

Virtual Learning-Based Media to Improve Learning Quality

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ABSTRACT

Less attractive learning media and methods that do not actively involve students will make students bored and pay less attention to the subject matter which results in students experiencing errors in understanding the material. Learning media need to be developed to be more interactive, flexible, fun, interesting, motivating, and easy for students to understand. The development of learning media can be done by utilizing information technology, one of which is a virtual learning media. This study is aimed to determine the feasibility, implementation, and learning outcomes using virtual learning-based media. This study is a Research and Development to the stage of limited trials and improvement of the initial product. The sample of this study was class X students of State Vocational High School 2 Surabaya. The data collection used learning media validation sheets, student learning achievement tests, and observation sheets of learning implementation. The data analysis used quantitative descriptive techniques. The results of this study are as follows. (1) The developed virtual media has excellent quality in aspects of the material, illustration, quality, and appearance as well as media appeal. (2) Learning using virtual media can be done well because it can be quickly adapted both by teachers and students. (3) Virtual media has advantages that can help improve student learning outcomes.

Keywords: Learning Media, Virtual Learning, Research and Development, Learning Outcomes

1. INTRODUCTION

Vocational High Schools (VHS) are educational institutions that are at the same level as high schools, but VHSs have different teaching and learning systems than high schools. The difference is that vocational students are taught to be ready for work. Skills are given at SMK so that after graduation they will be able to compete in the world of work and improve their economy [1]. Besides, the portion of learning in SMK has a portion of learning 60% practice and 40% theory. Vocational students are given initial skills and developed to be ready for work. Vocational education has individual and social field goals. Individual goals emphasize the readiness of students to work. Social objectives emphasize meeting the needs of the world of work and improving social welfare [2].

Learning in VHS aims to make changes in student behavior so that VHS graduates are ready to use in the industrial world with adequate competency standards. VHS graduates are expected to have cognitive and psychomotor skills. Cognitive skills are obtained from the learning process with the teacher's guidance, while psychomotor skills are obtained by students through

experience and training both from daily practicum and fieldwork practice [1].

Based on observations and interviews with teachers at state vocational high schools 2 Surabaya, learning media that is often used is PowerPoint. The teacher explains using media in the form of PowerPoints which are composed of the stages of introducing the tool to how to retrieve data in the field. However, the PowerPoint situation is not very interesting because many parts of the slide are not equipped with images, animated videos, or sound. Besides that, the learning method used by the teacher is a direct learning method, where the learning atmosphere does not involve students to be active in the process of teaching and learning activities. so students become bored quickly and pay less attention to lessons. This can have an impact on students' lack of understanding of the material being taught.

Students need to be more active in class to make it easier to understand new knowledge or information. Learners more easily remember something interesting and fun. For this reason, creative learning methods are needed in learning. The method is used so that students are interested and happy in learning, so they better

understand the lesson and can improve learning outcomes [3].

This is in line with the results of interviews that have been conducted with teachers of land surveying shows that the number of Class X students in Design Modeling and Building Information 1 VHS 2 Surabaya who achieved grades above the minimum threshold is good with a percentage of 77.8%. However, grade X Design Modeling and Building Information 1 students still have difficulty in understanding the Soil Measuring Science material about determining the height difference and calculation of data that has been obtained in the field. According to the subject teacher's information, mistakes in the practicum stage in the field still occur, especially when setting the Waterpass device and the crosshairs that are not parallel with the Nivo line. The second mistake is the zero line error on the bar. The third mistake is the Nivo box error which is used to make the ruler perpendicular.

The problem of students' difficulties with the material is important, so solutions need to be sought to improve the quality of learning. One such effort is by developing existing media so that it becomes a media that is more characterful, more interactive, flexible, fun, interesting, motivating, and easily understood by students. The learning process needs to be supported by learning media, one of which is electronic media such as radio, tape, video, interactive animation, etc. [4].

An interesting and interactive learning media needs to be developed because it can increase students' interest in the subject. Interactive learning media helps students to understand the lesson so that it can improve student learning outcomes [5]. The development of learning media can be done by utilizing the latest information technology developments. Information technology can be an opportunity to create interesting learning media [6]. Virtual learning-based media is one form of utilizing the development of information technology in learning activities.

1.1. Learning

Before discussing learning, we first review about learning. Learning is a relatively fixed change in one's behavior. Changes in a person's behavior are the result of experience or continuous training. Learning is the result of the interaction between stimulus and response [7].

Learning is a mental process in humans that includes the realm of knowledge, attitudes, and skills. Learning is a social experience through a process of interaction, which results in positive and permanent changes. Learning can occur at any time as from everyday experiences [8].

Learning is a change in someone's self that can be shown by the existence of new mastery, both in the form

of understanding, skills, and attitudes. Learning gives a permanent understanding to students when done by providing opportunities to be actively involved in learning, not only given memorization that just knows but directly involved in seeking understanding and skills [9].

Learning is a process of interaction between students and educators, as well as learning resources in the learning environment. Learning is an accumulation of teaching concepts and learning concepts [8]. Learning is an effort of students to learn teaching materials with the help of educators as facilitators. The role of educators here is different between then and now. Educators who used to be the main source of learning for students. The role of educators now is as a facilitator who directs learning activities. Students are required to be more active in learning. Knowledge will be easy to understand and stick to students, as long as they are active. Learning is an investment process, if it is not successful it will lose [9].

Based on the results of the above description, it can be concluded that learning is a permanent change in someone in the cognitive, affective, and psychomotor domains. Learning takes place throughout life and is ongoing, each time receiving new experiences and information, we will always learn.

Learning is a process of educational interaction between teachers and students. The purpose of the educational interaction includes increasing the competency of three aspects namely cognitive, psychomotor, and affective aspects. It takes the maximum role of a teacher, both in the delivery of material, use of methods, use of media, classroom management, and so on to achieve learning objectives. Besides, teachers are expected to be more creative in learning innovations in the classroom. One such innovation is the use of media.

1.2. Learning Media

Learning media are all that can be used to send messages from instructors to students, to increase students' interest in learning. Learning media can help the learning process. Media is commonly used in learning. Media used ranging from conventional to modern. Conventional media such as books, film projectors, radios, televisions, and cassettes. Modern media such as computers, DVDs, the Internet, and smartphones [5].

Learning media are used to facilitate the interaction of educators and students in the learning process. Learning media is something that is used to assist in the learning process. Learning media must be able to attract the attention of students. Good learning media consists of audio and visual sources. Good media must be able to make learning more enjoyable and be able to reach all students [4].

Learning media must be prepared and planned properly. Learning media used must be following the subject matter to be delivered. The choice of media is very important because it will influence success in learning. Learning objectives will be achieved with the help of effective media [10].

Students can learn actively and independently with learning media, but there is still control from the educator. Students must be controlled and reminded by existing tasks. Educators must be prepared if there are questions and discussions from students. Learning media must follow technological developments, so it must be developed continuously and periodically [11].

1.2. Virtual Learning

Virtual learning is a learning system that is synonymous with learning that can be done anywhere and anytime with the help of computers and the internet or intranet networks. With virtual learning-based learning activities, it is possible to develop optimal student learning flexibility. Students can access learning materials at any time and repeatedly. the teacher can find out when students learn and what topics are learned. Studying in a distance education environment students must be active must not be passive. Students must actively discuss, work on quizzes, practice, and chat. So students are not only responsible for admission but they must also contribute to the learning process by posting their thoughts and ideas to online discussions [12].

Virtual learning can complement face-to-face learning. With virtual learning, students can access subject matter before and after learning takes place. Students can learn the material at the beginning. Students who are active in virtual learning tend to be better at taking the final exam than those who are not active [13].

Virtual learning can be a means to enhance, motivate, and understand learners about certain events. Virtual learning can be combined with animation to explain the material that is difficult to understand with just an ordinary explanation. Users can learn well and happily by playing in a virtual environment [14]. The positive opinion of students shows that the use of virtual learning brings a new dimension to distance learning [15].

Virtual learning can also be developed with virtual reality. Virtual reality provides a new learning experience for students. Practical lessons with virtual reality can reduce the occurrence of waste of material. Practice can be done repeatedly without removing material. Virtual practice becomes the beginning of practice before direct practice [16]. Virtual learning can be combined with direct equipment, but practical work remains virtually virtual. The equipment is connected with a simulator with video and audio that is following reality [17].

Based on the description that has been stated above, then research on learning media based on virtual learning to improve the quality of learning needs to be done. The purpose of this study was to determine the feasibility of learning media based on virtual learning, the feasibility of learning to use virtual media, and student learning outcomes after applying to learn using virtual media in the basics of building construction and class X land measurement techniques at VHS 2 Surabaya.

2. METHOD

This study used is research and development (R & D) where this research method is to produce certain products and test the effectiveness of these products. This research is directed at testing the model through the development of a virtual learning media learning device.

The research subjects were Class X Building Design and Information at VHS 2 Surabaya with 39 students and building engineering teachers at VHS 2 Surabaya.

This research is limited from the first stage to the sixth stage, in the next stage until the tenth stage was not carried out in this study, because at that stage it was a large scale scope of research intended for mass manufacturing, while in this study only a small scale scope which is limited to partner schools and not for mass production.

The instruments used in this study were of three types namely the validation sheet of the media feasibility, the observation sheet of the feasibility of learning, and the test sheet of learning outcomes. Validation of the feasibility of the media aims to determine the feasibility of the media. Evaluation results are used as a basis for improvement before the media is used in the learning process. This sheet contains indicators and a Likert grading scale of 1 to 5. Percentage of media eligibility is obtained using the formula 1.

$$\text{Percentage of eligibility} = \frac{\sum \text{Answer score}}{\sum \text{Maximum score}} \times 100\%$$

The following in Figure 1 is the research design used in this study.

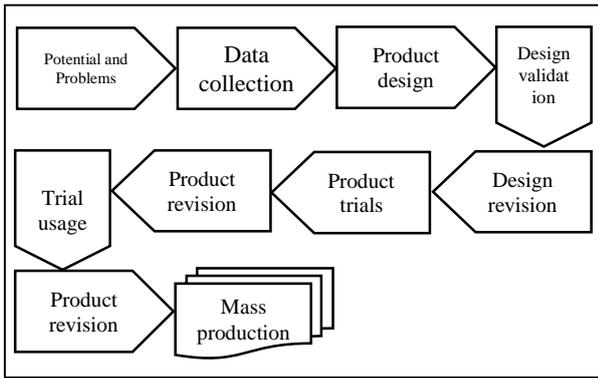


Figure 1 Research Design

This learning implementation sheet is used to assess whether the implementation of learning using the media has been applied by the teacher during the learning activities following the lesson plan, which is filled in by the observer. Learning outcomes test aims to determine student learning outcomes and find out how far students' understanding of the material provided by using media teaching materials.

Data collection techniques used in this study were questionnaires, observations, and tests. The filling out of this questionnaire was used to determine the appropriateness of the learning tools in the application of the developed learning media. The observation method is used to assess the feasibility of learning. Learning outcomes test is a data collection tool used to obtain data in the form of grades as student learning outcomes after getting learning using the developed learning media.

Data analysis techniques using quantitative descriptive techniques. The assessment is done by comparing the percentage of assessment results with the percentage of category based on the normal curve in Table 1 [18], for the questionnaire validation and learning outcomes. Analysis for learning outcomes is carried out to determine the completeness of student learning both individually and classically. Assess the percentage of completeness by comparing the answers with the total score. Classical learning is said to be complete if $\geq 75\%$ and incomplete $<75\%$.

Table 1. Category of Assessment Interpretation

Percentage	Category
81% - 100%	Very good
61% - 80%	Good
41% - 60%	Quite Good
21% - 40%	Not good
0% - 20%	Very Poor

Before conducting the product trial phase, namely virtual media, validation was also carried

out on several learning tools, namely the syllabus, lesson plan, lesson material, and test questions. Here are the results of the learning device validation.

- Syllabus: Syllabus validation results obtained from the answers of the validator get a percentage of 87% with a very good category.
- Lesson plan: The results of the validation of the lesson plan from the validator's answers get a percentage of 81%. The percentage is based on the results of the lesson plan validation table which is in a very good category.
- Teaching materials: The results of the validation of teaching materials obtained from the answers of the validator get a percentage of 82%. The percentage based on the results of the validation of teaching materials is in the very good category.
- Test: The results of the validation of the test results of learning outcomes obtained from the answers of the validator get a percentage of 81%. The percentage is based on the validation of the test questions results table that is in the very good category.
- Learning achievement sheets: The results of the validation of the learning achievement sheet obtained from the answers of the validator get a percentage of 82%. The percentage is based on the results table of the validity of the learning achievement sheet which is in a very good category.
- Performance assessment: The validation results about the performance assessment obtained from the validator's answers get a percentage of 83%. The percentage is based on the results of the validation table about the performance assessment results that are in the very good category.

3. RESULT AND DISCUSSION

The results of this study consist of assessing the quality of virtual-based learning media, the feasibility of learning using virtual media, and student learning outcomes after applying to learn using virtual media in the basics of building construction and class X land measurement techniques at VHS 2 Surabaya.

3.1. Quality of Virtual- Based Media

The quality of the media is obtained from the average score of validation results done by the validators. The following in Figure 2 and Figure 3 are virtual media views on the login page and the dashboard page.

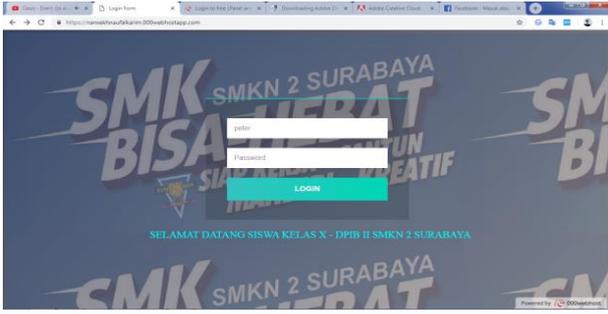


Figure 2 Login Page

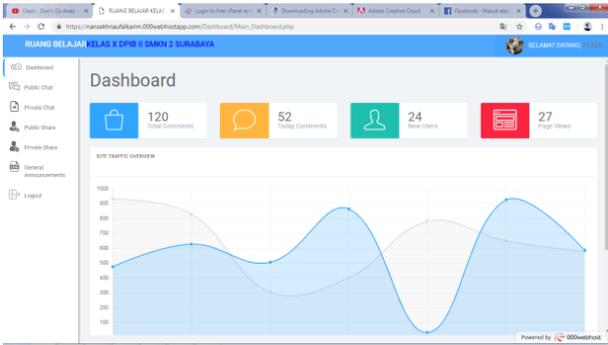


Figure 3 Dashboard

There are several aspects of the assessment carried out on the media, namely material, illustrations, quality, and appearance of the media as well as attractiveness. Figure 4, shows the results of an assessment of these aspects.

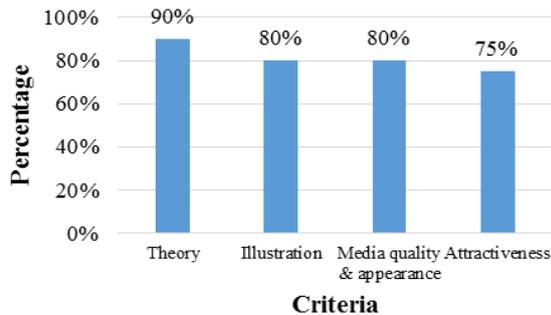


Figure 4 The Results of the Learning Device Validation

The average percentage of validation Learning media based on the evaluation of the validator got a percentage of 83%. This percentage is in the very good category. This 83% value indicates that virtual media has fulfilled the requirements for developing a medium as learning. From Figure 4, it appears that the virtual media developed, the material aspects contained in the media get the highest score, followed by successive aspects of illustration, quality, and appearance as well as the attractiveness aspects.

The aspect of attractiveness gets a value of 75% even though the value is the smallest of the other aspects, but it can already show that virtual media already has enough appeal. This is consistent with what is stated by the Linebarger [5], that interesting media need to be developed to help students' motivation to learn. The attractiveness aspect certainly has a close relationship with the quality and appearance of the media, where the developed virtual media already has good quality and appearance, with an average rating score of 80%. The illustration aspect also has an average value of 80% which is a high enough value in the development of a media. This value shows that virtual media is good enough in transforming abstract material into more concrete. This is consistent with the cone theory of Edgar Dale [19], that the media has a role in helping students understand by providing a more concrete learning experience. The material aspect turned out to be an advantage in the developed virtual media, with an average score of 90% which means that the material contained in the virtual media was well prepared, complete, and by the purpose of the purchase. The learning media used must be by the material to be delivered. Therefore, media selection becomes very important because it will influence success in learning [10].

3.2. Observation Results of Learning Implementation

The implementation of learning by using virtual media in the basics of building construction and land measurement techniques in VHS 2 Surabaya in class X Building Design and Information 1 can be seen from the observations. The measured data in the form of implementation data from each stage of the learning process. The assessment of learning achievement is obtained from the observation sheet which covers several aspects, namely preliminary activities, core activities, and closing activities.

Based on the results of observations of the feasibility of learning shows a percentage of 79% at meeting 1 and 82% at meeting 2. So it can be concluded that the observation of the feasibility of learning shows a percentage of 81% at intervals of 81%-100%, so the results of the assessment of the implementation of learning are in a very good category. The results of observations of the implementation of learning can be seen in Table 2 and Figure 5.

Table 2. Results of Observation Learning Implementation

Meeting	Observer results (%)	Category
Meeting 1	79%	Good
Meeting 2	82%	Very good
Average	81%	Very good

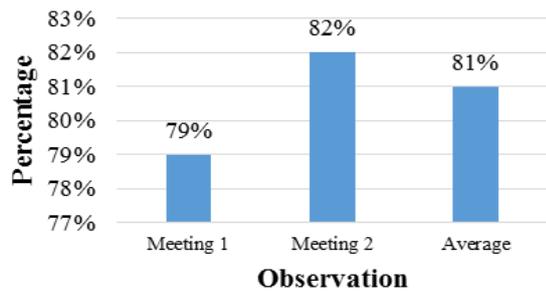


Figure 5 The Results of Observing the Implementation of Learning

From Table 2 and Figure 5, it can be seen that at meeting 1, the implementation of learning is still in the adjustment phase, while at meeting 2, both the instructors and students have been able to adapt well to the use of virtual media in learning. Virtual media has a good role in the implementation of learning because it can become a learning medium that can deliver and channel messages from planned sources to create a conducive learning environment where the recipient can carry out the learning process efficiently and effectively [8].

3.3. Learning Outcome

Student learning outcomes seen in this study are learning outcomes in the aspect of skills (product assessment). Achievement of the aspects of skills (product assessment) in this study was measured using a performance test sheet which consists of drawing the roof truss structure and drawing the roof truss structure details. Summary of student learning outcomes can be seen in Table 3 and Figure 6.

Table 3. Students Learning Outcome

The results	Total students	Percentage
Passed	34	87,2%
Not passed	5	12,8%
Total	39	100,0%

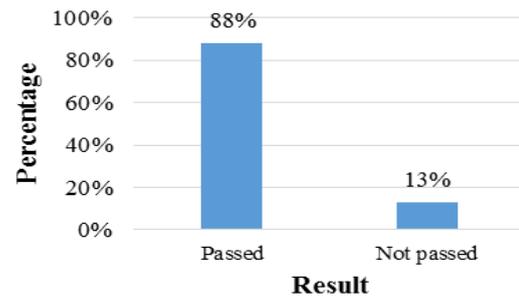


Figure 6 Summary of Student Learning Outcome

Based on Table 3 and Figure 6 it is known that the percentage of students mastery learning with a value of ≥ 75 amounted to 34 students or 87% of the total students, while the percentage of students who had not completed their studies with a value of <75 amounted to 5 students or 13% of the total students. Based on the results of the learning test, it can be concluded that completeness of student learning outcomes obtains an average percentage of 82% which is in the range of 81-100% with a very good category. This percentage of value is generated by the learning process that uses the help of virtual media-based learning media where the presence of virtual media at the time of learning helps students to more easily imagine the conditions when practicum in the field. Also, the virtual media used in this learning media shows how to collect data in the field. The positive impact after students is given material using virtual media when in class that students become more active in asking the teacher about the material presented.

During the learning process in the classroom, the teacher shows the features that must be used when learning using virtual media, then the teacher accompanies the student's process in class. The ability of developed virtual media is one of them to accommodate the advantages of virtual media, which can paint vivid images and sound effects that provide an attraction to learning. Virtual media with PowerPoint is generally used for presentation, documentation, and educational purposes. Virtual media with this PowerPoint can present information, explain the process, explain complex concepts, teach skills, shorten or extend time, and influence attitudes.

Based on the advantages of the virtual media described, it becomes clear that the quality of learning increases so that the impact on student learning outcomes becomes better with a completeness percentage of 81 that is far from the value of the minimum predetermined completeness criteria of 75. Therefore, virtual media developed is feasible to be applied in learning.

4. CONCLUSION

4.1. Conclusions

Based on the analysis of the results of the research and discussion above, it can be concluded as follows.

- The developed virtual media has excellent quality in aspects of the material, illustration, quality, and appearance as well as media appeal.
- Learning using virtual media can be done well because it can be quickly adapted both by teachers and students.
- Virtual media has advantages that can help improve student learning outcomes.

4.2. Suggestions

Based on the conclusions of the results of the study, the following suggestions are proposed.

- The features available in virtual media are to be refined, so further research is needed to change the features to be more complete but include everything that supports the material to be delivered.
- For further research virtual media to include sound effects to support the explanation of the material presented, thus making students more interested in paying attention.

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