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Developing Instructional Multimedia for High School Students

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ABSTRACT

This study aims to develop instructional multimedia interactive with Adobe Flash application on computer introduction material and determine the feasibility of instructional multimedia interactive based on expert judgment materials, media experts, and students. This research is a development (Research and Development) which adapted from the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation), but only carried out until the Implementation. Validation is carried out by material experts, media experts, teachers, and students. Data collection techniques in this development research use a questionnaire. Data obtained from the questionnaire was then analyzed descriptively qualitatively and quantitatively. The results showed that the level of feasibility of instructional multimedia developed based on the assessment of: 1) Material experts obtained an average score of 4,265 which is included in the Moderate category; 2) Expert, The media obtained an average score of 3,575 which is included in the Moderate category; and 3) Teachers obtained an average score of 4.095 and categorized as Moderate, 4) Students obtained an average score of 3.95 which belongs to the Moderate category. Thus the interactive instructional multimedia that was developed is worthy of being used as a medium computer introduction instructional for high school students.

Keywords: *Instructional Multimedia, Computer Introduction, Adobe Flash, ADDIE.*

1. INTRODUCTION

In the current era of globalization, humans are required to know the information that develops so that the community's ability in receiving information quickly will make resources people who are ready to face the era of globalization [1], [2]. One way to preparing and printing quality resources is a system educational process. In theory learning activities students are guided by the teacher to understand the material for further practice. Based on the review for theory learning activities, appropriate learning strategies are needed. Technological developments have had an impact on the world education, especially in the learning process. Previously existed technology as it is today, students assume that learning resources just a teacher[3]. Teachers are always thought to know everything. It's no longer happened again with the invention of technology.

Learning resources now not only from the teacher [4]. Students can now study anywhere, anytime, and with anyone by utilizing existing technology [5]. With the development of these technologies, many schools are providing supporting facilities to utilize the technology. It is hoped that with these facilities the teacher is able to convey subject matter to students better by utilizing existing facilities in schools to support the learning process. One of advanced technologies that were discovered was the computer. Computer capable almost simplify every element of human life from various fields. The use of computers in the world of education is one of them by creating instructional multimedia for the learning process in school [6], [7].

Introduction to instructional multimedia refers to the use of various forms of media, such as text, graphics, audio, and video, to enhance the learning experience [8]. Instructional multimedia refers to learning environments that contain both words and pictures with the intention to promote learning [9]. Instructional media can be used by both instructors and students to transmit knowledge and skills, and it can be used to teach a variety of subjects,

including psychomotor skills in health professions[10]. The use of instructional media can increase learner motivation [11]. The development of learning media has led to the combination of learning with technological facilities such as computers, laptops, and smartphones owned by schools, teachers, and students [12].

The use of learning strategies that have been chosen must of course be supported by appropriate learning media so that learning is meaningful for students. Based on the problems that have been described, it is necessary to evaluate learning tools that can support the learning process, where the media can help students to understand learning concepts related to the material. One of the developments of learning media is to combine learning with technological facilities owned by schools, teachers and students in the form of computers, laptops and smartphones. And efforts that can be made to minimize the problems that have been described is to develop an appropriate learning media according to needs. Furthermore, several studies explain that the use of interactive media as a learning medium has proven to be effective. Interactive learning media is proven to be effective in improving student learning outcomes[13], [14]. The use of learning media is one solution that can help teachers improve the quality of students which can be seen in learning outcomes[15], [16].

2. METHODS

Research & Development (R&D) is a process to develop and validate products used in the learning process. Selection of the right learning model will produce research products that are effective and efficient. If the selection of the product model developed is right, the research results can provide benefits and be applied by its users. In this study, the research model used is the ADDIE (Analysis – Design – Develop - Implement - Evaluate) instructional design model.

2.1. Analysis

In the analysis stage, the researcher conducted several analyzes to get an overview of the instructional multimedia that would be developed. The analysis carried out is a needs analysis where in determining the analysis of instructional multimedia needs, it is carried out by observing and interviewing productive subject teachers. It aims to determine the teacher's learning process in the classroom.

2.2. Design

There are several things to do at this stage, namely, design a flowchart that contains the flow of multimedia learning in a succinct manner. Developed based on the navigation structure that was created earlier, designing a story board is a brief descriptive description that contains the storyline in multimedia learning on subjects from the beginning to the end of the program, create a product assessment instrument that aims to assess the instructional multimedia products that have been made and measure the validity of the product.

2.3. Development

The development step includes activities to create or modify appropriate media to be used in delivering learning materials. In addition to the process of translating the instructional multimedia design in the actual display, at this stage a validation process is also carried out by experts.

2.4. Implementation

The implementation step is to implement the instructional multimedia product developed. At this stage all requirement that has been developed is in accordance with its function. The product is ready; it can be tested on students and then evaluated and revised to produce a final product that is ready to be disseminated.

2.5. Evaluation

Evaluation is a process to see whether the learning system that is being built is successful, in accordance with initial expectations or not. Multimedia products are evaluated based on the results of student responses, so it can be concluded whether the developed instructional multimedia is suitable for use in learning.

3. RESULT AND DISCUSSION

The product produced in this study is a multimedia learning material for computer introductions for high school students. This study focuses more on the development of learning media using Adobe Flash in accordance with the limitations of the problems that have been designed. The multimedia development method used in this research is using the ADDIE model. The stages in the development model adapted from the ADDIE model consist of several steps, including: (1) analysis, namely the field survey stage for analyzing the needs of the system to be developed; (2) design, namely planning and preparing the structural framework for flash instructional multimedia programs; (3) development, the stages carried out are making multimedia, alpha test, and beta test; (4) implementation, namely the stages of using instructional multimedia, there are two tests, namely limited trials and field trials; (5) evaluation, namely the stages carried out to determine the shortcomings and effectiveness of the products developed in large-scale use or field tests, besides that in this evaluation stage students will provide assessments on certain aspects related to the response after using instructional multimedia products

both in learning or independently. Each of the stages of research and development will be described as follows.

3.1. Analysis Stage

In this stage, the researcher conducts several analyzes to provide an overview of the instructional multimedia that will be developed. The analysis process obtained is a reference in the development of this instructional multimedia. The analysis carried out includes needs analysis which is described as follows: a. Needs Assessment. In this research, needs assessment is done by digging and collecting information related to development needs. The results of this assessment were obtained through observation and interviews. The results of observations and interviews conducted with a teacher, information is obtained that the obstacles that often arise in the use of learning media are the availability and utilization. Lack of media availability causes teachers to use improvised media.

3.2. Planning Stage

3.2.1. Collection of Resources

Based on the pre-survey result, then first determine and collect the resources needed in this product development research. There are 3 types of sources needed to develop this multimedia, including: Media Sources, relating to the As for some of the software used which are Coral Draw X7 and Photoshop Cs6 for editing the images used, Internet Download Manager for downloading the required videos, Microsoft Word for storing text material. For the sources of computer introduction materials taking from several school textbooks and other sources such as the internet. Supplementary Sources are sources that help develop this multimedia, including actual and factual articles.

3.2.2. Flowcharts

The flowchart was made after knowing the design of the Adobe Flash-based photography learning media content. Flowcharts in the development of adobe flash-based photography learning media are used to describe the flow from one frame to another and explain each step of making adobe flash-based Productive Multimedia learning media. Flowchart images can be seen in the attachment.

3.2.3. Create storyboards

The storyboard is made after knowing the design of the content in each part of the Adobe Flash-based photography learning media. Storyboard in the development of adobe flash-based photography learning media is used to describe each frame, by listing multimedia objects and links to other frames. Storyboard images can be seen in the attachment.

3.2. Development Stage

After the design process is complete, the next thing to do is the development stage. At this stage, researchers develop products based on previously obtained data. In addition, there are several processes that must be carried out so that the product development stage can be carried out. The steps taken are as follows:

3.2.1. Material Collection

In the development stage of adobe flash-based photography learning media, the first step is to collect materials that meet the required needs. The materials collected include learning materials, supporting pictures, audio, and video. These materials are obtained both from books and from the internet. For learning materials, researchers mostly collect material from teaching material books that are in accordance with the curriculum as well as the applicable KI and KD. In addition, the researchers also added some examples and questions that the researchers developed from the internet. Then for supporting images, researchers got it by downloading it from the internet and making it through Photoshop software. The images were developed by researchers back into animated images as needed. Then finally, the researcher looked for audio from the internet to be the background sound. Researchers select and sort out sounds that can make application users feel comfortable while using them.

3.2.2. Develop the Multimedia Instructional.

This research has successfully developed an instructional multimedia for teaching introduction of computer for senior high school students. What follows is a brief explanation of the layout in the multimedia developed. at the time the multimedia is run, an initial layout will emerge from the multimedia like what is shown in Figure 1. With the layout of the multimedia as shown in Figure 1, product is user friendly. Figure 2. Shows the features of multimedia instructional developed.

Figure 1 Initial Display of Multimedia Instructional

Figure 2 Feature of Multimedia Instructional

In the multimedia, students can see the features, contain of a set of lesson plan, the materials, quiz, and developers' profile and help button. The multimedia presents the content which designed in such a way to accomplish the learning process. The display of the content shows in Figure 3

Figure 3 Display of Learning Materials

When select the material button, some choices are displayed, the presentation of the materials are almost the same. However, Figure 4 provides help menu to guide students to understand about how to operate to multimedia instructional developed. After finishing the learning process, students will be given a comprehension test, the display of each of the pages can be seen in Figures 5.

Figure 4 Display of Help Menu

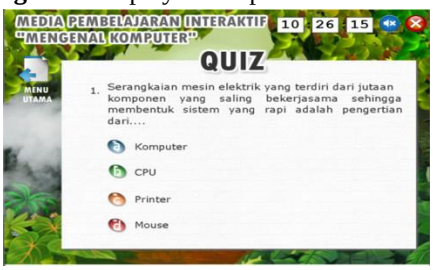

Figure 5 Display of Quiz

3.2. Implementation Stage

After getting the feasibility test from experts, the next stage carried out by the researcher is the product implementation stage. At this stage, the researcher begins to test the product. There are two further stages that researchers must do, namely testing and beta testing. The following is an explanation of the previously mentioned stages.

3.2.1. Trial

The trial stage is the stage where the product is implemented in learning activities. The goal is to find out the shortcomings and feasibility of the product when used in learning activities. The research activity was carried out on July 22, 2022, in a computer laboratory which was attended by 6 respondents, consisting of 5 students and 1 teacher at SMA Negeri 1 Tondano. In the first trial, students were given pre-test questions that had been previously validated. Next, learning activities with students begin to use the product on their respective computers. Students then first open the multimedia file on their device. After that, the researcher guides the students to use the product. In this phase the researcher asked students to try all the content contained in the multimedia. Not only students, but teachers were also asked by researchers to participate in trying the products made. This is so that the data obtained will be maximized. During the trial process, the researcher monitors the trial run on the product. In addition to helping students if they have difficulty or confusion, the researcher also records events such as if an error occurs or there is a bug. This is done so that later researchers can correct errors that occur even though basically the product that the researcher developed is feasible to use because it has been validated by material experts and media expert validation. After the lesson time was over, the researcher asked the students to give spontaneous input regarding the Adobe Flash-based learning media for photography that they used during the learning activities. Some students apparently have not finished trying all the existing content. The following week, on July 29, 2022, the researcher continued the research in class. After opening the class, the researcher asked the students to re-open the Adobe Flash-based photography learning media and study the material to continue the previous one. During the learning process using the given product, students seemed enthusiastic about the features in the application. The researcher at this time also noted events that should be used as data, such as increased student enthusiasm and the absence of bugs or errors that occurred while students were using the product. In addition, the researcher also asked several students about the multimedia they used. After that, in the last 60 minutes, the researcher gave post-test questions to find out whether there was an increase in students' abilities or not after using adobe flash-based photography

learning media. The results and discussion of this posttest will be explained in the discussion of the data description.

3.2.2. Beta Testing

After testing the product, the next stage is Beta testing. This stage is the last stage in the process of testing the developed learning media. This test is used in the development of product improvements where research data is taken from the responses of class X students of SMA Negeri 1 Tondano using a questionnaire that has been provided by the researcher. Furthermore, the data obtained from students is used to determine the level of product feasibility from the learning aspect, the display aspect, the audio media aspect, and the navigation aspect. In its measurement, every aspect of the questionnaire contains several indicators and assessment criteria used to assess product quality. The assessment criteria are used in the questionnaire to assess the level of product feasibility.

3.3. Stage of Evaluation

Evaluation is the last stage of ADDIE's multimedia development. This evaluation was carried out by researchers by accessing data obtained from the results of research. The data are material and media feasibility data which obtained from expert lecturers and product feasibility analysis from the results of student questionnaires. In addition to analyzing the results of material validation, media validation, and student questionnaires and analyzed the results of the pre-test and post-test needed to determine the improvement of students' abilities to the learning process and student learning outcomes before and after using the product. An explanation of the evaluation results data is explained in the data description and data analysis section.

The effectiveness test is a stage to determine the effectiveness of the learning media developed when applied to the teaching and learning process in the classroom. As a learning medium for class X students, the subjects in the effectiveness test were students of class X SMA Negeri 1 Tondano, total 23 students. The results of the effectiveness test resulted in an average score of 64.23 (pre-test) and 82.61 (post-test) with a gain index of 0.515. Thus, the effectiveness test is declared effective with a "medium" level.

4. CONCLUSION

Refers to result of data analysis and discussion, the conclusion as follows.

The product of the instructional multimedia to implement introduction of computer in this study is simple, clear, and contains, among other things, 1) basic competencies and learning indicators to be achieved in the teaching by using the multimedia developed; 2) material items to be learned; 3) description of activities for each page; 4) components contained in each page.

The instructional multimedia developed has been validated. The result of validation shows that the criteria is valid. Furthermore, it can be accepted as the instructional media for computer introduction topics.

AUTHORS' CONTRIBUTIONS

As for the role of the author in research and writing of this scientific article; All researchers made joint observations at school to analyse the needs of students in developing learning media. Furthermore, all authors conducted a literature study to be used as a reference in this research. The third and fourth authors develop learning media products while coordinating with the first and second authors. Furthermore, all authors jointly write articles based on the results of the product development that has been made.

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REFERENCES

[1] A. Hanson, Impact of globalisation on information seeking: the role of cultural Impact of globalisation on information seeking: the role of cultural lenses and indigenous knowledge lenses and indigenous knowledge, 2003.

[2] R. Lencucha and S. Bandara, Trust, risk, and the challenge of information sharing during a health emergency, *Global Health*, vol. 17, no. 1, pp. 1–7, Dec. 2021. DOI: 10.1186/s12992-021-00673-9.

[3] John King and Secretary, Reimagining the Role of Technology in Education: 2017 National Education Technology Plan Update. 2017.

[4] A. Sayed Munna and A. Kalam, Teaching and learning process to enhance teaching effectiveness: a literature review, International Journal of Humanities and Innovation (IJHI), 4(1), 2021, pp. 1–4. DOI: https://doi.org/10.33750/ijhi.v4i1.102.

[5] A. Rawashdeh, Advantages and Disadvantages of Using e-Learning in University Education: Analyzing Students' Perspectives, Electronic Journal of E-learning, 19(2), 2021, pp. 107–117.

[6] A. Asthana, Multimedia in Education, in Encyclopedia of Multimedia, B. Furht, Ed., Boston, MA: Springer US, 2008, pp. 549–554. DOI: 10.1007/978-0-387-78414-4_140.

[7] F. Mantiri, Multimedia and Technology in Learning, Universal Journal of Educational Research, 2(9), 2014, pp. 589–592. DOI: 10.13189/ujer.2014.020901.

[8] R. E. Mayer, Introduction to multimedia learning, in The Cambridge Handbook of Multimedia Learning, Second Edition, Cambridge University Press, 2014, pp. 1–24. DOI: 10.1017/CBO9781139547369.002.

[9] R. E. Mayer, Applying the Science of Learning to Multimedia Instruction, 55, 2011. DOI: 10.1016/B978-0-12-387691-1.00003-X.

[10] A. R. Smith, C. Cavanaugh, and W. A. Moore, Instructional multimedia: An investigation of student and instructor attitudes and student study behavior, BMC Med Educ, 11(1), 2011, p. 38. DOI: 10.1186/1472-6920-11-38.

[11] R. Ratih Ayu T, Z. Tasnim, and A. Rofiq, Investigating english teacher candidate's use of instructional media during the teaching practicum: a case study, Pancaran Pendidikan, 2020, 9(2), DOI: 10.25037/pancaran.v9i2.287.

[12] U. Ridwan Maulana, Development of smartphone-based learning media on computer and basic network subjects at SMK Negeri 1 Gunung Sindur, Bogor Regency, International Journal on Engineering, Science and Technology, 4, p. 2022, 2022.

[13] R. Sholikhah and M. Krisnawati, Effectiveness of the use of interactive video learning media in fashion technology courses, Advances in Social Science, Education and Humanities Research, 1st Vocational Education International Conference (VEIC 2019), 379, 2019, pp. 172–176.

[14] S. Sahronih, A. Purwanto, and M. S. Sumantri, The effect of interactive learning media on students' science learning outcomes, in ACM International Conference Proceeding Series, Association for Computing Machinery, 2019, pp. 20–24. DOI: 10.1145/3323771.3323797.

[15] M. R. A. Haryana, S. Warsono, D. Achjari, and E. Nahartyo, Virtual reality learning media with innovative learning materials to enhance individual learning outcomes based on cognitive load theory, International Journal of Management Education, 20(3), 2022. DOI: 10.1016/j.ijme.2022.100657.

[16] Y. D. Puspitarini and M. Hanif, Using learning media to increase learning motivation in elementary school, Anatolian Journal of Education, 4(2), 2019, pp. 53–60, DOI: 10.29333/aje.2019.426a.