The Enhancement of Junior High School Students Self-efficacy through Problem Based Learning

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Abstract: This study aims to examine enhancement of students self-efficacy who get learning with problem based learning and scientific approach. The design used in this study is the design of non-equivalent control groups. The population in this study were all of eighth grade students of one of the junior high schools in Bandung. Determination of the sample was done by purposive sampling. Technique of collecting data using a self-efficacy questionnaire. Data analysis techniques used the Mann-Whitney test. The results showed that the average value of the problem based learning class was 64.16 while the average value of the learning class students with the scientific approach was 51.06. Based on the Mann-Whitney test results obtained a value of significance value of 0,000 smaller than $\alpha = 0.05$. The conclusions from the study show that the self-efficacy of students who get problem-based learning is better than students who get learning with the scientific approach.

1 INTRODUCTION

In life, self-efficacy is a very important thing that humans have. self-efficacy encourages someone to discuss about who can solve someone who corrects and is successful. From that experience, he will be able to express his confidence. Etymologically, self-efficacy consists of two words namely "self" which is interpreted as not a belief structure (Alwisol, 2010), and "efficacy" related to oneself, can be used to perform tasks that can be done well, right or wrong, can or can not do something that is in accordance with the prepared (Alwisol, 2010).

Self-efficacy theory is based on Bandura's social-cognitive theory which postulates that one's achievement or performance depends on the interaction between behavior, personal factors (for example: thoughts, beliefs) and one's environmental conditions (Sudrajat, 2008). From the various opinions of experts, self-efficacy in practice is synonymous with " self-efficacy ". Self-efficacy has influence in election, big effort and perseverance, as well as patterns of thinking and emotional reactions. Self-efficacy assessment encourages individuals who avoid challenges that exceed their abilities or carry out activities that are expected to overcome them. In solving difficult problems, individuals who have doubts about their abilities will reduce their difficulties to let go.

Self-efficacy can improve students' mathematical abilities through an effort to build one's self-efficacy to achieve success in problems solving in life. self-efficacy is an ability that must be possessed by students, it is in accordance with the general goal of mathematics, namely having an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, attention and interest in learning mathematics, and being resilient and confident in problem solving.

According to (Hendriana et al., 2017) so that the ability of students to develop properly, several factors need to be considered by teachers, namely

- by providing relevant feedback.
- explaining the importance of objectives.
- giving examples (examples) which can be used as a guide for students to behave

Therefore, self-efficacy must be developed within students so that they can interpret mathematical processes and learning in real life, so that the learning process occurs optimally, and can connect the knowledge they have with the surrounding environment.

Some studies conclude that student self-efficacy is positively correlated with student motivation, performance and achievement. Among them is the research conducted by (Ilhamsyah, 2014) which states the positive influence between self-efficacy

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and student mathematics learning achievement. If the student's self-efficacy is higher then the learning achievement achieved is higher and vice versa. Successfully considering individuals who have higher self-efficacy consider it to be a failure, while individuals who have low self-efficacy consider better than ability.

The statements that are not much better are delivered by (Hamdi and Abadi, 2014) on PGSD STKIP-H students and PGMI IAIH, which states that there is an influence between self-efficacy and student learning achievement. Self-efficacy refers to the individual's belief that he is able to do certain tasks, or the belief can do something in certain situations successfully. Thus it can be seen that self-efficacy is not the same as expectation of results (outcome expectation), outcome expectation is a consideration of the possible consequences that will result from behavior (Bandura, 1993), but self-efficacy is the expectation of excellence or self-mastery (personal mastery expectation).

Based on preliminary studies conducted by authors on students of Senior high school Negeri 15 Bandung, information was obtained that many students had low self-efficacy. This can be seen from the attitude of students who are easily hesitant and unsure of their own abilities when given difficult questions and require problem solving concepts. Students look confused and do not have the confidence to resolve the problems given. Furthermore, weak students even give up immediately when given a problem that requires a high level of resolution. As a result students are not successful in learning the material provided by the teacher.

This is in line with the opinion of (Bandura, 1997) which states that individuals who have low self-efficacy will tend to stay away from difficult tasks because the task is seen as a threat to them. They are also slow in fixing or regaining their self-efficacy when facing failure. While individuals who have high self-efficacy tend to do a certain task, even though these tasks are a difficult task. They do not view duty as a threat that they must avoid. In addition, they develop intrinsic interests and deep interest in an activity, develop goals, and are committed to achieving these goals. They also increase their efforts in preventing failures that may arise. From some of the opinions of the experts above it can be concluded that student self-efficacy is still not as expected. To overcome this, one of the lessons needed to improve student self-efficacy is problem-based learning.

Problem-based learning is one of learning based on constructivism learning theory, which is oriented towards student centered learning. Problem-based learning according to (Fogarty, 1997) provides opportunities for students to understand concepts or subject matter to reveal problems first with the initial knowledge they already have, both formal and informal. In problem-based learning students are required to find problems first, state problems, gather facts, build questions, submit hypotheses, re-examine problems in other ways. Build alternative solutions and propose solutions.

In problem-based learning the teacher does not present mathematical concepts in ready-made forms, but by exposing students to a problem in which there are facts, situations, circumstances that can potentially lead to cognitive conflict in students. Through the help of friends and teachers, it is expected that students can rearrange and find the correct concept of the problem given. Assistance given by the teacher does not mean having to answer student questions directly, but can ask questions by using questioning techniques and directing students to find the right concepts. With all the knowledge and abilities they have, students are required to solve problems that are rich in mathematical concepts. Furthermore according to (Rusman, 2011) open learning spaces, using democratic processes, and centering on student activity are some of the learning environment factors that must be prepared in problem-based learning.

In the learning process, in the step of student orientation to the problem, the teacher motivates students to be involved in solving the problem provided so that students require high self-efficacy. Student's self-efficacy will be created in the first stage in problem-based learning syntax because with high self-efficacy students are able to solve mathematical problems. Based on these explanations, it can be concluded that problem-based learning can provide challenges to students in order to find solutions to solving mathematical problems and motivate students to be more active in learning and create a spirit of student self-efficacy.

The advantages of problem-based learning according to (Ibrahim and Nur, 2000) are :

- student retention of what is learned longer and stronger
- well integrated knowledge.
- develop long-term learning skills, namely how to research, communicate in groups, and how to deal with problems.
- increasing motivation, interest in the field of study, and learning independence.
- increasing the interaction of students and student teachers.

Based on the description above, the researcher is interested in examining whether problem-based learning can improve students' self-efficacy in mathematics learning. So this study the author entitled "the enhancement of junior high school students self-efficacy through problem based learning".

2 RESEARCH METHOD

This research is a Quasi Experimental study consisting of two research groups, namely the experimental class is a group of students who do problem-based learning and the control class is a group of students who conduct learning with a scientific approach. The design used is the design of non-equivalent control groups (Ruseffendi, 2006). This research was conducted in class VIII at one of the junior high school in Bandung, odd semester of the 2014/2015 school year. Samples are determined by purposive sampling, namely sampling techniques based on certain considerations (Sugiyono, 2013), namely classes that have equivalent academic characteristics and abilities. The purpose of sampling is like this so that research can be carried out effectively and efficiently, especially in terms of supervision, the condition of the research subjects, the time of the study set, the conditions of the research site and licensing procedures. Based on the consideration of the teacher of the mathematics class VIII local junior high school, two classes were chosen as the research sample, namely class VIII.C as the experimental class and class VIII.F as the control class.

Data relating to student self-efficacy were collected through self-efficacy questionnaires. The self-efficacy scale in this study is arranged in the form of a Likert scale. The self-efficacy scale consists of 18 items given to students after learning, both in the experimental class that have problem-based learning as well as in the control class that has learning through the scientific approach. Furthermore, to answer the hypothesis "whether the self-efficacy of students who obtain problem-based learning is significantly better than students who obtain learning with a scientific approach" then a nonparametric test is performed, namely the Mann-Whitney test. The self-efficacy questionnaire data processing of students uses the help of SPSS version 21 software for Windows.

3 RESULT DISCUSSION

3.1 Result

3.1.1 Self-efficacy Analysis

Student self-efficacy data were obtained from the provision of scale questionnaires composed of 18 statements consisting of 12 positive statements and 6 negative statements. Self-Efficacy of students was measured using a Likert self-efficacy scale in the form of a questionnaire given to students after obtaining learning treatment in both classes. The results of scale data processing of self-efficacy of students in problem-based learning class and learning class with scientific approach can be seen in the table below:

Table 1: Descriptive Obtaining Self-Efficacy Score of Students on Problem-Based Learning Classes and Learning with Scientific Approach.

	N	Min	Max	Mean	Sd
Efficacy experiment	37	48	75	64,16	7,034
Efficacy control	37	32	64	51,06	8,446
Valid N	37				

The table above shows that the difference in the acquisition of students' self-efficacy scores in the problem-based learning class and the learning class with the scientific approach. Problem based learning class with an average of 64.16 while the learning class with a scientific approach 51.06. Based on this, it can be concluded that the average difference between the acquisition of students' self-efficacy scores in the problem-based learning class and the learning class with the scientific approach is 13.1. The maximum value in the problem-based learning class is 75 and the minimum value is 48. As for the learning class with a scientific approach the maximum value is 64 and the minimum value is 32. Also based on obtaining the standard deviation between problem-based learning classes which is 7.034 and the learning class 8.466 means that the variance of class data distribution that applies problem-based learning and classes that apply learning with the scientific approach has different distribution variances. Furthermore, to reinforce the conclusions of descriptive statistics, nonparametric tests were carried out, namely the Mann-Whitney test to show that the self-efficacy of students in problem-based learning classes was better than students' self-efficacy in the learning class with the scientific approach.

3.1.2 The Difference of the Average Self-efficacy of Students

The test of the difference in mean self-efficacy of students was done to show the effect of learning treatment carried out by both classes on students' self-efficacy through nonparametric tests namely Mann-Whitney. The research hypothesis proposed is:

Hypothesis : "Self-efficacy of students who get problem-based learning is significantly better than students who get learning with a scientific approach".

With the testing criteria as follows:

H_0 The average self-efficacy score of students who get problem-based learning is the same as the average score of self-efficacy students get learning with the scientific approach.

H_1 The average score of self-efficacy of students who get problem-based learning is significantly better than the average score of self-efficacy of students who get learning with the scientific approach.

Table 2: The Mean Difference Test Results in Obtaining Self-Efficacy Score of Students in Problem-Based Learning Class and Learning Class with Scientific Approach

	Self-Efficacy
Mann-Whitney U	160,000
Wilcoxon W	863,000
Z	-5,671
Asymp. Sig (2-tailed)	,000

Based on the table above, it can be seen that the value of Sig. (2-tailed) is 0,000. Because the hypothesis test is used one-sided (1-tailed), the significance value is $0{,}000 < \alpha$. So it can be concluded that $\mathbf{H_0}$ is rejected, meaning that the self-efficacy of students who get problem-based learning is significantly better than students who get learning with the scientific approach.

3.2 Discussion of Research Result

A person's self-efficacy greatly determines how much effort is spent and how strongly the individual survives in the face of obstacles and painful experiences. The stronger the perception of one's self-efficacy the more active and diligent his efforts. Individuals who have high self-efficacy tend to do a certain task, even though these tasks are a difficult task. They do not view duty as a threat that they must avoid. In addition, they develop an intrinsic interest and a deep interest in an activity, develop goals, and are committed to achieving those goals. They also increase their efforts in preventing failures that may arise. This is also in line with the opinion of (Yolanda, 2019) which states that individuals who individuals who are persistent in carrying out developmental tasks as an individual with good things are individuals who have positive self-efficacy.

While individuals who have low self-efficacy will tend to stay away from difficult tasks because the task is seen as a threat to them. They are also slow to fix or regain their self-efficacy when facing failure (Bandura, 1997). The measurement of self-efficacy in this study focused on four characteristics adapted from (Hendriana, 2009), namely:

- believing in one's own abilities, namely a belief in oneself against all phenomena that occur that are related to the individual's ability to evaluate and overcome phenomena happened that
- acting independently in making decisions, which can act in making decisions about what is done independently without involving many others. In addition, it has the ability to believe in the actions taken
- have a positive self-concept, namely the existence of a good judgment from within themselves, both from the views and actions taken so as to create a positive sense of self
- dare to express opinions, namely the existence of an attitude to be able to express something in themselves that wants to be revealed to others without any coercion or things that can hinder the disclosure of these feelings.

The results of the study showed that the self-efficacy of students who obtained problem-based learning was better than students who obtained learning with the scientific approach. Based on descriptive self-efficacy statistical tests in both classes, for problem-based learning classes with many students 37 people obtained maximum scores of self-efficacy questionnaires by 75, a minimum score of 48 and an average of 64.16 with a standard deviation of 7.034. As for the learning class with a scientific approach with 37 students the maximum score of self-efficacy was 64 and the minimum score was 32 with an average of 51.06 and a standard deviation of 8.44. Based on the explanation above, it can be described in polygon form as follows:

The results of the above data are also proven by testing the difference in the average of the two classes. The average difference test results show a (Hendriana, 2009) significance value of 0,000 smaller than $\alpha = 0.05$. Thus it can be concluded that $\mathbf{H_0}$ is rejected, meaning that the self-efficacy of students who get problem-based learning is better than students who get learning with the scientific

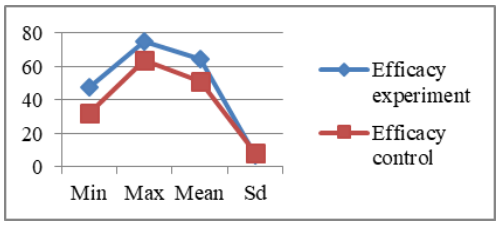

Figure 1: Descriptive statistics polygon.

approach. The results of this study are in line with the research conducted by (Hendriana, 2009) which suggests that the self-efficacy of groups of students who have learned metaphorical thinking is better than the self-efficacy of groups of students who obtain conventional learning. Furthermore, it is emphasized by research conducted by (Risnanosanti, 2010) which says that the self-efficacy of students who take inquiry learning is better than the self-efficacy of students who obtain normal learning.

4 CONCLUSIONS

Based on the research and discussion mentioned above, the average value of the problem-based learning class is 64.16 while the average value of the learning class with the scientific approach is 51.06. The standard deviation of the problem based learning class is 7,034 and the learning class with the scientific approach is 8,466. This means that the variance of class data distribution that applies problem-based learning and classes that apply learning with the scientific approach has different distribution variances. Furthermore, based on the Mann-Whitney test obtained a significance value of 0,000 smaller than $\alpha = 0,05$. The conclusion of this study is that the self-efficacy of students who obtain problem-based learning is better than students who obtain learning with a scientific approach.

REFERENCES

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational psychologist*, 28(2):117–148.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Macmillan.

Fogarty, R. (1997). *Problem-based learning and other curriculum models for the multiple intelligences classroom.* ERIC.

Hamdi, S. and Abadi, A. M. (2014). Pengaruh motivasi, self-efficacy dan latar belakang pendidikan terhadap prestasi matematika mahasiswa pgsd stkip-h dan pgmi iaih. *Jurnal Riset Pendidikan Matematika*, 1(1):77–87.

Hendriana, H. (2009). *Pembelajaran dengan pendekatan metaphorical thinking untuk meningkatkan kemampuan pemahaman matematik, komunikasi matematik dan kepercayaan diri siswa sekolah menengah pertama*. PhD thesis, Universitas Pendidikan Indonesia.

Hendriana, H., Rohaeti, E. E., and Sumarmo, U. (2017). Hard skills dan soft skills matematik siswa. *Bandung: Refika Aditama*.

Ibrahim, M. and Nur, M. (2000). Pengajaran berdasarkan masalah. *Pusat Sains dan Matematika Sekolah. Surabaya: PPS UNESA*.

Ilhamsyah, I. (2014). Pengaruh efikasi diri, metakognisi dan regulasi diri terhadap prestasi belajar matematika siswa kelas x sma negeri di kabupaten wajo. *JKIP (Jurnal Keguruan dan Ilmu Pendidikan)*, 1(1):10–20.

Ruseffendi, E. T. (2006). Pengantar kepada membantu guru mengembangkan kompetensinya dalam pengajaran matematika untuk meningkatkan cbsa. *Bandung: tarsito*, pages 336–337.

Rusman (2011). *Model-model pembelajaran: mengembangkan profesionalisme guru*. Rajawali Pers/PT Raja Grafindo Persada.

Sudrajat, D. (2008). Program pengembangan self-efficacy bagi konselor di sma negeri se-kota bandung. *Universitas Pendidikan Indonesia*.

Yolanda, F. (2019). Penerapan pembelajaran kooperatif tipe numbered heads together (nht) untuk meningkatkan self-efficacy siswa. *PHI: Jurnal Pendidikan Matematika*, 4(1):300–303.