

Using Open Ended Approach in Learning to Improve Students Thinking Skill in Banda Aceh

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Abstract

To enhance the student's math skill teacher needs to be prepared and arranged the strategy in teaching the material of math. In addition to that the strategy applied in the class is to make the teacher easy in getting the competency of students step by step and get the result of learning mathematics optimally. In order to apply the learning strategy in math the teacher is needed some skills to choose the best method in teaching learning process even for the material or the condition in learning on going now. Learning with that strategy could responded the students to get the competency. Hence open-ended is the approach in learning that could gave the opportunity to the students to get the knowledge, experience, knowing and solving the problem from several technics. This paper aims to analyze the open ended approach in learning to improve thinking skills of junior high schools.

Keywords: Using open ended approach in learning; creative critical thinking; students' performance.

1. Introduction

Nowadays the development of technology become very fast and it demand the society to adapt it quickly. Individuals who are able to adapt the technology fastly are progressing in the society and career substantially. In order to developed a learning curve in the schools which could increased the creativity of the students and they could compete to face the developing such technological changes should have to be adopted.

One of maths course learning that could improved the creativity of thinking skill is learning about the open ended approach. This research is a qualitative and descriptive in nature. The data were collected orally and that kind of research aiming to fix teaching learning in the class, to increase the skill of students thinking creatively, and their performance. This research was conducted at SMPN 17 Banda Aceh in the VIII grade of 2011 – 2012. The data was obtained based on the survey teaching learning process, fieldsheet report, and the result of interview. Teaching learning process was running in to two cycles. Each the end of cycles the students were going tested to see the skill of thinking creatively and their performance. The steps of open ended approach and Think Pair Share model which could improved the students thinking creatively are: (1) open ended question, (2) work individually, (3) discussion in group, (4) discussion class. Open ended question will be done sharply in order no waste the time in teaching learning process. The researcher gave the appropriate time toward students to answer the question even in individually or in group and the students could did it liberal. the researcher involved the students actively in concluding the material on discussion session and she could see the performance of students in thinking creatively.

In teaching learning on open ended approach that has conducted in order to increase the students skill in thinking creatively has good progress. The students skill in thinking creatively in range good enough with

the percentage 26,54% that consist of the percentage skill in thinking fuently for about 45,64%, the percentage skill thinking flexible about 12,59%, and the percentage skill thinking original about 22,02%. The students performance range of good category with the percentage of students complete learning was 83,33%. Jerrett (2000) said that open ended problem solving involved the problem that has method and lot of solving answer. Research proved that open ended problem solving was efective in developing the understanding of Math deeply. Based on the explanation mentioned before open-ended approach promising a chance to the students to investigate several strategy and the manner that they believe suitable with the skill in elaborating any of the problem faced. However this kind of such approach aiming toward the students to think creatively (think diveregen) could developed maximally and could passionate the creativity of sudents. The students were faced on a Math problem and than gived the freedom in finding process the truth answer. Meanwhile, at the same time of the creative activities from each students were going communicating in teaching learning process.

Open ended approach could constructed the interactive activity between the students and Math course with the result that interesting the students to answer the problem toward any strategy. [Suherman \(2001\)](#) said that activity of Math and activity of students were called open if completed by three aspects: 1) activity of students must open it means the activity of learning must accomodated the chance for the students to do everything that they want to do in liberal based on their willing or in the other hand the students have the opportunity to do such kind activities to answer the problem that teacher gave for them the result that they found the correct answer. 2) the activity of Math is kind of thinking it means the activity that involved in those activity has process of abstraction from real experience in daily life in the world of Math or opposite of it. If the process of solving problem invited the procedure and process of diversification and generalisation it means this kind of activity of Math called open. 3) the activity of students and the activity of Math were a united. The activity of students and the activity of Math were called open with simultan in learning of Math, if the way of thinking the student in Math were cared by the teacher toward the useful of Math activity to answer the problem that they have in Math.

How does the learning of Math by using open ended approach? [Khabibah \(2006\)](#) suggest the context of learning Math by using open question in the following.

- i. Orientation: The starting of learning is begin with giving motivation to the student such as the teacher gave problem that they faced in daily life. Those kind of problem could be given in writing or verbal. In this fase the teacher tried to remind the student about the material of Math that have learned.
- ii. Presentation of open problem: The teacher gave the general explanation about the material that will be undestood by the students and if this kind of material is not something new for the students it means they have base concepted about the Math, the game was given to the students to gain the creativity of the students in solving the problem of open ended. Moreover the teacher gave the problematic that tend to open problem and that kind of problem demand the students to find or to construct the idea, concept or the princips of Math.
- iii. Finishing open problem in individually: The students asked to answer the question aor they asked to solve the problem in individually. In this point is gaining to know the increasing of the students creativity in invidually as the gaining point that has given to the students. When the students solve their problem in individually they do not allow to ask help from their friends in the result that they can push themselves to increase their creativity to solve the problem by themselves. After finishing their question or problem, they were asked to collect the solve problem sheet.
- iv. Discussion group about the open problem: The students asked to work in group to discuss the solving problem of open ended have done in individually. In the manne of hopefully that in the discussion group the students idea will improve and the creativity of the students increase gradually. In the discussion session, the students were demanded to give idea each other in a group. in hope for the students who has high creativity want to help other group. in this case the meaning of high creativity in group is the students in a group has the variaty of creativity. At the end of the discussion each of group collect the discussion sheet in group.

- v. Presentation the result of discussion in group: Some or whole of the groups present the result of their working in group. In the discussion class, when the students see the finding that they have got or the way used in the other group. Those students were going comparing, testing, and modifying the result that their idea will develop. This kind of phase is to accustom the students in transferring the idea or concept in front of class.
- vi. Closing: The teacher and the students either conclude or summarise the concepts or ideas that involved in problem have been given because the way of solving the problem or the answer of the problem that has given very variation. In this case the students who have skill will feel uncomfortable of what they have got moreover for the students who have skill less. In this case the students need the guidance from the teacher to summarise or conclude the concepts or idea that involved in the problem that has given.

Moreover, this kind of context will be used as the steps in the learning with open ended approach. [Suherman, \(2001\)](#) said that the goal of teaching by using open ended approach is to help the students in increasing their activity in the creativity of Math especially in solving the problem together. In the other hand, between the activity and the thinking of Math by the students must be brief and complete. However this is more needed by the students in the result that they could develop in solving the problem based on their skill.

1.1. Open-ended approach

Based on the strategy in the material of learning, Open ended approach is same as the learning that has principle about the problem. A learning approach that in the process started to give the problem to the students. According to [Shimada and Becker \(1997\)](#) open-ended approach is an approach of learning which give a problem that has method or there has some of the way of solving the problem. Open ended approach could give the opportunity to the students to get the knowledge or the experience in finding the problem, knowing, and solving the problem with some of the technique. Meanwhile, in the open ended approach such the problem that were given tend to open ended problem or incomplete problem. The opening of the problem classified in three type following: (1) open the process, it means that problem has many of way in solving the problem fully. (2) at the end of the problem is open, it means that problem has many of true answer, and (3) the way of developing of continue problem is open, it means when the student have finished their problem they could develop the new problem and change the condition of the real problem.

1.2. Open-ended question

In learning process by using open-ended approach more commonly used the questions of open ended as the instrument in learning. Those has the same definition about open ended questions. [Hancock \(1995\)](#) and [Berenson and Garter \(1995\)](#) said that the questions in open ended is the questions that have more than one solving problem with the correct solving problem.

The most important thing in open ended question there has the applicable and freedom for the students to use some of method that they think best in solving the question the meaning of open ended were suggested to run the growing of the understanding of the problem.

In rearrange a question of open ended there has two techniques could be done.

1. the technique of working backward. This kind of technique consists of three steps

they are:

- a. identification the topic
- b. thinking of the question and writing the answer have made
- c. creating open ended question based on the answer that has done before.

2. Technique adapting a standard question. This kind of technique consists of three

steps:

- a. identification a topic
- b. thinking a standard question
- c. creating good question of open ended based on standard question have made before.

1.3. The level of thinking in Math

In arrange open ended question is better if the question base on the level of thinking in Math. The level of thinking that introduce by Bloom known as taxonomy Bloom (Bloom, 1956) classified the level of thinking into the six levels: *Memory, Comprehension, Application, Analysis, Synthesis and Evaluation*. Whereas Sanders (Way, 2003) level Comprehension divided into two categories: *Translation dan Interpretation*, in the result that the level of thinking used in Math become seven levels:

1. Memory or known as knowledge or recall or computation. In this stage the students demanded to discover or to recall the knowledge that has saved in the scema structure cognitive. The items that include in the stage of cognitive is about the base fact of knowledge, terminology, or manipulation that tend to routine of alogaritma.
2. Translation: the skill of the students to change the information into the symbol of different language.
3. Interpretation: the skill of the students to find the relationship between the fact, concept, principe, rule, and generalisation.
4. Application: the skill of the students to chose, to use and to apply the theory correctly or the way in the new situation. The step of this application covered the number of respond. Those repond were transfered into the new konteks that means the opposite of its. Bloom and his friends divided the skill into four, they are: the performance to finish routine, the performance to compare, the performance to analysis the data, the performance to know the pattern, isomorphic, and symmetrical.
5. Analysis: the skill of the students to schedule or to reduce a problem (question) into the smaller parts (componen) or to understand the relationship between those parts. The skill of the students in solving the problem non routine involved in this stage, that is the skill of the student to transfer the knowledge of Math that have learned into the new concept. The solving of the problem can be as the explanation of the problem into the parts. This steps of analysis divided into three styles: analysis toward the element, analysis toward the relationship and analysis toward the rule.
6. Synthesis: the skill of the students in thinking that means the opposite of an analaysis process. Sintesis is a process that combina the parts, elements, as logic in the result that can be as a structured pattern. The performance to find the relationship, the performance to rearrange the truth, the performance to think creative and also the performance in synthesis. (Way, 2003).
7. Evaluation: the skill of somebody to give judgement toward one of the situation, idea, method that based on the criteria.

2. Method

Based on the research question and the goal of the research in this case the researcher used developmental research. According to Seels and Richey (1994), the developmental research is oriented to the product whereas the process of developmental described in detail. In this research focused on the lesson plan, model of the learning, and the instruments needed.

2.1. Lesson plan and instrument of research

Some of the developed learning known as components inside its in this research are: (1) lesson plan (2) teacher's book, student's book, students answer sheet, topic analysis, assignment analysis, and map of the concept as the supporting model, (3) grouping in group, (4) scaffolding, supporting system for the teacher in responding the students performance.

2.2. The result from phase realisation

2.2.1. The result of realisation of lesson plan

Lesson plan and students answer sheet are the instrument. In operationaly those kinf of components explaned into the lesson plan. The activity of learning include of students activity and teacher activity based on the steps of learning and time.

2.2.2. The result of realisation of students activity answer sheet

In the students activity answer sheet there has many steps in solving the problem that can motivate the students to communicate their idea into the writing item. In solving the problem process the students

demanded to construct the concept and to write it into their own words in the students activity answer sheet. At the end of the students activity answer sheet there has some of questions to increase the students creativity.

2.2.3. The validation result of lesson plan

The mean of indicator value for each validation aspect of lesson plan from each validator is in the following table 1.

The mean of indicator in the table 1 was from the indicator values for each aspect given by each validators based on the number of indicator in that aspect. The aspect performance was from the mean given by the validator for each indicator based on the number of indicator for each aspects.

The value of V_a or mean total was 4,50 it got from the total aspect value based on the aspect number with the validation of lesson plan. The value of $V_a = 4,50$ if it referred to the validation criteria and the developed lesson plan has the validation level on the validity of criteria.

2.2.4. The validation result and students activity answer sheet revision

The mean of indicator value for every validation aspect students answer sheet from each validator is in the following table 2:

The mean indicator in this table 2 was from the indicator value for each aspect that given by each validator based on the indicator in that aspect. The aspect performance was gotten from the total mean given by validator for each indicator based on indicator for each aspects. The value of V_a or the total mean was 4,56 gotten from the total aspect based on the the validation aspect of students activity answer sheet. The value of $V_a = 4,56$ if its referred to the level of validation criteria and it means the students activity answer sheet has level of validation on validity level.

2.2.5. The validation result by validator and assignment revision

Before the creativeness was tested, at first its facilitated by the validator and practician. In this case, the researcher studied the question in qualitative and its purpose to test the quality of question toward indicator, material, construction, characteristic of question and language.

In this following data was the mean indicator value for each validation aspect of the result learning test in table 3.

The mean indicator in this table 3 was gotten from the number of indicator values for each aspect. Its values given by the validator based on the indicator in that aspect. The aspect performance was gotten from the mean by validator for each indicator based on the number of indicator for each aspect.

The value of V_a or the mean total was 4,37 from the result divided number and total value $V_a = 4,37$ based on the number validation aspect of the result learning test . The value of $V_a = 4,37$ if its referred on the the criteria validation level it means in learning result test has validation level on content validity.

2.3. The experiment result

The activity in the experiment items are : (1) to test the experiment toward lesson plan students activity answer sheet, (2) to analyse and to evaluate to the data of experiment result to determine the avitiveness of learning, (3) to revise the lesson plan and students activity ansher sheet, and also instrument based on the result of analysis and experiment evaluation. Before the experiment session applied in the classroom the researcher have explained the way practicing process in learning in the class to the model teacher, in this case the researcher have pointed 2 representatives person to survey the activity of the students and teacher, 2 representatives person to survey the teacher performance in teaching the material, and 2 representatives person to survey in applying model of learning. Then, in hope the model of teacher and the representatives person have same perception in understanding model of learning and aspects of indicators.

The data analysis result for each of the experiment and the revision have done toward the model of book and lesson plan are in the following.

The process of experiment explained in the following.

1. Firstly, the teacher gives the aperception, organizes the students into the group, and gives the students activity anwer sheet.

2. The students do the students' activity answer sheet in group.
3. The achievement of Math concept of students' activity answer sheet.
4. The students discussed the results of their answer sheet and investigated the application question with open ended.
5. Finally, Teacher helped the students to conclude the leaning and to give homework for them.

Conclusion

The open ended approach and question can give the freedom to students in giving expression of their utterance and their opinion in order to improving their thinking skills. Before the process of learning the teacher prepared the lesson plan that consist of: students respond, indicator, determining the problem of open-ended that involving about the level of thinking Math, consist of the simple Math level they are: Memory, Translation, and Interpretation, Application, Analysis, Synthesis and Evaluation. Then, the teacher gave the brief information with the enough time with the result that the students have wide opportunity in order to aplicate the knowledge and also they have skill in Math more comprehensively.

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Tables

Table 1: The mean value of indicator for each judgement validation aspect of lesson plan

No	Aspect performance	The mean of indicator value for each aspects by Validator							Aspect value
		I	II	III	IV	V	VI	VII	
I	Criteria	4,67	4,50	4,00	4,33	4,67	4,50	4,33	4,43
II	Content	4,00	4,63	4,50	4,75	4,63	4,63	4,75	4,56
III	Language	4,67	5,00	4,33	4,00	4,33	4,00	4,33	4,38
IV	Time	5,00	4,50	5,00	5,00	4,00	5,00	3,50	4,57
V	Method	5,00	4,14	4,00	4,57	3,86	4,57	5,00	4,45
VI	Closing	4,50	5,00	4,50	4,00	4,50	5,00	4,50	4,57
Va value or mean of complete aspect									4,50

Table 2: The mean of indicator value for every validation aspect of student's activity answer sheet

No	Aspect performance	The mean of indicator value for each aspect by Validator							Aspect value
		I	II	III	IV	V	VI	VII	
I	organisation Students activity answer sheet	4,33	4,67	5,00	4,67	5,00	4,67	4,33	4,67
II	Procedure	4,67	5,00	4,67	4,33	4,33	4,67	4,33	4,57
III	Question/ problem	4,75	4,50	4,50	4,00	5,00	4,50	4,00	4,46
Va value or the mean of complete aspect									4,56

Table 3: The mean of indicator value for each validation aspect of the result learning test

No	Aspect Performance	The mean of indicator value for each aspect by Validator							aspect value
		I	II	III	IV	V	VI	VII	
I	Material	3,75	4,50	4,50	3,75	3,50	3,50	5,00	4,07
II	Constructions	4,50	5,00	4,50	5,00	4,50	4,00	4,50	4,57
III	Language	3,67	5,00	4,33	4,67	4,67	4,67	4,33	4,48
Va value or the value mean of complete aspect									4,37