



IMPLEMENTATION OF VIRTUAL REALITY TECHNOLOGY IN VOCATIONAL LEARNING

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ABSTRACT

This study aims to produce innovative virtual reality-based works that can be used as archiving learning media. The design of this study adopts the Borg and Gall model which consists of 10 stages. As for the location of the implementation research at SMKN 1 Ngawi Department of Office Management and Business Services. The trial subjects involved 15 students in the small group trial and 50 students in the large group trial. This research activity also involved a validator expert to determine the feasibility and validity of the product being developed. The results of this research and development are learning media called V-Archives that are feasible and valid to be applied in the archiving learning process. This is based on the results of small group trials which obtained an average of 87% and large group trials obtained an average of 92%. While the results of the media expert validator and material expert obtained an average score of 90.75. So it can be concluded that V-Archive learning media can be used as an alternative learning media for archiving subjects

Keywords:

learning media,
archives, v-archives,
virtual reality

INTRODUCTION

Technology is currently developing faster and has changed the order of human life in all fields, both in the economic, social, political and educational fields (Arkadiantika dkk., 2020; Muchdie & Nurrasyidin, 2019). This technological development affects the world of education through new findings which are considered to be able to assist in the process of acquiring knowledge (Atmojo dkk., 2022). However, this technological advancement is inversely proportional to the reality of education in the field, especially learning at the vocational high school level, many teachers still use the lecture method and giving assignments which make students easily bored so they don't have the concentration to follow the subjects in class (Darojat dkk., 2022). As a result, students do not understand the material being taught, and student grade performance becomes unstable, even decreasing (Jaya, 2013).

Apart from that, there are several problems in class that also often occur, such as students being busy alone, disturbing classmates, daydreaming, and there are even some students who are sleepy while learning activities are in progress. Solutions to overcome these problems can be done by using interactive learning media, where these learning media can make students understand and have a focus on participating in learning activities in class, namely by utilizing virtual reality technology. (Musril dkk., 2020). Virtual reality is a learning medium that is indicated to be able to increase student interest and learning outcomes (Sukaryawan dkk., 2019). Virtual reality is a powerful technology for solving real-world problems today, so it has been widely proposed as a significant technological breakthrough that has great potential to facilitate learning and is considered interactive when carrying out learning. (Sahulata dkk., 2016). This is in line with the opinion of previous researchers who stated that the development of virtual reality as a learning medium is appropriate for use,



because it received a positive response during the due diligence on media experts and material experts, as well as during trials on students also received a positive response (Almira dkk., 2021).

Virtual reality (VR) is a technology that is able to provide a user experience to be able to interact with an environment designed by a computer (computer-simulated environment). The real natural environment is imitated or made like the original but in an imaginative form (Utari dkk., 2021). The technology is designed to convey a perception that uses emotion just like the user does in the real world. In addition, according to Sumardani, et al (2020) stated that specifically, VR is defined as an environment that is generated by a computer, is three-dimensional, and interactive (Sumardani dkk., 2020). These environments can be real-world models or imaginary worlds that can help students understand and become more focused in learning.

The purpose of this study was specifically to find out students' understanding and concentration of Archives subject matter with the help of virtual reality-based learning media. So far, the learning methods given to students have mostly focused on modules, power point slides, YouTube videos and lecture methods. So that this research has an urgency in terms of the importance of using appropriate learning media to support educational progress. This research is very important to support improving the quality of learning and students' understanding. With the application of this learning media, students are able to solve problems in real situations and help them become independent learners.

METHOD

This research is development research (RnD). The research subjects were students majoring in Office Management and Business Services (MPLB) at SMKN 1 Ngawi. The material to be used in this study is archival material, this is because archival material is basic material that must be mastered by students. In addition, archival material also contains many sub-materials that must be mastered by students.

As for the research model in this research activity adopted from the model (Borg & Gall, 1983). The Borg & Gall research model was chosen because the steps in the process are quite detailed which are capable of connecting theoretical and field research, this is in accordance with the plan to develop virtual reality media. In addition, the borg and gall research model is also able to provide a solution to a problem while at the same time generating knowledge that can be used in the future. Broadly speaking, the development steps are divided into 10 stages which will be described in the following chart.

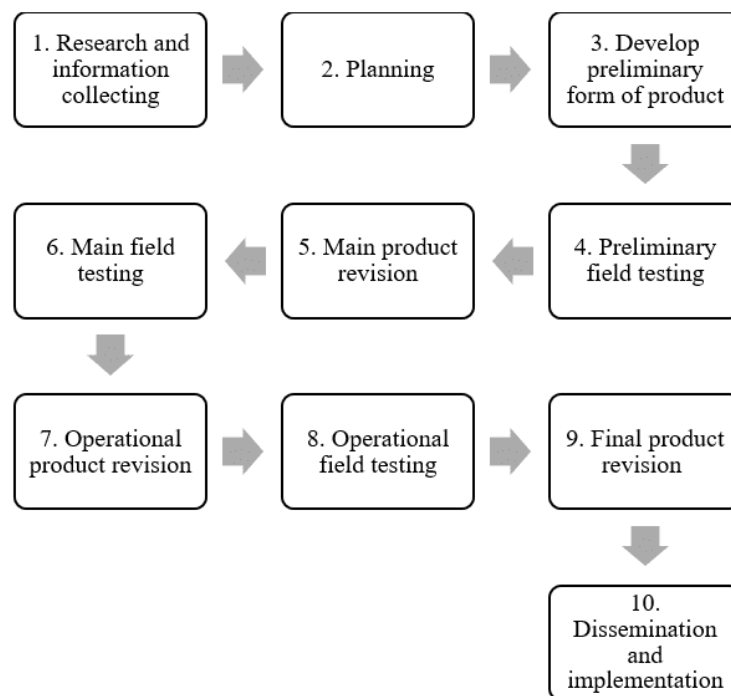


Figure 1. Borg and Gall's (1983) research steps

The research steps above will be described in the following explanation.

- 1) Research and information collecting. At this stage the research team conducted a field study to collect information related to the vocational learning process that occurred in several schools. The information collected is related to problems that often occur in the learning process, the media/technology used, and the learning outcomes obtained by students so far. In addition, at this information gathering stage a literature study was also carried out to find the right solution to overcome the problem.
- 2) Planning. At this stage the research team formulated the expertise and skills needed to answer the problems in the previous stage. Apart from that, at this stage it is also intended to make product designs and set goals to be achieved at each stage, if necessary also carry out a limited feasibility study.
- 3) Develop preliminary form of product. The third step of this research is to develop a product according to the design that was made in the previous stage. Included in this step is preparing other supporting components, such as guidebooks and questionnaires to evaluate the feasibility of the product being produced.
- 4) Preliminary field testing. The finished product was then tested on a limited scale involving as many as 15 subjects. In this step, data collection and data analysis were carried out using interviews and questionnaires.
- 5) Main product revision. Product improvements were made based on the results of the assessment and input from the subjects in the initial trials.
- 6) Main field testing. The revised product is then tested on a large scale involving a minimum of 50 subjects.
- 7) Operational product revision. At this stage, improvements were made again based on the results of the assessment of the test subjects, both criticism and suggestions.



- 8) Operational field testing. At this stage, the revised product is shown to the expert validator to test the feasibility of the media being developed.
- 9) Final product revision. Products that have been validated are repaired again based on the advice given by the expert validator.
- 10) Dissemination and implementation. At this stage the product is ready to be disseminated to improve the quality of learning in schools.

Data analysis

Data collection in this study was carried out using interview techniques and questionnaires. So the data generated from this study are quantitative data and qualitative data. The method of data analysis in this study is a percentage descriptive method by calculating the respondent's value and then looking for the average. Then do the percentage calculation with the following formula.

$$P = \frac{X}{Xi} \times 100\%$$

Information:

P = Percentage of trial subject results

X = Score obtained

Xi = Maximum score of question items

As for determining the conclusions that have been reached, the following criteria are determined.

Table 1. Media Eligibility Criteria

Percentage	Criteria
80% -100%	Decent medium
60% - 79%	Fairly decent medium
50% - 59%	Inadequate media
<50%	Inadequate media

Source: Sudjana in (Suparti, 2016)

RESULTS AND DISCUSSION

Research result

This research produced archival learning media for Office Management and Business Services (MPLB) majors. The learning media is named V-Arsip. V-Arsip (Virtual Reality Archive) is an innovative application that combines virtual reality technology with the aim of providing interactive and interesting education about archives. This application is designed as a learning tool that provides direct experience through a virtual environment.

The way the media works is that first the user will enter the lobby which is the starting point for studying the material and getting tutorials on using this application. When users enter the lobby in this virtual archive application, they will be greeted with various menus and features designed to provide a comprehensive learning experience. The Materials menu is the first section that users can access, where they can access various relevant information about the archives, as well as watch videos that explain important concepts visually and interactively.





Furthermore, there is a Usage Tutorial that provides step-by-step guidance on using the controller in a virtual environment. Users will be introduced to how to use movement in VR, such as walking or teleportation. In addition, users will also learn to use the Grab/Put feature to pick up and place virtual objects, and use click buttons to interact with elements in the environment.

In addition, this application also provides a feature that allows users to enter their own name. When users select this option, they are presented with a virtual keyboard view that allows them to interactively type their name. This provides a deeper personalized experience through a series of processes in virtual space.

There are also additional menus in this application, such as the Home Menu which provides quick access to the main features, the Material Tools Menu which explains the equipment and materials used in archiving, the Tasks Menu which provides exercises and challenges related to archiving, and the Video Menu which presents a collection of supporting videos to deepen user understanding.

With various features and menus available, this application is designed to provide a comprehensive and interactive learning experience about archiving. Users can explore various archiving concepts and practices through the available materials, as well as practice the skills they have learned in an interesting and challenging virtual environment. The lobby page on the V-Archive learning media can be seen in the following figure.

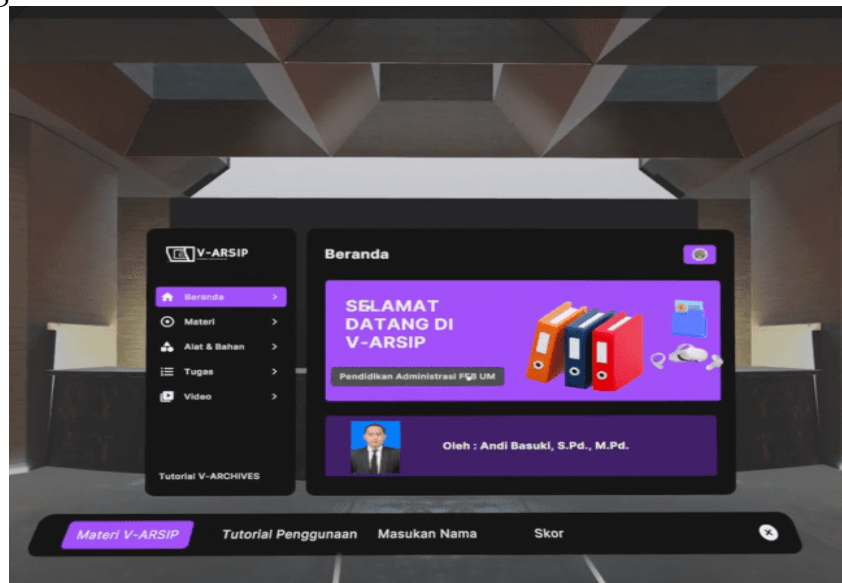


Figure 2. V-Archive Lobby

Furthermore, there is Room 1 which is specifically designed to introduce the tools and materials used in archiving. When users enter Room 1 in this virtual archive application, they will be in an environment that resembles a physical room equipped with various tools and materials used in archives. In this environment, the user will be given the task of locating and identifying certain tools and materials.

One example of a tool that can be found is a perforator, a tool used to make holes in paper. Users can simply hover over the perforators in the virtual room, then click on them to select them. After selecting the perforator, the user will be asked



questions regarding the use of the tool. If users can answer correctly, they will get certain points or prizes as a reward for their understanding.

Apart from perforators, there are also writing tools such as pencils or pens, snelhechter maps to combine and organize files, post-its to mark important pages, paper guides to assist in document arrangement, and incoming letters which are examples of materials to be archived.

By examining and identifying various tools and materials found around the room, users can practice their skills in recognizing and using the equipment needed in the filing process. In addition, through the tasks and questions given, users can also increase their understanding of the functionality and proper use of each of these tools and materials.

Through this interactive experience, users can experience the real thrill of carrying out archival work and gain a deeper understanding of the importance of tools and materials in managing records effectively. The Room 1 page on the V-Archive learning media can be seen in the following figure.

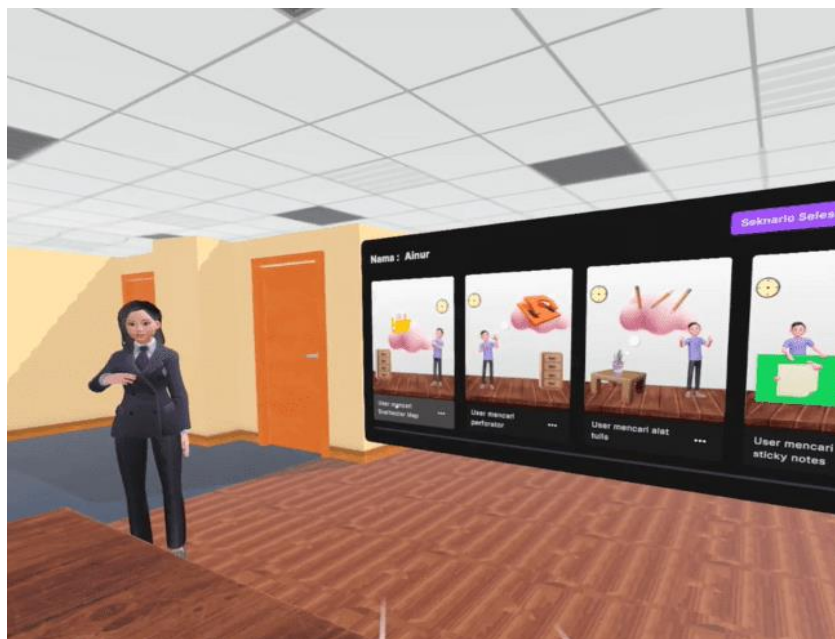


Figure 3. Room 1 V-Archive

Next is the simulation section which will provide an opportunity for users to learn practically and gain a deeper understanding of the steps involved in archiving. This stage is the longest, from checking the letter to saving the letter and conducting a review. The stages in this simulation activity are:

a) Checking Mail

The first thing that needs to be done is to check the mail, this is done to determine whether the letter can be saved or not. Before the letter is stored, the officer first checks the letter / archive that will be stored. Is it permissible to save the archive, or is the process still not finished? To find out whether the letter has been allowed to be saved or not, you can look at the letter whether there are signs of a storage order or not (release mark), such as "file", "save", "dep" (deponeren or save).



b) Indexing Letters

The second step is indexing the letters. The first thing that needs to be done is to look at the name of the institution or the name of the sender of the letter. However, in this simulation, the index corresponds to the name of the sending institution. After the names are indexed, then the letters are classified alphabetically from A to Z, but if there are a number of the same names then the arrangement is carried out based on the second, third, and so on letters.

c) Coding Letters

The third step is coding the letters. The letter code is taken from the alphabet code. The Alphabetical Code is taken from the first 2 letters of the first unit of the name that has been indexed. For example, if the sender's name is Anang, then the index is AN. Example PT: PT BUANA CODE BU

d) Sorting Letter

The fourth step is sorting the letters. Sorting letters, namely grouping letters that have the same code into 1

e) Save Letters in a folder

The fifth step is to save the letter in the folder. First, Prepare letters that have been coded and sorted. Second Prepare 3 HVS paper with different colors. HVS Used as a guide. Blue Color as Primary Guide. Yellow Color as Secondary Guide. Pink is the Tertiary color. The third step is to insert a guide as a separator between the letters that have been coded. The fourth step is punching holes in the letter

f) Marking Letters

The sixth step is to mark the letter. First prepare sticky notes. Then Paste the sticky notes according to the Guide. Blue Color as Primary Guide. Yellow Color as Secondary Guide. Pink is the Tertiary color.

g) The final step, Rewrite the letter code on the sticky notes.

h) Review Stage

i) Next you will go to the review simulation. At this stage you will look for letters according to employee needs. Please go to the review stage one

j) Done



Figure 4. V-Archive Simulation



Through immersive and interactive virtual reality experiences, V-Arsip makes archival learning more interesting and effective. Users can experience the immediate sensation of archiving activities as if they were in a real environment. Thus, V-Arsip provides a unique and fun learning experience, which can improve understanding and skills in managing archives properly.

The V-Archive media that has been developed is then tested on small groups, namely students at SMKN 1 Ngawi, Department of Office Management and Business Services. The small group trial involved 15 class XI students. In this trial activity students were asked to practice the media that had been developed and then provide an assessment of the questionnaire that had been distributed. The evaluation indicators of the trial students included ease of use, ease of understanding the contents of the material, the attractiveness of the design and the usefulness of the media being developed. Based on the results of the small group trials, an average of 87% was obtained which was included in the feasible category for use. As for the responses from the small group trial subjects that in general the media developed was quite good and very interesting, but the participants still had a little difficulty using the media because they were not used to it. Therefore the service team is trying to develop a guide to using the media in video form so that students better understand how to use the media.

Furthermore, the trial was carried out on a larger scale, namely on 50 students of SMKN 1 Ngawi, Department of Office Management and Business Services. The research steps carried out were the same as in the small group trial, namely by practicing using instructional media and then giving an assessment to the questionnaire. Based on the results of large-scale trials, an average value of 92% was obtained which was included in the category suitable for use. In this large group trial there was no significant input from students, they really enjoyed this learning media and hoped it could be developed for other learning materials. The results of the limited group and large group trials can be seen in the figure below.

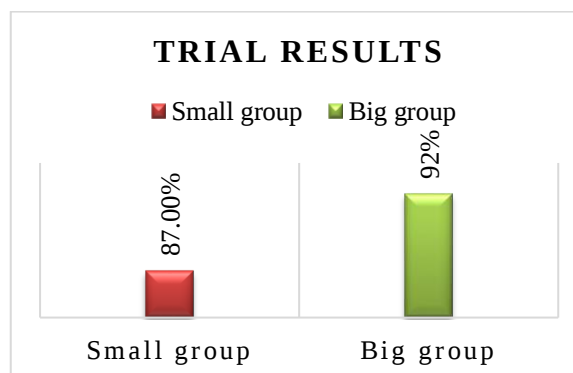


Figure 5. Graph of V-Archive trial results

The V-Archive learning media that has been tested on small groups and large groups, is then shown to the media expert and material expert validators. This is done to determine the feasibility of the product before being disseminated or disseminated. The assessment indicators for media experts include:



1. Aspects of learning : Interactivity, growth of learning motivation, ease of understanding, and involving several senses
2. Media aspect : Efficiency in using media in terms of time, program reliability, and can be run on multiple devices.
3. Design aspects : Detailed VR media display, color composition of VR media display, display size balance, and user interface,
4. Aspects of software engineering : Innovation creativity, ease of operation and ease of maintenance.

While indicators for material experts include:

1. Aspect of language : Language is easy to understand and communicative
2. Aspects of learning objectives : The suitability of the media with the goals, activities, assessment and characteristics of students.
3. Aspects of the material content : Appropriateness of the material content and the correctness of the material concept
4. Aspects of motivation : The ability to motivate and attract the attention of students.

Based on the results of validation by experts, the data is presented in the following table.

Table 2. Expert validation data

No	Validator	Percentage	Validity Criteria
1	Material Expert	89,5%	Very valid
2	Media Expert	92%	Very valid
Average		90,75%	Very valid

Source: Data validation results

Based on these data, the V-Archive learning media is valid and suitable for use in the learning process, this is based on data analysis using the percentage descriptive method. The comments given by expert validators include media that are very innovative in utilizing ICT for vocational learning. In general, the material is in accordance with the demands of learning on archival material. Suggestions for further research to be able to develop this media by adding to the discussion of various other vocational materials.

Discussion

Education is a means to improve the quality of human resources (Halean dkk., 2021). Quality human resources will ultimately have a major influence on the progress of a nation, because quality, superior and tough human resources both physically and mentally will have a positive effect on increasing the nation's competitiveness and



independence (Anas, 2022). In addition, superior human resources will also support national development. In this case, a good and quality education system is needed. So that it is necessary to organize the education system as a whole, especially those related to the quality of education. A quality education system introduces its students to foster a spirit of togetherness to study and master academics, know religious values and have sensitivity in the life of an information and technology-based society in the 21st century (Alifah, 2021).

Information technology is an indicator of the quality of education because it is able to facilitate learning to be more effective and interesting (Salsabila dkk., 2021). This is because the information needed will be easier and faster to access. In addition, an attractive learning media design is also able to stimulate students' interests, thoughts and attention so that learning becomes more optimal (Puspitarini & Hanif, 2019; Yuliansih dkk., 2021). Learning by utilizing information technology can also provide more knowledge to students because almost all of the information is contained on the internet. So that students' knowledge is not only limited to what is in the textbook. Based on these advantages, eventually various innovations regarding learning technology are increasing. One of them is virtual reality technology.

Virtual reality technology was developed with the aim of imitating the real world with a computer-generated environment involving the five human senses (Sumardani dkk., 2020). Through this technology, users will experience various virtual things that feel like real (Laba dkk., 2020). The application of VR technology in learning is useful for increasing the absorption of information received by students (Musril dkk., 2020). Complex and boring learning will become more interesting and imaginative. On the other hand, the application of VR technology is also able to encourage students to think critically and creatively, because VR technology requires students to be actively involved in learning. So indirectly students will carry out the process of analyzing which can enhance their learning experience.

The various benefits mentioned above reinforce the results of research conducted by researchers regarding the development of a virtual reality learning media called V-Arsip. The media was developed with various work steps including small group trials, large group trials and expert validation trials. From the entire series of studies, the V-archive learning media was declared feasible for use in the learning process. The main objective of this development is none other than to improve the quality of education in Indonesia.

CONCLUSION

This research activity produced a learning media called V-Arsip (Virtual Reality Archive). Virtual reality learning media is a new innovation in learning to increase student interest and motivation in learning. The development of learning media is intended for SMK students in the Department of Office Management and Business Services in archiving subjects. Based on the assessment by small group test subjects, large groups and expert validators, it shows that the resulting learning media is valid and feasible to use in the learning process. So that the learning media can be used by teachers to support the learning process in archival subjects.





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