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The Efforts to Improving the Critical Thinking Student's Ability Through Problem Solving Learning Strategy by Using Macromedia Flash at SMP Negeri 5 Padang Bolak

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***Abstract*: This study aims to determine whether the application of problem solving learning strategy by using macromedia flash can improve student's critical thinking skills on the subject two variables of linear equation (SPLDV)at SMP N 5 Padang Bolak class VIII^{-B} that attended by 25 students. The tools to collecting data in this experiment are test and observation. Data obtained from tests analyzed using descriptive statistics with five absolute scales, while data from the observation analyzed by percentage of the total aspects are observed. The results showed that the critical thinking ability of students has improved. This is indicated by the results of the achievement of the minimum criteria quite well in the first cycle by 40%. In the second cycle amounted to 60% in the third cycle increased to 80%. The results of the observation of teacher ability to manage by problem solving learning strategies by using macromedia flash on the first cycle get 66. 4%, so it has not fulfilled the ability of teachers in the classical style 75% in the second cycle and the third cycle reached 87,5%. So that it meets the expected categories according to the benchmark.**

***Keywords*: Students Critical Thinking, Problem Solving Learning Strategy, Macromedia Flash.**

I. INTRODUCTION

The development of education in this era is inseparable from the desire of all education practitioners in order to improve the quality of teaching as one of the efforts in advancing education. For modernize the education is one aspect that determines the way of good teaching by teachers (educators) to create a superior regeneration. Government Regulation No. 19 Year 2005 on the Indonesian National Standard of Education that the process of learning in the educational unit organized in an interactive, inspiring, fun, challenging, motivating the students to participate actively.

Learning Mathematics plays an important role in the development of science and technology. Is universal that underlies the development of modern technology that requires the ability to think logically, systematically, critical, creative, and innovative students. According Hasratuddin (2015) [1] is "Vision math education today is mastery of concepts in mathematics used to solve problems. While the future of mathematics education mission is to provide opportunities to develop the mindset, confidence, beauty, objective attitude, and open ".

Critical thinking skills are needed in mathematics, because it has a very dominant role in educating students. Students are expected to acquire the ability to manage information in order to survive in a state that is always changing, uncertain and competitive. In line with the opinion of Ozkahraman (2011) [2] Critical thinking is the process of seeking, obtaining,

evaluating, analyzing, synthesizing and conceptualization of information as a guide to develop one's thinking with self-awareness, and the ability to use this information to add creativity and taking risks.

But the reality at the present time is the critical thinking skills of students in mathematics learning is still low and needs to be improved. According to Simbolon (2015) [3] "The ability to think critically low due to the learning of mathematics had only describes the steps to simply calculate without helping the student to put the idea / ideas in oral and written form. In resolving the problems seen students are given less enthusiastic to solve the appropriate capabilities. Then, the students do not feel compelled to reason and think further how to solve the given problem ". Recognizing the importance of critical thinking skills students need to seek learning to encourage students to practice those skills. Therefore the change in view learning from teachers teaching to student learning has to be the primary focus in every math learning activities.

Problem solving learning strategies can reflect on their own thinking in a show of confidence, expectations and metacognition and serious attention in learning mathematics. This strategy intended to increase the range of students 'abilities, especially mature students' independence in thinking to solve problems in mathematics systematically. The given problem should be easily understood and challenging for students as opposed to the knowledge he had before so it requires students to think critically. In line with the opinion of Edy Surya. et al. (2013) [4] "The questions given are expected to support the achievement learning objectives. It is needed to deliver the challenge questions or a kind of divergent or conflicting cognitive questions in a condition to expect the students to visualize thinking and critical thinking, creative in mathematical problem solving ". The next Wena, M (2009) [5] "In problem solving learning modules in accordance with the concept of CTL (Contextual Teaching and Learning), which adopts the inquiry and constructivism emphasizes the high-level thinking. The basic principle of this kind of learning models developed critical thinking skills . . . and intellectual skills learned in various roles through their involvement in a real experience "

For the sake of strengthening the problem solving learningstrategies to facilitate teachers in the implementation and does not require a long time then in the presentation of the problem is the subject matter may be supported by ICT, for example using *Macromedia Flash.* Judging from its use *Macromedia Flash* can help the teacher to design and develop learning media in the form of animation that can be played with a flash movie. Presentation Flash player intended to facilitate students to understanding and identify the mathematical problem given by the teacher.

II. CRITICAL THINKING ABILITY

Thinking is a human nature that is special compared to other creatures. Soetriono and Hanafie (2007) [6] says "Humans have a special characteristic: the ability to think within the structure with the feelings and wishes". According to Ennis (1985) [7], critical thinking is to think reasonably and effectively with an emphasis on making decisions about what to believe or do.

Critical Thinking Ability in the study include the ability of students to:

Recognize assumptions, perform inference, deduction, interpretation and evaluate arguments Watson and Glaser (in Amri and Ahmadi, 2007) [8].

III. PROBLEM SOLVING LEARNING STRATEGIES BY USING MACROMEDIA FLASH

In mathematics, problem solving is an ablsolute that must be implement, as in mathematics found a lot of problems to be solved, a question can be considered as a problem if the issue of the need to think without their authenticity before completion example.

Application of *problem solving* models were first introduced Polya (1973) [9], which divides into four stages: (1) understand the problem, (2) develop a plan of settlement,(3) implement the settlement plan, and (4) review the results obtained. the stages of the most difficult and complicated in the model of *problem solving* is the second stageup to fourth, which requires students to think critically to solve the problem in order to achieve the intended solution. When doing the critical thinking process, involving students prior knowledge, reasoning, and cognitive strategies to generalize, prove, or to evaluate the situation of the lesser known way that reflective.

According Akinoglu (2007) [10], the model is a problem solving activity students to find information themselves, which these activities have become an educational program from teaching to learning. This model allows students to learn new knowledge to deal with problems that must be solved. By way of problem-based learning, some students' attitudes to increase them in areas such as problem solving, thinking, group work, communication, information acquisition and sharing information with others has positive effects.

According Pehkonen (2007) [11], about the ability of problem solving in school mathematics in Finland said, there are lectures and demonstrations that will be used to solve different problems. Troubleshooting was first introduced in 1986 in its efforts to systematically fatherly improve math education.

Pehkonen again (2013) [12]The United States is a pioneer in the development of mathematics, along with the progress there. They show that solution should not only be considered as the content of teaching, but also as a learning method. Then, The National Council of Teachers of Mathematics (NCTM, 2000), mentions as a problem-solving teaching methods which can improve the quality of teaching mathematics in schools.

Using problem solving in learning need an operational activity, that means how the teacher and students activity in the learning process. as in mathematics found a lot of problems to be solved, a question can be considered as a problem (problem) if the issue of the need to think without their authenticity before completion example.

In this study, researcher adopted the idea by Wena (2009) [5] in the operational stages of learning problem solving strategy is to identify problems, define problems, find solutions, implements the strategy, and reviewing and evaluating its influence. The process activities of teachers and students in learning can be described as follows:

Table 1: The process of Theacher and Student Activity in Problem Solving Learning Strategy

Learning Phase	Teacher Activity	Student Activity
Identification of problem	Giving problems	understand the general problem solving
	Guide students to understand the aspects of the problem	examine aspects related to the problem
	Guiding students to develop / analyze problems	develop / analyze problems
	Guiding students examine relationships between data	assessing the relationships between data
	Guiding students in mapping problems	mapping problems
	Guiding students develop hypotheses	develop hypotheses
Define the problem	Guide students to see the data / variables that have known or unknown	examine data / variables which are already known and unknown
	Guiding students search and browse through a variety of information from various sources	search and browse through a variety of information from various sources
	Guiding the students do the filtering of various information collected	refines various information that has been collected
	Guiding students through the formulation of the problem	formulate problems
Finding Solution	Guiding students seeking many alternative for troubleshooting	looking for a variety of alternative solutions to problems
	Guide students to review any alternative solutions to problems from various viewpoints	conduct an assessment of each alternative solutions to problems from various viewpoints
	Guiding students took the decision to choose one alternative solutions most appropriate	decided to choose one of the alternative solutions most appropriate
Implementation Strategy	Guide students gradually implement problem solving	problem solving gradually
Assessing Back and evaluate its influence	Guiding students viewed / corrected ways of solving the problem	viewed / corrected ways of solving the problem
	Guiding students viewed / analyzed the effect of the strategies used to solve problems	viewed / analyzed the effect of the strategies used in problem-solving

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Utilization of interactive multimedia is *ICT-based* learning *tool*. This media is intended to make it easier to convey information such as text, images, and audio / video. Macromedia flash one in ICT applications that can be used to design images, animations, etc. according to user needs. The advantages of this include some flash animation that has been created can be used as a flash movie video shaped. *Flash Player* will make it easier to visualize the process of formation of abstract learning becomes real, so that learners will be easier to understand. This makes the learners to participate actively in the learning process. (Khairani&Febrinal: 2016) [13].

In carrying out the stages of learning strategies such as problem solving strategies in the above table is certainly needed a way to simplify the teacher as an actor, facilitator, mediator and motivator when learning takes place. Thus, the use of interactive media is expected to answer that. According Rostina S. (2015) [14] "Great Expectations course that media into a tool that can accelerate / facilitate the achievement of learning goals".

As for the use of Macromedia Flash in order to help the implementation of problem solving learning strategies in question, namely:

- Helping students to identify and define the problem that given by teacher because it can be displayed on a relatively large screen with the help of InFocus,
- Make it easier for teachers to stimulate reasoning / thinking students seeking a solution with the help of animation,
- Helping teacher and student interaction in reviewing the answer given for solving problem that displayed on the screen,
- Enhance critical thinking skills of students in accordance with the benefits by using problem solving learning strategy, and
- Shorten time to carry out all stages of the problem solving strategy.

Library panel has a function as a symbol/media library that used in animations that are being made. Symbol is collection of picture and movie, button, sound, and static image. One of flash player (video) that made as in the image below:

Figure 1: Illustration of flash player (video) in the image form

By comparing to other media, flash has the following advantages:

- The file size is small, because it is specifically designed for use on the web. The smaller size makes the site loading time shorter.
- Having interactive side, the flash can receive input from the user.

IV. METHODS

This research was conducted by the method of action research (PTK). Hoopkins (in Kunandar, 2008)[15] defines action research as a form of activities of self-reflection by the rest of education to improve the rationality and justice on: "(a) The practice of their educational, (b) Their understanding of these practices, and (c) a situation where practices are implemented ".

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PTK conducted aims to improve critical thinking skills class VIII SMP N 5 Padang Bolak Alternating the subject of quadratic equations. The detailed procedure of this action research can be described as follows:

- Identifying the students situation in interest and readiness to providing preliminary tests prior to the implementation of learning,
- Discussing the subject matter by implementing aproblem solving learning strategyby usingmacromedia flashare:

- Determining the learning concepts
- Formulating the problem by showing the flash player
- Determining the thinking direction that is needed to solve the problem

- Doing assignments to students, according to the given material.

On each meeting, teacher record student problem solving activity and others

Data collection tool for the study were tests and observation. The test is used to measure the student's critical thinking ability and observations used for teacher's ability to manage problem solving learning strategies by using macromedia flash. Then, reference the achievement scores of students in accordance with achieving success indicator of the critical thinking ability follow the KKM (minimum completeness criteria) in applied mathematics lessons in school, with a score of 65. The teacherability to manage learning strategies seen from the percentage of successful achievement of performance by 80%.

This class action research consisted of two to three cycles, or two / three turnaround time is a series of interrelated activities. That is the first cycle took place followed by the cycle II and III. So before PTK done made instrumental input that is used for treatment in a PTK or commonly known as the Learning Plan. Disclosure of basic competence (KD) that would be material in the learning process.

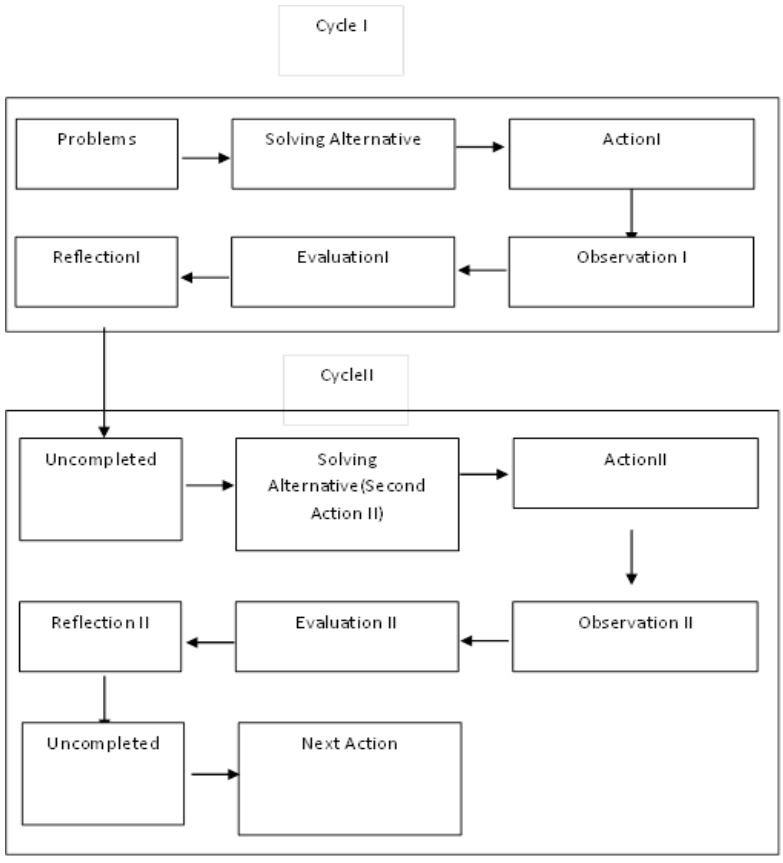

Figure 2: Schema Modification Procedure Class Action Research by Kemmis

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V. RESULT OF EXPERIMENT

Reliability and Validity Instrument Tested:

Table 2: Correlation of Grain Score and Total Score

Question	R_{count}	r_{table}	Significance	Note
1	0,595	0,349	Significant	Valid
2	0,521	0,349	Significant	Valid
3	0,654	0,349	Significant	Valid
4	0,255	0,349	-	Invalid
5	0,927	0,349	Significant	Valid

Judging from the students' critical thinking ability test, after the action on the first cycle of two sessions, students were given the test corresponding indicator critical thinking can be seen in the table below:

Table 3: Classifying Value of Test Cycle I

	Mastery Level	Frequency	Percentage	Qualifying Value
1.	90 – 100	0	0	Very Good
2.	80 – 89	**2**	**8**	Good
3.	65 – 79	**8**	**32**	Good Enough
4.	55 – 64	9	36	Not Good
5.	0 – 54	6	24	Very Not Good
Total		25	100	

Table 4: Classifying Value of Test Cycle II

	Mastery Level	Frequency	Percentage	Qualifying Value
1.	90 – 100	**1**	**4**	Very Good
2.	80 – 89	**5**	**20**	Good
3.	65 – 79	**9**	**36**	Good Enough
4.	55 – 64	6	24	Not Good
5.	0 – 54	4	16	Very Not Good
Total		25	100	

Table 5: Classifying Value of Test Cycle III

	Mastery Level	Frequency	Percentage	Qualifying Value
1.	90 – 100	**3**	**12**	Very Good
2.	80 – 89	**7**	**28**	Good
3.	65 – 79	**10**	**40**	Good Enough
4.	55 – 64	5	20	Not Good
5.	0 – 54	0	0	Very Not Good
Total		25	100	

In the first cycle was obtained as many as 10 students have reached a level of critical thinking in qualifying was good and enough, or 40%. A total of 15 students have not reached the expected level. Then after a given action on the second cycle as much as 2 meetings, the results obtained by 15 students fullfil or 60% of the 25 students who took the tests so that still need improvement of the number of students in the classical style. In the third cycle after the action has gained 20 students from 25 students who took the test, or 80% of the total number of students. This indicates that the criteria are expected to have been reached and there was an increase from the first cycle to the third cycle.

The results of observations of teacher performance and the ability to manage learning by problem solving method by using macromedia flash per cycle can be seen in the table below:

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Table 6: Capacity Teachers in managing to apply the learning strategy

	Indicator	Descriptors	Observation/ Cycle		
			I	II	II
1.	Opening Lesson Skills	a. Orientation	3	4	4
		b. Apperception	3	3	4
		c. Student motivating	3	3	4
		d. Giving direction	3	3	4
2.	Material Persentation	a. Mastering the material	3	3	4
		b. Clear presentation	3	3	3
		c. Systematic presentation	2	2	3
		d. Enrichment	2	3	3
3.	Learning Strategy	a. Learning Approach in accordance with the teaching in accordance with the basic competency.	3	3	4
		b. Learning method in accordance with the basic competency.	2	3	3
		c. Learning implemented systematically.	2	2	3
		d. Implementing the learning method of problem solving by using macroflash	2	3	4
4.	Class Managing	a. Effort to order the class	3	3	3
		b. Effort to involve student.	3	3	3
		c. Handling student behavior problem.	3	3	3
		d. Organizing the physical classroom.	3	3	3
5.	Learning Assesmengt	a. Pretest	3	3	3
		b. Process Assessment	3	3	3
		c. Final Assessment	2	3	3
		d. Feedback	2	3	3
6.	Closing Learning Skills	a. Resuming of learning material	3	2	3
		b. Giving Assessment	2	3	3
		c. Suggesting the benefit of learning	3	3	4
		d. Confirming the next material.	3	3	3
7.	Teacher Attitude during learning process	a. Sincerity	2	2	4
		b. Firmness	3	3	4
		c. Openness	3	4	4
		d. Objectiveness	3	4	4
8.	Using time efficiencies	a. The accuracy of the learning begin.	3	4	4
		b. The accuracy of presenting the material.	3	4	4
		c. The accuracy of an evaluation.	2	2	3
		d. The accuracy off the lesson.	2	2	3
		Ammount	85	96	112
Classical of percentage			85/128	96/128	112/128
			66. 4%	75%	87,5%

On the first cycle get 66,4%, so it's not fulfill of classical teacher ability. And on the second cycle get 75%. Furthermore, on the third cycle get 87,5% so that fulfill of the criteria that expects according to the benchmark.

Findings from the results of all the seven hypotheses tested showed convincingly that the problem solving approach proved to be a more effective and reliable method of teaching than the conventional lecture method. This finding provided

empirical support to earlier findings: Mohd Nazir Md Zabit (2010) [16] This literature review will prove that Problem solving method will stimulate teaching and learning. Problem is the main focus of teaching and learning that will happen through problem solving activities. Declarative knowledge and skills that are gained through critical thinking skills will be applied to solve a problem. Sri Mari Indarti (2014) [17] Achievement and improvement of communication skills and mathematics critical thinking will be better by using problem-based learning approach. Students will be more active, have an interest, motivated, enthusiastic during the ongoing learning and exploration. Cahya, Bisono I. (2013) [18] macromedia flash user, the using of multimedia learning application computer network topology based on macromedia flash improve the student learning outcomes rather than not using multimedia learning applications computer network topology based on macromedia flash. It is proved by hypothesis testing and normalized gain scores. The hypothesis testing showed tcount of 7. 460 while the ttable is 1. 997. Because tcount > ttable then H0 is rejected and Ha is accepted. And for normalized gain scores, the experimental class is higher than the control class, the experimental class normalized gain scores is g = 0. 866 or in high category, as for the control class g = 0. 687 or in mid category. But this study is contradict by Heris Hendriana experiment result in (2013) [19]on the application of problem solving learning strategy and conventional model, there are no differences between ability and students critical thinking disposition on both of class. Mathematics Critical thinking of students is good enough, and students critical thinking disposition are enough and good enough.

VI. DISCUSSION OF RESULT EXPERIMENT

Critical thinking ability of students to apply problem solving learning strategies by using macromedia flash has increased in each cycle to obtain good criterion. In cycle I and II, still have less because:

a. Students are not perform well due cause of the minimal critical thinking ability.

b. Students are not confidence to ask or answer the questions.

c. There is students are not active in learning.

d. Students are not accurate in counting.

The result of teacher ability to manage learning in first cycle get 66,4%, so it's still not fulfill the classical teacher ability.

Then in the second cycle is 75%. This is due to:

a. The lack of teachers ability in the classroom to managing and leading the discussion, because of during this time the teacher only implementing the curriculum-based learning model.

b. The lack of teachers ability in managing time, because of teachers have not been able to optimally use the time that having set in the RPP.

VII. CONCLUSION

Based on the results of the experiment, researcher can be summarized as follows:

1. Application of Problem Solving learning strategy by using Macromedia Flash can enhance the ability of critical thinking of students. This can be demonstrated by achievement of criteria test results are not good, enough, and good, with40% in the first cycle to 60% in the second cycle, and 80%in the third cycle.

2. Capacity of teachers in managing to apply the Problem Solving learning strategy by using macromedia flash to do well for the third cycle can be up to87,5%. This means that teachers can implement this learning strategy properly.

VIII. SUGGESTION

Problem Solving Learning Strategy by using Macromedia Flash can improve students' critical thinking ability, it is recommended that the following matters:

1. In the process of learning the student is expected to perform these actions on an ongoing basis in order to keep creating active learning and fun as well as further enhance the positive response to the learning of mathematics.

2. In the teaching and learning activities teachers are expected to make Problem Solving Learning Strategy by using macromedia flas has an alternative in the study of mathematics to improve students' critical thinking skills in learning mathematics.

3. Required additional improvements in the use of Macromedia Flash animation to present a problem and the material to be delivered according to specific material in the learning of mathematics.

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