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Differences in Mathematical Problem Solving Ability and Self-Efficacy Students Taught Using Problem Based Learning and Learning Type STAD

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Abstract : *The purpose of this research are: (1) To know the difference of problem solving ability of mathematics between students who are given problem-based learning model with students who are given STAD learning model, (2) to know the difference of self-efficacy of students between students who are given problem-based learning model with students (3) Find out if there is interaction between learning model with students 'early math ability on students' mathematical problem solving abilities, (4) to find out whether there is interaction between learning model and student's early math ability toward student self-efficacy. This research is a quasi-experimental study. The population in this study consists of all students of SMA PGRI 12 Medan. The sample of research was taken randomly as many as 2 classes amounted to 64 students. Data analysis was done with two-way ANAVA. The results of this study indicate that (1) there is a difference of problem solving ability of mathematics between students who are given problem based learning and who are given STAD learning, (2) There is difference of self-efficacy between students who are given problem based learning and who are given STAD learning (3)) There is no interaction between the learning model with the students 'early math skills to the students' mathematical problem solving abilities, (4) There is no interaction between the learning model and the students 'initial ability to the students' self-efficacy.*

Keywords - *problem-based learning model, STAD learning model, mathematical problem-solving ability and student self-efficacy*

I. INTRODUCTION

Mathematics is one of the subjects in school that can be used to form logical, critical and creative thinking effectively. As Soedjadi suggests that mathematics as one of basic science, both its applied aspect and its reasoning aspect have an important role in the mastery of science and technology [1]. Similarly, the expected objectives, in terms of the five standards of mathematical ability that students must have formulated by the National Council of Teachers of Mathematics (NCTM) in mathematics learning are problem solving, communication, connection, reasoning, and representation [2]. This grouping is in line with the demands of the government's recommended capabilities through the mathematics learning curriculum of 2006 which is the national assessment guide.

According to Arends "it is strange that we expect students to learn yet seldom teach then about problem solving," it can be concluded that in teaching teachers always demands students to learn and rarely provide lessons about how students to learn, teachers also demand students to solve problems, but rarely teach how students should solve problems [3].

Problem solving is a process or individual effort to respond or overcome obstacles or constraints when an answer or answer method is not yet apparent. The National Council of Teachers of Mathematics (NCTM) sets the problem-solving as one of the five standard mathematical processes of the school. Therefore problem solving is one of the main objectives of mathematics education and an important part of mathematical activity. NCTM states that problem solving is the focus of mathematics learning, because problem solving is a means of learning math ideas and skills.

In everyday life, we are inseparable from something called problem, so problem solving is the main focus in learning mathematics. According to Branca "problem solving is the heart of mathematics" which means the heart of mathematics is problem solving [4]. Therefore, mathematics is dynamic and flexible, always growing and developing. Students are said to have mathematical problem-solving abilities if they have been able to: (1) identify known elements, be asked, (2) construct mathematical models, (3) select and apply strategies to solve problems. These demands are impossible to achieve if the lesson is only a form of hapalan, routine work-up exercises, and a teacher centered learning process that does not require students to optimize their thinking power. According to Gagne (1970), high-level intellectual skills can be developed through problem solving.

The ability to solve problems in students is influenced by two major factors namely, internal factors such as: experience, ability intellegensi, confidence, creativity. While external factors that affect the ability of students in solving problems are family factors, peer influence, communication, educational environment (Funke and Frensch, 1995). Regarding the results of learning and problem-solving skills are low, Annisa and Tatag revealed that often students are not able to show optimal learning outcomes in accordance with the ability it has [5]. One of the reasons is that students feel unsure that they are capable of completing the tasks assigned to them.

Self-efficacy is a person's belief in his ability to solve problems he has. The concept of self-efficacy refers to the beliefs that individuals or learners have to accomplish a specific specific task and belief about the outcomes to be obtained later [6]. One's self-efficacy affects action, effort, persistence, flexibility in difference, and realization of purpose. Self-efficacy is a central construct in social cognitive theory, which one possesses. Bandura argues that self-efficacy is the basis of a person's decision-making, such as: (1) Influencing his decision-making, and influencing his actions [7]. A person will tend to run something when he feels competent and confident and will avoid it if not; (2) Assisting how much effort he or she acts in an activity, how long it lasts when it gets into trouble, and how flexible it is in a situation that is less favorable to it; and (3) Influence his mindset and his emotional reactions. From the expert opinion above, it is clear that high self-efficacy is very important owned by all students to support learning. But the reality of student self-efficacy is still low. This can be seen from the results of research Runtyani and Rusgianto (2015) against the students of SMA Negeri 4 Magelang. The results showed that the percentage of mean score of self-efficacy of 72% was in the low category. Further research from Rizkia Suciati (2015) Muhammadiyah Students of Bandung. The results showed that achievement of each indicator of self-efficacy of students no one reached the limit of achievement that is 60%.

Given the importance of student self-efficacy, student self-efficacy should be cultivated so that students have confidence in completing tasks related to the application of the concept of science, and not assume the tasks of the teacher as a threat. According Bandura which became an indicator in self-efficacy that is magnitude, strength and generality. Each of these dimensions has important implications for one's performance. Problem-solving skills and student self-efficacy can be grown with good learning, lack of student self-efficacy, problem-solving skills and low learning outcomes in mathematics learning can be affected by errors during the learning process. This may be due to improper learning models or the ability of teachers to develop less learning models can explore problem-solving skills and student self-efficacy. As revealed by Aprilia (2010: 3), the success of the learning process can not be separated from the ability of teachers to develop learning models that are oriented to increase the intensity of student involvement effectively in the learning process.

Problem-based learning (PBL) is often known as Problem-Based Learning is a model of learning that uses the problem as a starting point (starting point) of learning. The problems that can be used as a means of learning are issues that meet the context of real world that is familiar with the daily life of the students. Eggen and Kauchak mention problem-based learning is a set of teaching models that use problems as a focus for developing problem-solving skills [8]. According to Dewey (Trianto) study based on the problem is the interaction between the stimulus with the response, is the relationship between the two directions of learning and the environment [9]. The environment provides input to students in the form of help and problems, while the brain's nervous system functions to interpret the aid effectively so that problems encountered can be investigated, assessed, analyzed, and sought the solution well.

In addition to the PBL learning model, there are other solutions that are used to instill problem solving and self-effficay namely Student Teams Achievement Division (STAD) learning model. STAD learning model is a cooperative learning model. Based on the results of research ever conducted on learning strategies, one of the strategies that can effectively improve students' thinking skills is cooperatively [10]. Duren and Cherrington (1992) suggest that students who work cooperatively always remember and apply problem-solving strategies compared to students working independently (individually). This is also supported by Thorndike (Nasution), which concludes the usefulness of "social problem solving" or problem-solving in groups [11]. According to Karli and Yuliariatiningsih "Cooperative Learning is a learning strategy that emphasizes joint attitudes or behaviors in working or helping among people in a regular group structure of cooperation, consisting of two or more people".

Cooperative learning can help students to improve a positive attitude in mathematics. Individual students build confidence in their ability to solve mathematical problems. This will reduce and even eliminate anxiety to mathematics (mathematics anxiety) that many students experience so that unconsciously can improve students' self-efficacy ability. The encouragement of friends to achieve good academic achievement is one of the important factors of learning. This method has been proven to increase critical thinking and improve students' ability to solve problems [13].

One type of cooperative learning is the Student Teams Achievement Division (STAD), a group of 4-6 students, a mixture of men and women of varying degrees of ability. In STAD type cooperative learning students are always given the motivation to help each other and mutually membelajarkan group of friends in understanding the subject matter and to complete academic tasks in order to achieve maximum learning mastery [14].

The modeling of PBL and STAD as independent variables also refers to the advantages of each model in the previous study, Chan noted that problem-based learning can foster positive attitudes in solving mathematical modeling problems such as an open inquiry attitude, interest, persistence, and better faith conventional learning [15]. Nanda mentioned that to measure students' critical thinking skills the problem-based learning model is superior to Teams Games Tournament (TGT) learning model, Direct Instruction (DI) [16]. Aweke's research suggests that the ability to solve mathematical problems and student motivation is better by using problem-based learning models than conventional learning [17]. Winmery research mentioned that students 'mathematical problem solving ability and students' creativity taught by problem-based learning model is higher than conventional learning and student's answer is also more varied than conventional learning [18]. Nnodi mentioned that students' self-efficacy and achievement in basic science were better by using problem-based learning than conventional learning [19]. Jesy mentioned that students 'self efficacy and students' mathematical problem-solving skills are better at using problem-based learning models than conventional learning models [20]. Dwi's research suggests that STAD learning models are better at improving mathematical problem-solving abilities than conventional learning [21]. Wong Nguokling mentioned that students' mathematical learning achievement can be improved better with STAD learning model compared with conventional model [22].

The ability to solve mathematical problems and self-efficacy of students is not only driven from the learning approach used but also influenced by the student's early mathematical abilities (EMA) as well. EMA is an initial ability that students need to achieve instructional goals. EMA is the first ability students have to have before learning the next topic. As the Education Commission of the States (ECS) wrote that "The early mathematical abilities of students not only predict success in mathematics, but also predict student achievement" [23]. Early mathematical ability is an important factor in mathematics learning. Given the importance of the above, it is necessary to conduct research with the title " Differences in Mathematical Problem Solving Ability and Self-Efficacy Students Taught Using Problem Based Learning and Learning Type STAD".

II. METHOD

This research is a quasi experimental research with post-test only group design. The study population is all the students of class X in SMA PGRI 12 Medan, consisting of 5 parallel classes. The sample in this research is taken by random sampling technique because it is based on information and teacher that the students' ability of each class is evenly heterogeneous. Instruments done in this research are math ability test, math problem solving test and student self-efficacy . The resulting data were analyzed using an anava 2 pathway with the help of SPSS.

III. RESULT AND DISCUSSION

Result

To answer the formulation of the problems presented in the introduction, required an analysis and interpretation of research data. Analysis of the data in question is descriptive statistical analysis and inferential statistical analysis. Descriptive statistical analysis aims to provide an overview of students 'early mathematical ability data, students' mathematical problem solving abilities and student self-efficacy data after being treated in experimental class 1 and experimental class 2. While inferential statistical analysis aims to test statistically hypothesis.

An early mathematical ability test was provided to find out the average equality of the experimental group 1 and the experimental group 2, and to group the students into high, moderate and low-ability groups. The EMA test is obtained from giving the test while doing the research by giving the students 20 multiple choice questions. To get the picture EMA students performed the calculation of average and standard deviation. The results of the calculations are presented in Table 1 below:

Table 1 Description of Student Early Mathematical Ability Value of Each Sample Class

Class	Ideal Score	N	x_{min}	x_{max}	$\bar{x}$	SD
Experiment Class I (PBL)	100	32	35	95	66,56	15,63
Experiment Class II		32	35	90	66,25	16,77

The grouping of EMA (high, medium, and low) is formed as follows for students who have EMA scores grouped in high mathematical abilities, students who have grades are grouped in moderate math skills, whereas students who have EMA grades are grouped in low ability. The calculation results are presented in Table 2 below:

Table 2 Description of Student Grouping Based on EMA

EMA Category	Statistic	Experiment Class 1	Experiment Class 2
High	N	8	8
	Average	86,87	86,87
	SD	3,72	2,58
Medium	N	17	18
	Average	65,58	65,55
	SD	8,45	9,53
Low	N	7	6
	Average	45,71	40,83
	SD	6,07	4,91

Next we test the average equality of the two classes to see the equivalence of sample sample EMA. The average equality test was performed using t test. Before the t test is done first test the normality of data distribution and test data homogeneity. Normality test data used in this study using Kolmogorov-Smirnov test with the help of SPSS 18.00 program. The results of the normality test with the help of the SPSS 18 program are listed in Table 3 below:

Table 3 Normality Test Results of EMA Score experiment class 1 and Experiment Class 2

	Learning		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
EMA1and2	dimention 1	PBL	.129	32	.191	.958	32	.241
		STAD	.114	32	.200*	.948	32	.077

Table 3 shows that the EMA score of the experimental class 1 and the experimental class 2 students have Sig> 0.05 so that H0 is accepted and Ha is rejected. Thus the EMA score of the experimental class 1 and the experimental class 2 students are normally distributed. After doing the normality test, it will be tested homogeneity of variance. The homogeneity test results of EMA test in both classes were analyzed using Lavene test with the help of SPSS 18 program. The result of homogeneity test calculation with the help of SPSS 18 program is presented in Table 4 below:

Table 4 Homogeneity Test Results Student Early Mathematical Ability

Levene Statistic	df1	df2	Sig.
.161	1	62	.690

From Table 4 above, it can be seen that the EMA score of experimental class 1 and experiment 2 have Sig> 0,05 so that H0 is accepted and Ha is rejected. Thus, this means that the student's EMA score variance in the experimental class 1 and the experiment 2 class comes from populations that have the same variance or homogeneous variances. After the second condition, the second class EMA equation test is done by using t-test. The result of the equation of EMA experimental class 1 and experiment 2 with the help of SPSS 18 program can be seen in the following Table 5:

Table 5 Test Results of Two Eight Mean Equality Test Calculations

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
EMA1and2	Equal variances assumed	.161	.690	.076	62	.940	.31250	4.11795	-7.91917	8.54417

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
EMA1and2	Equal variances assumed	.161	.690	.076	62	.940	.31250	4.11795	-7.91917	8.54417
	Equal variances not assumed			.076	61.697	.940	.31250	4.11795	-7.91917	8.54497

Based on Table 5 above shows that the significance value is 0.690> 0.05 means that both experimental classes have a relatively equal average. Post test mathematical problem solving skills are given to the students in the experimental class 1 and the experimental class 2 with the aim of looking at students' mathematical problem-solving abilities after being given treatment. Based on the posttest data obtained the lowest score, the highest score is calculated average score and standard deviation for experiment class 1 and experiment class 2. The data are presented in Table 6 below

Table 6 Description of Postest of Student Mathematical Problem Solving Ability by Model Learning

Class	Ideal Score	N	$x_{\min}$	$x_{\max}$	$\bar{x}$	SD
Experiment Class I	100	32	53	98	73,31	14,15
Experiment Class II		32	48	95	67,37	15,28

The mean posttest of students' mathematical problem-solving abilities based on indicators is presented in Table 7 below:

Table 7 Average Posttest Ability of Mathematical Problem Solving by Indicator

Indicator	Experiment Class 1	Experiment Class 2
Indicator 1	83,07	75,26
Indicator 2	80	70,83
Indicator 3	60,4	58,4

The posttest average of mathematical problem-solving abilities based on EMA is presented in Table 8 below:

Table 8. Average Postest Ability of Mathematical Problem Solving Based on EMA

EMA	Experiment Class 1	Experiment Class 2
Low	53,14	44,83
Medium	73,35	66,67
High	90,88	87,12

The normality test is intended to see if the posttest score data of students' mathematical problem solving abilities in the two classes is normally distributed or not. The normality test was performed using Kolmogorov-Smirnov test in both classes. The following is the output of SPSS 18 calculation in Table 9 below:

Table 9 Test Results Normalities Post-test Mathematical Problem Solving Ability

	Learning		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
Postes	dimension1	PBL	.097	32	.200*	.971	32	.525
		STAD	.122	32	.200*	.961	32	.292

From the table above it can be seen that the significance value of the two classes is greater than significance (sig) = 0.05 so that H0 denoting the normal distributed data for the experimental class 1 and the experimental class 2 is acceptable. In other words, the posttest data for the experimental class 1 and the experimental class 2 have normally distributed data. Furthermore, the homogeneity test of the posttest score of the test results of students' mathematical problem solving ability. Homogeneity test results in both classes were analyzed using lavene test using SPSS 18.00 program aid are listed in Table 10 below:

Table 10 Homogeneity Test Results Posttest Score Mathematical Problem Solving Ability Experimental Class 1 and Experiment Class 2

Levene Statistic	df1	df2	Sig.
.205	1	62	.652

Table 10 shows that the pottstest score of mathematical problem solving ability of experimental class 1 and experiment 2 has a sig> 0,05, so H0 is accepted and Ha is rejected. Thus the posttes score variance test results of students' mathematical problem solving abilities in experimental class 1 and experiment 2 class come from populations having the same variance or homogeneous variance. After the prerequisite test is fulfilled ie the sample comes from a population that is normally distributed and has a homogeneous variance, then a two-track ANAVA test is performed to test hypothesis 1 and hypothesis 3.

Hypothesis testing that has been formulated is analyzed by using Two Path Varian Analysis using F statistic with formula and criteria that have been determined. The results of hypothesis test analysis analysis with the help of SPSS 18.00 program can be seen in Table 11 below:

Table 11 Interaction Test Results and EMA to Mathematical Problem Solving Ability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12205.045[a]	5	2441.009	63.109	.000
Intercept	256362.957	1	256362.957	6627.932	.000
Approach	540.944	1	540.944	13.985	.000
EMA	11592.013	2	5796.006	149.848	.000
Approach * EMA	56.753	2	28.377	.734	.485
Error	2243.392	58	38.679		
Total	331136.000	64			
Corrected Total	14448.438	63			
a. R Squared = .845 (Adjusted R Squared = .831)					

Based on Table 11, it appears that the learning approach p-value = 0,000 <0.05 or H0 is rejected. This means that there is an average difference in mathematical problem-solving abilities between students taught by PBL learning and students taught by STAD learning. For EMA with p-value = 0.000 <0.05 then H0 is rejected. This means that there is an average difference in students' mathematical problem solving ability among students with high initial ability, moderate or low. Interaction between learning factor and early math ability (EMA) obtained by value of Fcount = 0,734 with significance level equal to 0,485> 0,05 and value Ftabel = 3,17. This means F count <Ftabel. Thus H0 is accepted and Ha is rejected. This means there is no interaction between the learning approach with the initial ability of mathematics (EMA) on students' mathematical problem solving abilities. More details are presented in Figure 1 below:

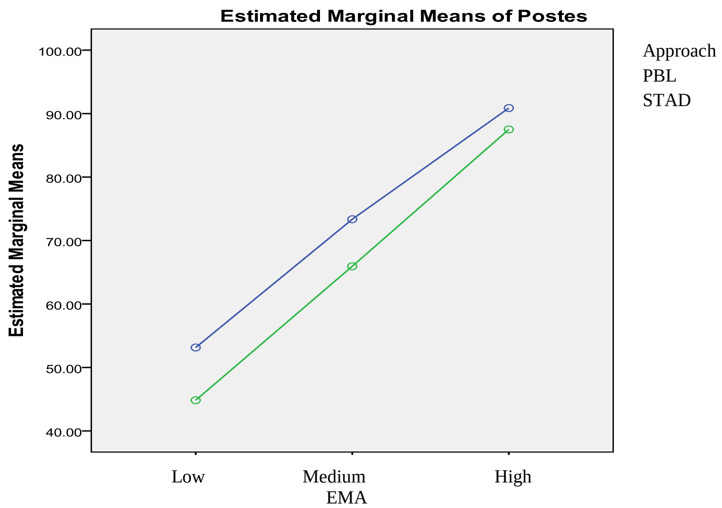

Figure 1 There is no interaction between Learning Model and EMA on Student Mathematical Problem Solving Ability

Figure 1 shows that the problem-based learning model is more influential in the potential of students' mathematical problem solving abilities because the average scores obtained by students in this class for each category of EMA are higher than the average score in the class that obtains STAD learning. In other words, the learning model can affect students' mathematical problem solving abilities at all levels of early mathematical ability (EMA) of students. So there is no interaction between the learning model and the early ability of mathematics to students' mathematical problem solving abilities.
Based on the students' self-efficacy scale data obtained the lowest score, average score, average and standard deviation (SD) average data of self-efficacy scale of experimental class 1 and experiment 2. The data are presented in Table 12 below:

Table 12 Student Self-Efficacy Scale Data

Class	Skor Ideal	N	x_{min}	x_{max}	$\bar{x}$	SD
Experiment Class I	100	32	54	99	74,45	12,83
Experiment Class II		32	48	95	68,95	13,25

The average self-efficacy scale score of experimental class 1 and experiment 2 students based on indicators is presented in Table 13 below:

Table 13 Average Student Self-Efficacy Scale by Indicator

Indicator	Experiment Class 1	Experiment Class 2
Indicator 1	78,44	75
Indicator 2	78	74,8
Indicator 3	77	74,14
Indicator 4	73	71

Average self-efficacy scale data for experimental class 1 and experiment 2 students based on EMA category are presented in Table 14 below:

Table 14 Average Student Self-Efficacy Data Based on EMA

EMA	Experiment Class 1	Experiment Class 2
Low	64	58
Medium	73,89	73
High	91,45	88,35

After the data is described then the data is then first tested by using the statistical prerequisite test required as a basis in testing the hypothesis, among others is the test of normality and homogeneity. The normality test was performed using Kolmogorov-Smirnov test in both classes. Here is the output of SPSS 18 calculation in Table 15 below:

Table 15 Normality Test Results Score of Experiment Self-Efficacy class 1 and Experiment Class 2

	Pembelajaran		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
Self Efficacy	dimention1	PBL	.104	32	.200*	.960	32	.281
		STAD	.086	32	.200*	.973	32	.595

Table 15 shows that the successive significance values are 0,200 and 0,200 for the experimental class 1 and the experimental class 2. The significance value of the two classes is greater than the significance (sig) = 0.05 so that H0 denotes the normal distributed data for the experimental class 1 and the experimental class 2 is acceptable. In other words, the self-efficacy questionnaire data for the experimental class 1 and the experimental class 2 have normally distributed data. Furthermore, the homogeneity test. Homogeneity test results in both classes were analyzed using lavene test using SPSS 18.00 program aid. The results of homogeneity test calculations with the help of SPSS 18 program are listed in Table 16 below:

Table 16 Homogeneity Test Results of Student Self-Efficacy Scale Data

Levene Statistic	df1	df2	Sig.
.017	1	62	.898

Table 16 above shows that the self-efficacy questionnaire score for the experimental class 1 and experiment 2 students has a sig value> 0.05, so H0 is accepted and Ha is rejected. Thus the variance of the students' self-efficacy questionnaire score in the experimental class 1 and the experiment 2 class comes from populations having the same variance or homogeneous variances. After the prerequisite test is fulfilled ie the sample comes from the population that is normally distributed and has homogeneous variance, then the two-track ANAVA test is done to test the hypothesis 2 and hypothesis 4. Testing the hypotheses that have been formulated is analyzed by using Two Path Varian Analysis using F statistic with the formula and predefined criteria. The results of hypothesis test analysis analysis with the help of SPSS 18.00 program can be seen in Table 17 below:

Table 17 Interaction Test Result of Learning and Early Mathematical Ability to Student Self-Efficiency

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	9042.700[a]	5	1808.540	52.794	.000
Intercept	271380.549	1	271380.549	7921.976	.000
Pembelajaran	500.241	1	500.241	14.603	.000
EMA	8556.112	2	4278.056	124.882	.000
Pembelajaran * EMA	8.602	2	4.301	.126	.882
Error	1986.887	58	34.257		
Total	340106.778	64			
Corrected Total	11029.587	63			

Based on Table 17, it appears that learning p-value = 0,000 <0.05 or H0 is rejected. This means that there is a difference in mean self-efficacy among students taught by PBL learning and students taught by STAD learning. For EMA with p-value = 0.000 <0.05 then H0 is rejected. This means that there is a difference in the mean self-efficacy of students between students with high initial ability, moderate or low. The interaction between the learning factor and the initial ability of mathematics (EMA) obtained value of 0.882 means 0.882> 0.05 or H0 is accepted, this means there is no interaction between learning with EMA on student self-efficacy. More details are presented in Figure 2 below:

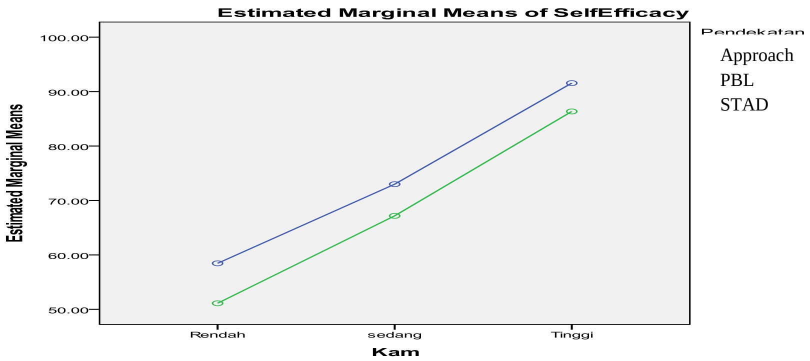

Figure 2 There is no Interaction between Learning Model and EMA Against Student Self-Efficacy

Figure 2 shows that the problem-based learning model is more influential in student self-efficacy because the average score obtained by students in this class for each category of EMA is higher than the average score in the class that obtains STAD learning. In other words, the learning model can affect students' self-efficacy at all levels of Low Medium High So there is no interaction between learning model and early EMA ans that there is no mutual influence between the learning model and the student's early math ability on student self-efficacy.

Discussion

Ability Mathematical problem solving shown by students in solving mathematical problems as measured by looking at indicators of mathematical problem solving ability in this research are: (1) identifying elements that are known and asked; (2) to formulate a mathematical problem or to construct a mathematical model; (3) selecting and implementing strategies to solve the problem.

Based on the data analysis, the average score of posttest of experiment class 1 is 73,31 while in experiment class 2 is 67,37. This shows that the average posttest score in experimental class 1 is higher than experimental class 2. This is because students on PBL learning students are given problems as starting point of learning and the problem is an authentic problem and related to daily life -day so students become more active in solving problems. While in learning STAD problem is not as main point of departure in learning so that student look less active in doing learning. This study is also reinforced by Delina's research results that problem-based learning can serve as an alternative in improving students 'problem solving skills [24] and Shinta states that the improvement of students' math-problem solving skills taught by PBL approaches is higher than that of conventionally taught students . Based on the results of statistical analysis using two-way ANAVA, it can be concluded that there is a difference of mathematical problem solving ability between students taught by problem-based learning with students who are taught by STAD learning. This suggests that PBL learning has a greater influence in developing problem-solving skills.

Self-Efficacy is a belief about one's ability to organize and implement actions for the achievement of results. This means that in the implementation of learning as one of the characteristics of students who should be considered in the learning process. Bandura states that there are three dimensions that make up the individual self-efficacy, among others: magnitude / level, strenght, generality, indicating whether self-assurance will take place in a particular domain or apply in various activities and situations. Based on the result of data analysis in this study, the average score of self-efficacy scale of experimental class 1 students is 74.45 while the average score of experiment class 2 is 68,95.

This suggests that PBL learning has a greater influence in developing student self-efficacy. The average high cell-efficacy of students is influenced by a series of activities that students undertake during learning. Where the learning of PBL that has the characteristics of the problem becomes the starting point in learning and the problem is familiar with everyday life, so that in the learning process takes place students are accustomed to the problems encountered so that self-efficacy will appear in itself after successfully solving the problem. The same thing is revealed by Bandura that "self-efficacy influences a person's decision making and actions and helps how much effort he or she acts in an activity and how long it lasts when it gets into trouble."

The results of statistical analysis using two-way ANAVA can also be concluded that there are differences in self-efficacy of students who are taught by problem-based learning and students who are taught by STAD learning. This difference, according to the researcher, may place the problem situation as a learning center, attract and retain students' interest in being able to express their opinions about things in a multi-perspective manner so that greater student self-efficacy occurs at PBL learning when compared to STAD learning. This is supported by the study of Nnodi (2012) mentions that student self-efficacy and achievement in basic science better by using problem-based learning compared with conventional learning and Jesy (2016) mentions that students 'self efficacy and students' mathematical problem solving skills are better using problem-based learning models compared to conventional learning models.

Based on the results of descriptive analysis, the average score of mathematical solving abilities in experiment class 1 in low math early ability category of 53.14; medium 73.35 and high 90.9. While for the average score of problem solving ability of mathematics in experiment class 2 on category low ability of early math 44,83; being 66.7 and 87.12 high. This shows that the mathematical problem solving ability for all categories of early math abilities in experimental class 1 is higher than in the experimental class 2. In other words for each category of students 'early mathematical abilities, students' mathematical problem-solving skills that obtain higher PBL learning are higher than those gain STAD learning.

Based on statistical analysis with two-way ANAVA shows that there is no interaction between students' early ability to mathematical problem solving ability of students (learning and EMA does not affect each other) This is in accordance with the results of research by Jumaita (2017) that learning in influencing the ability of solution Mathematical problems do not depend on students' early math skills. In accordance with Kerlinger's opinion that "Interaction occurs when an independent variable has different effects on a dependent variable at various levels of another independent variable".

Based on the results of descriptive analysis, the mean score of students' self-efficacy scores in experimental class 1 in low math early ability category was 64; medium of 73.89 and high of 91.45. While the mean score of self-efficacy score of students in experiment 2 class in low initial ability category was 58; medium at 73 and high of 88.35. This shows that the students 'self-efficacy for all categories of early math skills in experimental class 1 is higher than the experimental class 2. In other words for each category of students' early math ability, the self-efficacy of students acquiring problem-based learning is higher than that of students learning STAD.

Based on the results of statistical analysis with two-way ANAVA test it can be concluded that there is no significant interaction between learning model and early ability of mathematics to student self-efffacy. This is because each learning model is able to develop students' self-efficacy in all categories of early mathematical abilities, resulting in the absence of interaction between learning models and early math skills to student self-efficacy.

IV. CONCLUSION

Based on the results of data analysis on the ability of mathematical reasoning and self-efficacy of students who are taught with problem-based learning model and STAD, then obtained some conclusions as follows:

1. There is a difference of problem solving ability of mathematics between students who are given problem based learning with students who are given STAD learning.
2. There are differences of students' self-efficacy between students who are given problem-based learning with students who are given STAD learning.
3. There is no interaction between the learning model and the early ability of mathematics to students' mathematical problem solving abilities.
4. There is no interaction between learning model and early math ability to student self-efficacy.

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