



Utilizing Augmented Reality Technology to Create an Immersive Learning Experience

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ABSTRACT

Education is a process of reducing the number of ignorance and poverty in the world. Through education a person can change his life, far more advanced than people who are not educated. In today's advanced and sophisticated era, education is supported by the presence of various technologies. With technology, one can create interactive and creative education. Various kinds of technology emerged and developed. This rapidly developing technology also encourages the birth of a process of change in the world of education. The presence of this technology provides many benefits in the world of education. The purpose of this study is to find out the benefits of augmented reality technology in creating deep learning. The method used in this study is a quantitative research method with a survey design. Data for this study were obtained by filling out a questionnaire via the Google Forms link. The results of this study are that the benefits of augmented reality technology in creating in-depth learning have a significant influence and impact on the learning process. Through Augmented Reality Technology has the opportunity to improve the learning process in high school. Learning that uses AR technology allows students to learn in a more exciting, fun and interactive way. In addition, AR technology can also make students better understand the concept of learning. The limitation of this research is that the researcher only investigated at the school level. The researcher also hopes that future researchers can take this research to a higher level and he also hopes that in the future there will be other researchers who can advance this research.

Keywords: *Augmented Reality, Learning Experience, Technology*

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INTRODUCTION

Technology, a word that plays an important role in the development of human life today. In this modern age (X. Wang et al., 2022), probably almost half of the world's population, including Indonesia itself, has enjoyed the development of technology. Talking about technology cannot be separated from the internet and devices that are the

result of technology (Petkovšek, 2019). Technology and its rapid development are very helpful for human life, even with the development of existing technology, it is possible to create things that fill the coffers of rupiah without having to leave the house. Technology and its rapid development are very helpful for human life, even with the development of existing technology, it is possible to create things that fill the coffers of rupiah without having to leave the house (Ganievich Karimov et al., 2021). With technology everything can be done easily and quickly (Lyapuntsova et al., 2019). This is certainly an excellent step forward given that technology should be immediately deployed for positive use and there is an opportunity to enter the free market which certainly has a strong focus on technology and the advancement of society (Kravchenko, 2021). In addition, it also helps parents who previously didn't know how to use technology to inadvertently learn and try it out (Aheleroff et al., 2021). But unbeknownst to humans, today's technology can pose a threat if technology cannot be controlled properly.

Nowadays, technology plays a significant role in the world of education (Islami, 2019). Technology has become a very helpful part of the education process as well as finding out about the latest and most recent information (C. Wang et al., 2022). This can be proven by the tools used ranging from laptops, computers, smartphones, tablets, and others (Tseng et al., 2020). They are all present in everyday life and help people find and do things (Ke et al., 2022). From small tools that are easy to carry around, to other things, it has become a tool that can no longer be separated from human life. Some even say that technology has become half of us (Khan et al., 2018). This is because technology functions as a multitasking tool, a tool for browsing the web, opening e-books, opening social media, chatting, calling, video calling and other useful things. Everything is possible thanks to applications and technologies that are also available in education.

In education, various technologies emerge and develop to support the learning process (Rogers et al., 2021). One of them is Augmented Reality technology (Rauschnabel et al., 2019). Augmented Reality technology in schools provides profound benefits (Bottani & Vignali, 2019). Through Augmented Reality technology, teachers can increase student activeness by involving students in learning (Rogers et al., 2021). In addition, Augmented Reality technology also makes it easier for teachers to provide abstract and visual learning (Egger & Masood, 2020). As well as making students have a high memory of learning because it is supported by more real and authentic learning. With the existence of learning using augmented reality technology will create a deep learning experience because it involves visual gestures in learning.

In utilizing Augmented Reality technology in the learning process, schools can use Augmented Reality as a learning application (Huang et al., 2019). This Augmented Reality application can be used to create fun and interactive learning activities, such as making virtual projections on an object or historical place (Elmqaddem, 2019). In addition, AR technology can also be used to create realistic simulations of subjects that are difficult for students to understand (Maas & Hughes, 2020). However, in using AR

in the learning process, care must also be taken. Teachers and students need to know the technology and understand how it works (Eckert et al., 2019). In addition, privacy and information security issues must also be considered when learning with this augmented reality technology. In summary, augmented reality (AR) technology is a fun and effective learning tool to be implemented in secondary schools. By using augmented reality technology, students can learn more interactively and deeply about learning concepts (Joda et al., 2019). However, you also need to be careful when using augmented reality technology and pay attention to data privacy and security.

Through the use of app-based augmented reality technology in the learning process, it will automatically create a lively and active classroom (Papanastasiou et al., 2019). In this case, augmented reality led to the emergence of more in-depth learning for students (Gerup et al., 2020). Deep learning is a learning process that utilizes the power of renewal to shape student engagement in the learning process by discovering and managing existing knowledge as well as creating and using new knowledge in the world to produce deep learning outcomes (Ong et al., 2020). Deep learning is becoming increasingly important as the amount of data increases and computing power becomes more efficient and affordable (Akiduki et al., 2003). Companies across retail, healthcare, transportation, manufacturing, technology and more are investing in deep learning to drive innovation, unlock opportunities and stay relevant with the times.

Deep learning relies heavily on network architectures, powerful graph processing units deployed in the cloud or in clusters, and large amounts of labeled data to achieve very high text, speech, and image recognition accuracy (He et al., 2019). All this power can help your developers build digital systems with human-like intelligence and reduce time to value by cutting model training from weeks to hours. Learning through AR technology changes the nature of learning and offers an engaging and interactive experience that creates deep learning (Wei, 2019). Augmented reality (AR) is a technology that combines virtual elements with the real world, creating an experience that blends the two. With AR, virtual elements such as images, videos, sounds, or computer graphics are added to a real scene using devices such as mobile phones (Han et al., 2020). Augmented reality technology allows users to see and interact with the physical world through digital augmentation.

There are different views from previous researchers on Utilizing Augmented Reality Technology in Creating a Deep Learning Experience. First (Fan et al., 2020), He conducted a research entitled "The Potential Use of Augmented Reality (AR) and Virtual Reality (VR) Technology in Learning Architectural History in the Era of the Covid-19 Pandemic". The results of this study are the learning model used in online learning using PPT which presents 2D images to reflect images of historic buildings or historic sites. However, this learning model has the disadvantage that it can only display 3D objects in 2D. As time goes by, architectural history becomes a boring lesson and gets a negative image because it seems a waste of time. Therefore, it is hoped that an innovative learning model using augmented reality and virtual reality can be a solution to overcome students' boredom in learning architectural history, even though it is done

online. This article proposes the use of VR and AR as tools in architectural history lessons to make the lessons more interesting. Second (Musril et al., 2020), He conducted a research entitled "IMPLEMENTATION OF VIRTUAL REALITY TECHNOLOGY ON COMPUTER ASSEMBLY LEARNING MEDIA". And obtained the results of a virtual reality-based computer assembly learning environment consisting of an explanation of hardware components and a computer assembly simulation section. This learning environment works with Android phones, VR boxes, and controllers. The results of the product suitability test amounted to 0.79 with valid criteria. The practical test results achieved a score of 84.11 with very practical criteria. The performance test results scored 0.78 with high performance criteria.

The purpose of this research is actually to find out and examine the benefits of augmented reality technology in creating an immersive learning experience. In this study, it is also explained how to utilize augmented reality technology in creating a deep learning experience. With the help of Augmented Reality in creating immersive learning should be strengthened and supported. In this case, learning actually utilizes Augmented Reality in creating deep learning because it is supported by technology as a means used in learning. The benefits of utilizing Augmented Reality Technology in creating a deep learning experience have led to the researcher's interest in utilizing Augmented Reality Technology in creating a deep learning experience. Therefore, researchers decided to raise the title of the study entitled Utilizing Augmented Reality Technology in Creating a Deep Learning Experience.

RESEARCH METHODOLOGY

This research uses quantitative research methods (Nusinow et al., 2020). This quantitative research method produces data in the form of numbers obtained by filling out a questionnaire on Google Forms and given to students as research subjects (Aspers & Corte, 2019). In addition, this quantitative method allows for systematic, planned, and structured research. This quantitative research method is widely used in research (Zou et al., 2020). This quantitative method is defined as the process of systematically and tangibly discovering a phenomenon by collecting data and then measuring and verifying its accuracy by filling out questionnaires and interviewing stakeholders. This research is mostly conducted through statistical research where quantitative data is collected through research studies.

This type of research is a test that aims to test the usefulness of Augmented Reality technology in creating immersive learning (Wilson et al., 2019). The researcher's data collection technique is to find and collect the latest information about field fakes. Observation point data collection is a quantitative analysis technique for research data. In data analysis, this is done by describing and describing the data collected, without changing the source of the data obtained (Shukla-Dave et al., 2019). The first step of this quantitative research is to find the root of the problem or formulate the problem, then conduct a literature review, formulate a hypothesis, determine the methodology used, determine the research instrument or tool, conduct data analysis and finally design the

research results.

RESULT AND DISCUSSION

Augmented reality technology is one of the recent breakthrough results exploited in the interactive field. The use of augmented reality technology is Very useful for conveying messages or information to the crowd to its users. is augmented reality Interactive technology that connects the real (real) and virtual (virtual) worlds. The goal is to use this enhanced Reality technology aims to improve understanding and Data in the real world where advanced systems Reality takes the real world as its basis and A combination of several techniques Adds contextual data to make it easier for a person to understand clearly. There are three of them in augmented reality technology The basic features are: A combination or combination of real and virtual worlds, an interaction that works in real time and has the latest features is the form of objects in the form of three-dimensional or 3D models Context information format in the extended system This reality can be location data, audio or video In the form of 3D model data.

Utilization of the learning environment with computers allows the implementation of a more effective teaching and learning process by using a multimedia learning environment that can increase interest in learning, for example through the use of augmented reality (AR) as a learning tool. Augmented reality is a technology that can connect 3D objects with the real environment using a webcam or Android phone camera. A total station is an electronic theodolite combined with an electronic range finder (PJE) and electronic data acquisition device, which becomes an electronic total station (ATE). The price of this total station is quite high ranging from 30 to 80 million. The price varies according to the type of total station. The price is quite expensive to be an obstacle for students to study the total station, because the price is quite expensive so not all students have the tool, and the tool is only available at school. Augmented Reality is able to provide a deep experience and understanding in learning the components of the total station tool in a more interactive and interesting way. This augmented reality application only requires smartphone implementation, so users can use it anywhere and anytime.

The relationship between augmented reality and education is certainly closely related, because one of the benefits of augmented reality is support for the education sector. Augmented reality technology itself is a technology that arises from the real-time fusion of computer-generated digital content and the real world. The objects viewed are usually two-dimensional (2D) or three-dimensional (3D) screens projected onto the real world. In short, augmented reality technology is a technology that can add information to the virtual world and display it in the real world by using cameras, computers, and specialized applications.

The advantages of augmented reality in education are many, not only in the transition from the traditional version to the digital version, but also easier and more effective for students to understand and also in terms of good interactive results and

deeper understanding. So it can be said that the combination of interactive education and interesting content can make students remember what has been learned quickly acquire skills and knowledge in a short time.

This augmented reality technology can be used in all lessons of students of all ages, both in school and college. From math, language, science to technology, and so on. Not to mention, this smart education method can be combined with several assignments and worksheet projects where students evaluate student learning, making it more collaborative and more interactive to find out what they need in education. In order for education to be implemented through intelligent teaching methods, the education process must also meet some conditions set by the classroom for the implementation of such education. classroom management based on augmented reality must meet the following conditions: The classroom has a strong internet connection, Depending on the requirements and number of students, smart devices or tablets are included students have augmented reality applications (specifically for education) Learning platforms based on augmented reality such as Experience Real History, World Brush, Curiscope, and 3DBear. Or they can be customized to suit your training needs.

Augmented reality technology plays several roles in education and is very important. Not only will this technology trend new learning and education methods in the digital age, but it also has an important role in making changes to traditional education as a whole. But beyond that, the benefits of augmented reality in education are enormous and they are as follows: 1) using augmented reality technology will create a combined learning method, 2) this technology will make learning more interesting, 3) learning is more interactive, 4) learning can be done anywhere and anytime, 5) providing a diversity of content that can be accessed by students, 6) cost-effective. The use of augmented reality technology as the basis of smart education in education is very important in the digital era. It is time to implement an education revolution. We don't want to eliminate the core of the existing training, we want to complement it. Shouldn't a fair and equitable education be implemented for the entire archipelago? In remote areas such as Sumatra, Kalimantan, Sulawesi and Papua, there are still many Indonesian children who have not received education. That is the government's homework to implement equitable education. By using augmented reality technology in the world of education, it can be easily ensured that the distribution of education to the entire community.

Although Augmented Reality offers new learning opportunities, it will also create new challenges for educators. Augmented reality will also present problems related to technology, pedagogical, and learning using the application of augmented reality in education. For example, in the Augmented Reality environment, students can be cognitively overwhelmed by the amount of information students encounter, the various technical devices they need to use, and the complicated tasks they need to complete. the use of teaching media using augmented reality raises students' awareness to think critically about their problems and daily events because the nature of educational media helps students with this learning with or without the presence of teachers in the

educational process, so the use of learning media with Augmented Reality can learn directly wherever and whenever students want to complete learning. AR learning media can visualize abstract concepts understanding models and structures Objects activate AR as myang media simultaneously more effectively. In this case, it will create the benefits of augmented reality in creating deep learning.

Figure 1: Opportunity Score for Utilizing Augmented Reality Technology in Creating Deep Learning Experiences

ASPECT	
Opportunities to Utilize Augmented Reality Technology in Creating Immersive Learning Experiences	
Agree	Disagree
65	35

Based on Figure 1 above, it can be concluded that the use of Augmented Reality Technology in Creating Deep Learning Experiences brings great opportunities for students. The majority of respondents gave positive answers and reactions to the use of Augmented Reality Technology in Creating Deep Learning Experiences. In addition Augmented Reality Technology in Creating Deep Learning Experiences brings benefits to the development of Adaptive Learning quality. The results of the survey conducted as part of the survey also show that Augmented Reality Technology is essential in the learning process of Deep Learning. One of the main advantages of the Augmented Reality Technology intelligence model is that it provides different content that can be used as a guide and reference to support the learning process.

Figure 2: Challenge Scores of Utilizing Augmented Reality Technology in Creating Deep Learning Experiences

ASPECT	
The Challenge of Utilizing Augmented Reality Technology to Create Immersive Learning Experiences	
Agree	Disagree
70	30

Based on the results of the research supplemented by a questionnaire containing statements from student respondents, it can be concluded that there are several challenges associated with the existence of Augmented Reality Technology in Creating Deep Learning Experiences. These challenges can be in the form of challenges in the implementation of online learning, which can be limited by the network and which package to use. The internal challenge of the students is also whether they are serious in carrying out the learning, as they are not under the direct protection of the teacher. However, the use of Augmented Reality Technology in Creating Deep Learning Experiences offers a myriad of advantages that can facilitate deep learning, especially for students with learning disabilities.

At this stage of the research, researchers did not go directly to the school to conduct research, but by distributing a questionnaire. The questionnaire contains

statements. The purpose of distributing questionnaires is to obtain relevant data about the researcher's study entitled Utilizing Augmented Reality Technology in Creating a Deep Learning Experience. The data test was carried out by filling out a questionnaire from Google Form. The questionnaire contains 15 statements in which it contains the utilization of digital technology in learning transformation. From the results of filling out the questionnaire, the following data were obtained:

NO	Statement	SS	S	RR	TS	STS
1	I feel that the use of Augmented Reality Technology can help deep learning	60%	40%			
2	I feel that Augmented Reality Technology has a positive impact on deep learning.	33,3%	50%	16,7%		
3	I feel that Augmented Reality Technology can facilitate the deep learning process	70%	30%			
4	I feel that Augmented Reality Technology can support deep learning.	66.7%	33.3%			
5	I think the development of Augmented Reality Technology must be followed by every educational institution	55%	45%			
6	I feel that Augmented Reality Technology can make it easier to understand deep learning	50%	50%			
7	I think Augmented Reality Technology is very suitable to be applied in deep learning learning	70%	30%			
8	I think that with Augmented Reality Technology the in-depth learning process will run more effectively.	50%	50%			
9	According to Augmented Reality Technology as a transformation in deep learning has an interest in each other.	50%	50%			
10	I feel that with Augmented Reality Technology information is quickly obtained.	60,7%	39,3%			
11	I feel that with Augmented Reality Technology the organization process is getting easier.	60 %	40 %			
12	I feel that every learner must be able to master Augmented Reality Technology because technology has many benefits in its use.	50%	50%			
13	I feel that the in-depth learning	66,7%	33,3%			

	process will increase if Augmented Reality Technology is used.					
14	I feel that Augmented Reality Technology can change the way students learn.	50%	50%			
15	I think the use of Augmented Reality Technology in deep learning does not spend a lot of time.	33,3%	50%	16,7%		

Figure 1: Table of questionnaire filling by students

Description:

SS = Strongly Agree

S = Agree

RR = Undecided

TS = Disagree

STS = Strongly Disagree

The table above is the data obtained from filling out a questionnaire containing statements filled in by students. The statement consists of 15 statements related to Utilizing Augmented Reality Technology in Creating a Deep Learning Experience. The assessment stage consists of 5 categories, namely strongly agree, disagree, hesitate, disagree, and strongly disagree. The highest assessment result is 70% with a strongly agree category related to the statement "I feel that Augmented Reality Technology can facilitate the deep learning process" as well as the statement "I think Augmented Reality Technology is very suitable to be applied in deep learning learning". The second highest assessment result is 66.7% with the same category, namely strongly agreeing regarding the statement "I feel that Augmented Reality Technology can support deep learning" and also on the statement "I feel that the deep learning process will increase if Augmented Reality Technology is used". From the results of filling out the questionnaire, it can be concluded that the average student gives a positive response to Utilizing Augmented Reality Technology in Creating a Deep Learning Experience.

CONCLUSION

The use of augmented reality makes a lot of sense in an interactive and real and immediate learning environment for students. In addition, learning media through augmented reality can increase students' interest in learning because the nature of augmented reality connects the virtual world, which can directly increase students' imagination with the real world. Augmented Reality is interactive and allows students to see real and live situations and imagine the learning outcomes that teachers provide to students. The use of educational media with the help of augmented reality can stimulate students' way of thinking to think critically about problems and daily events, because the nature of educational media is to assist students in learning, with or without teachers in the teaching process. so that the use of educational media with augmented reality can enable direct learning wherever and whenever students choose to complete learning. AR Learning Media can visualize abstract concepts for understanding and object model

structure, making AR a more effective tool in accordance with the purpose of learning media. With the results of these achievements, it will create in-depth learning by utilizing augmented reality technology.

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