

The New Discovery Technology in Industry 4.0: The Role of Virtual Reality (VR) to Encourage Student's Knowledge in History Education

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ABSTRAK

In industry 4.0, the use of technology is increasing, especially in the field of education. The application of Virtual reality can be a modern technology-based teaching method, so that it can increase students' understanding of the history study program in learning local history in Pekanbaru. The research is a type of Research and Development, where the subject in this study is a student of the history study program at the University of Riau, with the object in the form of virtual reality based on local history. The analysis and evaluation of virtual reality uses observation and interview instruments, so that the results found are in the form of increased student understanding after using virtual reality in the classroom in local history learning.

The instruction division is closely related to the Technology industry4.0 which can be utilized to bolster learning designs and considering designs as well as create imaginative and an inventive advancement from understudies, in arrange to create the following era of the country that's predominant and able to compete. Instruction within the Mechanical Transformation Time 4.0 outlines different ways of joining cyber innovation both physically and non-physically in learning (Almeida & Simoes, 2019); (Mian et al., 2020). Education within the Industrial Revolution Period 4.0 may be a marvel that reacts to wants of the technology industry by altering the unused educational modules concurring to the current circumstance. On the other hand, teachers to get more references and instructing strategies (Maria et al., 2018); (Li, 2020); (Vieira et al., 2022). For colleges, the Technology industry4.0 is anticipated to be able to realize shrewd instruction through moving forward and evenhanded conveyance of instruction quality, extending get to and pertinence in realizing world course (Mokhtar & Noordin, 2019); (Mikhailov et al., 2018); (Dovgyi et al., 2020); (Gueye & Exposito, 2020); (Tran Ngoc Huy et al., 2021). To attain this, learning intuitive are carried out through mixed learning (through collaboration), venture-based learning (through distributions), flipped classrooms (through open intelligent and computerized intelligent) (Stachová et al., 2019); (Mystakidis et al., 2021); (Mehtar Singh, 2021).

Through certain applications such as virtual reality, online lectures, online tutoring and seminars are examples of services in the education sector that accelerate the implementation of Revolution 4.0 era education (Coşkun et al., 2019); (Fuentes et al., 2021). How not both lecturers and students are encouraged to understand at least the use of digital technology, students are also forced to explore technology and information and channel their creativity through innovations in the tasks given (Assante et al., 2019); (Catal & Tekinerdogan, 2019); (Akgunduz & Mesutoglu, 2021). In line with the vision of the G20 Indonesia Administration, "Recover Together, Recoup Stronger" as expressed by the Serve of Instruction, Culture, Investigate, and Innovation of Indonesia. Computerized innovation in instruction isn't as it were around the physical commitment of innovation as a learning apparatus but too a multidimensional concept, particularly within the use of virtual reality-based learning strategies within the technology industry 4.0 period (Samani, 2018). This learning development is one way to create the character of Pancasila Understudies.

This mechanical disturbance must be based on the Pancasila reasoning, which is to require positive values from the utilize of innovation for the learning prepare driven by speakers (Salah et al., 2019); (Keser & Semerci, 2019); (Sari & Wilujeng, 2020). Technology is anticipated to be the reply to issues of get to, quality, and social equity in instruction. Due to, one of the impacts of the widespread is the extending disparity in get to to quality instruction (Durakbasa et al., 2018); (Johnson-Glenberg, 2018); (Yakimov & Ilovev, 2019); (Gajek et al., 2022). For illustration, the utilize of virtual reality-based learning in history learning for understudies is really a representation of the utilize of innovation in instruction and learning. the

advancement of applying more curiously learning media within the instructing and learning handle so that it can gotten to be an imaginative learning media, to be specific through Virtual Reality (VR) technology-based media. VR makes immersive reenactments that permit clients to connected and feel like they are in an environment that exists on the internet (Slavova & Mu, 2018); (Scavarelli et al., 2019); (Park et al., 2009).

Virtual Reality (VR) itself could be a way of making learning pictures show up within the frame of three-dimensional media or what is usually better known as 3D, where this prepare is made through the assistance of computer components so that the comes about will see more genuine and of course with the assistance of computer components (Yang et al., 2021); (Cecil et al., 2021); (Neil A. Gordon & Mike Brayshaw, 2022). Bolster from a number of other imperative instruments. Where this will make the clients (understudies) as in case they will see directly and physically in a foreordained environment with this technology, it is trusted that the concept of association within the learning prepare will gotten to be simpler to utilize together with the advancement of keen phone innovation which has a critical calculate within the usage of the learning media. Indeed presently, based on inquire about conducted by a few analysts, it is clarified that presently as it were with a shrewd phone and the assistance of Google Cardboard can show the world of Virtual Reality (VR). Innovation cannot be isolated from issues, due to innovation was born and created to fathom issues confronted by humans. The Covid-19 widespread could be a collective issue of the country and indeed the world that brings changes and requests for adjustment to different lines of life, counting instruction and learning, so that the part of the Virtual Reality learning method can be an arrangement to the issues that happened within the 4.0 insurgency period, so that the presence of virtual reality can reply a few issues. Be that as it may, investigate such as, how to utilize learning innovation suitably as required will energize the accomplishment of the learning targets themselves? And how is innovation utilized in instruction and learning? To get it the investigate address, the investigate objective of this, to investigate how virtual reality suitably empower accomplishment and information of understudy in history instruction, in the meantime another objective is, to analyze how the virtual reality can be utilized in instruction, particularly history learning.

Numerous previous literatures which were discussed about Virtual reality in education will be reviewed to examine the concept of Virtual reality learning based in history education. The certain variables such as virtual reality for educational technology will be object of review. (Parong & Mayer, 2021) presented that virtual reality could be applied in education for academic in 12 years school and/or university, with students who are population and sample of this research, the virtual reality was showed with history lesson in auditorium of school. The measure of academic and cognitive response, Parong and Mayer used cognitive engagement based on electroencephalogram (EEG) as research instrument. Meanwhile, the cognitive development during learning from virtual reality learning based, student could encourage themselves to increase the academic performance.

(Calvert & Abadia, 2020) presented the adoption of virtual reality in education. the aim of this research, to examine the experience of student learning in classroom with educational technology such as virtual reality in history subject. The subject of this research is one of high schools in Australia and one of universities in India. The lecturers provided 360° video virtual reality of World war in classroom. With the observation, both subjects showed the increasing of empathy, cognitive and mastery and better knowledge. The finding indicates that there is the effect of virtual reality in education toward student's knowledge in history education. Numerous research who are viewed from lecturer perspective had been found, (Serin, 2020) presented perception of lecturers toward virtual reality in education. Subject of this research is lecturers who are working in private high schools in Iraq, the total of sample is 101 with the instrument is questionnaires to analyze the perception of using virtual reality in education. the finding showed that the majority of lecturers claimed using virtual reality had assisted them to teach and explain about the lesson, moreover students increase their experience and knowledge in certain subject of lesson.

(Checa & Bustillo, 2020) presented the advantages of virtual reality in education. the subject of this research is undergraduate students who are provided the semi tour of virtual reality with the Briviesca town as the object. To measure the knowledge and improvement of skills, the students were given the questions through history knowledge and urban layout. Meanwhile, the questionnaires were provided as primary instrument data collection. This is research and development study, whereas the virtual reality was provided to assist student in learning about Briviesca, history and urban town in Spain. The advantages of virtual reality in education, lectures are able to use high technology for lecturing especially in industry 4.0, (Paszkievicz et al., 2021) presented that virtual reality could be new approach of education in industry 4.0. The subject of this research is students who are enrolled in training class. The using virtual reality, could give the experience of students to assist their skills. Moreover, the virtual reality could be used in higher education such as institute and universities. The finding showed that the implementation of virtual reality could increase individual skill in academic. Meanwhile the social skill could be increased with virtual reality implemented for higher education.

METHOD

This investigate is investigate and advancement. Inquire about and advancement or investigate and advancement (R & D) is research that aims to produce new products and test the effectiveness of these products so that they can be used according to their functions. As for the population and sample of this study, students who are active at the University of Riau who enroll in the history education program, faculty of lecturer training and education. Research instruments such as observations and interviews are also used in validating data such as collecting product feasibility tests and results that have been developed. In addition, observational research instruments also support data in collecting data on the results of the development of virtual reality in increasing students' knowledge of local history based on heritage culture.

Procedure of Virtual Reality

The media development model is a form of approach used in the stages of developing a learning media, the first stage is to determine the goals and who the program users are (audience identification). In addition, determine the design and concept that will be used. In this virtual reality, using the concept of historical tourism in Kampung Bandar which is located in Senapelan District, Pekanbaru City, the objects studied are Mr. Khadi's halfway house, Senapelan Grand Mosque, Old Terminal, and Hinggap palace. The another organize is the handling organize where all mixed media objects or materials are made. Application advancement is based on the plan arrange. after that, assessment, approval and wrapping up are carried out after completing the get together organize by running the application or program and seeing whether there are blunders or not. This arrange is additionally known as the alpha testing organize (alpha test) where testing is carried out by the creator or the maker's claim environment. Finally, the launching of product toward students in history department, certain lecturers who are taking responsibilities in history subject are required to supply the virtual reality to student, after that the student could learn the history education of local history to gain knowledge in history.

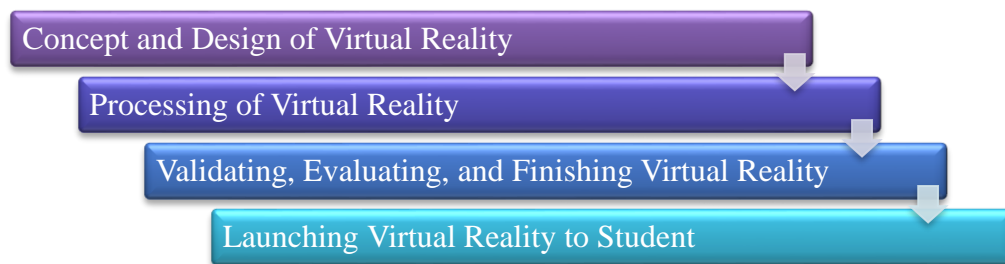


Figure 1. Process of Creating Virtual Reality as Learning Platform
(Source: field research 2022)

RESULT AND DISCUSSION

The development of the Industrial Revolution 4.0 gives a direct impression on various fields including the field of education because it becomes a provider of workforce in the future. In this manner, the accentuation on the instruction division is the as it were prerequisite so that the workforce delivered through the state instruction framework can meet the requirements of the work advertise based on the Mechanical Transformation 4.0. At this time, the way of teaching delivery involves a white board by copying notes and long lecture or class sessions that are outdated and may not be impressive, especially with the emergence of new technologies that are the lifestyle of today's generation. The country's education system needs to take steps towards digital technology-guided recitations that are more interactive and flexible. The development of the Industrial Revolution 4.0 gives a direct impression on various fields including the field of education because it becomes a provider of workforce in the future. In this manner, the accentuation on the instruction division is the as it were necessity so that the workforce created through the state instruction framework can meet desires of the work advertise based on the Mechanical Insurgency 4.0. At this time, the way of teaching delivery involves a white board by copying notes and long lecture or class sessions that are outdated and may not be impressive, especially with the emergence of new technologies that are the lifestyle of today's generation. The country's education system needs to take steps towards digital technology-guided recitations that are more interactive and flexible.

Universities must ensure that the curriculum provided, and the study programs offered are relevant and able to fill the workspaces required by the industry in the future. The problem is the industry is short of manpower. Ironically, there are still many students who are unemployed and cannot meet the demands of the industrial world 4.0. The importance of studying humanities even for aspiring engineers since for him understudies have to be get it the significance of ethics and morals,

particularly when smashed by the blast of the mechanical transformation, shouldn't advance and teach go hand in hand? Or the more created a nation is, the higher its self-interest. In expansion, instruction approximately history can be a positive value for another era of the country within the esteem of patriotism.

In the world of education, various types of technology have been applied in the education system. The technological revolution allows new approaches to be used in the learning process. In the world of education, various types of technology have been applied in the education system. The technological revolution allows the utilize of modern approaches within the learning handle. One of the conductive innovations for building inventive instruments for instruction is VR innovation, which offers a computer environment in 3D and a more successful interaction system, and increments inspiration within the learning prepare. VR technology can be used to support education and improve the quality of student learning. Meanwhile, the application of VR technology can be used in the history learning process related to the topic of learning the spice path. By applying VR technology to historical subjects, especially the history of tourism, students can conduct experiments based on objects of various shapes that exist in a virtual reality environment. In addition, VR technology can be used for other learning that is complex and difficult to do in real life.

In education, Virtual Reality can actually be applied in the learning process. In fact, this technology is one of the solutions for lecturers and students as a learning medium. The application of Virtual Reality technology in learning aims to increase the absorption of information received by students. With VR, complicated and boring subjects will be more interesting and imaginative, than just listening to the lecturer lecture. In absorbing information, students are not only fixated on visual books or other audio-visual materials, if there is application of Virtual Reality in learning. Given that Virtual Reality produces a three-dimensional effect that visualizes real objects, this encourages students to better understand the lessons being taught and increases curiosity to critical thinking. Through high curiosity, there is also a high enthusiasm for learning. Moreover, this VR technology also allows more interaction than conventional learning. in virtual reality, students' understanding of historical objects such as the Hinggap palace and the Senapelan Grand Mosque can be seen objectively with a 3D view, this can stimulate students' perceptions of the physical form of historical buildings.

An increased sense of enthusiasm for learning, boredom in the learning process can be overcome by the application of VR technology in the classroom. This is because teaching and learning activities using Virtual Reality become more interesting and imaginative. Thus, providing a new atmosphere in more modern teaching and learning activities, this technology also encourages student engagement. They are free to interact with virtual objects. As a result, students can analyze, experiment, and gain experiences that enhance their learning. learning using Virtual Reality can be regarded as active learning with the student center learning method. Students' understanding and curiosity can be seen by packaging virtual reality with historical objects that look real so that students' curiosity is increased. The application of Virtual Reality in learning makes learning activities feel more fun. This is also useful for lecturers as a medium for delivering material and facilitating the teaching and learning process. Lecturers do not need to deliver too much material in lectures, because they have been assisted by this VR technology. The positive impact is that the application of VR in the delivery of material can increase the effectiveness and optimal learning outcomes of students. The long-term benefit is that the use of VR in learning has the potential to improve the quality of education in the future. Considering the current generation Z is more interested in learning media that inserts technology in it, compared to conventional learning. This similar to the statement by one of students who are enrolled in history department.

“I feel excited, As explained in the first meeting, the history lessons I learned. Virtual Reality (VR), with this technology, I believe there is potential for learning that is more effective, relevant, and also makes our students more involved in the learning process.”

This is also explained in other student statements; "However, the first sample lesson was really an inspiration for learning and teaching for me. With technology endeavors, I hope to produce more technology-based teaching to students so that they can imagine concepts and learn new skills and knowledge in an interactive way. For me, this learning is indeed ongoing, and I can't wait to explore more VR applications in my studying"

Virtual Reality to Encourage Student's Achievement

Virtual Reality (VR) has a few benefits for understudies. from a few thinks about from different nations, virtual reality (VR) is able to progress students' understanding, expository control and memory. In expansion, Reality (VR) dreams are too accepted to be able to extend the creative energy, basic and imaginative considering in understudies. so that understudies can get a part of great impacts from understudies. The utilize of virtual reality (VR) in learning can increment the part of teachers in learning, offer assistance schools to supply reasonable 4.0 innovation and offer assistance decentralize learning offices. With the presence of VR innovation, it can increment students' learning eagerness since this innovation is able to extend students' interest in learning. This increased curiosity is what makes students want to learn again and again. Moreover, assisted by VR

technology that can visualize the lessons he learns. students' understanding in the field of history learning can be seen when students master the learning material better, in addition, through observation instruments, academic knowledge in the knowledge of local history in the city of Pekanbaru can be seen in student learning outcomes through giving quizzes and questions in discussion sessions.

The use of VR technology in education will make learning activities more enjoyable. This is also related to reducing student boredom which has been described previously. When learning can be done in an interesting and fun way, the boredom of students in learning will be reduced. So, it is expected that learning outcomes will also increase. However, the current millennial generation is more interested in learning media that inserts technology in it compared to conventional learning which is considered boring. One technology that can be inserted or as an intermediary is VR, with VR technology, it will increase students' interest in learning. it will also increase students' enthusiasm in learning activities. The ultimate goal is to improve student learning outcomes to be more optimal. That's why VR technology has the potential to improve the quality of education in the future.

CONCLUSION

Facing the era of the industrial revolution 4.0, the role of higher education is very important, especially in the development of science and technology. In this digital era, we must take advantage of available technology to assist teaching both inside and outside the classroom. Virtual reality is a technology that can be used. Since virtual reality content is three-dimensional and can be seen directly from all sides, it is easier for students to understand it in a more realistic way. Virtual reality facilitates student participation. Therefore research-based higher education must encourage the opening of knowledge that can improve human welfare. Virtual Reality not only provides a screen viewing experience, but users can sink and interact with the 3D world. Learning using VR can be a medium for detailed lessons from various procedures. So that prospective doctors can study the human body directly and practice better. Therefore, VR is very useful to improve students' understanding in learning history. The use of VR can increase the potential of visual perception for the educational process. For example, for students of history education, high-quality visual 3D models of historical objects such as Tuan Khadi's halfway house, Great Mosque of Senapelan and the old Terminal can help them learn significant details of organs. This visualization can be explored, and the experience gained by students is much better than through textbooks.

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