The Effectiveness of SAVI Approach with Macromedia Flash Toward Students' Critical Thinking Ability

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Abstract: One of study approaches which can be chosen by a teacher as a variation in biology learning is SAVI (Somatic, Auditory, Visualization, Intellectual) approach. SAVI approach can be applied with macromedia flash in order to keep up with IT development. This research aims to reveal the effectiveness of SAVI approach with macromedia flash towards the critical thinking of 2nd grade students of SMA Negeri 1 Depok focusing on the excretion system subject. This research uses quasi experiment type with pretest-posttest non-equivalent control group design. SAVI approach is used for the experiment group. Meanwhile scientific approach is used for the control group. The population of this research is all 2nd grade students of SMA Negeri 1 Depok Sleman with total 109 students who are divided into four classes. Through cluster random sampling, the students of 2nd grade science 1 class are chosen as the experiment class. Besides, the students of 2nd grade science 2 class are chosen as the controll class with the amount of sample are 56 students. Data collection technique which is used to analyze the students's critical thinking is an essay test. In addition, the hypothesis test uses independent sample t-test through SPSS 16.0 for windows. The result of the research reveals that the SAVI approach with macroflash is considered effective in increasing the critical thinking ability of the 2nd grade students of SMA Negeri 1 Depok Sleman in excretion system subject.

Keywords: *SAVI, macromedia flash, critical thinking ability*

INTRODUCTION

Undang-Undang Dasar Republik Indonesia number 20 year 2003 concerning the National Education System concerning education policy in Indonesia is directed at achieving eight goals. Based on these eight objectives, in Rencana Pembangunan Pendidikan Nasional Jangka Panjang year 2005-2025, Indonesia has a vision to produce Smart and Competitive Indonesians (Insan Kamil / Insan Paripurna) (Pendidikan, Kebudayaan, & Indonesia, 2014). In supporting the achievement of education development goals, several important components that can be used as indicators include mastery of science and technology (science and technology) for students and at the same time become one of the keys to the superiority of a nation in the era of globalization. Meanwhile, increasing the academic qualifications of all human resources, namely teachers and education personnel are other determinants and at the same time are the nation's assets in improving the quality of education. Some facts show that the quality of Indonesia's human resources is far behind compared to developed countries.

Indonesia have to work hard to improve the quality of their human resources because we still lags behind the other Asian regions. In learning activities, teachers are professionals who have significant influence. Developing the potential of the students is one of the roles and duties of the teacher. The role of other teachers is to determine the effectiveness and efficiency of learning activities. In addition, the teacher has a role as teacher, motivator, mediator, class manager, participant, and evaluator. Teachers play an important role in planning and implementing learning (Ayuni, 2012). Therefore, it is very important to increase the creativity, quality, and professionalism of the teachers.

Peraturan Pemerintah number 19 year 2005 concerning Standar Pendidikan Nasional in Bab IV related to Standar Proses, article 19 paragraph 1, states that the learning process in educational units

is held interactively, inspiring, fun, challenging, motivating students to actively participate, and providing sufficient space for initiatives, creativity, and independence in accordance with the talents, interests and physical and psychological development of students. In order for this to happen, various ways can be done by the teacher to create a learning environment that is interactive, inspiring, fun, challenging and motivating students.

Fun learning can be done by the teacher by implementing various approaches, strategies, models and appropriate learning media. One learning approach that can create a fun learning atmosphere is SAVI (Somatic, Auditory, Visualization, Intellectually) designed by Dave Meier. The SAVI approach is an approach that involves all the senses in the body to support learning, learning to actively move physically, by using the senses as much as possible, and making the learning process involve the whole body or mind (Hikmah, 2018).

In the SAVI approach, students are required to actively participate in learning such as observing, conducting experiments, presenting material, then solving problems based on knowledge that have been obtained during the learning. Engagement in learning will attract students' interest in learning. Thus, students do not just sit quietly and listen to the teacher who teaches in front of the class. Learning which employs SAVI approach will be more interesting if it is equipped with learning media. Learning media that can be used are such as teaching aids, LKS (Student Worksheets) or interactive videos. Thus, students can understand everything they learn so that they are more trained in their mindset in understanding the concepts learned. The concept that can be understood more easily by students has an impact on improving learning outcomes, especially the cognitive domain.

In the cognitive area, it contains various aspects, one of which is the ability to think critically. Critical thinking ability is the ability of students to explore and deal with things by not only accepting but also asking about the truth. Students who have critical thinking skills are expected to be able to provide simple explanations, provide further explanations, and apply strategies and tactics. Critical thinking ability is a competency that must be mastered by students. As revealed by Sudiarta (Ristiasari, Priyono, & Sukaesih, 2012), critical thinking has been proven capable to prepare students in thinking in various disciplines because critical thinking is a cognitive activity carried out by students by dividing thinking in real activities by focusing on making decisions about what is believed or done.

Responding to the demand for of science and technology mastering for students in the era of globalism, it is appropriate for teachers in the learning process to involve technology in it. Various technology-based learning media can be selected by the teacher to create a more modern and enjoyable learning atmosphere. One of the media that is being used is macroflash. With the help of Macroflash, the teacher can easily explain the concepts that are considered difficult before through video, images, and animation. The choice of the media must be adapted to the learning approach chosen. The SAVI learning approach which involves the ability to listen and see is appropriate if it is assisted by Macroflash.

The SAVI learning approach that is assisted with macroflash is expected to be in accordance with the demands of education in the era of globalization and so it can improve students' critical thinking skills. Based on the explanation, the researchers were interested in conducting research on the effectiveness of the SAVI learning approach assisted by macroflash to improve students' critical thinking skills.

METHOD

The type of this research is quasi-experimental (quasi experimental research). This type of research is selected because not all variables that appear and experimental conditions can be fully

controlled by the researcher. The research design used was the pretest-posttest non-equivalent control group design. The design of the research design is illustrated in the table below.

Table 1. Pretest-Posttest Design of Nonequivalent Control Group Design

Group	Pretest	Treatment	Posttest
E	O_1	X_1	O_2
K	O_3	X_2	O_4

Description:
E : Experiment Group
K : Control Group
X_1 : Biology learning with the SAVI approach
X_2 : Biology learning with a scientific approach
O1: Pretest critical thinking skills in the experimental class.
O2: Posttest critical thinking skills in the experimental class.
O3: Pretest critical thinking skills in the control class.
O4: Posttest critical thinking skills in the control class.
(Source: Arikunto with modification, 2010)

In this study, the study population was all of the eleventh grade students of SMA Negeri 1 Depok Sleman in the 2018/2019 academic year, totaling 109 people and divided into four classes. While the sample used for this study was XI MIA 1 class as the experimental class and XI MIA 2 as the control class. In both classes the number of students was 28 in total. Data collection used in the form of tests in the form of description questions amounting to 6 questions about critical thinking skills. The results of the research data are then analyzed by inferential statistics to test the hypothesis. The analysis used for test the hypothesis is an independent test sample t-test. But beforehand, a prerequisite test was carried out in the form of a normality test and variance homogeneity test. The normality test employed Kolmogorof-Smirnov and the variance homogeneity test employed Levene's Test. While, the whole test employed the SPSS 16.0 for Windows computer program application.

RESULTS AND DISCUSSION

Based on the research done, in general, the students' critical thinking ability increases both in the control class and the experimental class. The results of the study of students' critical thinking skills (Table 2) showed that the average value of the experimental class post-test was higher than the control class.

Table 2. Description of the Value of Critical Thinking Ability in the Control and Experimental Classes

Description	Class			
	SAVI approach+ Macroflash (Experiment)		Scientific Approach 5M (Control)	
	Pre-test	Post-test	Pre-test	Post-test
Average	43,79	84,96	44,32	76,86
Minimum Value	13	67	33	63
Maximal Value	60	90	57	97
Standard Deviation	9,93	5,32	6,02	7,73

On the comparison chart the, the average value of students' critical thinking skills (Figure 1) is seen that both the control class and the experimental class have pre-test values with almost the same average. This indicates that the students of both classes have initial abilities that are not much different. The average score of the experimental class post-test increased far more than the control class. The percentage increase in the experimental class was 41.17%, while the control class was 32.54%. Increasing the value of critical thinking skills in the experimental class is the impact of the implementation of the SAVI approach with macromedia flash. The SAVI approach assisted by Macromedia Flash can make students more active and able to reflect learning activities, this causes the mind of students to fully follow the ongoing learning process. In addition, the SAVI approach provides opportunities for students to learn according to what they want. The experience explored by students through the learning process can be used as initial information for further learning (Astawan, 2013).

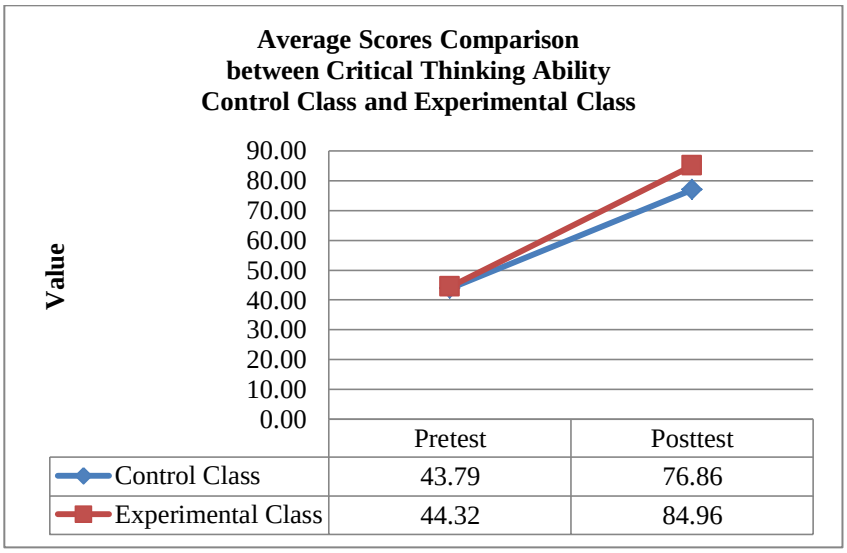

Figure 1. Graph of Comparison of the Average Value in the Pre-test Posttest of Critical Thinking Ability of the Control Class and Experimental Class

To determine the effectiveness of the SAVI-assisted macroflash learning approach, an independent t-test was performed using the SPSS version 16.0 application. The prerequisite test is done by testing the post-test scores of students through tests of normality and homogeneity. Obtained sig. (2-tailed) 0.208 for the normality test (Kolmogorov-Smirnov Test) which means normal data distribution ($\alpha \geq 0.05$). Meanwhile, the homogeneity test (Levene's Test) sig. (2-tailed) of 0.095 ($\alpha \geq 0.05$) then the data is homogeneous data or originating from the same population. The next hypothesis test employed is parametric paths because the data is normal and homogeneous. The test employed is the independent T-Test because the data tested are paired data. The independent T-test results of critical thinking skills (Table 3) show that the sig value. (2-tailed) is 0,000 ($\alpha \leq 0,05$) which means H1 is accepted. From the results of the independent T-test, it can be concluded that there are significant differences between the critical thinking skills of the control class and the experimental class.

Table 3. Result Independent T-Test Critical Thingking Ability

Date Type	Sig. (2-tailed)	A	Decision	Result
Post-test	0,000	0,05	H_1 accepted	There are significant difference

The average results of N-gain values (Table 5) show that the experimental class is higher than the control class. After categorizing according to Table 5, the control class is in the medium category

with a value of 0.59 while the experimental class is in the high category with a value of 0.73. Thus, the experimental class that uses the SAVI learning approach assisted by macroflash has a very significant influence on improving students' critical thinking skills. This is in line with the research conducted by Rifda and Rendy (2015), the results of the study state that there is a significant effect of Brain Gym-based SAVI approach to cognitive learning outcomes in science learning at Bandar Lampung SMPN 13. The average pretest and posttest scores increased from 69.06 to 77.03 in the experimental class. In the control class the average value of pretest was 63.75 and the posttest average value was 70.63.

Table 4. Categorization of N-gain Score

N-gain	Description
$0{,}00 \leq g \leq 0{,}3$	Low
$0{,}3 \leq g \leq 0{,}7$	Medium
$0{,}7 \leq g \leq 1{,}00$	High

Table 5. Result of The Average of N-gain Score

Class	N-Gain Score Average	Conclusion
Control	0,59	Medium
Experiment	0,73	High

In order to find out how effective the use of the SAVI learning approach in excretion system material in the second grade of senior high school, it can be discovered by effect size formula presented below (Sugiyono, 2014):

$$ES = \frac{\mathrm{Xe} - \mathrm{Xc}}{\mathrm{Sc}}$$

Description:
ES = Effect Size
Xe = Average posttest experiment class
Xc = Average posttest control class
Sc = Average standard deviasion

Table 6. Categorization of Effect Size

Koefisien Effect Size	Description
ES < 0,2	Low
0,2 < ES < 0,8	Medium
ES > 0,8	High

According to the calculation result, the effect size is 1,04 which can be concluded that the application of SAVI learning approach with Macromedia Flash has high effectivity in improving students' critical thinking ability. It is supported by a research by Dadang (2018, 49) which states that SAVI learning approach can improve students' critical thinking ability from average score 44,3 becomes 91,3. Meanwhile, according to a research done by Maruli (2017, 89), macromedia flash is proven can improve students' critical thinking ability. In the first cycle, students who are able to achieve KKM only 40%, then increases into 60% in the second cycle, and 80% in the last cycle.

The principle of SAVI learning approach is students being active in physical or intellectual activity in learning process. SAVI learning approach focuses on modern cognitive science that argues on how the best learning should include emotion, whole body, and realize that every individual studies in different method (Khusna, 2018). The SAVI approach consists of somatic, audiotory, visual and intellectual phases. Somatic phase learning takes the form of simple proof activities as the first step in learning activities. Somatic activities are designed to sharpen students'

critical thinking skills through simple evidence. A simple proof of activity aims for students to find their own conclusions from each event. Carla Hannaford (in Meier, 2002) states that brain function can increase due to body movements. The movement of the body can stimulate various chemicals that are important for the construction of the brain's nerve tissue out, so that the learning process can be helped.

The audiotory facilitated by macromedia flash helps students to listen to a specific explanation record. In the audiotory phase, students also listen to explanations from group friends when they are discussing and then the teacher gives clarification at the end of the learning activities. Meier (2002) states that if you want to learn more then talk about it nonstop. When students learn by talking and listening, the brain membranes and other parts of the brain will be stimulated to condense and integrate learning.

In the visual phase, it is displayed moving animation, videos, and various images. This is able to attract the attention of students during the learning process. The colors and images presented for students to be interested and help them in remembering subject matter (Eshter, 2013). Students in intellectual activities are faced with various problems that can build critical thinking skills. Together with a group of friends, students will discuss to solve the problems presented.

SAVI learning follows the modern cognitive science which states that the best learning is involving emotions, the whole body, all senses and all the depth and breadth of the person, respecting the learning styles of other individuals by realizing that people learn differently (Eka, 2013) . The SAVI approach is capable of arousing the integrated intelligence of students in whole through the incorporation of physical motion with intellectual activity. Where students are required to play an active role, all senses must help in the learning process so that students' thinking skills are better (Wahyu, 2015). From the explanation, it can be concluded that students with any learning style can be facilitated by the SAVI approach with macromedia flash, so that students' critical thinking skills can be improved.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the SAVI approach with macromedia flash is effective in improving the critical thinking skills of students of the XI class excretion system in SMA Negeri 1 Depok, Sleman. This result is proven by the significance value of 0,000 which is smaller than the alpha value (<0.05) through the independent sample t test using the SPSS 16.0 program.

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