

Development of Virtual Reality-Based Learning Videos in Smk Negeri 2 Bengkulu Utara

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ABSTRACT

The purpose of this research is to develop video-based learning media to become video-based virtual reality. This research is included in research and development. Research and Development is a process for making a new product or perfecting an existing product, which can be further accounted for. The development model in this research is to research and test to develop existing products. This was done because video as a learning medium had already existed, then it was developed by researchers to become VR-based Learning Videos. So it is very appropriate when using this model. The obtained data was analyzed through the stages of information gathering, development design, product testing and drawing conclusions. The results of this study can be concluded that the VR-Based Learning Video is feasible to use, because it has a good impact on students' understanding of the learning material. The score obtained is 1664 or 73% of the total score of 2250, a score of 1664 is in the feasible category for use because it provides benefits. and increase student knowledge

Keywords

Learning Videos, Virtual Reality, SMK Negeri 2 Bengkulu Utara.

INTRODUCTION

The impact of the covid 19 pandemic is felt in daily life. Children are being severely affected. Restrictions on playing, activities, become a problem for those, who are naturally active in socializing and enjoy exploring. It takes creative and entertaining thinking and ways to make children better understand pandemics while minimizing the impact of stress.

The year 2020 is an era of big and sudden change due to the Covid-19 pandemic. The education sector is experiencing the impact of teaching and learning activities that are usually done face-to-face, now turned into online activities. A lot of unpreparedness occurs because in a short time, educators have to adjust to the available technology that drains a lot of their energy.

On the other hand, students also experience boredom due to ineffective online learning methods and consuming a lot of internet quota. They want a new method that can provide learning pleasure and can be wrapped in technology. One solution for educators and students is to use Virtual Reality technology as a learning medium.

The educational need for Virtual Reality technology was also addressed by a report from the World Economic Forum published in October 2020. This report mentions that the absorption of Virtual Reality technology in the world of education reaches 70% until 2025.

This high need is certainly not without basis, Virtual Reality is proven to improve students' achievements in terms of material understanding, improvement of positive emotions, to critical thinking skills. This evidence has been conducted in many countries in the form of university scientific research as well as independent research.

Learning videos aim to help communicate the messages, which can give more understanding to the recipients of the message. Today's video is often used for demonstration and evaluation, but we believe that a more productive approach is to use video to support teachers' ability to notice

and interpret classroom interactions (Sherin, 2017: 50). The theory above explains that learning videos are also used to help teachers to interact in the classroom.

But even if the video is a moving image that can show the situation, circumstances or actual shape, the video can only display the image in 2 dimensions only. The user cannot feel the same condition. This becomes the weak point of a learning video, so the learning video is still not able to convey the message or material to the maximum. The use of learning videos is an effective strategy, as it can provide modeling examples of how to perform a task. (Hoogerheide, 2016:22). Teachers are using digital videos in the classroom to introduce and reinforce course content through short video segments known as learning objects (Nugent, 2005 in Skoretz, 2011 : 219). The above statement explains how teachers use video in learning to amplify the content learned. Weaknesses in regular learning videos give an idea to do development with Virtual Reality. Because the main advantage of virtual reality is the experience that makes the user feel the sensation of the real world in the virtual world. The use of electronic prison media in the world of education is a significant innovative step in the world of education (Manoj Roy, 2013 : 211). Even the development of virtual reality technology today allows not only the senses of vision and hearing that can feel the real sensation of the virtual world from virtual reality, but also other senses.

Teachers are active and interactive educators especially during the covid 19 pandemic. There are many breakthroughs that teachers can use to make students not bored to learn, including introducing the covid 19 pandemic to students and prevention efforts.

Teachers can create learning media, which is a means to convey the content or learning materials, such as through books, movies, videos and games. Along with the development of technology today many learning media that can be utilized one of them is virtual reality.

According to (Prameswari, 2008) virtual reality is an environment simulated by computers. Virtual reality media can be applied in various fields, one of which is used as a learning medium to support the learning process.

Virtual reality is indispensable in the world of education. There are several advantages to using virtual reality, including improving students' positive emotions, improving students' cognitive focus and memory abilities. With virtual reality, it is expected that simulation of learning concepts is easier and cheaper to apply.

Virtual reality helps teachers create content using the help of platformer software. Teachers can create their own learning content or modify templates, taken from virtual reality community groups joining *cloud computing*.

The virtual reality revolution in education is very possible and helps teachers in socializing the introduction of covid 19 to their students. Teachers can use cloud-based platform software that can be used without having to use programming languages in their operations. In addition, teachers can perform on simple computers with *medium to low* specifications.

There are several virtual reality methods for learning. First, the self virtual model. This model gives students the freedom to choose an interactive 360 mode or hand-held, to access content shared by teachers online through classrooms, on their smartphones. Students explore problems, then answer quizzes in a virtual world. In addition to it, students can describe in the form of essays.

Second virtual group flex model (family role). This model gives students the opportunity to engage with parents, as a group or group. Teachers provide scenario-based content to students. Students can access using VR accompanied by parents, then students are given a more in-depth explanation from the parents.

Thus, if students already understand the content of virtual reality, then an evaluation is provided related to the steps of introducing the covid 19 pandemic and its countermeasures. When using virtual reality methods, students look engrossed in their world. What is in front of the eyes is the form of an introduction, a story, a video, which is packed interestingly so that the focus and knowledge of the student increases.

According to Borg & Gall (2003), in his book "Educational Research", explains that "Research and Development" in education is an industry-based development model where the findings of the research are used to design learning products, which are then systematically tested in the field, evaluated, and refined until the production of a learning product that meets certain standardization, namely effective, efficient, and quality.

RESEARCH METHOD

This research is included in his research and development. Research and Development is a process to create a new product or improve an existing product, which can be accounted for further (Sugiyono, 2015:45). The development model in this study is researching and testing to develop pre-existing products. This is done because Video as a learning medium already existed before, then developed by researchers into VR-based Learning Videos. So it is very appropriate when using such models. As explained in the picture below.

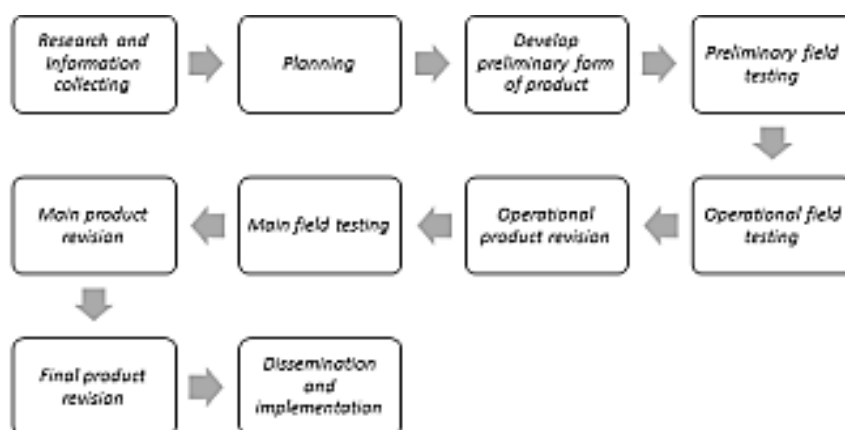


Figure 1. R and D Steps

Before testing the product is validated first by experts and teachers. The experiment was conducted on students of grade IV and V SDI Al Azhar. This subject was taken because the material level in the class corresponds to the material to be presented with a Virtual Reality Device.

RESULTS AND DISCUSSION

3.1. Information Collection Stage

At this stage the researchers observed how students understand conventional learning videos that are still in two-dimensional format. This stage begins with observing the classroom, reviewing the use of learning videos with students' understanding of the materials delivered, availability of facilities and infrastructure to support VR-based learning videos. The next step is to review the content standards, this is done to find the conformity of the material with the Competency

Standard (SK) and Core Competency (KI). This is done to determine the material that will be presented in VR-based learning videos. Based on these stages, two defense video materials will be developed, namely material about volcanoes and underwater life. Once the material is found to be developed, the next step is the stage of material adjustment with VR devices.

3.2. Development design planning stage

At this stage the concept of VR-based learning video development began to be created development timeline. This second stage consists of the creation of a grid of research instruments that become the criteria for development assessment. The finished infrastructure was developed into a research instrument. The research instruments that will be used are expert trial sheets, observation sheets, questionnaires and interview guidelines. The trial sheet is used to determine its feasibility of Virtual Reality-based learning videos based on expert assessments. Observation sheets, questionnaires and interview guidelines are used to determine the responses and responses of teachers and students regarding the use of Virtual Reality-based learning videos in the classroom. Validation of instruments is performed by supervisors.

Purchase of some VR equipment and VR support, the purchase is tailored to the required specifications, in order to work to the maximum. Install the AAA video Player app on the device you want to use. The steps to install the AAA Video Player app can be seen in the attachment.

3.3. Product development stage

At this stage, virtual reality-based learning video products are made. The steps taken are; 1) Create a Time Line. Time Line was created with the aim of making it easier to develop media and to determine the next stage of development, so that parts of the learning video can run well. 2) Time Line is then used as a reference in the development of learning videos by paying attention to aspects of ease, color, composition and clarity of information; 3) at this stage began to make video editing, resolution adjustments, angel correction, and adjusting the video with the video player application and 4) After the above steps have been completed then the VR-based learning video files are stored in the internal memory of the Smartphone.

3.4. Product tests conducted by teachers and teachers

This stage of expert trials is conducted so that the learning videos developed can be known eligibility based on expert assessment. Vr learning video trials are conducted by experts who are competent in the field of interactive learning media. Here is an assessment of the results of the trial ahli presented in the following table.

Table 1. Expert Test Results

| No. | Aspects | Score | | | | | Comments & Suggestions |
|-----|----------------|-------|---|----|----|---|--|
| | | 5 | 4 | 3 | 2 | 1 | |
| 1 | Easy to Use | | | | V. | | a. Resolution must be adjusted at HD and Full HD ranges b. Video File Size is so Large that it requires large storage space |
| 2 | More Realistic | V. | | | | | |
| 3 | methodical | | | V. | | | |

| | | | | | | |
|-----|-------------------------------|----|----|----|----|---|
| 4 | Motivating Students | V. | | | | c. The teacher gives technical direction before the use of the tool |
| 5 | Improving Students' knowledge | V. | | | | |
| 6 | Increase speed Learning | | V. | | | |
| 7 | Increase creativity | | | V. | | |
| 8 | Low cost | | | | V. | |
| 9 | Easy-to-get devices | | | V. | | d. The teacher should explain after seeing the Video so that students' understanding of the material is stronger. |
| 10 | help | V. | | | | |
| 11 | picture | | | V. | | |
| 12 | voice | V. | | | | |
| 13 | compatibility | V. | | | | |
| sum | | 40 | | | | e. Schools should facilitate due to the high cost and difficulty of obtaining |

The media products that have been tested are subsequently revised in accordance with expert advice and input during the trial process. The feasibility test results of this VR-based Learning Video product are the following suggestions:

- Resolution should be adjusted at HD and FullHD ranges.
- Video File Size is so Large that it requires large storage space
- The teacher gives a technical briefing before the use of the tool
- Teachers should explain after viewing the Video so that students' understanding of the material is stronger.
- Schools should facilitate due to the high cost and difficulty of obtaining

From the suggestions above then researchers make improvements and prepare for product trials on teacher. Because for Hamalik (2003:54) learning itself is: A composed combination includes

human elements, facilities, equipment, and procedures that affect each other to achieve the purpose of learning itself. Here are the results of the trial on the teacher.

Table 2. Teacher Likert Test Results

| Likert | | | | | | | | | | | | | | | | | |
|-------------|--------------------|-----|-----|-----------|-----|-----|----|-----|----|-----|-----|-----|-----|-----|-----|-----|------|
| Subject | Problem Item Score | | | | | | | | | | | | | | | sum | % |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | |
| 1 | 4 | 4 | 3 | 4 | 5 | 4 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 65 | 86,7 |
| 2 | 3 | 3 | 2 | 3 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 4 | 4 | 4 | 4 | 53 | 70,7 |
| 3 | 3 | 4 | 3 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 61 | 81,3 |
| sum | 10 | 11 | 8 | 11 | 14 | 13 | 12 | 11 | 12 | 11 | 10 | 14 | 14 | 14 | 14 | | |
| % | 6,7 | 7,3 | 5,3 | 7,3 | 9,3 | 8,7 | 8 | 7,3 | 8 | 7,3 | 6,7 | 9,3 | 9,3 | 9,3 | 9,3 | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Total Score | 179 | | | Max Score | | 225 | | | | | | | | | | | |
| % | 79,5556 | | | % 100% | | | | | | | | | | | | | |
| Average | 3.97778 | | | | | | | | | | | | | | | | |

From the table above can be seen that the score can be as much as 179 or 79.6% of the total score of 225. The score of 179 is on classification 2 or decent. to ensure the data obtained by researchers triangulation instrument and methods. Triangulation instrument used Semantic Differential, the following are the results of Semantic Diferential.

Table 3. Semantic Diferential Test Results

| Semantic Diferntial | | | | | | | | | | | | |
|---------------------|--------------------|-----|----|-----------|-----|------|-----|-----|---|----|-----|----|
| Subject | Problem Item Score | | | | | | | | | | sum | % |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| 1 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 2 | 2 | 3 | 39 | 78 |
| 2 | 3 | 4 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 4 | 28 | 56 |
| 3 | 5 | 5 | 5 | 4 | 4 | 3 | 4 | 3 | 5 | 5 | 43 | 86 |
| sum | 13 | 14 | 12 | 11 | 11 | 10 | 11 | 7 | 9 | 12 | | |
| % | 8,7 | 9,3 | 8 | 7,3 | 7,3 | 6,7 | 7,3 | 4,7 | 6 | 8 | | |
| | | | | | | | | | | | | |
| Total Score | 110 | | | Max Score | | 150 | | | | | | |
| % | 73,3333 | | | % | | 100% | | | | | | |
| Average | 3,66667 | | | | | | | | | | | |

The table above explains that the data obtained consistently from table 2 and table 3 have the same data interpretation that VR-Based Learning Video Development is feasible to use. this is reinforced by the results of interviews that state that VR-based learning videos are indeed worth using. From the results of the interview obtained an input that is the use of headsets in each student, to cope with the sound from mobile phones that are too small so that information is not clearly heard.

From the results of the above research the product is then revised and tested to students. This testing process should be closely observed, both the condition of the class, the conduciveness of the atmosphere, the behavior of the students, and the behavior of the teacher.

3.5. Product trials for students

At this stage the researchers looked at the effectiveness of the results of vr-based video defense development. After the VR finish-based learning video was revised, a trial phase of media use was conducted in classroom learning, which aimed to know the response of teachers and students to the learning videos developed. The trial phase was conducted at Al Azhar in grades 4 and 5 due to similar material. The trial was conducted by using media in classroom learning by teachers to students. During the use of media researchers made observations on the use of such media. After using the media, students are asked to fill out a questionnaire and be interviewed for comments on the learning media developed.

Based on the results from table 4, it can be seen that the score obtained as much as 1664 or 73% of the result score of 2250, the score of 1664 falls into the category worthy of use because it benefits and improves students' knowledge. To ensure the data obtained by the researchers again triangulation instruments and methods. Triangulation instrument used Semantic Diferential, the following are the results of Semantic Diferential.

Table 4. Semantic Diferential Test Results

| Likert | | | | | | | | | | | | | | | | | |
|---------|--------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|-----|------|
| Subject | Problem Item Score | | | | | | | | | | | | | | | sum | % |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | |
| 1 | 3 | 3 | 3 | 3 | 3 | 5 | 4 | 5 | 5 | 3 | 3 | 3 | 3 | 4 | 3 | 53 | 70,7 |
| 2 | 3 | 4 | 3 | 3 | 4 | 2 | 4 | 3 | 3 | 1 | 4 | 3 | 3 | 4 | 4 | 48 | 64 |
| 3 | 4 | 5 | 4 | 5 | 5 | 4 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 4 | 2 | 63 | 84 |
| 4 | 4 | 5 | 4 | 3 | 5 | 4 | 5 | 5 | 3 | 4 | 5 | 5 | 5 | 3 | 4 | 64 | 85,3 |
| 5 | 4 | 4 | 3 | 5 | 5 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 66 | 88 |
| 6 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 5 | 3 | 3 | 4 | 52 | 69,3 |
| 7 | 4 | 4 | 3 | 5 | 4 | 3 | 4 | 5 | 3 | 5 | 1 | 4 | 5 | 4 | 5 | 59 | 78,7 |
| 8 | 5 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 52 | 69,3 |
| 9 | 5 | 3 | 4 | 3 | 4 | 3 | 3 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 53 | 70,7 |
| 10 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 1 | 5 | 1 | 3 | 1 | 1 | 5 | 46 | 61,3 |
| 11 | 3 | 3 | 3 | 5 | 5 | 3 | 3 | 5 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 53 | 70,7 |
| 12 | 3 | 3 | 4 | 3 | 3 | 5 | 4 | 3 | 4 | 3 | 3 | 5 | 5 | 4 | 3 | 55 | 73,3 |
| 13 | 5 | 5 | 4 | 4 | 3 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 68 | 90,7 |
| 14 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 5 | 63 | 84 |
| 15 | 3 | 3 | 3 | 5 | 5 | 3 | 3 | 5 | 5 | 5 | 3 | 3 | 5 | 3 | 5 | 59 | 78,7 |
| 16 | 5 | 5 | 4 | 2 | 2 | 5 | 5 | 5 | 4 | 5 | 3 | 5 | 5 | 5 | 5 | 65 | 86,7 |
| 17 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 2 | 4 | 2 | 3 | 5 | 3 | 3 | 47 | 62,7 |
| 18 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 55 | 73,3 |
| 19 | 1 | 2 | 1 | 2 | 2 | 4 | 2 | 2 | 1 | 4 | 4 | 4 | 2 | 4 | 4 | 39 | 52 |
| 20 | 3 | 3 | 5 | 3 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 3 | 3 | 4 | 2 | 57 | 76 |
| 21 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 1 | 4 | 5 | 5 | 5 | 5 | 5 | 67 | 89,3 |
| 22 | 5 | 5 | 2 | 5 | 5 | 4 | 2 | 5 | 4 | 5 | 5 | 5 | 3 | 5 | 5 | 65 | 86,7 |

| | | | | | | | | | | | | | | | | | | | |
|-------------|---------|-----|-----|-----------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|------|--|--|
| 23 | 3 | 4 | 3 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 5 | 59 | 78,7 | | |
| 24 | 5 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 2 | 3 | 5 | 5 | 5 | 4 | 4 | 60 | 80 | | |
| 25 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 4 | 2 | 4 | 3 | 2 | 1 | 34 | 45,3 | | |
| 26 | 4 | 5 | 5 | 5 | 5 | 2 | 3 | 3 | 3 | 5 | 3 | 5 | 5 | 4 | 5 | 62 | 82,7 | | |
| 27 | 1 | 2 | 3 | 1 | 1 | 3 | 2 | 3 | 5 | 2 | 4 | 3 | 5 | 2 | 1 | 38 | 50,7 | | |
| 28 | 5 | 5 | 3 | 3 | 3 | 4 | 3 | 5 | 5 | 5 | 3 | 5 | 5 | 3 | 3 | 60 | 80 | | |
| 29 | 3 | 4 | 3 | 2 | 4 | 2 | 1 | 1 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 39 | 52 | | |
| 30 | 3 | 5 | 5 | 5 | 3 | 5 | 5 | 5 | 3 | 3 | 5 | 3 | 5 | 3 | 5 | 63 | 84 | | |
| sum | 109 | 114 | 105 | 109 | 113 | 110 | 108 | 117 | 104 | 114 | 108 | 117 | 117 | 105 | 114 | | | | |
| % | 73 | 76 | 70 | 73 | 75 | 73 | 72 | 78 | 69 | 76 | 72 | 78 | 78 | 70 | 76 | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Total Score | 1664 | | | Max Score | | 2250 | | | | | | | | | | | | | |
| % | 73,9556 | | | | | 100% | | | | | | | | | | | | | |
| Average | 3,69778 | | | | | | | | | | | | | | | | | | |

| | | | | | | |
|----------|--------|---------|--|-------|--|------|
| VAR00014 | 107,43 | 327,013 | | ,570 | | ,728 |
| VAR00015 | 107,13 | 321,982 | | ,545 | | ,725 |
| X_Total | 55,47 | 86,809 | | 1,000 | | ,839 |

From the data above it can be seen that only VAR0009 is said to be invalid. This is obtained because the table r of 0.2960 for N amounts to 30. So researchers can conclude that the above data is valid, because only 1 variable is said to be invalid. The above results are inseparable from the factor of adding stimulus in students that makes precepts different. Bimo Walgito (2004 : 89) describes several factors that play a role in perception: Perceived objects, sensory devices, nerves and nerve structure centers, Attention.

VR-based learning videos that have been tested in the classroom are then revised based on suggestions and feedback from teachers and students. The final result of this research and development is a VR-based learning video product

CONCLUSION

Vr-based Learning Video Development Research above produces four conclusions, namely:

- 1) Students' understanding of conventional or two-dimensional learning videos of the information contained in the learning video content is still lacking.
- 2) The development of video-based learning media using the Virtual Reality model allows users to get more stimulus than conventional learning videos.
- 3) The activeness, interest and interaction of students is the result of the development of video-based learning media using the Virtual Reality model
- 4) The effectiveness of the use of Virtual Reality-based Learning Videos in improving the user's understanding of the information contained in the learning video content proved effective, this is due to the stimulus that comes in more, thus increasing the activeness, interest and iteraksi of students that has an impact on improving student understanding.

Based on the above conclusions, the development of VR-based Learning Videos in this study was collected successfully. This conclusion is supported by data obtained during research activities. Data obtained during research consistently states that VR-based Learning Videos are worth using, as they have a good impact on students' understanding of learning materials.

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