

Humanistic Mathematics Learning Assisted by Interactive CD using SAVI approach to Increase Students' Critical Thinking Skill

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Abstract

The purpose of this research was to evaluate the response of teachers and students towards the humanistic mathematics learning assisted by interactive CD using SAVI approach and to knowing the effectiveness of humanistic mathematics learning assisted by interactive CD using SAVI approach to increase the students' critical thinking skill. This research is an experiment research. Subject in this research are students of the junior high school in Central Java. The results showed: (1) the teacher's response was 3.29 out of a maximum score of 4.00, it indicates a good response. (2) the student's response was 3.43, indicating a very good response, and (3) the mean score critical thinking of the experimental group students' is 82.95 of the maximum score of 100, showed good critical thinking. Therefore, the use of humanistic mathematics learning assisted by interactive CD using SAVI approach gets good response from the teachers and students and also improve students' critical thinking skill.

AMS subject classification:

Keywords:

1. Introduction

One of the problems of education in Indonesia is still lagging behind the development of education. According to data from the Human Development Index (HDI) of Indonesia, in 2013, Indonesia has score 0,629, which means was ranked 121 of 186 countries and 8-state territory. The whole country in the world is classified into four cases based on the

score of the final result. The four cases are very high human development, high human development, medium human development, and low human development. Indonesia with 121 ranked occupies the medium human development.

Brown^[3] (1996:1316) said that the concept of humanistic mathematics learning at school, not only with regard to the views of teaching mathematics that may be of and its relationship with the logic alone, but also with regard to the encouragement of mathematics teaching associate with the deepest thoughts and emotions of human beings. Therefore, students are expected to have the provision of critical thinking skills, problem solving abilities, and decision making ability.

One of the mathematics learning characterized by humanistic mathematics learning is the study of mathematics by using SAVI approach (Somatic Visual Auditory Intellectual). According to Meier^[1-4] (2004: 91), SAVI approach is a learning approach that combines physical movement with intellectual activity and the use of all senses in learning. This learning approach has four elements, namely: somatic learning (learning by moving and doing); auditory learning (learning by listening and speaking); visual learning (learning by observing and describing); intellectual learning (learning by solving problems and reflection).

The preliminary research has been carried out by creating an interactive CD with SAVI approach and results from this preliminary research were that the results of expert validation declare all devices are developed and can be used with an average score of 3.62 out of a maximum score of 4.00. The trial results demonstrating the humanistic learning mathematics assisted interactive CD with SAVI approach effectively used to increasing critical thinking ability. This effectiveness, characterized by: (1) the average score of the experimental class of 81.28 is above the Minimal Mastery Learning of 70.00, so it can be concluded due classical achievement of students, (2) intellectual activity and motivation students during the learning process affects the achievement of 87.2%. (3) the average achievement of experimental class is 81.3 better than the control class that is only 68.4.

1.1. Critical thinking

Critical and creative thinking embodies the higher order thinking. Critical thinking is seen as a thinking person's ability to compare two or more information, for example the information received from the outside with the information held. If there are differences or similarities, then he will ask you questions or comments in order to obtain an explanation.

Ernest^[8] (2004) defines critical thinking as the ability to make conclusions based on observation and information. Beyer^[2] (1987) describes critical thinking as an activity judging the authenticity, accuracy, and the value of a claim, belief and argument. In short, he stated that critical thinking is the act of making a reasonable assessment. Norris stated that forward- thinking critically is the application of all the knowledge and feelings to evaluate his own thoughts, particularly to change behavior. Paul Ernest^[9] (1991), defines critical thinking as the ability to make conclusions based on observation and information. According to Beyer^[2] (1987), illustrates the critical thinking as an accurate evaluation

activities, beliefs, and by using arguments, or briefly he stated that critical thinking is an act that a person in making judgments with good reasoning. Furthermore Inch^[11] (2006), stated that critical thinking has eight interrelated components, namely (1) The question at issue (problem), (2) purpose, (3) information (lack of data, facts), (4) concepts (theory, definition, axiom, postulate), (5) assumptions (early completion), (6) points of view (the framework of the settlement), (7) interpretation and inference (completion and conclusions), and (8) implications and consequences.

Based on the above opinions, it can be concluded that a person's critical thinking with major features: (1) resolving a problem with a specific purpose, (2) analyze, generalize, organize ideas based on facts or information, and (3) draw conclusions in resolving these issues systematically with the correct arguments. Characteristics associated with thinking, then in the process of mathematics learning in junior high school, a teacher should think of learning scenarios and using learning tools that aim to improve cognitive abilities and critical thinking skills. Bert Johnson^[1,2] (2014), says that the analysis indicate that more responses during practice is associated with the test task performances and this is stronger for mathematically founded reasoning of participants.

1.2. Learning Based Humanistic

Humanistic mathematics learning means putting mathematics as part of a human real-life. The learning process also put the students not as objects, but subjects who are free to find understanding based on everyday experience. Learning outcomes of humanist education is the reason people are critical and able to express themselves so as to established communication quality (Drost, 1998: 110)^[6].

In addition, the mathematics learning in schools is also considered to be off to develop the personality of students. Learning mathematics is more focused to develop cognitive abilities, even though the development of attitudes and skills are also part of the needs of students in social life. It happens because there are several reasons, among others: there are some mathematics teacher who do not like mathematics, the teacher is difficult to adapt the model of innovative learning, mathematics teacher assumed that the material of mathematics as a hierarchical structure that should be taught in the order of the curriculum, and teachers assume that purpose mathematics only on the cognitive aspects without adding any other purpose, such as the ability to think critically, creatively and shape the character of the students.

1.3. Humanistic learning mathematics assisted by interactive CD using SAVI approach

Humanistic mathematics learning is an approach to learning the characteristics of the cases that meet the characteristics of humanistic cases (Haglund, 2004)^[11], which take into account the characteristics of the process of the creation of critical thinking ability of students assisted by interactive CD with SAVI approach. The activities carried out in the research are: (1) puts students in the position of investigating, not only the receiver of facts and procedures through the step of perception are dug prior knowledge; and the exploration step is the material construction using an interactive CD (element visual), (2)

the teacher asked a question which relates prior knowledge of the material to be learnt, the teacher explained about the material with the help of interactive CD and its benefits in everyday life (visual, auditory and intellectual elements), (3) students engaged in learning divided into groups with each group containing 4-5 students (somatic elements). Learning activities at this step students discuss working list activity student (humanist elements work together). Teacher as facilitator in the discussions progressed, (4) any groups of participants were asked to express opinions on the results of discussions they have done. At the time exposure results of the discussion group, other groups can give their opinions (humanist elements of mutual respect). Each group made a presentation in turn (Somatic, Auditory, Visual, and Intellectual elements). The duty of the teachers here give positive feedback and reinforcement in the form of oral, written, or a gift to the success of students, (5) facilitate students' reflection to gain a learning experience that has performed consistently and programmed (intellectual element). A student was asked to repeat the contents of the interactive CD study at home (Somatic, Auditory, Visual, and Intellectual elements), and (6) the teachers together with the students make a summary of the lesson to reflect on the form of assignment or homework.

2. Research Problems and Research Purposes

Based on the introduction, then formulated some issues that are the focus of research is

1. How is the response of teachers and students towards the humanistic mathematics learning assisted by CD interactive using SAVI approach?
2. How does the effectiveness of humanistic mathematics learning assisted by CD interactive using SAVI approach to increase the students' critical thinking skill?

interactive using SAVI approach to increase the students' critical thinking skill? The purpose of this research was to evaluate the response of teachers and students towards the humanistic mathematics learning assisted by interactive CD using SAVI approach and to knowing the effectiveness of humanistic mathematics learning assisted by interactive CD using SAVI approach to increase the students' critical thinking skill.

3. Method

3.1. Type of Research

This research is the experiment research. Instrument of research that have been include: (1) Syllabus, (2) Lesson Plan, (3) Student Work Sheet, (4) Interactive CD, and (5) a Test of critical thinking skill. The instruments in this research is the students' questionnaire responses and the teacher's questionnaire response as well as critical thinking test.

3.2. Research Procedure

The first step was done by conducting field trials with population Junior High School in Central Java and take samples 7 Junior High School in the city of Semarang, Pati and

Demak regency, namely; Junior High School 1 Demak, Junior High School 1 Karangtengah Demak, Junior High School 4 Pati, Junior High School 1 Jakenan Pati, Junior High School 15 Semarang, Semarang Junior High School Mardi Siswa and Junior High School PGRI 2 Semarang. The next phase is that mathematics learning tools given to teachers to obtain a response, and then given to students. Based on the responses of teachers and students, it made improvements in order to obtain an accountable learning device. The step of the learning process is carried out using a device that has been revised and ends with giving tests associated with critical thinking.

3.3. Data Analysis Technique

The data analysis technique used in this research is that a descriptive analysis of the data associated with the response of teachers and students. Inferential analysis for critical thinking test data used to test the mean difference between the experimental group and control group. Furthermore, the comparative test results of students' critical thinking test experimental group with a Minimal Mastery Learning in the amount specified by the school.

4. Research Finding

Experiment was done by holding the test device with a population of junior high school mathematics learning in Central Java and sample 7 Junior High School in the city of Semarang, Pati and Demak, namely; Junior High School 1 Demak, Junior High School 1 Karangtengah Demak, Junior High School 4 Pati, Junior High School 1 Jakenan Pati, Junior High School 15 Semarang, Junior High School Mardi Siswa and Junior High School PGRI 2 Semarang. Results associated with the response of the teachers and students towards the mathematics learning are presented in Table 1 and Table 2 below:

Table 1: Response to the research of Mathematics Teachers

No	Name of School	Score	Max Score	Condition
1.	Junior high school 1 Demak	3,20	4,00	Good
2.	Junior high school 1 Karangtengah Demak	3,20	4,00	Good
3.	Junior high school Jakenan Pati	3,20	4,00	Good
4.	Junior high school 4 Pati	3,40	4,00	Very Good
5.	Junior high school Mardasiswa Semarang	3,20	4,00	Good
6.	Junior high school PGRI Semarang	3,60	4,00	Very Good
7.	Junior high school 15 Semarang	3,20	4,00	Good

Based on Table 1 above, the average score is 3.29 out of a teacher's response maximum score of 4.00. This shows that the teacher responds well to the humanistic mathematics learning assisted by interactive CD using SAVI approach.

Based on Table 2 above, the average score of the students' is 3.43 out of 4.00.

Table 2: The response of students to the learning of mathematics

No	Name of School	Score	Max Score	Condition
1.	Junior high school 1 Demak	3,60	4,00	Very Good
2.	Junior high school 1 Karangtengah Demak	3,40	4,00	Very Good
3.	Junior high school Jakenan Pati	3,60	4,00	Very Good
4.	Junior high school 4 Pati	3,20	4,00	Good
5.	Junior high school Mardisiswa Semarang	3,20	4,00	Good
6.	Junior high school PGRI Semarang	3,60	4,00	Very Good
7.	Junior high school 15 Semarang	3,40	4,00	Very Good

This shows that the students responded very well to the humanistic mathematics learning assisted by interactive CD using SAVI approach. Then, test the mean differences in students' critical thinking skills. This difference test was intended to compare the mean of a variable between the experimental class and control class. Data critical thinking test scores of experimental class and control class first tested the similarity variance. The hypothesis to be tested is that:

Ho : (there is no difference variance between the experimental class and control class).
It means that both classes are homogeneous classes.

H1 : (there are differences in variance between the experimental class and control class).
It means that both classes are not homogeneous.

In this research data analysis of variance equality test using the Independent Sample Test and the results are shown in Table 3.

By looking at the table independent sig Samples Test by $0.229 = 22.9\%$. The sig value is greater than 5% then Ho is accepted, so that we can conclude there is no difference variance between the experimental class and control classes or variants of both classes are homogeneous. That information is used to test differences mean that the t-test. Since both classes declared homogeneous then selected row equal variances assumed. The hypotheses to be tested are:

Ho : (no critical thinking mean difference between the experimental class with a class of control)

H1 : (no critical thinking mean difference between the experimental class with a class of control)

Furthermore, by looking at the values in column sig (2 - tailed) column of Independent sample ttest of $0.000 < 0.05$ indicates that the H0 is rejected, meaning that the mean critical thinking classes experimental and control group differed significantly. To determine which classes have higher mean values used analytical Group Statistics can be seen in Table 4.

Table 3: Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Critical Thinking	1.478	.229	4.744	62	.000	12.844	2.708	7.431	18.256
			4.744	57.973	.000	12.844	2.708	7.424	18.264

Table 4: Group Statistics

Cs		N	Mean	Std. Deviation	Std. Error Mean
Critical Thinking	Experiment	32	82.95	12.174	2.152
	Control	32	67.35	9.294	1.643

By looking at the mean critical thinking on the mean column, table Statistics Group acquired 82.95 to 67.35 for the experimental class and control class. These results indicate that critical thinking class experiment better than the control class. Based on these results we can conclude that the experimental group had a higher mean value completeness compared to the mean value of the thoroughness of the control cs. Based on these results, it can be concluded that learning using humanistic mathematics learning assisted by interactive CD with SAVI approach that applied to the experimental class has been able to improve students' critical thinking than students in the control class.

5. Discussion

The positive response of the students after implementation of humanistic mathematics learning assisted by interactive CD with SAVI approach, supported by several factors namely (1) The learning atmosphere is not tense and students are able to discuss and creativity, (2) interactive CD used has been able to attract the attention of students, because along with an attractive appearance, and with the questions to the students' understanding, also given the level of the easiest to the most difficult, and (3) the student feels acquire new learning experience and quite different from the previous learning experience.

Then the teachers also had a good response to the learning process using the humanistic mathematics learning assisted by interactive CD with SAVI approach. Things that can be seen as a contributing factor obtaining positive responses from mathematics teachers, namely the desire of teachers to use these media to the next lesson. Teachers stated that the media has been well made and can assist in the implementation of learning, especially in terms of preparing the material and develop critical thinking skills. By using humanistic mathematics learning assisted interactive CD using SAVI approach, students can learn to be more responsible to construct the material for themselves and develop their critical thinking skills. This is in line with the opinion of Aida and Zah[1] (2009) states that learners are motivated and in order to go to cs or active, learning mathematics are likely to succeed. Motivation of learners to grow through the use of interactive CD and that make learning more interesting. Another impact of this condition is increasing students' critical thinking, it is appropriate with opinion of Piaget (Brooks and Brooks, 1993) which says that in the assimilation, the stimulus is interpreted based on a scheme that is owned by someone. If the stimulus that goes in accordance with the existing scheme, then one can directly respond to the stimulus.

6. Conclusion

Stages of this study do dissemination by organizing test the media humanistic mathematics learning assisted by interactive CD with SAVI approach with a population of junior high school in Central Java and seven Junior High School in the city of Semarang, Pati and Demak as samples, namely; Junior High School 1 Demak, Junior High School 1 Karang Tengah Demak, Junior High School 4 Pati, junior high school 1 Jakenan, Junior High School 15 Semarang, Junior High School Mardi Siswa and junior high school PGRI 2 Semarang. The results obtained are as follows.

1. The teachers respond to the learning process using the humanistic mathematics learning assisted by interactive CD with SAVI approach is good. This is shown also by the average response of 3.29 of a teacher is the maximum score, it shows a good response.
2. The students responded to humanistic mathematics learning assisted by interactive CD with SAVI approach is very good. This is shown also by the average student response that is 3.43 of a maximum score of 4.00, it shows a very good response.
3. Humanistic mathematics learning assisted by CD interactive with SAVI approach is effective to improve students' critical thinking. It can be seen from the mean value of critical thinking is the experimental class that exceeds 82.95 Minimal Mastery Learning 70 and better than the mean control class 67.35.

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