THE DEVELOPMENT OF INTERACTIVE FLASH MULTIMEDIA BASED ON PROBLEM BASED LEARNING OF SD SCIENCE LESSONS

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Abstract

The purpose of this study was to determine the characteristics and viability of flash interactive multimedia based on problem-based learning on single and mixed substances topic of natural sciences subject. The type of this study was Research and Development (R&D). The development model used is the Borg & Gall model adapted by Sugiyono with several stages adapted to the needs of the researcher. The data collection techniques used observation, interviews, documentation, and questionnaires. The results showed that (1) flash interactive multimedia matched with the characteristics of the problem-based learning model; (2) flash interactive multimedia was suitable to be used as a learning media, based on the result of the media expert's validation with a percentage of 83% with the very viable category and the result of the content expert ' s validation with a percentage of 86% with the very viable category. The conclusion of this research was the developed flash interactive multimedia based on problem-based learning was appropriate to be used as a learning media on single and mixed substances topic of natural sciences in the fourth grade at Kalibanteng Kidul 02 Elementary School, Semarang City.

1. PRELIMINARY

Education is important for the Indonesian nation to achieve the national goal of the Indonesian nation, which is to educate the nation's life. This is in line with the importance of education as stated in the Republic of Indonesia's Shrimp Law No. 20 of 2003 concerning the National Education System in Chapter I article 1 which explains that education is a conscious and planned effort to create an atmosphere of learning and the learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by himself, society, nation and the State. In order to realize these national goals, the government has always made improvements to regulations related to education. One of them is by developing a curriculum that is adapted to the times in order to improve the quality and quality of education in Indonesia.

Based on the results of a survey from TIMSS (Trends International in Mathematics and Science Study) in 2015, it shows that the achievement of Indonesian students in science subjects is ranked 45 out of 48 countries. Then based on a survey from PISA (Program for International Student Assessment) which measures the achievement of students' reading, mathematics, and science literacy, Indonesia has experienced a decline from year to year, especially in the field of science. Data for 2018, Indonesia was ranked 71 out of 79 countries specifically in the field of science with a

score of 396.Based on the results of this data, it shows that Indonesian students' knowledge of science is still lacking, so it requires improving the quality of education, especially in the field of science.

Based on the data obtained by researchers from the results of pre-research conducted on November 18-25, 2019 through interview with a class, sheet Observation observations and document data in the form of learning outcomes of class V SDN Kalibanteng Kidul 02, found several problems in the science learning process in class V, including the availability of instructional media in science subject content in school which is still less supportive. There is learning media Seeing the existing problems efforts need to be made in improving the learning process. One of them is by developing learning media that is attractive, innovative, easy to learn and related to technology in accordance with the times so that it makes it easier to understand science subject matter. One of the efforts that can be made by researchers is to develop interactive multimedia flash based on problem-based learning on science subject content.

According to Suryani, (2018: 201) interactive media is a medium that allows students to interact with the media and receive feedback on the material displayed. The research that supports solving this problem is research conducted by Dwy Unggul Wibowo (2018), the results of the study show that the development of interactive media using Adobe Flash CS6 is suitable for use as a medium in the learning process. Another study conducted by Deliany et al, (2019), shows that the

application of interactive multimedia can improve students' understanding of science concepts.

In addition, there is also international research conducted by Ahmad Syawaludin et al, in 2019 with results worthy of being used to improve critical thinking skills in science learning. Another research conducted by Reza Rachmadtullah, et al, in 2019, with the result that learning uses multimedia but the media is less attractive and innovative, such as image media and teaching aids in schools, such as parts of plants, blood circulation images, IPA KIT and there is a human body frame, thus making students 'motivation to learn less and students' understanding of the material also less. The learning models implemented by teachers in science learning have varied, but have not shown any significant progress in student learning outcomes. The teacher often uses the discussion method besides the teacher also applies the lecture, question and answer method, and assignments. In the learning process there are still some students who pay less attention to the teacher and do not focus on the learning process, because there is still a lack of interest and student motivation to learn. So that the learning objectives have not been achieved optimally. computer-based interactive can improve understanding of the material.

Based on this description, the researcher will examine the characteristics, feasibility of interactive multimedia flash based on problem based learning on science subject matter single and mixed substances.

2. RESEARCH METHODS

The type of research used is R&D (Research and Development) or what is known as Research and Development. According to Borg and Gall in Sugiyono (2016: 28) states that development research is a process or method used to validate and develop products. The products in question are, such as text books, learning films, and computer software or (software). The product developed in this research is interactive multimedia flash based on problem-based learning on single and mixed substance science subject matter.

The research method carried out by the researcher is in accordance with the research journal conducted by Taufiq Nuril Akbar in 2016, with the title "Development of Interactive Science Multimedia Oriented Guided Inquiry on the Material of Class V Human Respiratory System SDN Kebondari 3 Malang" with the research method used is R & D (Research and Development) which is used to produce certain products. Another supporting research is research conducted by Nanda Septiana (2018) entitled "Development of interactive multimedia-based learning media on student concept understanding" with the method used is R&D (*Research and Development*) that aims to be able to produce a product in the form of interactive multimedia learning media, with a development model from Borg and Gall.

The development model used in this research is a model / design according to Borg and Gall in Sugiyono (2015: 409) which is used into 5 stages of development, namely: (1) potential and problems; (2) data collection; (3) product design; (4) design validation, (5) design revision. The subjects in this study were fifth grade students of SDN Kalibanteng kidul 02. The data collection techniques used observation, interview, documentation, and questionnaires.

3. RESULTS AND DISCUSSION

The product developed in this research is interactive multimedia flash based on problem-based learning in science subject matter single substance and mixed grade V SD. The discussion of the results of this study includes: 1) the characteristics of interactive multimedia flash based on problem based learning in science subject content for class V SD / MI; 2) the feasibility of problem-based learning based on flash interactive multimedia in science subject content for class V SD / MI. The developed interactive flash multimedia is characterized by a problem based learning model. And it consists of several menus, including: (1) The main menu consists of several menus, namely: manual menu, competency menu, learning material menu, game menu, quiz menu, and profile menu; (2) The manual menu contains instructions for using the media; (3) The competency menu contains core competencies, and basic competencies; (4) The learning material menu contains Chapters 1-4 which present material on single and mixed substances; (5) The material menu in multimedia displays several menus, namely indicators, learning objectives, and concept maps. The presentation of the material is adjusted to the problem-based learning syntax; (6) Indicators menu in multimedia, presents indicators that will be studied by users in each chapter; (7) The concept map menu displays a concept map chart, to make it easier for users to know what will be learned in each chapter; (8) The learning objectives menu displays the learning objectives that must be achieved by the user; and concept maps. The presentation of the material is adjusted to the problem-based learning syntax; (6) Indicators menu in multimedia, presents indicators that will be studied by users in each chapter; (7) The concept map menu displays a concept map chart, to make it easier for users to know what will be learned in each chapter; (8) The learning objectives menu displays the learning objectives that must be achieved by the user; and concept maps. The presentation of the

material is adjusted to the problem-based learning syntax; (6) Indicators menu in multimedia, presents indicators that will be studied by users in each chapter; (7) The concept map menu displays a concept map chart, to make it easier for users to know what to learn in each chapter; (8) The learning objectives menu displays the learning objectives that must be achieved by the user; (9) The game menu displays games to entertain as well as to learn; (10) The quiz menu contains practice questions; (11) Profile menu on multimedia displays developer identity information.

Figures 1 and 2. Home and Main Menu

Figures 3 and 4. Manual Menu and Competency Menu

Figures 5 and 6. Menu CHAPTER Material and Menu Material

Figures 7 and 8. Game Menu and Quiz Menu

Media Validity Test

In the validation process there is an assessment of the feasibility of media and media development materials for science learning. Media that has been created then given input as material for improvement or revision. Improvements were made so that the media can be said to be worthy of being a learning medium in schools.

Table 1. Results of Feasibility Validation Media

Validator	Device Validator	Validation Result	Criteria
Lecturer KTP UNNES	Media Validation	83%	Very Feasible
Lectuter PGSD UNNNES	Material Validation	86%	Very Feasible

From the results of media and material validation, it was found that the developed media was feasible and could become a learning medium that could be used in grade V elementary schools, according to research conducted by Windha Octafiana, et al. (2018) with interactive multimedia that was developed received an assessment from material experts of 3.37 (very good) and an assessment from media experts of 3.10 (good), and was suitable for use as a learning medium that could facilitate students in understanding the material. In line with research conducted by Faizal Chan, et al. (2019), with the results of interactive multimedia products that are feasible and can be used in the science learning process. With the results of the assessment from material experts of 3.27 (valid), media validation of 3.3 (valid).

Another supporting research, conducted by Reza Rachmadtullah, et al, in 2018 entitled "Development Of Computer-based Interactive Multimedia: Study On Learning In Elementary Education" with the results of expert validation, it is known that interactive multimedia-based computer applications get the title worthy of use. Another research conducted by Bagus Amirul Mukmin and Nurita Primasatya, (2020) entitled "Development of K-13 Macromedia Flash Interactive Multimedia as a Thematic Learning Innovation for Elementary School Students" with validation results from experts that interactive multimedia macromedia flash is feasible for use in learning.

4. CONCLUSION

Based on the results of research and discussion, this research can be concluded (1) The interactive flash multimedia developed in this study is characterized by a problem-based learning model and has several menus that have been adjusted according to needs. (2) Interactive multimedia flash based on problem based learning on science subject content of single and mixed substance material that has been developed, is declared fit for use in learning, by media experts and material experts. The assessment aspects of media experts include 6 aspects, namely material aspects, navigation aspects, interactivity aspects, display and media aspects, language aspects, program aspects. Percentage of assessment from media experts by 83%presentation with an assessment percentage of 86% with the criteria "very feasible".

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