Influence of science digital storytelling against motivation of learning and critical thinking ability learners

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Abstract. The purpose of this study was to analyze the influence of science digital storytelling against the motivation of learning and critical thinking ability learners. The research design used a nonequivalent control group design because it uses two different treatments when implementing learning. The selection of the samples was done randomly (cluster random sampling). The sample in this research is grade VII D (control class) and VII C (experimental class). Data collection methods used are observation methods, methods of test and method question form. The observation method is measured using an observation sheet consisting of five aspects of critical thinking ability. Every aspect of critical thinking ability analyzed is descriptive. The test method is measured using a multiple choice question in the form of reasoned cognitive taxonomy levels based on Bloom. The influence of science digital storytelling against motivation learning seen from biserial correlation analysis results (rb = 0.87). This means science digital storytelling has a very strong influence on the motivation of learning. While critical thinking ability is also seen in biserial correlation analysis (rb = 0.80). Based on the results of the study it can be concluded that the application of science digital storytelling gives a positive effect against motivation of learning and critical thinking ability.

1. Introduction

21st-century learning paradigm was supposed to shift toward higher-order thinking skills learning, especially the ability of critical thinking. Teaching critical thinking to students is an important objective in the field of education [1]. Teachers as educators should be able to train the learners to keep critical thinking finding information independently and actively create cognitive structures on learners [2]. Someone who thinks critically is someone who is able to solve problems, make decisions and learn new concepts through capability thinking reflective thinking and reasoning based on the logic that is believed to be true. The critical thinkers capable of critiquing it, ask, evaluate and reflecting the information obtained. In fact, critical thinking ability may be formed by means of encouragement and stimulus that can stimulate learners to think, especially in learning.

The boost in the learning process is closely related to the learning motivation of learners. The motivation of learning occurs because there is a will, needs, desires and urge learners to participate and succeed in the learning process. The high motivation of learning and learners who are confident will usually produce good study achievements [3]. Critical thinking ability is achieved when there is a strong motivation for learners to continually think reason based on logic. In line with research that motivation to learn and the ability of critical thinking have relationships that are positive. Research
shows the average critical thinking ability learners who have high motivation of learning better than the learners who have low motivation of learning.

The instructional media has an important correlation with the incentive to raise the motivation of interest or action and stimulation of learning activities [4]. The use of instructional media in teaching and learning can generate motivation and stimulation of learning activities and even bring psychological influences on learners. The media used in teaching should meet several criteria that can attract students’ interest and motivation; in accordance with the purpose of learning; can enhance a variety of skills possessed by the students; can increase the activity of students in the classroom. The development of inquiry using a digital-based media (android) can improve learning outcomes and the critical thinking skills of learners [5]. Indicators of critical thinking are composed of 12 indicators and grouped into five basic skills that give a simple explanation, build basic skills, conclude, make further explanations and set the strategy and tactics [6]. Optimizing the use of digital learning media in the form of audio-visual is now considered very necessary especially to visualize material science.

Results of research on the development of instructional media that science digital storytelling, fit for use in learning. The product of development research-based science learning media in the form of digital storytelling implementation needs to be done to determine the effect on learning motivation and critical thinking skills of learners.

2. Methods
2.1. Research Design
The research design used is the nonequivalent control group design because it uses two different treatment when implementing learning. The selection of the samples was done randomly (cluster random sampling). The sample in this research is grade VII D (control class) and VII C (experimental class).

2.2. Method of Data Collection and Analysis
Data collection method used is self-assessment, observation and test methods. Self-assessment method is used to measure the motivation of learners. Indicators of learning motivation were analyzed descriptively. Observation sheet used to measure critical thinking skills. Every aspect of critical thinking skills was analyzed descriptively. The test method in the form of reasonable multiple choice questions to analyze the effect of science digital storytelling to critical thinking skills. The influence of science digital storytelling to learning motivation and critical thinking skills derived from the analysis of correlation biserial.

3. Results and Discussion
3.1. Influence of Science Digital Storytelling against Motivation of Learning
Motivation is important in the learning process. If there are two students who have the same abilities and provide the same opportunities and conditions for achieving objectives, performance and results achieved by learners who are motivated to be better than the students who are not motivated. According to the theory of educational psychology, there are several factors that affect the motivation of learners. Stimulation is a change in perception or experience with an environment in which a person is active.

Data obtained from the learning motivation self-assessment in the classroom control and experiment. Self-assessment sheet consists of 32 statements were prepared based on eight indicators of learning motivation. The final results of the self-assessment sheet shows that there are differences in the percentage of each indicator between the control and experimental classes. The percentage of each indicator motivation to learn is presented in Table 1.

| No | Indicators                | Experiment | Control |
|----|--------------------------|------------|---------|
|    | Pre (%) | Post (%) | Pre (%) | Post (%) |
| 1  | The strong will to do    | 43         | 62      | 46      | 55      |
In general, the experimental class learning motivation increases significantly after the learning process using science digital storytelling. Table 1 shows that the highest percentage is in the seventh indicator that is more than happy to work independently. In the process of learning to use science digital storytelling learners are required to work on an independent assignment sheet. Learners who have a high learning motivation would prefer to work independently to achieve the goal. Individuals who have confidence in him that the success / his success will be determined by the business and the ability itself, then the individual will have the drive and need for achievement [7]. Indicators are not much different from the percentage indicator is able to hold his seventh, which amounted to 92%. Independent assignment sheet is equipped with the command to write the opinion of students about the materials that are considered difficult. The answer each learner is different from one another. The difference is used as a discussion in class. The discussion process makes learners eager to learn to express and defend their opinions. The dramatic message in the science digital storytelling films can influence social attitudes, learners can open in the discussion process and always maintain the ideas and opinions [8].

The lowest percentage owned by the indicators of the strength of will to do. The percentage results of questionnaires control class in strong indicator of willingness to act are 55% while the experimental group was 62%. This is because students often complain when work on the problems. So teachers must raise the motivation of learners at the time. Learning motivation indicator has a percentage in the middle category is the amount of time available to learn, willingness to leave obligations/task to another, persevering in doing the task, resilient in the face of adversity, and showed interest in a particular issue. People who have the determination, hard working, motivated and full of initiative achievement is a person who prioritizes tasks and results. The analysis showed that science digital storytelling has influence against motivation of learners evidenced by the significant difference in the average value score of self-assessment sheet, the experimental class is higher than the control class. Calculation of the coefficient of determination shows that the motivation of learners 77.26% influenced by the science digital storytelling. This is because the learners prefer to watch movie media in the learning process than listening to a lecture. Pleasure will certainly make the learners' learning spirit in a long time.

Some of the advantages of science digital storytelling related to the motivation to learn, including to give a message that can be received more evenly by learners; more realistically can be repeated and can be stopped as needed; give a deep impression that influence the attitudes and motivation of learners; a combination of audiovisual can be more effectively and more quickly than the media to convey the message text; integration with other media to enrich the understanding of learners. The use of science digital storytelling makes learning science learners do a lot of learning activities, because not only listen to the explanation of the teacher, but also other activities that do like to observe, discuss and conclude. The result development of teaching materials based on digital storytelling can increase metacognition ability [9].

3.2. Influence of Science Digital Storytelling against Critical Thinking
Critical thinking skills are the ability to think that involves cognitive processes, analytical, rational, logical, and invites students to think reflectively on the issues. These capabilities are indispensable in the learning process, especially in science materials that requires learners logical and scientific
thinking. Evaluation tool used to measure the ability to think critically is a reasonable multiple-choice test and observation sheet. Values obtained posttest conducted four times after learning activities both in the experimental class and control class, while scores of observations obtained at each meeting. The learning activities are held in the experimental class and control class produces posttest value that indicates that the critical thinking skills of learners experimental class is better than the control class. Critical thinking skills have five basic aspects which include the twelve indicators and can be analyzed descriptively. Critical thinking skills of observation data presented in Table 2.

| No | Indicators                              | D-1 (%) | C (%) | E (%) | D-2 (%) | C (%) | E (%) | D-3 (%) | C (%) | E (%) | D-4 (%) | C (%) |
|----|----------------------------------------|--------|------|------|--------|------|------|--------|------|------|--------|------|
| 1  | Give a simple explanation              | 65     | 59   | 77   | 60     | 86   | 59   | 39     | 59   |      |        |      |
| 2  | Build basic skills                     | 67     | 64   | 80   | 63     | 89   | 63   | 94     | 63   |      |        |      |
| 3  | Conclude                               | 71     | 66   | 83   | 66     | 87   | 66   | 93     | 66   |      |        |      |
| 4  | Providing further explanation          | 72     | 60   | 82   | 60     | 88   | 66   | 95     | 73   |      |        |      |
| 5  | Set of strategies and tactics          | 73     | 62   | 85   | 62     | 89   | 62   | 92     | 60   |      |        |      |

Aspects of the first critical-thinking skills that give a simple explanation. The aspect contains several indicators such as focus questions, analyze arguments, ask and answer questions of clarification challenging. Experiments class using science digital storytelling media learning allows students to be more critical in focusing the question. Table 2 shows that there are differences in critical thinking skills between the experimental and control classes. There are significant differences in critical thinking skills among learners who follow learning with interactive video learning media by setting small group learning and students following the conventional learning. Assessing the activities of learning resources in science teaching digital storytelling can train learners to develop the ability to think. Science digital storytelling is films that related with daily life so can develop critical thinking of learners [10]. Critical thinking is an activity to analyze the idea or ideas, sharply distinguish and identify and develop towards a more perfect.

Class experiments using science digital storytelling learners being required to create questions about material that is not yet fully understood that the other learners are obliged to answer the question. It stimulates critical thinking ability learners, so it brings out a sense of curiosity is high. One of the characteristics of learners who have the ability to think critically could bring questions and formulate it clearly. The success of these indicators is visible from the liveliness of the learners in the asking and answering of questions from a teacher or friend of his colleagues. One of the components of digital storytelling is the dramatic question where in the media there are a number of questions. These questions provoke students to ask and answer questions.

The second aspect is to build basic skills, contains two indicators of which consider the credibility of a source of learning and observing and developing the results of the observation. Table 2 shows that the ability to build basic skills class experiment is better than classroom control proved the existence of the increased percentage in each class meeting on the experiment. The percentage in class controls tend to be constant. The increase in the experimental class of 27%, i.e. from 67% to 94% (table 2). Stages of committed learners in a search for information is watching the media science digital storytelling, observing or watched the movies, and understand the material in the media. Furthermore, the students are asked to work on the independent task sheet properly, so that learners have a better capability in terms of considering the results of the observation. These results are supported by research which proves that the assignment method is able to develop a video analysis of results cognitive learners [11].
The third aspect is concluded with indicators make a deduction and considering the results of the deduction; making induction and consider the results of the induction; make and take into consideration the results of decisions that contain thought-provoking alternative learners. Data presented in table 2 shows the data aspects of the control class concluded on and experiments have differences in classroom experiments the percentage increased every aspect of the meeting, while the percentage of control class is constant. Percentage of classroom experiments conclude on aspect shows an increase of 22%, i.e. from 71% to 93%. Learners in the experimental class were asked to observing the media science digital storytelling, then the prediction results and then collect data information. The statement supported by research that at this stage of development of the summary, the learners will involve various aspects of critical thinking ability, that is, logical thinking, inductive, deductive process, evaluative, and give a logical argument in making conclusions.

The fourth aspect of providing a further explanation which includes the indicators identify the term, considering the definition. The success of these indicators is shown in the ability of learners to make a definition as well as the argument. In table 2 it looks that there is an increase in the percentage at any meeting, either processed or control experiments. On the control class, there was an increase of 13% while the experimental class of 23%. An aspect provides further clarification is an aspect which achieves the highest percentage compared to the other aspects. Study on a class of experiments emphasizing the process of discovery of the material and the discovery of solutions to some problems encountered. The learning train learners to make arguments and make it easier for learners to understand some of the terms in the classification. In line with research that critical thinking ability increasing after the learners follow a learning model with discovery (found). The result of research there is an increase in the ability of problem-solving using video-based media problem.

The fifth aspect is a set of strategies and tactics that include indicators identifying assumptions; determining a course of action and interact with others. The data presented in Table 2 was no significant difference between the control and experimental classes. Each meeting is an increase in the experimental group, while the control class is permanent even declined in the fourth meeting. If seen early in the experimental class percentage of 73%, whereas the fourth meeting reached 92%. There is a percentage increase of 19%. The success of this aspect is shown in the determination of appropriate selection given assumptions. The students who have the ability to take decisions to solve the problem of power have good critical thinking.

Critical thinking skills were also measured using the test method. The results of the t-test analysis posttest score of the experimental class and control class show that there is a difference between critical thinking skills experimental class control class. The relationship between these two variables is calculated using the correlation biserial, by calculating the value of r. Based on calculations, the r of 0.8083 which shows there is a strong relationship between science digital storytelling with the critical thinking skills of learners. The coefficient of determination shows that the critical thinking skills of learners 65.33% influenced by digital science storytelling. This is due to the learning using digital storytelling science invites students to always think a high level. Teaching materials based on audio-visual as digital storytelling can improve high level thinking ability of learners [12].

4. Conclusion
Based on the research that has take place, it can be concluded that:

a. Science digital storytelling significantly influence the learning motivation of learners, obtained the r value of 0.87

b. Science digital storytelling significantly influence the critical thinking skills of learners, obtained the r value of 0.80

c. Science influential digital storytelling by 77.26% on motivation to learn and 65.33% of the critical thinking skills of learners.

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