Research Article

Development of 360-Degree Video-Based Virtual Reality Learning Media to Enhance Students' Learning Interest

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Article Info

Abstract

Technology development in education has become essential for optimally, efficiently, and effectively achieving educational goals in 21st-century skills. The utilization of technology in education is relevant to the development of Society 5.0 and can be seen in the academic growth of global challenges. One of the solutions for implementing technology in education is the application of technology-based learning media, which can be developed using technological advancements, including 360-degree video-based virtual reality (V.R.). The results of this study explored that virtual reality can improve students' interactive and immersive learning experience as if they can feel the sensation of being in the environment depicted in the displayed video. Additionally, engaging learning experiences can enhance students' learning interests in primary schools. However, we suggested that students accustomed to online learning must readapt to conventional understanding in future studies. Therefore, one media that can attract students' learning interest in primary schools is 360-degree video-based virtual reality.

Introduction

The advancement of science and technology in Society 5.0 has significantly impacted various aspects of life, including education. This era is based on modern technological intelligence such as Artificial Intelligence (AI), the Internet of Things (IoT), big data, and robotics. These technologies can simplify people's lives and transform our interactions with science and technology.

In education, the development of science and technology continues with innovations in learning devices tailored to the needs and complexities of education today. Technology in education plays a crucial role in achieving educational goals to the fullest, efficiently, and effectively. One form of implementing technology in education is through technology-based learning media. Technology-based learning media refers to the use of technology in the learning process. Learning media serves as a mediator or connector between teachers and students, aiming to motivate students to participate in meaningful and comprehensive learning (Hasan et al., 2021). Therefore, learning media can be used as a communication tool in the learning process.

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Learning media must be adapted to the student's development and technological advancements to ensure innovation and relevance. Learning utilizing media is more effective because students can understand the learning material delivered more quickly. Technology-based learning media can stimulate engagement, creativity, critical thinking, and a sense of interest in learning, thereby maximizing the achievement of learning objectives. One of the learning media that can be developed by utilizing technological advancements is 360-degree video-based virtual reality (VR). Virtual reality offers several valuable features for education, such as presenting environments in three-dimensional, more realistic, and interactive conditions. Virtual reality creates a virtual space that gives users the sensation of experiencing events or incidents within that media (Darojat et al., 2022). Virtual reality offers students a more interactive and immersive learning experience as if they can feel the sensations of being present in the environment displayed in the video. Therefore, one media that can attract students' learning interest in elementary school is 360-degree video-based virtual reality. This is supported by the research conducted by Friesta Ade Monita in 2019, which found that the use of virtual reality media in the subject of science, particularly the solar system, was more effective in improving science process skills compared to conducting actual experiments and using conventional video media.

Effective learning requires using engaging, innovative, relevant, and up-to-date media. Teachers must adapt various learning media to ensure smooth learning processes and achieve desired goals, as engaging learning can enhance students' interests. After the Covid-19 pandemic, elementary school students experienced changes in their learning interests as they had to adapt from online learning to conventional understanding. The learning interest of elementary school students is influenced by internal factors (attention, curiosity, needs, motivation) and external factors (family, school, community).

To enhance the learning interest of elementary school students, one solution that can be utilized is 360-degree video-based learning media using virtual reality technology. Virtual reality is designed to cultivate students' learning interest by providing an experience as if immersed in a natural environment depicted in the 360-degree video. The development of virtual reality begins with creating a virtual environment that accommodates visual objects, allowing students to interact with the virtual world and its visible things directly. This virtual environment is expected to stimulate the absorption of information provided to the students (Fardani, 2020). Using this technology, students can actively engage in learning and have immersive experiences, igniting their learning interests. The use of virtual reality-based learning media is expected to create an engaging and interactive learning experience, thus enhancing the learning interest of elementary school students.

Methodology

This research method uses a literature review focusing on descriptive analysis and relevant theoretical references related to the cases and issues identified (Creswell, 2012). In this study, the researchers employed a literature review encompassing several empirical and conceptual articles discussing the utilization of virtual reality-based learning media and its impact on students' learning interests at the elementary school level followed by Torres-Carrión (2018). However, we used and followed the step of ADDIE model from Reinbold (2013) to develop the learning material as can be seen in **Fig. 1.**
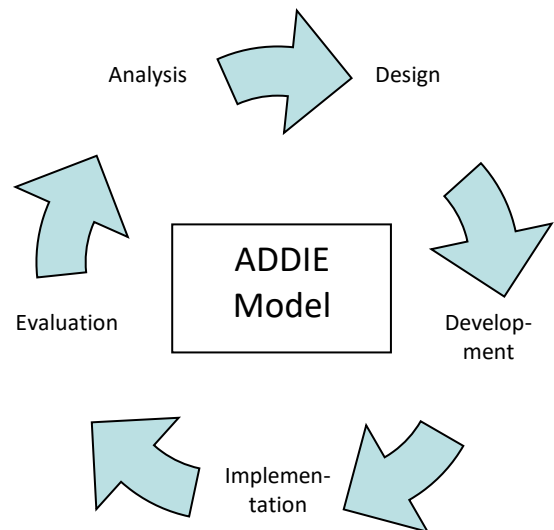

Figure 1. Step of Development of ADDIE model

Results

Media that conveys information and contains instructional meanings is learning media. Generally, media is defined as anything that delivers information to recipients, which can stimulate students' feelings, attention, thoughts, and interests in the learning process. Learning media serves as an intermediary between teachers as information providers and students as information recipients stimulating and motivating students to engage in meaningful learning fully (Hasan et al., 2021). According to the Association for Education and Communication Technology (AECT), media encompasses all forms and tools used in the information process. Based on experts' opinions, it can be concluded that learning media is a tool that aids the learning process in conveying the meaning of messages or information clearly and enjoyably, thereby stimulating students to participate in learning actively. This enables the effective and efficient delivery of learning materials.

In line with the globalization happening in the era of Society 5.0, using technology-based learning media is highly relevant in assisting students in the learning process. This is because learning media itself serves to enhance students' learning interests. Learning media can improve the quality of education as it can generate desire, increase learning motivation, and psychologically influence students. Learning media plays a crucial role in the teaching and learning process. Specifically, learning media provides meaningful learning experiences. Learning media is a communication tool for teaching and learning (Hasan et al., 2021). Another perspective on the functions of learning media, as proposed by Wina Sanjaya, includes the communicative function, which means that teaching media is used to convey information between teachers and students, eliminating verbal barriers and misunderstandings; the motivational function, which means that learning media can motivate and enhance students' enthusiasm for learning; the meaningfulness function, which means that learning media makes learning more meaningful as students not only receive information but also analyze it; the perception alignment function, which means that teaching media can align each student's perception; and the individuality function, which means that learning media can cater to the diverse characteristics, interests, and learning styles of students (Sanjaya, 2014).

In conclusion, learning media serves as a source of student learning, an intermediary of information, a preventive measure against obstacles in the teaching and learning process, enhances the motivation of students and teachers in the learning process and maximizes the learning process. In other words, the selection of learning media is based on its alignment with competency standards, essential competencies, and indicators; alignment with the learning material, meaning that the content of the learning media should correspond to the material being taught; alignment with student characteristics, indicating that the learning media should be suitable for students' characteristics to avoid negative responses or gaps in understanding; alignment with theories, meaning that the selection of learning media is based on valid research theories; alignment with students' learning styles, as students have diverse learning styles such as visual, auditory, and kinesthetic; alignment with environmental conditions and infrastructure, meaning that the implementation of learning media can be maximized when supported by adequate infrastructure and sufficient time (Rohani, 2019).

The use of technology in education has several benefits, such as improving the quality of learning, increasing access to education, transforming abstract concepts into tangible experiences, facilitating student understanding of the material, making learning more engaging and enjoyable, and connecting the content with the learning process (Hasrah, 2019). Technology integrated into learning media goes beyond mere text-based content and includes visuals and sounds that enhance students' interest in learning. Technology-based learning media have complex advantages and disadvantages compared to other learning media. The advantages of using technology-based learning media for students include independent and proactive knowledge, flexible time and location for learning, enhanced creativity and skills, and meaningful learning experiences. Implementing technology-based learning media requires synergy among teachers, students, and stakeholders to ensure effective and purposeful implementation. Technology-based learning media can be classified into several categories: audio media, which relates to the sense of hearing, such as audio cassettes, open reel tapes, vinyl records, and compact discs (Pribadi, 2017); visual media, which involves visual stimuli for students, such as slide films, paintings, photographs, images, cartoons, graphics, and printed media; audiovisual media, which combines sound with simultaneous text delivery, such as television, laptops,

and videos; and multimedia, which communicates learning materials through integrated video, sound, text, and hyperlinks (Iskandar, 2019). One of the latest technology-based learning media is virtual reality-based 360-degree videos. Virtual reality-based 360-degree videos are a recent technological product that has the potential to be used as a learning medium which was created by a camera system that simultaneously records the entire direction with a 360-degree rotation, allowing viewers to shift and rotate the perspective of the video to watch from different angles (Rambing et al., 2017). The concept of virtual reality (VR) is related to technological advancements. Virtual reality (VR) immerses users in a video, creating an interactive experience where users feel like they are inside the simulated virtual environment. In Indonesian, virtual reality (VR) is called "realitas maya." These virtual videos can be easily accessed through platforms like YouTube if the user has an internet connection and a VR gadget (S-VR). S-VR refers to optical glasses with two curved lenses in the VR goggles. Utilize S-VR, aided by using a device with a Gyroscope feature (Syafril et al., 2019). The use of virtual reality (VR) requires various additional devices, such as virtual reality headsets, for example, Oculus Rift, Sarlar 3D VR, Samsung Gear VR, and other virtual reality (VR) headset products.

Interestingly, it is an individual's inclination towards everything related to awareness, attention, and enjoyment of relevant objects (Iskandar, 2019). It serves as a source of motivation for one's actions. Interest arises from a sense of pleasure and attention toward something. Interest is influenced by three factors: internal needs related to physical and psychological aspects, the need for recognition and respect from the individual's environment, and the individual's emotions. The meaning of learning, such as Endang Komarah, states that learning is an individual's activity in acquiring knowledge, behaviour, and skills by processing instructional materials (Komarah, 2016). Learning interest can be interpreted as an individual's or student's proactive motivation to pursue a change in behaviour due to their individual experiences interacting with their environment, encompassing cognitive, affective, and psychomotor aspects. Learning interest is a sense of liking and being interested in learning without coercion. Learning interest is an attitude of obedience in the learning process, including planning one's study schedule and dedicated efforts to learning (Andriani & Rasto, 2019). Learning interest also has indicators, including feeling interested and happy to learn, active

participation, a tendency to pay attention and a high level of concentration, positive feelings, an increasing desire to learn, comfort during learning, and the ability to make decisions related to the learning process (Yunitasari & Hanifah, 2020).

Furthermore, indicators of students' interest in using technology-based learning media include more structured delivery of learning materials, increased engagement and activeness in learning, more effective learning duration, improved learning outcomes, flexible time and location for education, and teachers being able to act as consultants or advisors to students. One way to enhance students' learning interest is by using audiovisual learning media such as engaging videos. The development of video-based learning media should be pursued to keep up with rapid technological advancements, for example, by utilizing 360-degree video learning media with virtual reality (VR) technology.

Discussion

Our research primarily revolves around developing 360-degree video-based virtual reality learning media to enhance students' learning interests. We examined the content, structure, and outcomes of teacher education papers published in recent years. Research by Ressi Kartika Dewi titled "Utilizing 3D Virtual Reality-Based Media to Enhance Students' Interest and Learning Outcomes in Science for Grade V Elementary School Students" was carried out at an elementary school (SDN 01 Suruh, Tasikmadu, Karanganyar). This study utilized VR media as the research tool to examine its effectiveness in the learning process of grade V elementary school students. The research resulted in the development a VR media product in the form of a CD or flash drive. The study employed the Research and Development (R&D) method with the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model, chosen for its systematic approach to instructional development, which is considered the most effective for developing learning products. The research findings indicate that the 3D Virtual Reality-based learning media effectively enhances students' interest and learning outcomes. This is demonstrated by the significant difference in students' interest and learning outcomes before and after using the learning media, with an average score improvement from 52,95 to 82,05 (Dewi, 2020). Utilizing virtual reality-based learning media has proven to be highly

effective in communicating information that is difficult to explain conventionally and visualizing learning materials effectively. Furthermore, using this media also enhances students' learning interests and effectively enables the achievement of learning objectives.

Another research by Friesta Ade Monita in 2019, titled "Development of Virtual Reality Media for Enhancing Science Process Skills and Scientific Attitudes", revealed several findings: The developed VR-IPA media has been proven to be suitable and practical for use in science learning, specifically in the topic of the Solar System, based on validation from experts and assessments by science teachers. Therefore, the media can serve as a solution to address the inadequate laboratory facilities at SMPN 8 Yogyakarta regarding learning tools and materials. The use of VR-IPA media in teaching the Solar System topic is more effective in enhancing science process skills than actual laboratory practices or video media. Additionally, VR-IPA media has been more effective in fostering scientific attitudes than basic laboratory practices (Monita, 2019). Thus, it can be concluded that using virtual reality-based learning media enhances students' learning interest and improves science process skills compared to fundamental laboratory practices. Febri Iskandar and Hadiyati Idris (2022) conducted a study on learning media that utilizes virtual reality technology and 360-degree videos. The research "Development of Physics Learning Video on the Solar System Topic with Virtual Reality 360° Video Approach using Blender Software for Grade VIII of Junior High School/MTs" showed that instructional videos effectively stimulate student interest and motivation. Audiovisual elements in instructional videos capture students' attention and align with technological advancements (Iskandar & Idrus, 2022). This research was motivated by the complexity of physics topics, particularly the solar system, which is challenging to explain solely through text or written materials. Typically, this content is delivered in 2D media format. Therefore, the development of media that can make objects more realistic, such as 360-degree videos, Blender software, and virtual reality technology, is necessary. Based on previous research, a Physics learning video based on Virtual Reality 360-degree video using Blender software for Grade VIII of Junior High School/MTs has been successfully developed. The video underwent validity testing, with a validation percentage of 84.37% for content, instructional, and technical aspects. Furthermore, regarding practicality,

the success rate among students and teachers reached 81.55% and 82.69%, respectively.

Based on previous research, it can be concluded that Virtual Reality (VR) has the potential to innovate in creating learning media that can enhance students' learning interests and outcomes and positively impact students. This research indicates that using virtual reality (VR) technology in education can enhance motivation, capture attention, and improve learning effectiveness. This innovation is expected to motivate students to be more interested in the learning process and facilitate the learning of subjects enjoyably, aligning with the current technological advancements.

Conclusion and Recommendation

Based on the findings and discussions from several previous studies, it can be concluded from this research. Several studies have been conducted on using 360-degree videos and Virtual Reality as instructional media to enhance students' learning interests and abilities. These studies have received positive responses, showing improvements in students' learning interests. Furthermore, Virtual Reality-based instructional media also holds great potential, particularly in addressing challenges in the education field, such as technological advancements, diverse student characteristics, and limitations in students' understanding due to inadequate or insufficiently clear instructional media. However, we suggest that further research and studies need to develop and implemented to improve the learning experiences of students' learning interests using online learning need to readapt to the conventional understanding of the 360-degree video-based virtual reality related to skills and competencies in 21st-century classrooms.

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