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Development of VR-Based Learning Media for the Buya Hamka Birth Museum to Increase Motivation to Learn History in Class XI of Muhammadiyah 1 Vocational School, Pekanbaru

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ABSTRACT

This study aims to develop Virtual Reality (VR)-based learning media at the Buya Hamka Birth Museum to enhance students' motivation in learning history. The research was conducted at SMK Muhammadiyah 1 Pekanbaru, focusing on the history subject for Grade XI students. The background of this study arises from students' lack of interest in history lessons due to conventional teaching methods that rely heavily on textbooks. To address this issue, the research develops an interactive VR learning medium that allows students to explore historical sites virtually. The research follows the Research and Development (R&D) method using the ADDIE model, which includes Analysis, Design, Development, Implementation, and Evaluation. Data collection involved observations, interviews, and questionnaires distributed to students and history teachers. The VR-based learning media was validated by experts in both media and historical content before being tested in small and large groups of students. The findings indicate that the VR learning media is effective in increasing students' motivation and engagement in history lessons. Students showed a higher level of enthusiasm and understanding when using VR compared to traditional learning methods. In conclusion, VR-based learning media can be an innovative solution to make history lessons more immersive and appealing.

1. Introduction

Education is one of the main factors in forming a generation that has critical thinking, creativity, and the skills needed in community life (Asadullah & Nurhalin, 2021). Law No. 20 of 2003 on the National Education System states that education is a conscious and planned effort to create a conducive learning atmosphere so that students can develop their potential to the maximum, both in spiritual, intellectual, and social aspects (Indy et al., 2019). In this context, history education has a very important role in instilling national values, building national identity, and teaching critical reflection on past events that shaped the nation's journey (Ata et al., 2024).

However, history learning is often considered boring by students because the teaching methods are still conventional, such as lectures and reading texts in textbooks, which are unable to arouse their curiosity and interest in learning (Abdul et al., 2023). According to Prastawati and Rahmat (2023), innovative and technology-based education is needed so that students can be more active and involved in the learning process, so that their understanding of the material can be more optimal.

Along with the development of technology in the digital era, the world of education is required to adapt to various innovations, including in the use of technology-based learning media (Firmadani, 2020). One technology that has great potential in supporting history learning is Virtual Reality (VR). VR technology allows students to experience virtual simulations of real environments, so they can explore historical places without having to visit the location directly (Aljupri, 2024). This is very relevant in history learning, especially for schools that have limited access to visit historical sites. In this case, VR not only offers a more interactive and enjoyable learning experience, but can also increase students' learning motivation, especially in history subjects which are often considered difficult and boring (Siahaya, 2024).

Based on the results of observations conducted at SMK Muhammadiyah 1 Pekanbaru, it was found that the history learning method used in this school is still dominated by lectures and the use of textbooks. Although history teachers have tried to utilize visual media such as pictures, maps, and videos, students' interest in learning history is still relatively low. This is due to the lack of direct interaction between students and the historical objects being studied, as well as limitations in conducting field visits to historical sites due to cost and distance factors. In addition, many students feel that history learning only focuses on memorizing facts and dates, so they have difficulty understanding the relevance of history to their current lives. This condition shows that innovation is needed in learning media that can make students more interested and involved in the process of learning history, one of which is by utilizing VR technology.

In addition, the results of interviews with history teachers at this school revealed that one of the main obstacles in teaching history is the lack of learning media that can provide a more in-depth learning experience to students. The teacher stated that although the history material taught was quite complete, the delivery of material using the lecture method often made students quickly feel bored and less able to understand the essence of the historical events being studied. The teacher also added that the use of technology such as VR can be an effective solution to increase student engagement in learning history. With VR, students can "visit" museums and historical sites virtually, so they can feel a more real experience in learning history. One of the historical places that has high educational value is the Buya Hamka Birthplace Museum in Sungai Batang, Agam Regency, West Sumatra.

This museum houses various collections related to the life and struggles of Buya Hamka, a cleric, writer, and national movement figure who made a major contribution to the spread of Islamic teachings and the development of the

Muhammadiyah organization in West Sumatra. However, limited access for students to visit this museum is an obstacle in the process of learning history. Therefore, by developing VR-based learning media that displays the Buya Hamka Birthplace Museum, students can explore the museum virtually and gain a more interesting and in-depth learning experience.

This study aims to develop, test the feasibility, and measure the effectiveness of Virtual Reality-based learning media in increasing the motivation to learn history of class XI students of SMK Muhammadiyah 1 Pekanbaru. With this learning media, it is expected that students can be more enthusiastic in learning history, have a better understanding of the material being taught, and develop critical thinking skills in analyzing historical events. In addition, this study also aims to contribute to the development of technology-based history learning media innovations that can be applied in various other schools. Thus, the use of Virtual Reality in history learning is expected to be an effective solution in improving the quality of history education in Indonesia.

2. Methodology

This study uses the Research and Development (R&D) method which aims to develop Virtual Reality (VR)-based learning media in history subjects. The development model used is ADDIE (Analysis, Design, Development, Implementation, Evaluation). This model was chosen because it allows for systematic and gradual product development, starting from needs analysis, design, development, implementation, to evaluation (Iriani et al., 2023). This approach allows the developed learning media to be adjusted to the needs of students and evaluated thoroughly before being widely applied in the learning environment (Sugiyono, 2019).

This research was conducted at SMK Muhammadiyah 1 Pekanbaru, located at Jalan Senapelan No. 10A, Kampung Dalam, Senapelan District, Pekanbaru City, Riau. The selection of this school was based on the results of initial observations that showed a need for innovation in history learning. The research implementation time began after obtaining permission from the Faculty of Teacher Training and Education, University of Riau until the implementation and evaluation stages were completed. The research process includes various stages starting from needs analysis, media development, trials on students, to evaluation of the effectiveness of the developed learning media.

The development model used in this study is ADDIE, which consists of five main stages (Anafi et al., 2021). The first stage, Analysis, is carried out to identify problems in history learning and determine the need for VR media development (Hidayat, 2021). In the second stage, Design, the VR media concept, design sketches, and workflows to be used are compiled. Furthermore, the Development stage includes the creation of media using the Keypano site, validation by media and material experts (Putri, 2018), and revisions based on input from experts. After the development is complete, the Implementation stage is carried out by testing the

media on small and large groups to determine its effectiveness in increasing student learning motivation. The last stage is Evaluation, which is evaluating the media based on the results of the trial and improving aspects that still need to be improved before being widely implemented.

However, Okpatrioka (2023) stated that the development procedure in this study began with a needs analysis, which was carried out through observation and interviews with teachers and students at SMK Muhammadiyah 1 Pekanbaru. Furthermore, at the media design stage, historical material was collected, the learning flow was compiled, and the VR display design was determined. After that, media development was carried out using the Keypano platform, which was then validated by media experts and material experts before being revised based on their input. After the media was declared feasible, the trial implementation stage was carried out in two groups, namely a small group consisting of six students and a large group consisting of 24 students. The last step was the evaluation of effectiveness, which was carried out by analyzing the results of the student response questionnaire and their level of learning motivation after using VR media.

The trial subjects in this study consisted of two groups, namely a small group consisting of six students of class XI TJKT, and a large group consisting of 24 students from the same class. The small group was used for initial trials to identify potential obstacles in the use of VR media before being tested on a larger group. After revisions were made based on the results of the small group trial, the media was then tested on a large group to measure its effectiveness in increasing motivation to learn history.

The types of data used in this study consist of qualitative data and quantitative data (Mulyadi, 2011). According to Agustiningsih et al. (2020), qualitative data were obtained through observation results, interviews with teachers, and validation conducted by media experts and material experts. Meanwhile, quantitative data were obtained from the results of a questionnaire given to students after they used VR media. This questionnaire was used to measure the level of learning motivation before and after the use of VR-based learning media, as well as to assess student responses to the media developed.

The data collection instruments used in this study include several techniques (Waruwu, 2024). Observation is used to observe the conditions of history learning before and after the use of VR media, in order to determine the extent to which this media can increase student interest and engagement. Interviews were conducted with teachers and students to understand the challenges in history learning and the effectiveness of the media developed (Firmansyah, 2024). Expert validation questionnaires were given to media experts and material experts to assess the feasibility of VR media before being applied in learning. In addition, student response questionnaires were used to measure their learning experiences, including aspects of engagement, understanding, and motivation after using VR media.

The data analysis technique in this study uses a qualitative and quantitative analysis approach (Rofiah, 2022). Qualitative analysis is carried out by describing the results

of observations and interviews to understand the problems and effectiveness of the learning media developed (Syahwani, 2015). Meanwhile, quantitative analysis is carried out by calculating the percentage of media feasibility based on expert validation results, and measuring the effectiveness of the media with a Likert scale based on student responses. Expert validation data is categorized on a percentage scale, with a range of 85-100% considered very valid, 68-84% valid, 52-67% quite valid, 35-51% less valid, and 20-34% invalid. With this analysis method, research can provide an objective picture of the feasibility and effectiveness of VR-based learning media in increasing students' motivation to learn history.

3. Result and Discussion

Development of Virtual Reality Learning Media

The development of Virtual Reality (VR) based learning media was carried out using the ADDIE development model which consists of five stages, namely: Analyze, Design, Develop, Implement, and Evaluate.

a. Analyze Stage

In this initial stage, researchers identified various problems in history learning at SMK Muhammadiyah 1 Pekanbaru. The problems found included students' lack of interest in history lessons, and the learning media used by teachers had not been able to attract students' attention. Although lecture, discussion, and visualization methods had been used, learning was still considered boring. Therefore, researchers developed VR-based media to create a more interactive and enjoyable learning experience. The material raised was about the Indonesian national movement, with a focus on the Muhammadiyah organization and its figure Buya Hamka. The Buya Hamka birth museum was raised as the main content in VR, because it illustrates the figure's contribution to the Muhammadiyah organization in West Sumatra.

b. Design Stage

In this stage, researchers began to design media by collecting data from textbooks and visiting the Buya Hamka Birthplace Museum in West Sumatra directly. Images of museum objects such as buildings, bedrooms, reading houses, clothes, information boards, and book collections were collected to be included in the VR media. Researchers also created flowcharts and sketches to describe the contents and navigation of virtual reality so that it runs systematically and is easy to understand.

c. Development Stage

In this third stage, researchers carry out 2 parts, namely product creation, validation and revision. The creation of virtual reality media consists of several parts, namely as follows. Front View of Buya Hamka Birthplace Museum. As in figure 1, on this page display displays the front view of the Buya Hamka birth museum with a view

of Lake Maninjau. To move to the second page, users can click on the arrow section provided.



Figure 1. Front view of the Buya Hamka Birth Museum

Appearance of the Buya Hamka Birthplace Museum and the Buya Hamka Reading House, as in figure 2, on this page or the next page presents the Buya Hamka birth museum directly and next to the museum there is a Buya Hamka reading house. Users can click on the arrow direction that has been provided, the arrow direction will later lead to the Buya Hamka reading house.



Figure 2. View of the Buya Hamka Birthplace Museum and the Buya Hamka Reading House

Buya Hamka Reading House, on the next page as in figure 3, it displays the Buya Hamka reading house page. However, at that time the Buya Hamka reading house was locked. The Buya Hamka reading house presents various books by Buya Hamka and there are also various trophies. For the next page, it presents an information board where the information board contains information that inaugurates the Buya Hamka reading house.



Figure 3. Buya Hamka Reading House

Information on the Inauguration of the Buya Hamka Reading House, this page presents information on the inauguration of Buya Hamka's reading house. As in figure 4, it can be seen that the inauguration was carried out by the Regent of Agam, Mr. Indra Catri and also by the chairman of ABIM, Mr. H. Ahmad Azam on February 19, 2015 in Sungai Batang, Agam Regency. And to return to the next page or the page of the Buya Hamka birth museum, users can click the arrow to the left.



Figure 4. Information on the Inauguration of the Buya Hamka Reading House Buya Hamka Birthplace Museum Page, as in figure 5, this view shows the entrance directions to get to the Buya Hamka birth museum. By clicking on the straight arrow, users can see what is presented in the museum, one of which is Buya Hamka's room.



Figure 5. Courtyard of Buya Hamka Birthplace Museum

Buya Hamka's Room, by clicking on this arrow section, the user will be presented to the Buya Hamka room page. As in figure 6 to 12, this page displays the appearance of Buya Hamka's room with various objects in it. Like Buya Hamka's bed which is often used as a place to rest after doing various activities, there are also Buya Hamka's daily clothes, 2 clothes that were once worn by Buya Hamka when receiving an honorary doctorate and 1 shirt that was given by Buya Hamka's father as a sign of affection and there are also clothes and a turban from Buya Hamka.



Figure 6. Buya Hamka's room



Figure 7. Buya Hamka's Bed



Figure 8. Buya Hamka's everyday clothes



Figure 9. One of the clothes worn by Buya Hamka when receiving an honorary doctoral degree in Egypt



Figure 10. One of the clothes worn by Buya Hamka when receiving an honorary doctoral degree in Malaysia



Figure 11. Clothes given by Buya Hamka's father as a sign of affection



Figure 12. One of the clothes and turban worn by Buya Hamka

Information about Buya Hamka's Life History at the Age of 10. To go to the next page or to the page that contains information about Buya Hamka's life history for 10 years, users can click the arrow to the left. As in figure 13 and 14, after clicking the arrow, it will display information about Buya Hamka's life history.



Figure 13. Direction of the Arrow Sign to the Biography Information of Buya Hamka



Figure 14. Description of Buya Hamka's Life History When He Was 10 Years Old

Types of Childhood Buya Hamka Games. Next to Buya Hamka's history information when he was 10 years old, there are types of games Buya Hamka played during his childhood. As in figure 15, by clicking the arrow to the right, it will display the types of games.



Figure 15. Types of Childhood Buya Hamka Games

Books by Buya Hamka, by clicking on the arrow symbol, users will be presented with the types of books by Buya Hamka and some of them have even been adapted into films, as in figure 16.



Figure 16. Books by Buya Hamka

Buya Hamka's Seating and Method. The next question mark symbol displays the seating and carano that Buya Hamka once used, as in figure 17.



Figure 17. Buya Hamka's Seating and Way of Life

After the media was completed, validation was carried out by two experts, namely material experts and media experts. The results of the validation by material experts showed that the media received a score of 43 out of a total of 50, or 86%, and was categorized as "Very Valid", meaning that the media can be used without major revisions. Meanwhile, the validation by media experts showed a score of 69 out of 75, or 92%, which also fell into the "Very Valid" category, indicating that the media is suitable for use and is visually and technically attractive.

d. Implementation Stage

After being declared valid, VR media was tested on two groups:

- 1) Small group (6 students): obtained a score of 129 out of 150, with a percentage of 86% and the category "Very Valid". Students stated that the media was interesting and made it easier to understand.
- 2) Large group (24 students): obtained a score of 521 out of 530, with a percentage of 98% and the category "Very Valid". Student enthusiasm increased significantly.

e. Evaluation Stage

The evaluation was conducted based on the results of expert validation and student responses. All evaluation results showed that the media was very feasible to use. In addition, testing the effectiveness of the media in increasing learning motivation was also carried out. In small groups, student motivation increased from 78% to 94% after using the media. While in large groups, motivation increased from 69% to 85%. This shows that virtual reality-based learning media is very effective in increasing interest and motivation to learn history.

The Feasibility of Virtual Reality Learning Media in the Learning Process

This study aims to determine the feasibility of virtual reality-based learning media Buya Hamka Birth Museum for the history learning process in class XI TJKT SMK Muhammadiyah 1 Pekanbaru. The assessment of feasibility is carried out through

validation from material experts, media experts, and direct trials on students as media users.

Validation results

- 1) Material experts gave an assessment of 86%, which is categorized as "Very Adequate".
- 2) Media experts gave a score of 92%, which is also in the "Very Decent" category.

In addition, the feasibility of the media is also reviewed from the student's response, which shows high enthusiasm in using the media. The trial was conducted in two stages:

- 1) A small group (6 students) gave an assessment of 86%, with the category "Very Eligible / Very Valid".
- 2) The large group (24 students) gave an assessment of 98%, with the same category, namely "Very Valid".

The trial was conducted by randomly appointing students to take a virtual tour of the museum using VR media, then students filled out a response questionnaire. This media is used in learning the material of the Indonesian national organization movement.

Based on all of the data, it can be concluded that virtual reality-based learning media is very suitable for use in the history learning process. This is also shown through table 1 of the average scores obtained.

Table 1. Average Score

| No | Assessment Stage | Score | Persentase | Information |
|----|--------------------------------|-------|------------|-------------|
| 1 | Material Expert Assessment | 43 | 86% | Very Valid |
| 2 | Media Expert Assessment | 69 | 92% | Very Valid |
| 3 | Small Group Student Assessment | 129 | 86% | Very Valid |
| 4 | Large Group Student Assessment | 521 | 98% | Very Valid |
| | Mean | | | Very Valid |

Thus, it can be concluded that the development of virtual reality-based learning media for the Buya Hamka Birth Museum is very suitable for use as a supporting medium for learning history, especially in increasing student learning motivation in class XI TJKT of SMK Muhammadiyah 1 Pekanbaru.

The Effectiveness of Virtual Reality Learning Media to Increase Motivation to Learn History

This study aims to determine the effectiveness of virtual reality-based learning media Buya Hamka's birth museum in increasing the motivation to learn history of class XI TJKT students of SMK Muhammadiyah 1 Pekanbaru. The effectiveness of the media was measured through a student learning motivation questionnaire,

which was conducted in two stages, namely before and after the use of VR media, both in small and large group trials.

a. Small Group Trial

In a small group trial involving 6 students, two meetings were conducted. The first meeting was conducted using conventional methods (lectures), while the second meeting used virtual reality media and peer tutoring methods. The results of the questionnaire showed an increase in motivation scores from a total of 198 to 236. The percentage of student learning motivation increased from 78% (High category) to 94% (Very High category). This shows that the use of virtual reality-based learning media can significantly increase students' interest and motivation to learn, especially in history learning which was previously considered boring.

b. Large Group Trial

A large group trial was conducted on 24 students of class XI TJKT. In the first meeting, the learning process was carried out conventionally. History learning was carried out using the Merdeka Curriculum book and other sources. The results of motivation before using the media showed a total score of 833 with a percentage of 69% (High category), with less conducive classroom conditions because many students did not pay attention and some fell asleep.

After using virtual reality media, the classroom atmosphere became more active and enthusiastic. The learning motivation score increased to 1016 with a percentage of 85% (Very High category). This increase shows that the use of VR media has succeeded in attracting students' attention and creating a more enjoyable learning atmosphere.

Conclusion of Effectiveness

With the increase in learning motivation in both small and large groups after using VR media, it can be concluded that this virtual reality learning media is very effective in increasing the motivation to learn history of students in class XI TJKT SMK Muhammadiyah 1 Pekanbaru. This media is a solution to the problem of learning history which has been considered monotonous, and is able to attract students' interest and curiosity about historical materials, especially those related to national movement figures and organizations such as Buya Hamka and Muhammadiyah.

4. Conclusion

This study successfully developed virtual reality (VR)-based learning media that displays the Buya Hamka Birth Museum as a form of innovation in history learning in class XI TJKT SMK Muhammadiyah 1 Pekanbaru. This media is designed to overcome the low motivation of students to learn history, as well as to answer the need for more interesting and interactive learning. Through the development

process using the ADDIE model, this media was validated by material and media experts and tested on students, and was declared very feasible and effective for use in the learning process. This media not only helps understanding historical material, but also significantly increases students' interest in learning. The success of this development proves that the use of virtual reality technology can be an alternative learning solution that is interesting, contextual, and in accordance with the times. For further research, this media can continue to be developed by adding more complete interactive features and reaching other historical materials as a form of enrichment of teaching materials.

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