

THE APPLICABILITY OF SCIENTIFIC APPROACH TO INCREASE THE STUDENT'S CRITICAL THINKING SKILL IN MATHEMATIC OF THE STUDENT 5 GRADE

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Abstract

The goal of this research is to increase the student's critical thinking skill using scientific approach in mathematic of the students 5 grade SD Negeri Ledok 01 Salatiga. It use Classroom Action Research (CAR), it will do to solve learning problems in the classroom. The writer does Classroom Action Research (CAR) collaboratively with the teacher of 5 grade SD Negeri Ledok 01 Salatiga. The subjects of this research is the students 5 grade SD Negeri Ledok 01 there are 30 students consists of 16 boys and 14 girls. The result of the analysis data show the students critical thinking skill of the pre-cycle is 26% high level, 20% intermediate level and 54% in the low level. First cycle it about 50% high level, 43% intermediate level, and 7% low level, second cycle 57% high level and 43% intermediate. Based on the result above, the writer can conclude the scientific approach is increasing the students critical thinking skill in mathematic of the student 5 grade SD Negeri Ledok 01 Salatiga.

Keywords: *Scientific approach, Critical Thinking, mathematic.*

INTRODUCTION

The student creativity's improvement is emphasized in Curriculum Of 2013. The Curriculum of 2013 demands the student to observate, ask, think, and communicate somethings the learnd (Kemendikbud, 2013:3-4). This Curriculum is based on the scientific approach.

The improvement of Curriculum 2013 in learning mathematic is increasing students learning and experience they got. The teacher advited to move from the traditional approach to the inovative approach so that the goals of the study is succes. Innovative learning is designed to facilitate student progress in the learning process as well as to realize student's creative and critical thinking.

Students understanding to know the material with a scientific approach is not only from the teacher's information but also from every where and any where, this is the emphasis of scientific approach (Majid 2014:193). Learning by using the scientific approach is the learning activities that encourage students to be more active in building the concept through the stage of observing, trying, reasoning, formulating the problem and collecting the data they found (Daryanto 2014:51).

Learning by using scientific approach especially on mahematic, students will be equipped with a variety of knowledge skills and disposition to think, by those reasons they provided the demands in the life of society and state in order to compete in a fair manner and able to cooperate with other nations, and able to solve their problems of life by critical and creatively thinking (Maulana 2015:118).

Mastery of the material and learning strategies that are less precise, are the factors that affect the ability of mathematical understanding. Therefore, one way to encourage the ability of understanding mathematic required is an approach that can cultivate the ability of students understanding, one of them is scientific approach. Learning process by scientific approach is the learning process designed to students in order to active in the learning activities. In the case, the students is expected to able finding out some informations from various resources through observation. The teacher is expected to develop on learning approach that encourage students more active in the learning activities. Scientific approach is one of way to solve those problems. It gives understanding to the students to know, ability various material, others information from various resources, in every time and every where, not only from the teacher's given to them. In this case, the learning activities is centered on the students namely studying the matter by discussion to solve a problem to that the students critical thinking increased level. Knowing student's ability of mathematic is in low level, this research offering to solve it by using scientific approach. Furthermore, the students is in centered activity so that they are able to cooperate each other. This approach expected more meaningful and give the impression for the students. To know the level of the ability students to think of SD Negeri Ledok 01, the writer observing and interviewing to the teacher of 5 grade.

The result of the observations found that the condition of learning that occurs in the class supported, but also there are some students are not supporting. It can be seen from their respons when the learning activities is done. The teacher only explained, gave the question, so that the students are not active and creative to think when they got the problems. In general, the students tend to memorizing the formula so, in solving problems they just

focused on the book. They got difficulties to raise the new ideas in solving the problems. When the teacher explain the material, some students not responding, they choose to talk with their friend. When the teacher asking the students they can not answer and just be quiet, those are the impact of traditional approach. Basec on the observations and interview the writer found data from 30 students only 8 students (26%) in high level, 6 students (20%) in intermediate level and 16 students (54%) in low level. Therefore, the writer will do action to increase students critical thinking skill by applicating scientific approach. The scientific approach is motivating the students more active increasing their skill and knowledge.

The relevan research to this had be done by Nuhyal Ulya (2016), Ratna sariningsih, Grida kadarisma (2016) that showed the implemantation scientific approach is ability to increase students critical thinking skill in mathematic.

Based on those result, the writer will know the students critical thinking skill of 5 grade SD Negeri Ledok 01 saltiga. This research will give benefit:

1. Teoritical, this research is expected give an idea of the students critical thinking skill of students SD in mathematic
2. Practice, the students increasing their ability to think creative and active and are able to solve the problems they get in daily life. For the teacher as an to create their methode in learning process.

REVIEW OF RELATED LITERATURE

The Nature of Mathematic

According to the experts of math, is science discussing the patterns or regularity and level (*order*). It shows the math's teacher must facilitate their students to learn creative through (pattern) (Shadiq, 2014:xii) quoted by Muhammad daut Siagan (2016:59). While Siswono (2012:2) quoted by Muhammad daut Siagan (2016:59) also records a collection of mathematic understanding made by experts in the 1940s to 1970s. The definition of math is consist of: (1.) Math of science of numbers and shapes, (2.) Math is about quantity, (3.) math is about numbers, shapes, quabty and wideness, (4.) math is about relation, (5.) math is about abstact form, (6.) math is about deductif. Those meaning influences to the objects of the skill from mathematicians it self.

Based on the opinion above conclude that mathematic is science result of thinking that discuss of numbers, the arround, and wide (capacity).

Scientific Approach

Fauziah (2013) quoted by (Maria Emmanuela Ine 2015: 271) scientific approach invite the students to conclude problems in formulation of problem

form. The students do observation and found the problem and increasing and presents the result of the work. Nur (dalam Putra, 2013:12) scientific approach is learning approach where the students invite to look for the knowledge that related the learning material and directed to find the facts and values of the life. Irwandi (2012) quoted (Maria Emmanuela Ine 2015: 271) scientific approach is filling learning activity contextual based. The knowledge and skill obtained by the student is not the result of the remember but the result of its discovery.

This is in line with the research conducted by Ratna sariningsih, Gida Kadarisma (2016), the implementation of scientific approach Etnomathematic based able to increase students creativity thinking skill. The research do by Nuhyal Ulya (2016) cooperative learning type of Group Investigation by using scientific approach is increasing the ability mathematic concept in the material of flat building of 5 grade SD Genuk Sari 02 Semarang.

The steps of learning scientific approach consists of 5 step. Firstly, observe, in this steps the students activity is by seeing, reading, observing. Listening, gathering (use or not the instrument). Secondly, asking question, the students asking some questions related to the information they observed. The third, is collecting the data, the students looking for the information from other resources through various ways. Fourth, is associations, they do analysis the data and conclude it. The last step is communication, in this step they retell anything they got.

From this opinion, can conclude that scientific approach is learning process to invite students do observation and asking them look for the facts and knowledge related to the material of learning.

Critical Thinking

Fisher in Danu Aji Nugraha, Achmad Binadja, Supartono (2013), critical thinking is the ability to evaluate from observation result and communication, information and argumentation. It is an effort to test something believed the truth or knowledge with the proof of evidence to support so that can be taken the right conclusion. In simple ways according to Duron in Danu Aji Nugraha, Achmad Binadja, Supartono (2013) the ability to analyse and evaluate of information. The critical thinkers found the important problem and able to solve it by abstracts ideas and communication it effectively. According to Facione in Danu Aji Nugraha, Achmad Binadja, Supartono (2013), there are 6 definition of it. Explanation, interpretation, analysis, inference, evaluation, and the setting self.

In line with the research conducted by Karunia Eka Lestari (2014) Implementation *Brain-Based Learning* is able to increase connection and

critical thinking and motivated the students learning. The research by Farida ardiyanti, winarti (2013) and Risa Hartati, Hayat Sholihin (2015) critical thinking can be increased by using *Problem Based Learning* (PBL). Nova Puspitasari Nurlaeli, Siti Nurul Hidayati, Tutut Nurita (2016) and Eka (2011) *Discovery Learning* model scientific orientation and implementation cooperative learning *Think Pair Share* it increasing critical thinking in learning IPA student of SD.

METHOD OF THE RESEARCH

This research is using Classroom Action Research (CAR), it is do to solve the learning problems in the class. Classroom Action Research (CAR) will do in 5 grade of SD Negeri Ledok 01 with the address at Jalan Argo Tunggal 3, Ledok, Kec. Argomulyo. There are 30 students consists of 16 boys and 14 girls. In this research, the writer will cooperative with the teacher to discuss the problems in learning process. Finding the problem about critical thinking skill, so the writer will make a plan of the Classroom Action Research by using scientific approach to increase the students critical thinking skill. Technic and instrument of data collection that the writer do it some statements in instrument form of self-judgement of critical thinking skill that given to the students to measure it their level. The written question is for knowing the students understanding after they join the learning process. Analysis technique of this research is quantitative data by descriptive analysis to measure the percentage of the level critical thinking skill students and comparative technique of the cycle.

TECHNIQUE OF DATA ANALYSIS

Cycle I and II

The cycle I and II is done by using scientific approach in learning process in order to students critical thinking skill more active and creative. It can be seen in the tabel bellow.

Table 1
Recapitulation of students critical thinking skill

Cycle I					Cycle II	
No.	Interval	Criteria	Frequency	Percentage	Frequency	Percentage
1.	≥ 61	High	15	50	17	57
2.	46 – 60	Intermediate	14	47	13	43
3.	31 – 45	Low	1	3	-	-
Total			30	100%	30	100%

Based on the tabel above, the students is skill is increasing in the cycle I, 15 student (50%) in high level, 14 students (47%) is in intermediate level and 1 students (3%) in low level.

In the cycle II, 17 students (57%) in high level and 13 students (43%) is intermediate level.

This approathe giving advantages, one of it is increasing students critical thinking skill. Learning by using scientific approach especially on mahematic, students will be equipped with a variety of knowledge skills and disposition to think, by those reasons they provided the demands in the life of society and state in order to compete in a fair manner and able to cooperate with other nations, and able to solve their problems of life by critical and creatively thinking (Maulana 2015:118). This is in line with the research conducted by Ratna sariningsih, Gida Kadarisma (2016), the implementation of scientifis approach Etnomathematic based able to increase sudents creativity thinking skill.

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Hawa Liberna (2015) conducting research on students mathematic critical thinking skill can be improved through the use of the improve method in the material system of two variable linear equations. The research do by Nuhyal Ulya (2016) cooperative learning type of Group Investigation by using scientific approach is increasing the ability mathematic concept in the material of flat building of 5 grade SD Genuk Sari 02 Semarang. Farida Rahmawati (2011) in her thesis entitled to "Improve critical thinking skills about the characteristics of building space by applying the *Number Heads Together* (NHT) type to students 5 grade SD Negeri Balerejo 01 Kebonsari Madiun school year 2010/2011". The result of the study indicatedthat by applying type cooperatif learning *Numbered Heads Together* can improve critical thinking skills about the characteristics of building space student 5 grade SD Negeri Balerejo 01 Kebonsari Kabupaten Madiun.

Calsam (2007) in her thesis entitled to "Implementation learning models *Realistic Mathematics Education* (RME) to improve students learning outcome 6 grade SD Negeri Limbangan 03 school year 2006/2007 in the subject of fractional counting operations". From the result of research and discussion it can be concluded that there is an increase in mathematic learning outcome in the subject matter of fraction using model education RME. Dwi Nurjanah (2010)) in her thesis entitled to "Effort to improve critical thinking skills through approach *Realistic mathematics Education* SD Negeri 3 Mojopuro, Wuryantoro class 3 school year 2009/2010". Based on the result of this class action research it can be concluded that students critical thinking skill in mathematic problem solving have increased.

Conclusion

Based on the research above, can be concluded that implementation of scientific approach is able to increase the students critical thinking skill. This can be evidenced in the cycle I is student (50%) in high level in cycle II, 17 students (57%) in high level. Furthermore, the conclusion of the scientific approach to increase the students critical thinking skill in mathematic of 5 grade SD Negeri Ledok 01 is success.

Suggestion

Based on the conclusion above, the writer advices to the teacher to implementate the scientific approach in order to increase the students critical thinking skill in mathematic.

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