

Multimedia for Learning Science in Elementary School

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Abstract-This study aimed to: 1) develop multimedia learning science can be used to solve students' learning problems, especially lack of student learning resources, and 2) test the feasibility of multimedia learning products developed for elementary science learning. This research is a development involving 50 respondents, consisting of 6 students for one-on-one test, 12 students for the test group, and 32 for field trials. Before the product tested and validated by experts material media experts assessed by a scale of 1-5. Aspects of assessment include material aspects, aspects of learning and media aspects. Data were analyzed by descriptive quantitative. The results showed: 1) the development of multimedia learning science has been conducted with media development procedures, including preliminary research, learning analysis, production / media development, and revision, while the evaluation of multimedia learning science for elementary / MI has been developed in accordance with the evaluation procedures media development. 2) the results of the validation by experts and media materials show that multimedia learning science has a good quality of learning (with a value of 4.16), good quality material with a value of 4.20) and a media display quality is very good (with a value of 4.30) and good quality media programming (with a value of 4.13). Average Field Trial results show that multimedia learning science teaching quality is very good (with a value of 4.63), and the quality of the material is excellent (with a value of 4.66) and the excellent quality of the media (with a value of, 4, 68). These results indicate that the developed multimedia science learning be used as a medium of learning and learning resources.

Keywords: Multimedia Development, Learning Science

Preliminary

Science learning scientific inquiry should be carried out (scientific inquiry) to develop the ability to think, work and communicate scientific as well as being an important aspect of life skills. (Sri Murtini: 2008:1). Therefore, learning science in elementary emphasizes providing direct learning experience through the use and development of science process skills and attitudes. The main purpose of elementary science learning is to help students get ideas, knowledge, and skills (life skills) essential as citizens. Essential life skills students should possess is the ability to use certain tools, the ability to observe objects and the surrounding environment, the ability to listen, ability to communicate effectively, respond and solve problems effectively secara.

Indonesia has become a day of education the lower the quality. Based on Survey of United National Education Scientific and Cultural Organization (UNESCO) on the quality of education in developing countries in Asia Pacific, Indonesia is ranked 10th out of 14 countries. As for the quality of teachers, quality is at the level of 14 out of 14 developing countries (ReknoDewati: 2007:1). With regard to the teaching of science, there are some problems that occur in the field, namely, one factor the ability of teachers to teach science in the classroom is still very low, this is due to the professional competence of science teachers are also low. Relating to the professional competence of science teachers, according to a report from a national survey of agency science and math United States Department of Education about the poor competence of teachers in science and mathematics learning was found about 67% were grade 4 science teachers, while 42% grades 5 to 8 and 39% other grades 9 through 12 who do not meet the standards of professional competence of science teachers, while the teachers are qualified to teach science in the lower 21% of teachers of physics, earth science teachers 11%, and 10% of life science teacher (Joseph Furner & Kumar, 2007: 185).

This demand inspired the importance of learning science should be done in an innovative and creative teachers particularly at the elementary school. It is important because it is based on some basic needs of learning in primary school science education that is first due to the structure of the elementary school curriculum as in Permendiknas N0. 22 of 2006 be allocated as much as 8 hours of lessons / week. Both the real conditions of the learning process that not all schools assess appropriate national standards in achieving competency standards, as well as learning science in primary schools is still very dependent on the teacher in the learning process so that students become less creativity develop optimally. Moreover, the subjects of Natural Science Topics Events which is a category that is difficult subject matter in science. Thus requiring multimedia that can help to facilitate students in improving student learning outcomes. As well as to enable the students in the learning process through the development of multimedia interactive learning.

Innovations in teaching science this topic Natural events are in dire need of multimedia interactive learning. Because according Latuheru (1988: 22) that multimedia learning: (1) useful to attract students to the subject matter presented, (2) is useful in terms of improving students' understanding of the material presented, (3) able to present strong data and reliable information about a thing or event, (4) is useful to corroborate the information, and (5) is useful to facilitate the collection of data. Clarified by Dale in Latuheru (1988: 23) that used a multimedia learning well in the learning process would be beneficial in terms of: (1) the attention of the students to the subject matter will be higher, (2) students gain concrete experience, (3) encourage students to dare to work independently, and (4) the results obtained protege hard to forget.

While the condition now that it turns out the learning process less interactive, less inspiring, boring, less challenging, less motivation to students to participate actively, less can lead to innovation, creativity, independence according talents, interests and development of learners as well as less provide exemplary. Science learning in the classroom has been generally delivered with expository method and partly by the experimental method and practice. Expository teaching methods by providing explanations and giving examples of the students, the teaching materials such as textbooks, modules or handout. Such a learning process is not yet sufficient to obtain optimal results in learning, because students feel just as objects, not as subjects that can play a role in building his own knowledge. Learners will assume that science into something that was not hers, but belongs only to the teacher. While learning by demonstration and lab methods, although the involvement of learners in the learning process more effectively with media, but in practice it is less effective and efficient use of time and still be classical or groups who are less attentive to the needs of learners with learning independently and can only be performed on a particular subject. (source: survey researchers dated May 5, 2009).

Based on the observations and experiences in the field, today there is a tendency that science subjects are less enthused students, earned value tends to be low and incomplete learners in learning the material presented.

Table 1
Distribution of Semarang Standards Test Scores

distribution of values	Indonesian	Matematics	Science	Sosial	Civil	JmlNilai	Average Value
Top Value	8.90	9.80	9.20	8.40	9.80	46.10	9.22
Low Value	4.60	2.25	4.20	4.40	6.20	21.65	4.33
Average valeu	7.04	7.56	6.48	6.53	8.09	35.7	7.14
Standart deviation	0,76	1,18	1,02	0,70	0,83	4,04	0,67
Modus	7,00	7,75	6,40	6,40	8,60	43,30	7,22

The results are not in line with expectations, among others, is the influence the attitudes and interests of learners as the course. This was confirmed by Hamzah B. Uno (2007: 23) who says that motivation and learning are two things that affect each other. The relationship between attitudes and interests can be seen from less berminatnya students to follow the learning which is characterized by frequent lupanya homework, forgot to bring a book, and often license back when the learning is ongoing.

Good science learning requires a significant learning experience. Meaningful learning experience means an experience where the students learn a subject matter that is useful and necessary in later life learners. Through meaningful learning expected of students into the spirit and keen to learn in earnest around the competencies that must be mastered. In an effort to provide meaningful learning, it is necessary to use media that enable learners acquire not only theoretical knowledge but rather on learning experience more realistic. Media used is still simple to use yet interactive multimedia and less create learning situations that can enhance students' enthusiasm for learning. Likewise, the limited ability of teachers and availability of multimedia learning support. While the principles of the implementation of the curriculum in every school curriculum unit 2006 is to use the approach multistrategi and multimedia learning resources and technology memadahi and utilize the environment as a learning resource.

Multimedia can not be separated from the overall teaching and learning system. The use of multimedia learning have a positive impact by providing a meaningful (meaningful learning). Students will better appreciate the overall teaching and learning process in the presence of multimedia in learning. Determination of the integral components of multimedia in teaching and learning systems based on the assumption that students obtain the knowledge gained from experience, organized, ranging from direct experience that allows the concrete knowledge to the experience gained only through language and indirect (abstract). As an implication, with the birth of technology is expected to improve the quality of learning. This is in line with the learning paradigm shift from teacher-student curriculum-a curriculum-teacher-student-media, even today-student-media curriculum

The presence of computers with a variety of programs and applications have provided tremendous benefits. With the computer can obtain information in the form of science, technology / art and also make learning programs, resulting in a model of learning with the computer as a tool. Therefore, the author tries to develop multimedia learning student-centered and individualized to the use of computer technology in the form of multimedia interactive learning. Multimedia is designed to look at the characteristics of elementary education students adapted to the environment and the

availability of infrastructure in Semarang City Elementary School. Therefore multimedia interactive learning is very suitable and appropriate to the needs of students who, in turn, can create an active learning, creative, effective and fun and in turn can improve the learning process and student achievement in elementary schools.

Research Focus

Based on the issues identified, this study is limited to the problem of low achievement IPA value than other subjects with an average value of 6.48 and the limited ability of teachers to create interactive learning media that required the availability of software science subjects. This study therefore focused on developing multimedia science learning for elementary and feasibility analysis of multimedia lessons developed as a good learning resource for elementary students.

Research Methods

This research approach or research and development Research and Development (R & D) Borg & Gall (1983:772). This study develops media products such as science learning for school students of class V are adjusted to the level of development of primary school age children. The products are developed to suit the purpose of the research was conducted based on the development of several models. Model development proceeds this simplification has five stages: analysis, design, production, testing and revision, as well as the use and dissemination. An explanation of each phase of the model development are as follows: Development model that is used can be described as follows in Figure 1: Figure 1 Multimedia Development Model Model adapted from Borg & Gall (1983:774-786), and Dick & Carey (2005:282-291).

Product Trial

Here is the translation of the test design, test subjects, data types, and data analysis techniques. 1. Trial Design

Design-based science learning test developed computer are as follows:

a. Validation Matter Expert and Expert Media Before the products tested, the products manufactured / developed must be validated by at least one person and one person matter experts media expert. Expert validation is considered important to do in order to get assurance that the initial product developed deserves to be tested to the test subjects. In the validation phase, the experts will provide assessment materials, comments, and suggestions on products that have been developed from the aspect of learning, and content or learning materials. While media experts, providing assessments, comments and suggestions on products that have been developed from the aspect of media. Next, the researchers tested products through three stages, namely the one-on-one test against 6 student, small group testing 12 students (small-group evaluation), and field-testing 32 students (field trial).

b. Testing Individual (One to One Evaluation) The goal of the trial is to obtain a deficiency or error on aspects of learning and obtain empirical evidence about the performance and response learners on the learning content. The data obtained in this pilot phase in the form of student comments, observations and suggestions of teachers were collected and analyzed for repair / revision of the product. The procedure is done as suggested Arif S.Sadiman (2006:183) as follows:

1) Students are briefed that the developers have designed the new media and would like to know how the students' reactions to the media.

2) Ensuring that students are relaxed and free to express their opinions about the media being tested.

3) Distribute to each student learning CD and allows students to use. As long as students use multimedia learning, developers observe and record students' reactions.

4) Distribute the sheets to be filled out questionnaires about the students' responses to multimedia products that have been tested.

5) Analyze all of the information gathered.

6) Based on student input, multimedia products be revised so that the media product is ready to be tested in small groups.

c. Small Group Trial (Small-Group Evaluation) Objective testing small groups (small-group evaluation) to determine effectiveness and identify learning problems that are still owned by the student and determine whether the student can use the media independently without interacting with the teacher (Dick & Carey, 2005: 289). Besides, this trial aimed to obtain data or information that can be used to improve the product in the next revision (if necessary). The test try the procedure is as follows:

1) Provide information to students about multimedia tested and require feedback from students to improve.

2) Distribute the learning CD to each student and allow students menggunakanannya. As long as students use multimedia learning, developers observe and record students' reactions and to provide assistance when needed.

3) Distribute the sheets to be filled out questionnaires about the students' responses to multimedia products that have been tested.

4) Analyze all data and information collected.

5) Perform revision multimedia products developed based on data and information from the students so that the product is ready to be tested in field trials.

d. Field Trial (Field Trial)The purpose of field trials (field trial) to menentukan whether multimedia products IPA has developed feasibility, both in terms of aspects of learning, content or material aspect, or aspects of the media / display so it is worth using. At this stage, students are given a pre-test and post-test to see if there are significant gains in student learning outcomes before and after using this product multiimedia. Learning outcomes can be seen from the increase in student scores from pre-test to the students' level of mastery learning on the post-test with a minimum of "70". So, if the value of a student on a post-test to reach at least "70", the student is declared to achieve mastery learning materials. Mastery learning class where 80% of the number of students in a class reaches 70 or more.

Product trials at this stage involved 32 students are students of class VA. This class is taken as a class with a very heterogeneous student ability so that the ability of low, medium and high are represented. The learning procedure at this stage is:

1) Provide pre-test.

2) Provide information to students about multimedia tested and require feedback from students to consummation.

3) Distribute CD pembelajaran to each student and allow students to use. During the students' use of instructional media, developers observe and record the reactions of students and to provide assistance when needed students.

4) Provide post-test.

5) Distribute the sheets to be filled out questionnaires about the students' responses to multimedia products that have been tested.

6) Revise multimedia products based on an assessment of the student so that problems can be resolved in the final end multimedia products. The final product is made in the revision stage is ready for field trials disseminated and implemented to the user.

2. Trial Subjects After the development of multimedia learning products validated and declared eligible by (expert Judgments) both experts and the media matter experts, we then tested on multimedia learning test subjects (students). Test subjects in this study were students of class V Hj Elementary School. Isriati Semarang. This class is a class of compound is taken as meaning the ability of students is very heterogeneous so that the ability of low, medium and high representative and not burdened for the preparation of National Examination (UN). In this study, there are three stages of product testing performed are: a. Individual trials (one to one evaluation with learners), as 6 student representative (representative learners), two students representing the group under which students with low achievement, two students representing the central achievement of the students with the ability to moderate, and 2 students with the ability high.

b. The trial groups (small-group evaluation) as many as 12 students of a representative (representative learners), students were randomly assigned.

c. Field trials (field trial) were 32 student representative (representative of the targeted population).

Type of Data The data obtained in this study is qualitative data and quantitative data. The qualitative data in this study is the data obtained from the responses regarding aspects of learning, materials, and media from a variety of sources that matter experts, media specialists and students. This qualitative data diangkakan (scoring) so that the qualitative data in this study turned into quantitative data. Other quantitative data obtained from the student's score on the pre-test and post-test.

Instruments Collecting Data.

To get the required response from the respondent quality research instruments. To produce a quality product development required an instrument that is able to collect data that is needed in the development of multimedia products. The instruments used to collect data in this study in the form of questionnaires and tests. Instrument in the form of questionnaires intended to evaluate the quality of multimedia software and instrument in the form of pre-test and post-test to determine the improvement of student learning outcomes in learning science fifth grade elementary school. Data Analysis Techniques

Data obtained through pilot activities are classified into two, namely the qualitative data and quantitative data. Qualitative data in the form of criticism and suggestions put forward media expert, material experts, and learners gathered and abstracted to improve multimedia products, whereas the effectiveness of data products the average pre-test and post-test comparison.

a. Data obtained from the comments changed to 1-5 interval data from very poor (1) to very good (5) as follows:

Very Good = 5 (100% in accordance with the elements contained in that statement)

Good = 4 (80% according to the elements contained in that statement)
 Pretty Good = 3 (60% according to the elements contained in that statement)
 Not Good = 2 (40% according to the elements contained in that statement)
 Very Not Good = 1 (20% according to the elements contained in that statement)
 Comments are given five options to provide feedback on the development of multimedia products, namely: excellent (5), good (4), fairly good (3), poor (2), and very poor (1). For example, students responded "excellent" in item statement, then the statement item score of "5", and so on.

- b. Scores obtained, converted into value, on a scale of 5, with reference tables cited Sukardjo (2005; 101), as follows:

Research

Description of Development The first step is developing a needs analysis conducted to obtain information about the extent to which the development of interactive multimedia pengoptimalkan is needed in the implementation process and learning outcomes. Data in the first step is taken from the literature and field studies with limited observations on SD Hj. Isriati Semarang. In addition, the researchers also deploy a needs analysis questionnaire, which aims to capture information regarding the use of this type of learning resources, learning, multimedia development using learning in the learning process and the development of multimedia learning needs of students. The results of the questionnaire specific to the needs of teachers and students is that most of the fifth grade teachers in the study are still many who use textbooks, modules, diktat and LKS. They do not use multimedia as a learning resource. The reason given by them for the learning resources that are used in this book, module, LKS is relatively easy to obtain, and to LKS made in accordance with the characteristics of student learning. As for the use of multimedia learning resources using them very difficult to develop because of limited ability to understand multimedia learning. Therefore, based on the results of needs analysis was a teacher proposes to create materials with a natural event in the form of multimedia development because such materials are some basic concepts that are abstract so it needs to be visualized and students will be more motivated to learn.

The second step is the development of learning design. The results of this step are:

1) Focus on the achievement of student characteristics as the target of the use of this product, namely (a) the motivation to learn during the learning process or during the use of multimedia programs and (b) the results of their study of test results showing mastery of the material presented in the interactive multimedia product.

2) The standard of competence defined as detailed in the syllabus of science subjects are: "Students understanding the changes that occur in nature and its relation to the use of natural resources".

3) Core competencies specified in the multimedia product are: "Students identify natural peristiwa occurred in Indonesia and its impact on living organisms and the environment."

4) The strategy applied learning in multimedia products developed include: (a) the order of learning, which is a preliminary form of navigation instructions for use and the expected competencies, the presentation of the material in the form of a complete description along with examples (illustrative pictures, video, animation mapun), and cover in the form of exercises for each subject matter and tests to determine the level of mastery of all program materials have been studied: (b) methods of learning emphasis on individual learning methods and the application of learning theory completely. 5) The material developed in this multimedia product is (a) Earthquakes. (B) Mount erupts. (C) Flood.

(D) Tsunami and (4) Wind Putting pickaxe. 6) The form used in the assessment of learning using interactive multimedia product is a test and non-test. The test is used to measure the level of mastery and non-mastery of the test used to measure the level of motivation of the users. The third

step is the development of interactive multimedia product designs. Diproleh results at this step are (1) Programming the interactive multimedia product developed or manufactured by using the software program Macromedia Flash MX applications. As for its use do not have to go through an application program Flash MX for the product in the form of interactive CD has been formatted in auto run so that it can be read (compatible) for the entire program Microsoft Windows-based PC xp 2003 upwards. (2) Design layout that's been on this type of multimedia product images, it balances the content of the program material is very dense so that users are not too tense and saturated. The design layout of this product consists of the opening, the main menu screen, the manual, the display of competence, display material, display test, and display development. (3) Design the navigation structure is applied to the interactive multimedia product is a combination of a linear structure and a central navigation structure. Design the navigation display is designed in the form of text and image-shaped buttons. (4) Graphic Design selected more predominantly orange (red-yellow) corresponds to the color of the Empire 21 movie theater that is quite familiar to the public. (5) Material material about natural events already collected, selected and arranged in order of presentation of the material and developed into finished products (the initial product) in the form of interactive multimedia CD that is ready to be evaluated.

The fourth step is a formative evaluation of the initial product. The result of this step are: (1) execution of the initial product review conducted by two experts and two experts of the material medium of learning. Experts material into product reviewer research is Prof..Dr. Djukri and Prof Dr. ZuhdanKunprasetyo science lecturer at Yogyakarta State University Graduate. 2 people are media expert. Dr. Mukminan and Dr. Haryanto Lecturer Graduate Yogyakarta State University. Data either by expert reviewer and expert instructional media materials are used to determine the quality of design products. Reviewers provide a revised assessment for the product to be tested to the student judged worthy. Once the product is declared eligible by the experts, then tested multimedia products to students. (2) one-on-one test performed by 6 elementary students Hj. Isriati Semarang and they gave judgment for later revised again. (3) small group trial conducted by 12 elementary students Hj. Isriati Semarang who then gave his assessment of the product to be revised. (4) Once revised, made more field trials conducted by 32 students as previous trials. Assessment results of the field test was made final revisions to the final product ready to be implemented on the target group. The results of product validation by matter experts, media, and field trials are more clearly seen in the following table:

From the above table it can be seen that science learning multimedia product test results one by one expressed both from the aspects of learning, content and media. And small group testing revealed both from the aspects of learning, content, and media, as well as field trials revealed excellent views of the aspect of learning, content and media.

Data Usage Effectiveness Test Product Test Results Pre and Post Test

Activity pre test and post test done after all the steps of testing (formative evaluation) done and produce the final product that has been developed from multimedia. The event was held as well as product implementation measure summative evaluation (step five) of the development procedure in Chapter III. This activity is only carried out in one session by 32 elementary school students Hj. Class B Isriati Semarang as a subject or target group and never involved the development of this pilot study previously.

Pre-test performed for a maximum of 30 minutes and its implementation before the respondents to freely use the multimedia end product. Post-test carried out in the same time duration and practices after students completed mengoprasikan all the facilities available in the final product. Data acquisition of the pre-test and post-test are given in Table 24.

Conclusion

Based on this research is the development of multimedia learning, can be summed up some of the following:

1. Multimedia learning science in accordance with procedures developed by the media development stages a. conduct preliminary research (literature, classroom observations, and determine the materials

to be developed), b. analyzing learning, c. undertake the design development, multimedia software in the form of creation script, flowchart, storyboard, collection materials, processes pembuatan product, d. product evaluation, e. revised. Evaluation of Multimedia learning science class V SD / MI through the validation phase material experts and media experts, individual testing, small group testing, and field trials, as well as analysis and revision of the product so that the final product which is used as a medium of learning content and resources learn in school.

2. Feasibility Multimedia science learning for students of class V SD / MI in adding to the learning experience in terms of positive responses to multimedia learning, the results of the validation by experts and media materials exhibit good study quality category (value 4.16), good material quality category (grade 4 , 20) and the display quality is very good media category (with a value of 4.30) as well as good quality media programming (value 4.13). Average Field Trial results show that multimedia learning science has a very good quality of learning categories (value 4.63), and the quality of the material is very good category (value 4.66) and the category of medium quality is very good (value, 4.68) . These results indicate that the developed multimedia learning science researchers fit for use as a medium of teaching and learning resources.

Limitation

As a scholarly work, research is still far from perfection. In this study, the developer has several limitations, especially in terms of cost, time and effort, so research is still not comparable to the research and development that is professional as in a company in which a researcher is given the freedom in terms of cost, time and effort accordance with the agreement made between the researcher denagan developers or companies that require the fund penelitan. This study was limited to elementary school Hj. Isriati Semarang in Central Java alone. To be able to say that these products are effective and efficient use in learning science in general, still need to be tested to a much larger scale involving several provinces that have average ability levels of students from the top, middle, and bottom. And the next stage, it is also the product compared to other products similar to obtain a standard of eligibility and compliance with minimum quality specified. Another limitation is that not all materials can be packed in science learning using multimedia computer-assisted learning, particularly materials that require hands-on with the real thing.

Suggestion

Suggestions Product Utilizationa

Multimedia computer-assisted learning science to the material events of this nature are very effectively used in teaching, teachers can create learning materials using computer technology. b. From the test results stating that IPA pembelajaran multimedia can enhance students' motivation in learning. For that we need the use of multimedia learning broadly, so as to improve learning outcomes and learning can take place tinng well and learning objectives can be easily achieved c. Looking at the effectiveness of multimedia learning, the school is expected to facilitate the development of media denagan complete computer facilities, provision of funds pengembangan, and also pengembanagan multimedia computer-assisted training for teachers in the respective schools.

2. Dissemination This product can be disseminated through such limited activities through KKG (working group of teachers) to spur the increase creativity in developing computer-assisted multimedia pembeajaran for science subjects.

3. More Product Development With some of the above limitations it is necessary dikembangkan on other subjects and on different materials can be developed that enables multimedia computer-assisted learning. Besides testing should be implemented widely and reached the level of saturation, resulting in a kind of instructional media, and can be widely used. Training development of multimedia computer-assisted learning also need to be implemented to improve the ability of teachers to develop instructional media, so that teachers are not only competent in the design phase only, but the whole production stages.

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