

SKILLS AND SELF EFFICACY AMONG SECONDARY STUDENTS IN INTERACTIVE MULTIMEDIA LEARNING

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ABSTRACT. This study aims to describe the critical thinking skills and self efficacy of 31 students of junior high school as the impact of interactive multimedia courseware. Interactive multimedia developed for science class, which topic about Environmental Pollution. The research design used was one group pretest – posttest design. Before learning process, the students given pretest and scale of self efficacy. The critical thinking of the student's skill was obtained through tests using HOTS assessment. Analysis of data (pretest-posttest) was the description of the results of the average effect size of sample then categorized based on Cohen's interpretation. Analysis of students' self efficacy was using three indicators in instruments are magnitude, strength, generality. The results showed that the interactive multimedia developed is effective to improving students' critical thinking in learning science. Beside, learning process with interactive multimedia encourage students' self perception.

Keywords: critical thinking, interactive multimedia, self efficacy

1. INTRODUCTION

Learning process is one of the efforts to improve the success of education in Indonesia, the quality learning process can develop the ability-trap in students, for example, the ability to think critically and the efficacy of students. According to Puspita and Jatmiko (2013) in education, critical thinking has been shown to prepare students to think in various disciplines, toward self-fulfillment of intellectual needs and developing potential learners as individuals. Self-efficacy involves a person's judgment about his or her own ability to perform certain behaviors or attain certain goals (Bandura in Ormrod, 2008).

Efforts to develop students' critical thinking and self-efficacy skills start from the teacher, where the teacher is able to provide innovative learning media. The use of instructional media. the right one can stimulate interest in learning and student learning outcomes (Prasetyo, 2011). One of learning media innovation that is multimedia learning, in Curriculum 2013 media needed is media of learning based on information and communication technology (ICT) that fulfill student learning style, such as computer based learning media, animation, audio video, multimedia and website based learning media.

Based on the observation that has been done in Lampung Utara Lampung Province to 12 science teachers showed that 83.3% of teachers have never used interactive multimedia in the learning process of IPA, whereas in the school already has a computer laboratory, where the computer condition is in good condition. In addition, 100% of IPA teachers observed agreed

that the use of interactive multimedia with the subject matter of Environmental Pollution can make it easier for students to understand the concepts of science in detail. The use of interactive multimedia can also address the problem of limitations in viewing polluted sources of environment and the location of the contaminated environment directly.

The problem faced by science teachers today is the limited media of learning that can improve students' critical thinking skills. Critical thinking is the embodiment of learning behavior especially related to problem solving (Liliasari, 2009, Fitriawati, 2010). Critical thinking can be achieved more easily if a person has dispositions and abilities that can be considered as the nature and characteristics of critical thinkers (Ennis, 2007). The use of appropriate learning media strongly supports the effective and efficient learning process. Learning media and good learning process will develop students' self-efficacy on science learning (Setyono, 2016). Efficacy is a self-assessment in which a person can do good or bad, right or wrong, can or can not do something (Azizah, 2014). In addition, self efficacy can also be interpreted as a belief that he can master the situation and obtain positive results (Bandura, 1997). Important sources that can be used by individuals in the formation of self-efficacy are the attitudes of experience of success, imitation, social persuasion, and Physiological & Emotion State (Friedman, 2006).

The purpose of this research is to produce interactive multimedia on Environmental Pollution material that can improve students' critical thinking and self efficacy. Based on the objectives, then compiled the problem formulation in this research, as follows:

1. How is the practicality of using interactive multimedia on environmental pollution material?
2. How is the effectiveness of using interactive multimedia on environmental pollution material?
- 3.

2. METHOD

Research Design

The design used is research development. The research procedure is done by using research and development step according to Borg & Gall (1983: 775). The development procedure is divided into three stages of development, they are preliminary study stage, design and planning stage, and product evaluation of development result. Design a product trial using pretest-posttest with control group design. The data of the students' critical thinking and self-efficacy assessment are qualitative data, and the data of the students' effectiveness test is the quantitative data seen from the students' pretest and posttest score.

Research Samples

Sampling technique purposive sampling, schools were selected based on the consideration of researchers regarding the quality and location of the school. The research sample for the needs analysis involves 12 science teachers in six junior high schools in North Lampung District. The experimental test of the product in this research involves 2 science teachers and students of class VII A (control class) and VII C class (experimental class).

Instruments Research and procedures

Instruments for needs analysis in the form of a questionnaire to find out what needs are needed in school to improve students' critical thinking and self-efficacy skills. Validation test instrument consisting of questionnaire of content suitability and quality of interactive media. Instrument of practicality test in the form of observation sheet of learning implementation, and student response questionnaire. Student activity observation sheet, this observation sheet was prepared

by adopting the instrument developed by Sunyono (2012). The critical thinking-based test tools used include pretest and postes. Self-efficacy instrument in the form of a questionnaire adopted from Putrizal (2015).

The research procedure consists of three stages, the first stage is a preliminary study in which the researcher uses a questionnaire to reveal the current learning that encompasses: the use of interactive multimedia, the acquisition of interactive multimedia, the purpose of use, the student's response in learning, critical thinking skills and self-efficacy of the students. Stage design and development, conducted product manufacture and validation expert products interactive multimedia. Evaluation stage to know the practicality and effectiveness of interactive multimedia development end result.

Data

Analysis of the data of interactive multimedia validity by calculating the average score of each validator, then change the average score of the value into a value with the criteria. The reference to change the score to five scale according to Ratumanan (2003) can be seen in Table 1 below.

Table 1. Commentary percentage questionnaire

Percentage	Criteria
21.0 - 36.0	Invalid
37.0 - 52.0	Less valid
53.0 - 68.0	Valid enough
69.0 - 84.0	Valid
85.0 - 100.0	Very valid

Analysis self-efficacy data was adopted from Putrizal's research (2015) which can be seen in Table 2. Data analysis for critical thinking skills test using independent sample t-test, beside that data analysis result also supported by analysis of average score N-Gain.

Table 2. Scoring on the scale of Self efficacy

No	Answer Options	Score Positive	Negative Statement Score
1	Always	3	1
2	Sometimes	2	2
3	Never	1	3

3. RESULTS AND DISCUSSION

This development research produced a medium learning in the form of interactive multimedia focusing on improving critical thinking skills and fostering students' self-efficacy. Multimedia learning that has been implemented in schools is discussed in two aspects: practicality and effectiveness.

Aspect of Practicality Practical

aspects are measured based on the implementation of learning and the response of learners in the experimental class. The implementation of learning with interactive multimedia is determined through an assessment of the syntax of learning, social systems, and reaction

principles. Assessment of the implementation is done by two science teachers as observers who observe the course of learning. The observations of two observers on the implementation of learning are shown in Table

Table 3. Recapitulation of observation result of learning

Observation Aspect	Control Class(%)	Experimental Class (%)
Syntak	70	88
Social System	85	95
Reaction Principle	88	98

Based on the observer's assessment it is seen that all aspects achievements obtained in the experimental class of $\geq 88\%$ fall into the category of "very high". This shows the implementation of learning using interactive multimedia Environmental Pollution is included in the "very high" category. Aspects of practicality of learning is also determined through the response of learners. Overall the response of learners to the three meetings on learning using interactive multimedia produces an average value of "very high" category.

Interactive multimedia is also useful in improving students 'interest in learning the material (100%), facilitating understanding (100%), at the end there are interactive question exercises so as to help teachers to see students' skills in critical thinking (80%), problem in interactive multimedia facilitate students in learning activities by 100%. Organizing the appearance of teaching materials becomes an important thing to note including the laying of the image display; order and systematic arrangement of materials, use of letters, placement of manuscripts, drawings, color variations and interesting illustrations; easy-to-understand arrangement and flow between chapters, between units, and inter-paragraphs; titles, subheads (learning activities) and the description format of learning activities that are easy to follow, so that all aspects can help students learn more actively (Ariani and Haryanto, 2010; Princess, 2010).

Critical thinking skills

The effectiveness of interactive multimedia in this study is determined by the improvement of critical thinking skills based on values *pretest* and *posttest*. The average *pretest*, *posttest*, N-Gain results, and the *independent sample t-test results* in the control class and experimental class are presented in Table 4 below.

Table 4. The average value *pretest*, *posttest*, N- gain and significance of

Class	Pretest	Posttest	N-gain	Category	Sig.
Experimental	30.25	78.14	0.68	Medium	0.025
Control	35.59	68.48	0:42	Low	

Results *N-Gain* experimental class is higher than the control class. Seen in Table 4 the value of *N-Gain* experimental class is 0.68 (medium) while the control class gets a score of 0.42 (low). T test results using *independent sample t test* obtained sig value. 0.025 (<0.005), this indicates that H_0 is rejected which means that in the SPSS testing criteria there is a difference between the test results in the experimental class and the control class. This happens because multimedia learning products attract students to learn and cultivate student curiosity so that learning outcomes can increase. This is in accordance with what is said Waryanto (2008) that interactive audio visual multimedia presentation makes visualization more interesting because it makes users (*users*) more freely choose, synthesize and elaborate the knowledge he wants to understand. Learning

with interactive multimedia accommodates students who are slow to receive lessons, because computers never get bored, very patient in carrying out instructions as desired. Exercise questions and *feedback* in the form of scores can help students to improve students' cognitive processes and improve critical thinking skills. This is supported by the statement of Gagne and Briggs (in Munir, 2013) stating that computers as media can provide feedback and affirmation, that is, computer media can help students obtain feedback (*feedback*) on the lesson freely and can stimulate student motivation by affirmation positive given when students give answers. Example of interactive multimedia display can be seen in Figure 1.



Figure 1. Interactive multimedia assignment appearance

Self efficacy self-efficacy self-

efficacy aims to obtain self-efficacy data of students in the implementation of science learning using non-interactive multimedia in class VII A as control class and class VII C as an experimental class which can be seen in Table 5.

Table 5. Assessment of self-efficacy students

Aspects <i>Self Efficacy</i>	Control Class				ClassExperiment%			
	% Early	Category	% End	Category	% Early	Category	% End	Category
<i>Magnitude</i>	45.40	Medium	71.44	Medium	45.60	Medium	83.70	High
<i>High-Strength</i>	46.65	Medium	73.08	Medium	45.79	Medium	83.24	High
<i>generality</i>	45.40	Medium	69.83	Medium	43.97	Medium	85.63	High

Based on students' self-efficacy ratings for all aspects (*magnitude, strenght andgenerality*) in the control group before treated (initial) the percentage of entry in the "moderate" category, after receiving the treatment percentage is still in the medium category, but the percentage of self-efficacy of the control class students increases.

4. CONCLUSION

Based on the description of the discussion can be concluded that interactive multimedia, 1) practical views of the implementation of interactive multimedia in learning, excellent teacher

response, and positive student responses to the use of interactive multimedia, 2) effective views of differences in test results of students' critical thinking skills and high self-efficacy results. Interactive Multimedia Environment Pollution material that focuses on critical thinking and self-efficacy has a very high attractiveness and ease and get positive response from learners. Multimedia developed format *exe* that consists of the beginning, instructions, KI / KD, subject matter, evaluation, bibliography and developer profile. The form of teaching materials on interactive multimedia in the form of text, images, video, graphics, animation and simulation.

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