INTRODUCTION DEVICE NETWORK THROUGH AUGMENTED REALITY

Khoirul Nizam[1], Ryan Aulia Amanda[2], Sigit Nugroho[3], Sendi Al Fadil[4], Fahmy Syahputra[5], Reni Rahmadani[6]
nizamapsc11@gmail.com[1], auliaryan10@gmail.com[2], nugrohosigit079@gmail.com[3], endyalfadil007@gmail.com[4]
Universitas Negeri Medan

ABSTRACT

Study This aiming For develop and implement Augmented Reality (AR) technology as innovation in learning media device network. This AR application designed For give experience Study interactive, where students can visualize device network in three dimensions (3D) and understand function and method his work with more clear. Technology This expected can increase motivation and understanding student about draft complex network. The method used covering development application AR based using easy mobile device accessed. Trial conducted on a group student For evaluate effectiveness of learning media This. The results show that the use of AR in learning device network can in a way significant increase understanding student compared to with method conventional. Besides that, application this also gets bait come back positive from users who feel that AR provides experience learn more interesting and easy understanding material.
Keywords: *Augmented Reality (AR), Learning Media, Technology Education, 3D Visualization.*

INTRODUCTION

Development digital technology today This has bring change significant in various fields, including education. One of the innovation that begins Lots applied is use Augmented Reality (AR) technology that allows merger virtual objects with environment real in real-time. AR does not only offer an interesting visualization, but also creates experience interactive and in - depth learning, so can help student in understand abstract material or complex.

In context learning network computer, understanding about structure and function device network often become challenge for students. Learning media conventional like book text and images two dimensions often not capable give clear and in - depth picture about device network. Therefore that, is needed innovation that is capable serve visualization three dimensions (3D) and interactions more direct realistic and profound.

AR technology is here as solution innovative For increase experience Study in understand device network. Through application AR based, students can visualize device network in 3D shapes, interact with models, and study function as well as connection between device with more intuitive. This is No only increase interest Study students, but also facilitates better understanding Good about draft difficult network.

Study This aiming For develop Augmented Reality applications used as a learning medium device networks, especially in the environment education. Application This expected can give alternative learning media that are more effective compared to method traditional as well as increase motivation and understanding student in learn device network computer.

LITERATURE REVIEW

Augmented Reality (AR) technology has be one of growing innovation rapid in a number of year Lastly . AR allows merger virtual elements to in real world environment in real-time, providing experience rich interactive in various fields , including education . In

the field of technology network computer , AR provides opportunity For help student understand device network through 3D visualization , which can to clarify concepts difficult complex understood through method conventional ..

Application of Augmented Reality in Education

The use of AR in education the more get attention Because his ability serve virtual objects that can viewed , played , and studied from various corner in a way interactive . AR provides experience learn more immersive compared to with book text or static image , because student can interact direct with virtual models. In learning technology network , AR can help explain connection between device networks , such as routers, switches, and servers, with a more visual way .

Augmented Reality in Anatomy Learning

In context learning device network computer , one of the challenge main is understand structure and function every device in detail. Students often have trouble visualize How devices like routers, hubs, and switches work together in a network . AR offers solution with allow student see devices This in 3D shapes and manipulate them , for example to rotate device , see part internally , or understand functions and interconnections within network computer .

AR technology makes it possible student For get a better picture real about device network , so that they No only understand function theoretical from device the , but also see How device the work in the real world . Besides that , through AR simulation , students can explore topology network visually , which helps understanding about method device connected and working One each other.

Effectiveness of Using AR as Learning Media

A number of study show that the use of AR in learning No only increase motivation students , but also improve results Study they . In learning device network , AR facilitates better understanding Good about how data moves through network , as well as How devices such as firewalls and routers process information . Visualization The interactive features provided by AR allow student For more easy understand the usual process difficult understood only through verbal description or picture two dimensions .

Other studies show that AR also improves ability student in remember the material being taught . This is very relevant in learning network computer , where many draft technical matters that must be memorized and understood . With using AR, concepts This can served in a more format intuitive and engaging visually .

The need for innovation in learning media

Even though AR has Lots potential in increase effectiveness learning , there is a number of challenges that need to be overcome be noticed . One of them is availability device hard support AR technology . No all institution education own access to adequate equipment For support use of AR in wide . Besides that , development relevant AR content For learning network need investment significant time and cost .

RESULTS AND DISCUSSION

Research Approach

Study This adopt research and development (R&D) approach that aims For designing and implementing learning media based on Augmented Reality (AR) in teaching device Network . Approach This chosen Because allow researcher For create product innovative and appropriate with need learning in the environment education . With R&D, development done in a way systematic start from stage design until testing For ensure the effectiveness of the resulting learning media.

Technology, Software, and Hardware Used

Study This use various supporting technology development AR applications as a learning medium . One of them device software used is Unity 3D, which is at the heart of the development process . Unity 3D is a popular platform For making application interactive , including games and simulations . In context This , Unity allows developer For create an engaging and informative AR environment with interactive 3D models from device network .

For support integration virtual object to In the real world , Vuforia is used as system introduction image . Vuforia provides a tool that allows AR application for recognize picture specific through camera device users . With technology This is a 3D model of the device. network can displayed in a way accurate and responsive when user direct camera to the image that has been determined .

From the side device hard , research This requires a compatible smartphone or tablet with AR technology . Devices This become the main media for student For access developed applications . Selection device This based on facts that majority student own access to the smartphone, so that use AR applications become more practical and easy accessed . In addition that , computers are also used in development process AR application , works as tool For programming , design graphics , and testing application before applied in the field .

Experiment Design

Experimental design in study This designed For evaluate effectiveness use AR applications in increase understanding student about device network . This process consists of from a number of mutual stages related , started from thorough preparation until data analysis systematic .

At the stage preparation , materials learning that will delivered through AR applications are compiled with be careful . Material This covers explanation deep about various device network , including its function and structure . We develop AR application that displays interactive 3D models from device network , where students can rotate , zoom , and explore device from various corner . At the stage this is important for us to ensure that information presented accurate and easy understood by students .

PROJECT RESULTS

Learning Media Application Devices Network based on Augmented Reality (AR) successfully developed and implemented For give experience interactive and interesting learning for students . The results of project This covering a number of aspects measured based on interface user interface, and feature interactive features offered by the application.

User Interface

Interface application designed with principle intuitive and attractive design , with objective give easy access for users , especially students . Views main The application (shown in Figure 1) presents a list of devices network that can selected . Every device displayed with attractive icons and images , so make it easier student For recognize and choose device the network you want they learn more carry on .

The interface design also takes into account aspect readability , where the text used in application own font size and type easy letters read . Usage palette bright colors and good contrast create atmosphere learning that is fun and not boring , which is very important in context learning for student.
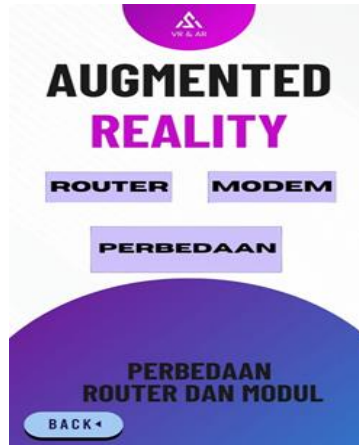
Figure 1. Main view of the app

Interactive Features

Interactive features be one of strength main from application this . With use AR technology , applications capable displays a 3D model of the device network in real-time. When students direct camera device they to the area that has been specified , device selected network will appear in the room real (can seen in Figure 2). This feature give chance for student For :

Interaction Direct : Students can rotate , zoom , and explore device network from various corner view . This is help they understand structure and function device network with more Good .

Information Additional : Every device equipped with information additional , including description function , fact interesting , and pictures related . Students can access information This with Clicking the devices they select , enable more learning deep.

Learning Mode : Features This No only add interactivity , but also makes the learning process become more pleasant .

Figure 2. Start menu

CONCLUSIONS

Implementation Augmented Reality (AR) technology in introduction device network proven effective in increase understanding students . AR allows visualization device network in interactive 3D shapes , so make it easier student For understand structure and function device network in a way more in - depth . The interactive features offered by AR, such as rotation and zooming, providing experience learn more interesting and profound compared to method conventional . With AR, learning device network become more easy

accessible , efficient , and enjoyable , as well as potential increase motivation and results Study student .

REFERENCES

Liberatore, M. J., & Wagner, W. P. (2021). Virtual, mixed, and augmented reality: A systematic review for immersive systems research. Virtual Reality, 25, 773-799.

Asad , M. M., Naz, A., & Churi , P. (2021). Virtual reality as pedagogical tool to enhance experiential learning: A systematic literature review. Educational Research International, 2021, 7061623.

Lee, S.-M., & Park, M. (2020). Reconceptualization of the context in language learning with a location-based AR app. Computers & Education, 33, 936-959.

Anuar , S., Nizar, N., & Ismail, MA (2021). The impact of using augmented reality as teaching material on students' motivation. Asian Journal of Vocational Education And Humanities, 2, 1-8.

Sagoo , M.G., Vorstenbosch , MATM, Bazira , P.J., Ellis, H., & Kambouri , M. (2021). Online assessment of applied anatomy knowledge: The effect of images on medical students' performance. Anatomical Sciences Education, 14, 342-351.

Dreimane , S., & Daniela, L. (2021). Educational potential of augmented reality mobile applications for learning the anatomy of the human body. Technology, Knowledge and Learning, 26, 763-788.

Nechypurenko , PP, Stoliarenko , VG, Starova , TV, Selivanova , TV, Markova, OM, & Modlo , YO (2020). Development and implementation of educational resources in chemistry with elements of augmented reality. Educational Resources, 2020.

Alalwan , N., Cheng, L., & Al- Samarraie , H. (2020). Challenges and prospects of virtual reality and augmented reality utilization among primary school teachers: A developing country perspective. Studies in Educational Evaluation, 66, 100876.

Sanfilippo, F., Blazauskas , T., Salvietti , G., Ramos, I., Radianti , J., & Vert, S. (2022). A perspective review on integrating VR/AR with haptics into STEM education for multi-sensory learning. Robotics, 11, 41.

Debnath, A., Pathak, U., & Badoni, P. (2021). An augmented reality application to teach human anatomy to secondary school students. Design for Tomorrow—Volume 2: Proceedings of ICoRD 2021. Springer.

Zaina , L.A.M., Fortes, R.P.M., Casadei , V., Nozaki, L.S., & Paiva, D.M.B. (2022). Preventing accessibility barriers: Guidelines for using user interface design patterns in mobile applications. Journal of Systems and Software, 186, 111213.

Keil, J., Edler , D., Schmitt, T., & Dickmann , F. (2021). Creating immersive virtual environments based on open geospatial data and game engines. KN-Journal of Cartography and Geographic Information, 71, 53-65.

Simon, J. (2023). Augmented Reality Application Development using Unity and Vuforia. Interdisciplinary Description of Complex Systems: INDECS, 21, 69-77.