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DEVELOPMENT OF LEARNING VIDEO MEDIA ON BUILDING CONSTRUCTION BASIC LESSONS (Study of Class X Students in the Modeling and Building Information Design Expertise Program at SMK Negeri 2 Binjai)

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Abstract

This study examines learning media on Building Construction Basic subjects, Occupational Safety and Health (OSH) material on Building Works.. Learning media are essential in the learning process, and good learning media are very effective in the teaching and learning process. In this case, the researcher tries to develop a learning video media that students can use using gadgets or laptops and androids through the storage media of CDs, flash drives, or other data/file storage places. It aims to facilitate students in understanding the material and facilitate the teacher's teaching process. In making this learning video media using the 4D model (Define, Design, Develop, Disseminate). This research was conducted in the google classroom application, while the sample in this study was 20 students of class X Modeling and Building Information Design Expertise Program, SMK Negeri 2 Binjai. The feasibility test of the media experts' developed instructional video media assessment showed an average rating of 3.80 and was declared "Eligible". The material experts showed an average rating of 4.17 and was declared "Very Eligible", the tests conducted of 20 State Vocational High School 2 Binjai students showed an average of 4.30 was stated as "Very Eligible".Based on the feasibility test and testing results, it can be concluded that the instructional video media developed is excellent and feasible to be used as a learning media for K3LH material on building work.

Keywords: Learning Video Media; Building Construction, 4D Model

Introduction

Science and technology in the 21st century have led to the development of the world of education. Science plays a critical role in creating quality human beings. The 21st century emphasizes at the core of education based on human roots, it aims to understand, recognize and seek individuals, and recipients are expected to develop in thoroughly learned knowledge (HE & WANG, 2001). Industrial progress in the technological era currently being carried out is the empowerment of digital integration in the industrial sector, known as the Industrial Era 4.0. Having 21st-century skills for a society or country will be very important to organize Industry 4.0 (Idin, 2011). All fields will be affected by the development of industrial revolution 4.0, a new pattern when technological disruption comes so quickly that all circles, especially education, must immediately adapt to the development of industry 4.0. (Muktiarni et al., 2019). The Industrial Era 4.0 has also resulted in the speed of the development of science and technology, demanding changes in the ways and strategies of teachers in teaching (Maryanti & trie Kurniawan, 2018).

Learning in the 21st century is more student-centered; the teacher's role is to help and encourage students to develop student skills (Jones, 2007). The learning process is where most of the power during the experience lies with the student (Estes, 2004).

Education is one of the essential aspects that humans must fulfill in their lives. The higher the level of education passed, the higher the intellectual level a person has (Tegeh et al., 2019). Education is described as a means of sustainable human development and results in increased human well-being (Landorf et al., 2008). The purpose of National Education in Law No. 20 of 2003 Article 3 concerning the National Education System (No, 20 C.E.). Which is to prepare students to become productive human beings, work independently, fill existing job vacancies as a workforce under the competencies in the skill program they choose. Also, prepare students to choose a career, be tenacious and persistent in competence, and develop a professional attitude in their field of expertise.

SMK Negeri 2 Binjai is a formal educational institution managed by the Government, with the vision of making vocational education and training attractive to the business world (DU)/industrial world (DI), prioritizing the quality of graduates who have excellence. This school is a vocational school, where vocational education has a very important role to play in ensuring the readiness of the skills of the workforce (Bhardwaj & Gupta, n.d.). Vocational High Schools that have and provide human resources as prospective workers need to understand the context of industrial development (Mahmudah & Santosa, 2021). SMK Negeri 2 Binjai is located at JL. Bejomuna, Timbang Langkat District, East Binjai District, Binjai City. This institution has several engineering majors, one of which is Modeling and Building Information Design (DPIB). The DPIB Department has several subjects, including the Basics of Building Construction (DDKB). These subjects are classified as Science, Technology, Engineering and Mathematics (STEM. Where STEM is an essential component in 21st-century education (Ismail et al., 2016).

DDKB is a subject obtained by class X students at SMK Negeri 2 Binjai. DDKB is a fundamental subject in the advanced learning process. DDKB learning material requires a scientific description that is quite real to students. So the material is difficult to understand if the teacher only uses simple media in the form of a blackboard in learning, as a result, learning media is needed that can be used effectively (Meidina & Rizal, 2019). Media in the teaching and learning process tends to be defined as graphic, photographic, or electronic tools for capturing, processing and rearranging visual or verbal information (Humaeroh, 2014). Learning media also serves to facilitate students in independent critical thinking (Lafifa et al., 2022). A study by (Geller et al., 2021) shows an increase in students' understanding of scientific

content by viewing content-dependent presentations.

Android is a collection of software for mobile devices that includes an operating system, middleware, and main applications (Developers, 2011). Android is widely used by the community, including students (Siahaan et al., 2021). This use can be used as a learning tool easily accessible by students. It is possible to change the paradigm from the philosophy of teacher-learning to student-centered learning (Rinaldi et al., 2017). Android also has the advantages of many menu options, ease of use, and the ideal QWERTY keyboard (Lazareska & Jakimoski, 2017). Considering these reasons, this study intends to use learning video media by utilizing *gadgets or Android*.

The daily test scores of students on DDKB subjects at SMK Negeri 2 Binjai on the minimum completeness criteria (KKM) are 75 and students who have exceeded the KKM limit. 30% or 9 students are categorized as quite competent, 23.4% totaling 7 students are classified as competent, while 13.3% or 4 students are categorized as very competent.

Learning media can convey messages, stimulate thoughts and feelings, and encourage the learning process (Ramdhani & Muhammadiyah, 2015). One of the popular learning media is video learning.

Learning videos can be developed with technology as a resource and used in specific ways to improve learning (Fevre). Learning videos are live image recordings to deliver learning materials so that students obtain learning objectives (Ario & Asra, 2019). Meanwhile, according to (Alicea, 2016), learning video is one of the relatively new media, the development of internet technology that has recently proliferated.

According to (Garsinia et al., 2020) video learning media can help students understand the material and assist teachers in providing interesting practice questions. Several studies have shown that video, in particular, can be a very effective educational tool (Allen & Smith, 2012).

The process of making video media requires a 4D development model (Define, Design, Develop, Disseminate). Learning videos are one of the appropriate media to display the stages in the learning process that are tailored to the learning materials in detail and detail (Nurainun & Saehana, 2019). According to (Riyana, 2012) learning video media aims to clarify and facilitate the delivery of messages, knowing the limitations of time, space, and senses, can be used appropriately and varied.

Learning video media certainly has advantages and disadvantages. According to (Sadiman, 2009) video as a learning medium has advantages and disadvantages. One of the drawbacks of video is that although videos provide independent learning, some students find that pausing videos interrupt context, even for short pauses (Caspi et al., 2005). One of the advantages of video is that it can facilitate understanding by seeing movement because many tasks are difficult to explain verbally (Wetzel et al., 1993). Another advantage of videos is that when students forget the subject matter explained, they can playback the video as often as they want.

The learning videos made must be adapted to the character of the students, and serious efforts are needed in making these learning videos which is the key to the success of developing this learning video (Ario & Asra, 2019). Similarly, video documents should be structured to compile a table of contents, extract keyframes, and key sequences as index entries for scenes or stories (Sahouria). By paying attention to the importance of the learning video media used, the researchers conducted a study titled "Development of Learning Video Media in the Subject of Building Construction Fundamentals for Class X Students of Building Modeling and Information Design Expertise Program".

Based on the problems above, the purpose of this research is to find out the process of developing Learning Video media in the subject of Building Construction Fundamentals for Class X DPIB Even Semester SMK Negeri 2 Binjai Academic Year

2019/2020. As well as knowing the level of feasibility of Learning Video media on DDKB subjects for class X DPIB Even Semester students of SMK Negeri 2 Binjai for the 2019/2020 Academic Year.

The benefits of developing learning video media on DDKB subjects for students of Class X DPIB Even Semester SMK Negeri 2 Binjai for the 2019/2020 academic year is hoped that this media can improve learning outcomes DDKB subjects. This research is also expected to be used as an alternative teaching media used by teachers in learning DDKBs subjects and is helpful for students to increase their knowledge of DDKB. And it is also beneficial for schools as a basis for making policies to improve school quality and the quality of DDKB learning. This research is also helpful for student to train and increase researchers' experience, insight, and skills, especially in learning video media.

Research Methods

This research was conducted *online* using the *google classroom* on the competence to apply K3LH to building work. The research time was carried out in the even semester of the 2019/2020 academic year.

The subjects of this research were 20 students of class XII DPIB DPIB SMA Negeri 2 Binjai, and 3 product validators who had criteria as material experts and media experts. The research object in this study is to assess the learning video media for class X students with K3LH material on building work.

This research conducts development research. Development research is defined as the systematic study of designing, developing, and evaluating instructional programs, processes, and products that must meet internal consistency and effectiveness criteria (Richey, 1994). The research development model that will be planned follows the path of Sivasailam Thiagarajan and Semmel (Thiagarajan, 1974), namely using a 4D model consisting of 4 stages; namely the definition stage *(define),* the planning stage (*design*), the development stage *(develop)* and the dissemination stage *(disseminate)*. The 4D model was chosen because this development model is arranged systematically with a sequence of activities that can be used for solving appropriate problems in instrument learning (Wardani et al., 2019).

Data collection is done by using a questionnaire. A questionnaire is defined as a document containing questions and other items designed to gather information suitable for analysis (Babbie, 1973). Questionnaires are equally used in survey research, experiments, and different observation modes (Acharya, 2010). Questionnaires are also used in sample surveys or censuses to obtain reports of facts, attitudes, and other subjective circumstances (Martin, 2006). The main advantages of the questionnaire are its simplicity, versatility, and low cost (Fife-Schaw, 1995). This questionnaire was given to material experts, media experts, and students. This questionnaire was given at the validation step by material experts and media experts and assessed by students.

The questionnaire was structured in open-ended questions to obtain information needs that support the information theory of needs for model development. The use of structured questionnaires achieved a higher sensitivity than unstructured ones (Joffe, 1992). The questionnaire is helpful in knowing whether students use learning video media and the assessment or quality of the given learning video media.

The learning media assessment questionnaire was then given to media experts, material experts, and students to determine the feasibility of the media. The instrument used in this study is the result of the adaptation of the assessment of learning video media. This questionnaire contains aspects to assess whether the learning video media developed is feasible or not. Instruments for material experts are viewed from the quality of the material and learning. While for media experts, it is considered from the appearance and quality of the media.

At the data analysis technique stage, the instrument used is a questionnaire, a data collection technique containing questions posed in writing to a person or group of people to get

answers or responses and information needed by researchers. The data obtained from the instrument is an answer in the form of an explanation of the validation of the development of video learning media for K3LH material on building work. The data from the instrument obtained will be analyzed with the following steps: (1) The instrument has been filled in by the respondent, checked for completeness of the answer, and then arranged according to the respondent's code, (2) Quantitative the question by giving a score according to a predetermined weight. (3) Tabulate the data, then it is transformed into the following table:

Table 1. Data Tabulation

NO	Inverval Score	Interpretation	
1	0,00-2,49	Not Good	Not Feasible
2	2,50-3,32	Less Good	Less Feasible
3	3,33-4,16	Good	Feasible
4	4,17-5,00	Very Good	Very Feasible

The score of the assessment results is obtained from the sum as follows:

Results and Discussion

This research was carried out using the 4D development model procedure (Define, Design, Develop. Disseminate). The research results include 1. The Define stage is to determine and define the needs compiled in the learning video media that will be made. Data will be obtained in the curriculum, syllabus, and materials at this stage. 2. Two videos are designed using the VN Video Editor application in this design phase. The first video contains accident cases; the second explains the Occupational Safety and Health (OSH) material on building work. The stages are as follows: a. Make an initial cover or welcome menu in this first video. The appearance is as follows:

Figure 1. Welcome Menu

Before entering the second video broadcast, a video is shown about cases of accidents in the field.

Figure 2. Video About Cases Of Accidents

Make a display of Basic Competencies, Indicators, and Learning Objectives, which is a menu that contains information for students.

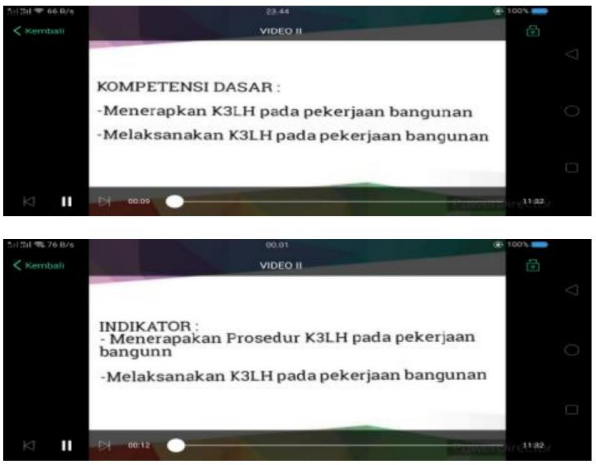

Figure 3. Display of Basic Competencies, Indicators, and Learning Objectives

Creating a display of learning materials on the material menu containing information related to the contents of the materials that will be broadcast starting from the Definition of Occupational Safety and Health (OSH), OSH Legal Basis, OSH Main Objectives, Safety Equipment, and OSH Signs, and Accident Classification.

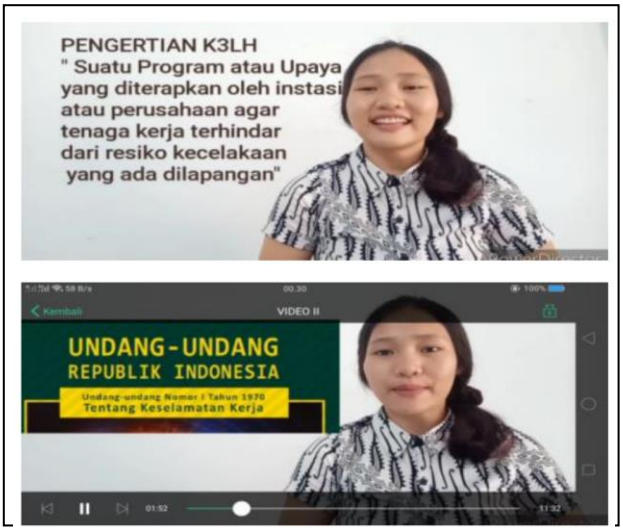

Figure 4. Learning Materials

Development Phase. At this stage, the product design is realized into a learning video, and this learning media is formed on a CD or other storage area, which aims to make it easier for students to learn. After the learning media has been created, the next stage is validation, assessing the learning video media. This validation stage consists of validating material experts and media experts with product assessment options in several categories of answer options 5: very good, 4: good, 3: not good, 2: not good, 1: very not good. a. The validation results by material expert I (Ernesto Maringan, S.T., DEA) got a score of 4.50, and material expert II (Zahrani Harahap, S.Pd) got a score of 3.80. It is known that the learning video media got an overall average of 4.17 "Very Eligible." However, there are some comments/suggestions from material experts I and II: fix/add sound in the learning additional video pictures about OSH signs in the field. Show Personal Protective equipment (PPE) installation videos. b. Validation by media experts (Dr. Rachmat Mulyana, M.Si) is known that the media get an average rating of 3.0 "Eligible." However, media experts have comments and suggestions, namely: Create a Learning Video user guide, Suitable for use as a learning medium. 4. Disseminate stage. At this stage, the learning media was tested on 20 class XII DPIB. This research was conducted using the Google Classroom application, starting from showing videos and filling out questionnaires. 14 The research results on learning video media for students of SMK Negeri 2 Binjai obtained an average value of 4.20 "Very Good." There are several inputs obtained as follows: this learning video media is good, this learning video is very helpful, this video is very easy to understand, provides convenience in learning, very good learning with videos, all material is explained very well.

This research aims to develop learning video media and test feasibility. The development of learning video media on K3LH material is made with a 4D model, producing a good learning video media and suitable for use. The results research has been carried out at the defined capital for developing a product, such as collecting the needed data and information.

Design is the product assessment stage of media experts, material experts, and users. Suggestions and input from experts and users are beneficial for product improvement so that the products used are under user needs and are suitable for use.

Development is the stage of the results of the research. Validation data are filled in by material experts and media experts as validators. Then this learning video media is declared to meet the requirements to be suitable for use as learning media with a score of 4.17 "Very Eligible" from media experts and a score of 3.80 "Very Eligible" from material experts. Which was tested on students with a score of 4.30 "Very Good" with validation results from content experts, media experts, and users; the media was declared suitable for use in K3LH learning materials on building work.

Stage *Disseminate* is distributing products through users in learning activities and distributing them via *CD* or *Flashdisk, Google Classroom*, or *YouTube*.

Conclusion

The results of the validation of media experts and two material experts, this Learning Video media is feasible to use, evidenced by the value of media experts with a score of 3.80 "Fair", and material experts 4.17 "Very Eligible", carried out by 20 class XII students of DPIB SMK Negeri 2 Binjai with different levels of ability got an average score of 4.30 "Very Good". This fact shows that the developed media is worthy of being used as media and learning resources for K3L materials on building work from DDKB subjects in class X DPIB Expertise Program at SMK Negeri 2 Binjai.

Based on the results of the research, the discussion, and conclusions above, the suggestions in this research are: 1) Teachers should generate creativity in learning media for students and create more teaching media; 2) Teachers should suggest for students to be able to learn to use learning video media independently on the subject of Building Construction Fundamentals.

It can be presented as a reference and input for other researchers for further research. Besides that, the assessment instrument on learning video media can be applied through collaboration with other materials.

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