grade 5 by using the PBL model. This research using quasi-quantitative methods students were divided into 2 groups based on their cognitive style, by conducting a GEFT test

THEORETICAL STUDIES

The PBL model or known as the problem-based learning model (PBM) has been known since the time of John Dewey. Today many PBL models have begun to be applied. In general, PBL is a model that presents problems to students in an authentic and meaningful problem situation. Trianto (2014: 63) said the term PBL/PBM was adopted from the English term Problem Based Instruction (PBI), in the form of a learning model based on the principle of using problems as a starting point for acquisition and integrity and new knowledge. Meanwhile, according to Arends (Suprihartininghum 2017: 215) PBL is a learning process, where students do authentic learning with the intention of compiling their own knowledge, developing inquiry, higher-order thinking skills, developing and learning independence. It can be concluded that the PBL model is a learning model that uses a problem to be solved by students, where all the information they can or have is used as an answer or solution to solve the problem at hand. The purpose of choosing PBL is to increase students' self-efficacy.

According to Noer (2012: 802-803) Self-efficacy is a person's opinion about his ability to do a certain activity, while according to Bandura (Utami and Wustqa, 2017: 167) said that self-efficacy is a person's belief in his ability to arrange and complete something in managing a situation in the future and according to Hidayat and Mutakim (2015: 419-420) a person's belief about his ability to overcome confusion of situations that arose in his life. It can be concluded, self-efficacy is a belief that a person has in the abilities he has that he can solve with full persistence even though each of these problems has a level of difficulty, but with all the abilities possessed that have been learned in various situations he will be able to solve them. According to Kurniawati (2014: 37) self-efficacy has 3 aspects, namely level, strength, and generality.

In addition to the application of PBL in this study aimed at increasing self-efficacy, there is another control variable that will be examined in this study, namely cognitive style. Susanto (2015: 4) stated that cognitive style is a potential that every student has in an effort to increase their learning effectiveness. The cognitive style of each individual is different from one another.

Nasution (Wijaya, 2016: 6) distinguishes cognitive styles into 2 parts, namely Field Independent (FI) and Field Dependent (FD) FI is someone who has a high level of independence in observing a stimulus without dependence on external factors and is less able to cooperate. FD is a person's cognitive style that tends and relies heavily on outside sources of information and is better to work with. Students who can be classified in FI are students who are able to do the tasks given to themselves without depending on others, while students who are classified as FD are students who depend on others in doing their assignments.

DISCUSSION

Quantitative data were obtained using the GEFT test and filling out self-efficacy ability questionnaires at the beginning before PBL was applied and after PBL was applied. The data was obtained from 19 students and divided into two groups, consisting of 9 FI group students and 10 FD group students. Statistical analysis of self-efficacy data of FI and FD students on mathematics lessons using statistical testing and its description

Table 1. The average score of the questionnaire before and after the implementation of PBL on FI and FD students

Cognitive style	Average Before deployment	Average After deployment	Average n-Gain score	Interpretation
Field independent	21.55	24.66	0.291041	Low
Field Dependent	20.1	24.6	0.220276	Low

It can be seen that students with FI cognitive style ability average questionnaire filling score before PBL implementation obtained a score of 21.55 and and the average after PBL implementation was 24.66, and N-Gain score of 0.29 with low category. Students with FD cognitive style before the application of PBL obtained a score of 20.1 and after the implementation of PBL awas 24.6 with an N-Gain score of 0.22 and categorized as low. Here is a histogram of the self-efficacy level of FI and FD students.

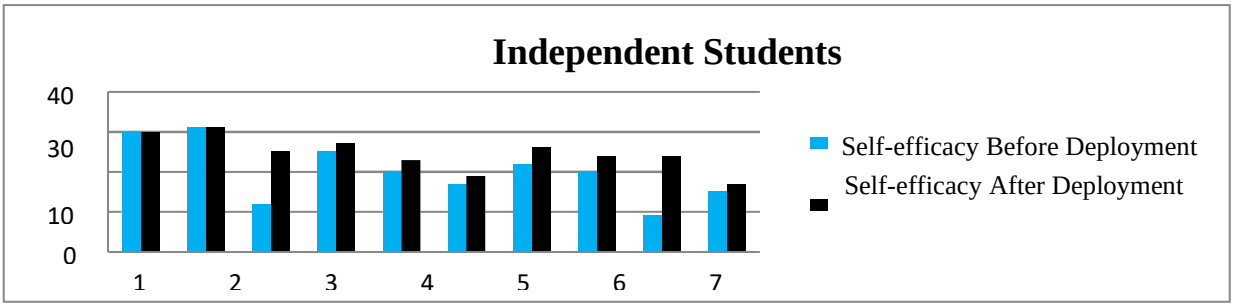

Figure 1. Histogram of Field Independent Students

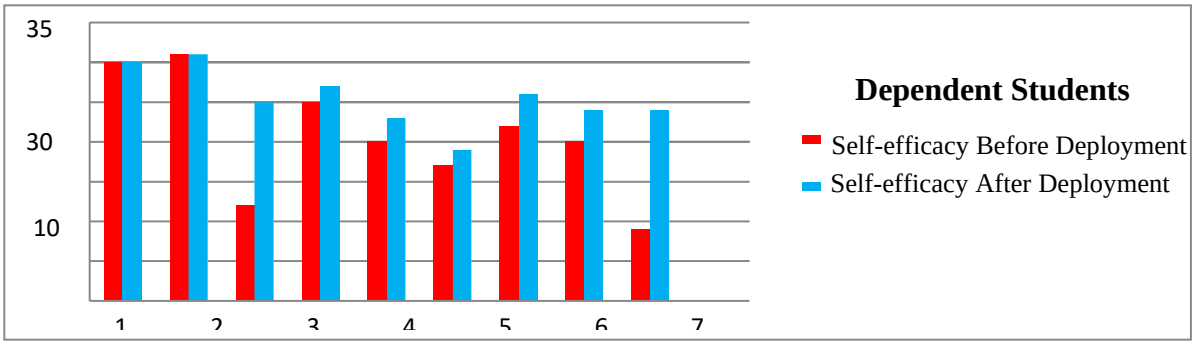

Figure 2. Histogram of Field Dependent Students

Students with the same FD cognitive style as FI mostly experienced a significant improvement even though there were some students who did not experience a decrease or improvement. This study also conducted a normality test and this data was categorized as normal. The following are the results of the normality test calculation which can be seen in the following table:

Table 2. test of Normality N-Gain Score between FI and FD students in terms of cognitive style using PBL to increase Self-efficacy Shapiro-Wilk

	Shapiro-Wilk		
	Statistic	Df	Sig.
NGain_FI	.857	10	.070
Ngain_FD	.884	10	.146

Next, uji homogeneity variance scores N-Gain mathematical reasoning ability using the Levene test at $\alpha = 0.05$. A summary of the results of the homogeneity test is presented in table 3

Table 3. Test Homogeneity of Variance N-Gain Score

F	df1	df2	Sig.	H0	Keterangan
0,829	3	43	0,487	Diterima	Variansi homogeny

And then perform the T test, where to test the research hypothesis, researchers use the T test with the help of the SPSS 22 program. After data processing using the help of SPSS 22 software, the following output display is obtained :

Table 4. Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper

Ngain	Equal variances assumed	.080	.780	.566	19	.578	.06876	.12156	-.18567	.32318

Based on these statements, it can be concluded that there is no significant difference that occurs in the application of PBL to increase student self-efficacy reviewed with cognitive styles. Based on the results of the t test, it shows that Ho is accepted, there is no difference. When the research researchers found several factors that caused no increase even though there were students who tended not to experience an increase or decrease in the application of PBL, such as the observations that researchers made during this study, researchers made observations on homeroom teachers and students at the school. There are several factors that can cause no difference in self-efficacy ability between students who have FI and FD cognitive styles when given PBL, namely:

1. Grouping between FI and FD students

   At the time of this study the students were grouped into several groups, in accordance with the statement of Ibrahim and Nur (Haryanti (2017: 59), namely the teacher helps students in designing and preparing and helps students divide students into several groups and what tasks will be given in the group and where students with this cognitive style are mixed between FI and FD, Of course they will conduct discussions to complete the tasks given starting from finding answers and the distribution of discussion tasks also have a very important role, namely producing ideas even though they are different, but still one goal, not personal will, but group goals, colored by dialogue, question and answer, or exchange opinions, arguing with evidence and reason; there may be rejection of opinions or ideas, giving responses, suggestions, criticisms, and proposals; On the other hand, complete and detailed information can be presented to bring results in the form of conclusions, agreements, alternative thoughts, and others as a result of joint thinking.

   However, the difference between FI and FD students according to Nasution (Sunaryo 2017: 41), where FI students are students who have a high level of independence in translating information without relying on others, making it difficult to work together in a group, on the contrary, FD students are students who are very dependent on the help of others in looking at information and are better at working together in a group. Based on the results of observations that have been made, it was found that during the study, students with the FI cognitive style prefer to do tasks individually without involving their group friends and their group friends only need to copy the results, but occasionally students who have the FD cognitive style ask the teacher how to answer the question, especially with limited time students will tend to make decisions to be able to complete the task given in order to be collected on time.

2. Student comfort

   Researchers added that this factor is in accordance with what is experienced when carrying out research, where students will tend to feel awkward and even afraid of new people they meet, in that students like to get attention from others or teachers. When students feel cared for and given motivation, it tends to cause a sense of comfort so that it will crush self-confidence in students and will do assignments given happily even if the task is difficult according to one aspect of self-efficacy, namely level. Students who have high self-efficacy will tend to put more effort into tasks that are challenging, resilient, not easily anxious, and can manage their minds as well as possible, when students find it difficult to adjust to their environment, the process of learning activities is also disrupted, students often feel confused, lazy, and can reduce learning motivation. These results are in line with Schunk's (2014) research which shows that self-

efficacy is a strong predictor of influencing student performance and motivation. Other studies that are in line with the results, this can also be done to cause comfort by communicating intensely to the chest of students. A child only wants to open up to people who are always close to him. The goal is for children to be brave in socializing and making friends with their peers. That is what makes the bond between teachers and students attached through interpersonal communication that is built together. Making students comfortable is very important. This is because if students are comfortable then students will express what they want, in this case teachers can find out whether their way of delivering material is enough to make students enthusiastic in learning or even make students bored, help / guide them in doing assignments, listen to their complaints and much more.

CONCLUSION AND CONCLUDING

Based on the results of research at one of elementary school in south Jakarta to find out the difference in the self-efficacy ability of grade 5 students in terms of their cognitive style using the PBL model, it can be concluded:

1. There is no difference between children who have FI and FD cognitive styles using the PBL model, this is based on the N-Gain score using the t-Test obtained from the self-efficacy questionnaire of both students with FI and FD cognitive styles with a value obtained > 0.05. During the study, researchers found several things that caused no difference in the self-efficacy ability of FI and FD students, which have been explained in chapter IV.
2. If examined more deeply, this self-efficacy has 3 aspects, strengths, levels and generalizations, of these 3 aspects between FI and FD students have insignificant differences. Based on the t test, students with FD and FI cognitive styles had a difference of 0.29, for FI students an increase in score of 3.11 and for FD students an increase of 4.5. This shows that there is an increase in scores in both and the highest score increase occurs in students with FD cognitive style, this shows that PBL is more suitable for students with FD cognitive style.

There are several suggestions related to learning and discussion that have been described earlier, so the author concludes:

1. For teachers
   Teachers must understand the learning model that will be applied to students, such as PBL which turns out to be suitable for children with FD cognitive style because this PBL emphasizes group work and students must cooperate with each other but in this case the teacher can be able to combine learning models so that each student gets the expected results. Pay more attention to students' sense of comfort because this will greatly affect their desire to learn, teachers communicate intensely to all students.
2. For researchers
   Further research for self-efficacy can be related to things such as learning outcomes, learning motivation, learning anxiety, and much more, as well as paying attention to students' cognitive styles because these cognitive styles have a crucial role for students.

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