VIRTUAL REALITY-BASED LEARNING MEDIA PLANNING FOR OFFICE ADMINISTRATION BUILDING MANAGEMENT MATERIAL

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Abstract

One of the lessons that requires interactive multimedia innovation is office administration. Office administration subjects combine corporate management (office unit consisting of buildings, land, personnel, and equipment) with operation management (office work). In this learning, building management material can be given interactive media innovations so that students understand the material concretely. The building management material requires spatial planning skills to be implemented in studying office administration. Spatial planning is a structural form and pattern of space utilization that is planned and shows the hierarchy and interrelationship of space utilization. This research designs virtual reality-based learning media for building management material in office administration courses as a contextual and open learning resource for upper secondary or higher levels. This research uses the research and development method through the ADDIE model. This model consists of five steps: analysis, design, development, implementation, and evaluation. The five steps are summarized into three parts: planning, development, and evaluation. This research focuses on the first part, namely planning. The planning consists of two stages: analysis in the form of a needs assessment for Office Administration teachers and design by determining software, making the appearance and content of learning media. The result of the learning media design is spatial education that can be overcome with VR so that users can learn, practice, and reduce the limitations and challenges of actual learning in the classroom. The development of office administration VR media on building management material is a novelty that has been out to overcome existing limitations, and an f.oIt is allowing innovation so that learning can be immersive.

Keywords: learning media, office administration, virtual reality, building management.

1 INTRODUCTION

The utilization of technology in education has yet to reach its maximum potential because it is still limited to PowerPoint, information technology, and the web (Risandi et al., 2015). Virtual simulation technology can serve as an alternative to traditional learning processes that are more student-centered. Supported by Liao's opinion (*in* Kurniawati & Nita, 2018), several educational research studies have shown that technology has the potential to improve the quality of education significantly.

In today's classrooms, students actively participate in their education using technological advances in learning media. This follows the various ways media can enhance learning, including overcoming inactive student participation, physical limitations, the passage of time, and the influence of the five senses (Sadiman, 2014). Practical learning goals or optimally achieved goals can only be achieved through teachers' development of new learning methods and innovations. The achievement of student learning achievement is the indicator. According to Winkel (in Arifin & Wakid, 2014), learning achievement includes the ability of students to complete learning tasks according to the weight they have achieved. This is also reinforced by interactive multimedia that can motivate students to achieve 80% of their learning goals during the learning process (Suryanto in Nopriyanti & Sudira, 2015). Research by Zainuddin et al. (2019) revealed that interactive learning activities assisted by multimedia can improve student learning outcomes in contrast to learning activities that only use conventional learning models. Therefore, multimedia-assisted interactive learning activities make it easier for students to understand the material and attract their interest, motivation, and involvement in the learning process.

One of the lessons that requires interactive multimedia innovation is office administration. Office administration includes *corporate management*, which includes the office as an entity consisting of structure, land, personnel, and equipment, and *operations management,* which handles office labor. This research comes from a course on the Office Administration (ADPU4331) module in the Public Administration study program, FHISIP, Universitas Terbuka. However, Office Administration courses can be found in other study programs at the college level or the vocational high school level.

In this learning, building management material can be given interactive media innovations so that students understand the material concretely. The building management material requires spatial planning skills to be implemented in studying office administration. There is a hierarchy and interconnection of space utilization in the form and pattern of structurally designed space utilization. Spatial planning incorporates spatial planning results into a comprehensive policy plan for utilizing space for various activities (Asriel, 2018).

Adequate facilities and infrastructure or the completeness of the media to be used are among the factors that influence the success of the learning process. Students ' optimal absorption of messages and learning materials will increase with the diversity of media used. The most crucial approach for teachers in fostering student achievement and learning motivation is the utilization

of computer technology-based learning media. Students tend to understand better and remember the topic when teachers use learning media to complement their instruction. Due to the benefits of the media used, students will be more engaged in their learning, making the learning process more enjoyable. Learning materials should be understandable so students can comprehend and achieve learning objectives. In addition, students will be more involved in the learning process as they cannot understand the theory by just passively listening. Learning methods can be varied (Inawati, 2021).

Currently, various technology-based learning media are available, along with the rapid development of technology. *Virtual Reality* (VR) media is one of the learning media currently being developed and can be implemented in the learning process. Zulmaulida et al. (2021) wrote that VR is a technology that allows users to engage with a three-dimensional (3D) environment that is as similar as possible to the real world. VR media allows users (in this case, students) to experience different worlds, thus taking them to different locations.

Ariatama et al. (2021) revealed that the process of displaying learning images in three-dimensional or 3D media is known as VR technology. This is achieved by utilizing computer components to ensure that the results appear more realistic and, of course, with the help of other essential devices. This creates the illusion that the user is physically present in a predefined environment. One of the benefits of VR is its capacity to create interactive learning environments and offer learning experiences that encourage students' abstract thinking and communication (Fernandez, 2017). VR is expected to serve as a solution to the problem of monotonous learning in office administration, building management material, as well as an innovation.

The research entitled "Application of 3D Technology on VRML-Based Web (Case Study: PT Plaza Mebel Pekanbaru)" examines a sales *web prototype* that can be an alternative in the realm of online shopping. This website is characterized by a high-quality visual display of goods and an easy-to-use interface (Reza et al., 2012). Another study by Asfari entitled "Making 3D Spatial Planning Applications for Multipurpose Buildings Using *Virtual Reality* Technology (Case Study: Graha ITS Surabaya)" discusses the creation of spatial planning applications at Graha ITS Surabaya (Asfari et al., 2012). Frenchman et al. (2017) conducted a study entitled "Implementation of 3D Computer Graphics in Kitchen Layout," showing users can design kitchen equipment layouts according to their wishes using objects available in the application.

This research also provides information about *kitchen* equipment to help users order *kitchen* sets (Franchman & Wardijono, 2017).

This study's formulation of the problem is how the design of *virtual reality-based* office administration learning media on building management material. This study aims to design *virtual reality-based* learning media on office administration learning as a contextual and open learning resource for vocational high schools or higher education levels. To find out the novelty of research related to VR in office administration learning, it is necessary to create a learning media that becomes a link between variables. VR is often used in *digital games* and showrooms to attract public attention and introduce technology to the community. VR has an essential function. This shows that VR also plays a vital role in space facilities (Nathania, 2020). As a result, some spatial education problems can be overcome with VR through a contextual virtual approach that can allow users to learn, train, and reduce the limitations and challenges of actual learning in the classroom. The development of Office Administration VR media on Building Management material includes a novelty implemented to overcome existing limitations and a form of learning innovation.

2 METHODOLOGY

Research and Development (R&D) is the research methodology used to create this VR media. Sugiyono (2017) revealed that research procedures used to produce products and evaluate their efficacy are research and development. The ADDIE paradigm, which is a systematic learning design model, is used in this development. Romiszowski (in Ma'ruf, 2021) it was revealed that systematics, the procedural aspect of the systems approach, has been applied in various methodological practices for designing and developing computer-based learning materials, audiovisual materials, and texts at the learning materials design and development level.

The steps in making this *mobile learning* application are adapted from the ADDIE development model. This paradigm consists of five stages: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. The five stages are elaborated into three components: planning, development, and evaluation. The first component of this study deals with planning as its focus. The planning stage is divided into two stages: the first stage is a *needs assessment*. ADDIE is the paradigm used in this study. It was chosen for its systematic development and theoretical grounding in learning design. The model is structured in a way that is consistent with the requirements and characteristics of learners and is organized in a systematic sequence of activities to address learning challenges associated with learning resources. This paradigm

consists of five stages: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. The five stages are summarized into three components: planning, development, and evaluation. This study focuses on the first part, planning. The planning part consists of two stages: analysis, *analysis of the* form of *needs assessment,* and *design*.

The Analysis stage includes data collection to identify problems related to learning media development. This process includes interviews with SMK Office Administration teachers to understand the needs of learners through teachers in learning Building Management. This analysis also includes examining material needs, learning objectives, and learner needs relevant to the material (Sukmadinata, 2006). In addition, there is also a *design* stage. The design includes the advanced stage of analysis. The analysis results from the previous stage are used to design and develop VR media. The design stage involves drawing up a plan for the product development process. The initial stage is determining the software that will be used to create the media. Then, an image display was created to complement and illustrate the material content sourced from various websites. The images include *backgrounds*, buttons, and supporting images made using Corel-Draw x7 and Canva software (Sugiyono, 2017).

3 FINDINGS AND DISCUSSION

Learning media in the Office Administration course developed is *virtual reality* (VR), which contains office building management material concerning the ADPU4331 module at the Universitas Terbuka (UT). This VR-based learning media is "VROOM: *Virtual Reality Room Organization and Optimization Media*." This media has PowerPoint material, instructional videos, and practice questions. This VR-based learning media was developed to serve as an alternative learning media for office building management *to enable independent learning* for UT students, students from any university, or the public.

This research will continue over the course of two years. The first year will focus on planning and developing learning video content that will eventually be used as web-based learning content. In the following year, the VR media will be assessed. The following explains the research procedure conducted during the first year.

3.1 Student Needs Analysis

The researcher conducted a teacher needs analysis by distributing questionnaires during the initial stage. 23 respondents from Vocational High Schools carried out this stage. The needs analysis phase was conducted in June 2024. Data from the needs analysis instrument for teachers or tutors in the field of building management revealed various essential aspects in the

practice of teaching this material. Through the teachers' responses, the understanding, application of teaching methods, use of learning media, and challenges and solutions faced in the education process can be analyzed. Most teachers understood building management well, including siting, layout, facilities, and equipment. This indicates a solid theoretical basis through a good understanding of the material. They also felt able to teach the material effectively, reflecting a high level of confidence in their pedagogical approach.

In terms of teaching methods, discussions and presentations were the top choices, followed by question exercises that support interactivity and deep understanding. All respondents used discussion and presentation methods, while 63% used practice questions as part of the teaching methods. The use of PowerPoint and ICT (Information and Communication Technology) is dominant, indicating the integration of technology in learning with all respondents using this media. This media helps visualize complex concepts and supports visual and auditive learning styles. This is confirmed by Edi (in Imamah, 2012) that the use of interactive multimedia in the learning process can improve understanding of the subject matter and increase student motivation. Students pay more attention and concentrate on lessons when presented with exciting media.

The challenges faced include difficulties in applying building management theory to real practice, lack of hands-on opportunities, and a large material load. To overcome these obstacles, almost all teachers (87%) have used smartphones and learning videos as alternative solutions. Digital media allows access to a wider range of learning resources and can help simulate real-life situations that are less realizable in traditional classrooms.

There was a very positive response to the use of Virtual Reality technology. Responding teachers believe that VR can enhance understanding of the material more interactively and engagingly. VR enriches the learning experience with virtual simulations of building management environments and cases, allowing students to explore and solve problems in a controlled yet realistic setting. Desirable features in VR include integration with AI to make the simulation more dynamic and adaptive to students' learning needs. This is in line with Parhan's research (2019). Students are motivated to continue their education by compiling learning materials that are more interesting and meaningful, and the learning process is more in line with their experiences in the real world. This is achieved by incorporating a contextual learning model, which allows students to uncover the underlying meaning behind the theoretical material.

From the data analysis, there is a strong need to continue integrating technology in building management education and develop more practical and applicable methods. Teachers identified strengths in their teaching but recognized room for improvement, particularly in practical application and adopting new technologies such as VR that could bring a new dimension to building management learning. Nowadays, the utilization of technological media significantly influences the learning process (Sakat et al., 2012). As a result, advanced technology can create more innovative and inventive learning media. Teachers also agree that features such as learning videos and practice questions in educational games would be helpful. The advantage of VR as a digital media is its ability to give students the ability to access materials and information at any time and in any location (Ally, 2009). 93% of educators were enthusiastic about teaching the office building administration course using VR.

3.2 Expert Needs Analysis

Based on interviews with experts, office building management courses discuss the implementation of office activities that require good organization and building management.

"This lesson gives us insight into the implementation of office activities that require organization, good building/office management, work systems, procedures, archives etc."

Management is the process of planning, organizing, leading, and controlling an organization's efforts in all its aspects to ensure organizational goals are achieved effectively and efficiently. Effectiveness is doing the right task according to set guidelines, while efficiency is doing the job right. Office management is a collection of activities that involve planning, organizing (setting up and arranging), mobilizing, supervising, and controlling various office services. The office services include all tasks performed to facilitate the achievement of critical objectives. In fact, the objectives of office management are broader than complete writing office work. However, four Office Management has covered various components: finance, filing management, office methods, *personnel*, *office space*, and office communication (Rusdiana, 2021).

Building management materials also require spatial planning skills, which are also used to study office administration. Spatial planning includes the form and structural pattern of planned space utilization and shows the hierarchy and interrelationship of space utilization. The results of spatial planning are used to integrate space utilization policy plans for various activities (Asriel, 2018).

According to expert opinion, the Office Building Management course requires the development of critical and analytical thinking. Furthermore, it requires the acquisition of a range of additional skills, including managerial and spatial abilities.

"What is definitely needed is... our critical and analytical perspective as a foundation for understanding the subject matter. Then, spatial and managerial skills are also important."

Critical thinking involves an analytical and reflective examination of an observed object or phenomenon. If evidence supports the object or phenomenon, then it will be accepted as truth. Ennis (in Na'imah et al., 2022) revealed that reflective and rational thinking is the focal point of critical thinking, including determining what to believe or do.

Furthermore, various assessments were carried out on the learning process of building space material. As stated by the expert:

"The main evaluation is that most of the learning process is still guided by printed books and lecture methods...Learning is also not creative because it does not utilize media or technological developments."

"Learning is still textual and has not used appropriate learning media."

The material in printed books is considered less than optimal because of the need for concrete examples to understand office building administration material, which cannot be explained satisfactorily only with text and images. Complementary media that incorporates VR technology can assist educators in delivering material creatively with 3D visualization in printed books, thus facilitating understanding and interest (Abdillah et al., 2020). VR technology has the potential to significantly improve the quality of learning during the educational process and support learning activities by integrating the real world with the virtual world, thus solving this problem (Nincarean et al., 2013).

During the interview, the informant (expert) gave an opinion related to interesting office building management learning, namely the exploration process through concrete things to reduce learning boredom.

"Learning is interesting when there are simulations that can provide experiences that we can easily apply in the real world."

"Providing an overview of ideal and non-ideal building designs as knowledge to everyone who wants to access the VR and provides an opportunity for us to create an ideal building through VR."

"The use of VR is very good, it can give us the experience to get a new experience to make an ideal building management."

Based on the interview process, informants (experts) agree that VR media can be used as an alternative learning method in office building management courses. Zulmaulida et al. (2021) revealed that VR is a technology that allows users to interact with 3D environments that are as realistic as possible. Users (in this case, students) are given access to various visualization experiences through VR media as they are taken to a whole new world. In addition, VR can increase the adaptability of educational activities. Students can utilize digital-based learning media as a practical resource for self-learning as they can access the available materials (Alyahi et al., 2015).

"Good, because it facilitates access to learning and provides additional (alternative) materials for students. It should also be noted that its use must be practical (easy to operate)."

Saputra and Gunawan (2021) also stated that students can understand learning materials and remember information by creating exciting learning media. Learning media is very important to increase the effectiveness of the learning process. To make it easier for students to understand the material, in addition to exciting and stimulating learning media, it is also necessary to use media that is easily accessible online (Samoling et al., 2022). This cannot be separated from the attributes of online learning, namely: (1) interactive, (2) independent, (3) accessibility, and (4) enrichment (Hamid et al., 2020).

Visual and audiovisual materials are essential for learning office building management courses in VR.

"In my opinion... Features that show examples of ideal and non-ideal buildings, features about objects and tools that must be in an office building. Selection of office furniture. In essence, it needs visual and audiovisual material... there can also be responses and questions for evaluation."

After conducting the data collection stage in the form of needs analysis from teachers and experts, the next step was the planning stage. The planning stage shows the need for educational game applications on social arithmetic material based on *Virtual Reality* for learning support to improve students' mathematical abilities and facilitate the exploration of abstract concepts presented interestingly.

3.3 Application Development Planning

The learning media to be created is an application based on VR. Students can choose the time and location that best suits their learning ability. This is the principle of fun learning, and VR media provides students with alternative times and locations to learn without external pressure. This includes the advantages of virtual applications regarding time and location, allowing students to access materials and information anytime and anywhere (Ally, 2009). This research aimed to create VR-based learning media focused explicitly on office building administration, particularly on office layout. VR is one of the learning media that utilizes technology to make it easier for students to access information and learning materials anytime and anywhere.

One of the benefits of VR is its capacity to create interactive learning environments and offer learning experiences that enhance students' abstract thinking and communication. (Fernandez, 2017). Due to the many benefits offered by VR, VR math learning can serve to achieve the goals of office administration education. In Indonesia, VR is expected to serve as an innovation as well as a solution to the challenges of traditional learning. This VR-based learning media is expected to function as a learning support that can increase students' understanding of office building management material to provide an ease of exploring various concepts and theories that are projected in an exciting form.

4 CONCLUSION

This research aims to enhance the learning experience using interactive multimedia, specifically VR, which provides a contextualized and immersive learning environment for students. The results show that VR can be an effective tool in building management education by presenting material in a three-dimensional format that allows students to interact directly with the subject matter. This supports better concept understanding and facilitates a more active and engaging learning experience. The development of VR-based learning media for building management material in office administration courses offers an innovative approach beyond traditional learning methods. VR increases interactivity and engagement in the learning process and facilitates a deeper understanding of complex subject matter. This research provides evidence that the integration of VR technology in education can overcome various challenges of conventional learning, such as physical limitations and lack of learning motivation. Recommendations for further research include evaluating the effectiveness of VR in diverse learning scenarios and developing VR educational content for other subjects in office administration.

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