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Development of Learning Media "Geoscan" Related to Geographical Characteristics of Indonesia as an Archipelago and Its Influence on Aspects of Life in Grade V Theme 1

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ABSTRACT

The use of the application aims to make the essence of learning effectively received by students, one of which we will discuss is the material "Geographical Characteristics of Indonesia as an Archipelago and its Effect on Life". Geographical conditions reflect an integration of regions, namely how the regions are arranged by physical and social symptoms. Therefore, this research discusses the Multimedia Development Life Cycle (MDLC) method. From the research that has been done, it can be concluded that making an application called GEOSCAN by utilising barcode scans in learning grade V Theme 1 SD about "Geographical Characteristics of Indonesia as an Archipelago and its Influence on Life." and in grade 5 social studies subjects about "Geographical characteristics of Indonesia as an archipelago / maritime and agrarian country and its influence on economic, social, cultural, communication and transportation life". This research is intended to help facilitate delivery and achieve learning objectives. This application is made through Unity, in its use students can open the application, scan maps, and access material on the geographical conditions of the five major islands in Indonesia.

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1. INTRODUCTION

Science and technology are developing very rapidly today. This triggers the emergence of new breakthrough ideas that can help human activities in everyday problems. One of the existing technologies is the application. According to (Panginan and Irwansyah, 2020), an application is a ready-made programme that can be used to carry out commands from users with the aim of getting more accurate results in accordance with the purpose of making the application. According to the Big Indonesian Dictionary, an application is the application of a system design to process data using the rules or provisions of a particular programming language. It can be concluded that the definition of application in general is an applied tool that functions specifically and integrated according to its capabilities, the application is a computer device that is ready for users.

One form of sophistication of the application is the ability to visualise objects, both in two dimensions and three dimensions. Technology that can do this is AR or Augmented Reality. According to (Kamelia, 2015) augmented reality is a technology that combines three-dimensional (3D) virtual objects into a three-dimensional real environment. (Haryani and Triyono, 2017) Defining augmented reality as one part of the Virtual Environment (VE) or commonly known as Virtual Reality (VR). AR gives users an idea of the merging of the real world with the virtual world seen from the same place (Lahay and Mohamad, 2020). Referring to the quote above, augmented reality is a technology that combines a two-dimensional or three-dimensional virtual object into a three-dimensional real environment and then projects these virtual objects into the real environment. With the help of augmented reality technology, the real environment around us will be able to interact in digital (virtual) form. Information about objects and the environment around us will be added to the augmented reality system and then the information is displayed on top of the real world layer in real-time as if the information is real.

Technology is present as a means of convenience in running life, including education. Education has a challenge to be able to optimise the role of technology in contributing to the success of education, both from the aspects of the learning process, learning media, learning strategies, to learning evaluation (Deslianti and Sonita, 2022). Along with the development of Technology and Information, thus encouraging the creation of innovative, effective, and efficient learning media utilisation. For this reason, a digital-based learning media is needed so that it can be utilised in an effort to improve student learning outcomes. According to (Salsabila et al, 2020), learning media is a tool to clarify the presentation of material and information so that it can clarify and improve the learning process and results. Learning media can also direct students' attention so that it can generate learning motivation which has an impact on activeness and learning outcomes.

Learning media is an integral part of the learning system, so the use of learning media affects student learning outcomes. The teacher's ability to design and implement learning designs is the key to the success of enjoyable learning. (Rahmatullah et al, 2020). One of the innovative, effective, and efficient uses of learning media is the use of applications supported by augmented reality. This can be seen from the facts found by (Riskiono et al, 2020) in his research concluded that the results of Usability testing using questionnaires, the applications made were tested in the "GOOD" category where the test scores obtained were above 4.0, making it feasible to be applied as learning media. (Aprilinda et al, 2020) suggested in their research that the calculation of the percentage increase in value, for groups of students who studied using biology textbooks obtained a percentage increase of 14.5%, while for groups of

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students who studied using the Digestive System Augmented Reality application obtained a percentage increase of 24.8% which means that groups of students who study using the Digestive System Augmented Reality application have a higher percentage increase in value than groups of students who study using biology textbooks.

Looking at one of the learning contents in thematic learning in elementary schools, namely Social Sciences, one of the most material contained in this learning content is geography material (Darung et al., 2020). Geography is a science that studies human interaction with nature and examines the physical landscape of the earth and social life so that this science is very close to students' daily lives (Pratiwi et al., 2021; Sugandi, 2015). Geography learning is outlined in the curriculum and also developed into lesson plans. The purpose of geography needs to be studied by students so that students are able to understand the surrounding environment such as the community environment, the environment of their own country, and the environment of other nations as well. The basic material for learning geography is the spatial aspect of the earth's surface which includes all natural events and human existence with regional variations. Geography learning in Social Sciences (IPS) involves the role of students in learning the scope of geography taught in the classroom and adjusted to the level of mental development of each low and high class.

The scope of geography allows students to find answers about the world around them, especially on the spatial and ecological aspects of human existence. According to Ministerial Regulation No. 22/2006, Geography subject content is intended to create the ability to behave intelligently, wisely, and responsibly in dealing with social, economic, and ecological problems. A person will grow into a person with character if they develop in an environment with character. Of course, massive efforts are needed by all parties or components in society (Sugandi, 2015). This shows that geography does not only emphasise the understanding of concepts and skills, but also character education in accordance with the ideology of Pancasila owned by the Indonesian nation. In addition, an integrated learning process between theory and practice is needed because the most important essence of learning is habituation that is always related to everyday life.

Geography covers various aspects of human life, namely social, economic, political and educational aspects (Sudarwanto and Murtomo, 2013). In this regard, it can be seen that Indonesia is a multicultural country consisting of many islands with different territories and different customs, tribes, languages, and cultural habits. Learners as Indonesian citizens need to understand about the local wisdom of their own country and the geographical conditions that affect the aspects of life around them (Sumayana et al., 2021; Dewi et al., 2015). By doing so, it is hoped that students will be able to foster a sense of patriotism or nationalism in themselves and obtain character education from these things.

In learning in the era of Society 5.0, teachers as facilitators of students need to understand and master the techniques of teaching various materials in the classroom effectively and communicatively (Rukmana and Susila, 2017). When examining the facts in the field, it is not uncommon for the application of teacher-centred learning methods to often make students passive in class and even reluctant to ask questions when students feel they do not understand the material. In addition, the selection of traditional learning media that is monotonous and less interactive also causes students to experience difficulties and misunderstandings in absorbing the main essence of the learning material presented (Sabirin et al., 2022). The importance of developing learning media will affect student learning outcomes. Therefore, teachers must find answers to this problem.

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Nowadays, the development of technology has penetrated into various fields of life including social, economic, political, and education (Sakti, 2020). The integration of technology into education can be found everywhere such as the application of cloud computing applications (Gmail, Google Classroom, etc.) in digital learning (Muhammad et al., 2021). The use in a computer, instruction (instruction) or statement (statement) which is arranged in such a way that the computer can process input into output is called an application (Mustaqim, 2016). In the field of education, applications can be used as media to assist the learning process. Learning media is anything that can convey or channel messages from a planned source, so that a conducive learning environment occurs where the recipient can carry out the learning process efficiently and effectively (Nurhayati and Rahardi, 2021).

The use of applications aims to ensure that the essence of learning can be received by students effectively, one of which we will discuss is the material "Geographical Characteristics of Indonesia as an Archipelago and its Effect on Life'' (Lesmono and Mulyadi, 2019). Geographical conditions reflect an integration of regions, namely how the regions are arranged by physical and social symptoms. The influence of the earth on human life can be seen from the condition of its geographical factors. As Indonesian citizens, learners need to understand how the geographical characteristics of their country and its influence on life (Puspitasari et al., 2021). In addition, there is also the application of Augmented Reality (AR) and Virtual Reality (VR) (Sumarni et al., 2021). Augmented Reality is a technology in the field of multimedia that is used to be able to visualise a virtual world that is part of the real world that seems to be connected to the real world and can interact (Hamzah et al. 2021) (Ramadhan et al. 2017), so 3D objects in cyberspace can be as if lifted and appear as real as real objects.

The utilisation of technology in education can be the right answer to develop interactive and communicative technology-based learning media (Mustaqim, 2016). Therefore, the author tries to make an application called GEOSCAN by utilising barcode scans in learning grade V Theme 1 SD about "Geographical Characteristics of Indonesia as an Archipelago and its Influence on Life." In grade 5 theme 1 SD, in social studies subjects about "Indonesia's geographical characteristics as an archipelago or maritime and agrarian country and its influence on economic, social, cultural, communication and transportation life" (Alawi et al., 2018). Making this application is intended to help facilitate delivery and achieve learning objectives. This application is made through Unity, in its use students can open the application and access material on the geographical conditions of 5 large islands in Indonesia, then students can also scan AR from markers that have been prepared according to the islands in Indonesia or scan maps of Indonesia on a particular island.

2. METHODS

The research method used in this research is the Multimedia Development Life Cycle (MDLC) method developed by Luther (1994). In this research method, there are six stages of activities that need to be carried out as shown in **Figure 1**.

2.1 Concept

Conceptualisation is a stage which is used to determine the concept, purpose, audience or users of the application (Borman and Erma, 2018).

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2.2 Design

This design stage is the stage of designing programme architecture specifications, style, appearance, and the need for materials in making the programme (Sugiarto, 2018).

2.3 Material Collecting

Material Collecting is the stage of collecting the required materials, including images, photos, animations, videos, audio, text, and other materials needed in making the programme (Sumaryana and Hikmatyar, 2020).

2.4 Assembly

This stage is the stage where the programme begins to be made based on the design that has been designed and the materials that have been prepared in the previous stage (Mustika et al., 2018).

2.5 Testing

Testing is the stage of testing the feasibility of the programme that has been made (Rahman et al., 2016).

2.6 Distribution

This is the stage where the programme that has passed the test is then distributed by saving the programme in the form of an application (Borman and Erma, 2018).

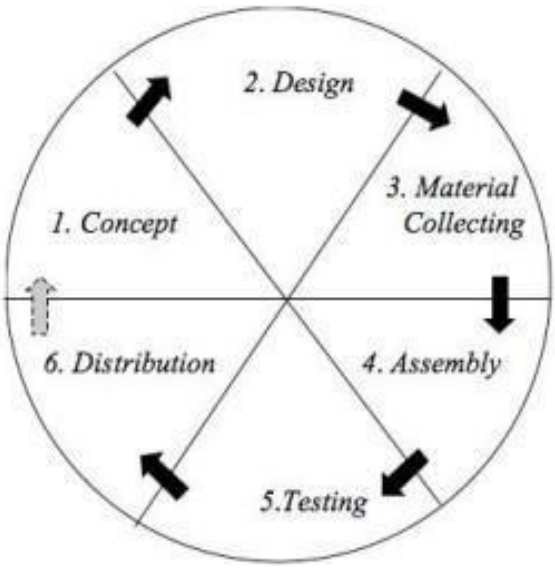

Figure 1. MDLC Method

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3. RESULT AND DISCUSSION

The use of the Multimedia Development Life Cycle (MDLC) research method by Luther obtained the following research results.

3.1. Concept

At this stage, it produces a concept formulation of making learning media called Geoscan related to the geographical characteristics of Indonesia as an archipelago and its influence on aspects of life in class V Theme 1. The target of this learning media is grade V elementary school students. This learning media is made with an interesting concept,

Easy to use, innovative, interesting, interactive. This Geoscan learning media is made with the aim of attracting interest and increasing students' enthusiasm for learning because the material is packaged in an interesting and varied way, so that students are not easily bored and have no difficulty in understanding the material.

3.2. Design

The design stage is a stage used to make specifications related to programme architecture, style, design, appearance and material requirements for making programmes (Mustika, 2018). At this stage, the design of learning media is carried out. In this learning media design planning consists of this media menu consisting of a start page, menu page, info page, material menu page, material page, 3D scan page (AR), and developer page.

3.3. Material Collecting

At this stage, the materials needed to create Geoscan learning media are collected. The materials used are images, learning materials related to the geographical characteristics of Indonesia as an archipelago and its influence on aspects of life obtained from the internet, application designs designed through canva, 3D model assets in the form of suitable traditional houses and sound for backsound obtained from the internet.

3.4. Assembly

The assembly stage is the stage where the learning media is made based on the planning that has been made and the materials that have been obtained. At this stage, Geoscan learning media is made using the Unity application. The results of making Geoscan learning media are as follows.

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3.4.1. Icon Aplikasi

We designed the icon in **Figure 2** below using Canva and with Unity we set the icon become the become of the Geosca application.

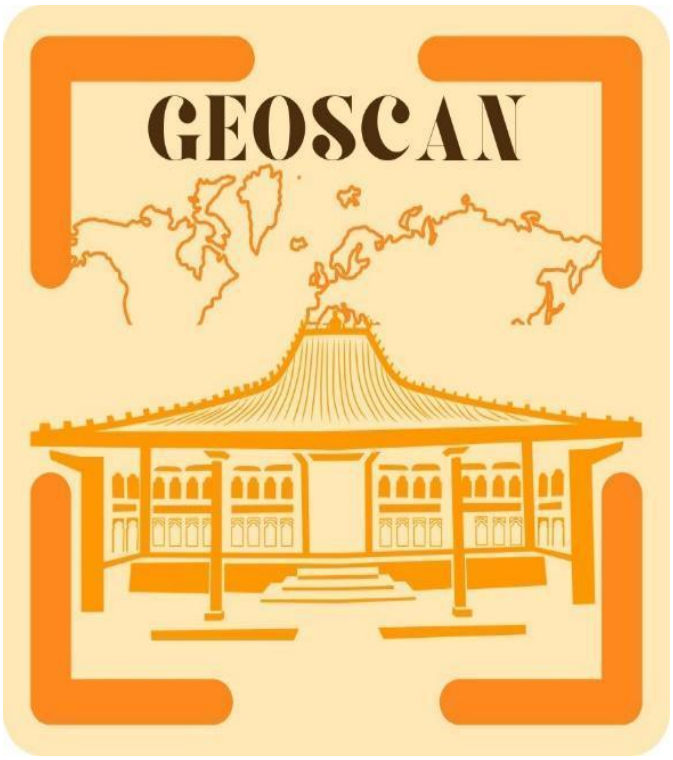

Figure 2. *Application Icon.*

3.4.2. Start Page

The following is the display that will appear for the first time when students open Geoscan learning media. This page displays the name of the application, the START button which if pressed will display the menu page, the title of the material to be studied and the backsound (see **Figure 3**).

Figure 3. Start Page

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3.4.3. Menu Page

On this menu page there are four buttons including the INFO button which is used to go to the info page, the MATERIAL button which is used to go to the material menu page, the DEVELOPER button which is used to go to the developer page and the EXIT button which is used to exit the application (see **Figure 4**).

Figure 4. Menu Page

3.4.4. Info Page

On the info page there is an explanation of the function of each button in this Geoscan application. In addition, there is also a MENU button that can be used to go to the menu page and an EXIT button to exit the application (see **Figure 5**).

Figure 5. Info Page

3.4.5. Developer Page

This page contains information from the application developer consisting of name, Student Identification Number and developer photo. In addition, there is also a MENU button that can be used to go to the menu page and an EXIT button to exit the application (see **Figure 6**).

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Figure 6. Developer Page

3.4.6. Material Menu Page

On this material menu page there is an image of the island of Indonesia and on each major island such as Sumatra, Kalimantan, Java, Sulawesi and Irian Jaya there is an island name button (SUMATERA, KALIMANTAN, JAWA, SULAWESI and IRIAN JAYA buttons) that can be clicked to go to each material. There is also a MENU button that can be used to go to the menu page and an EXIT button to exit the application (see **Figure 7**).

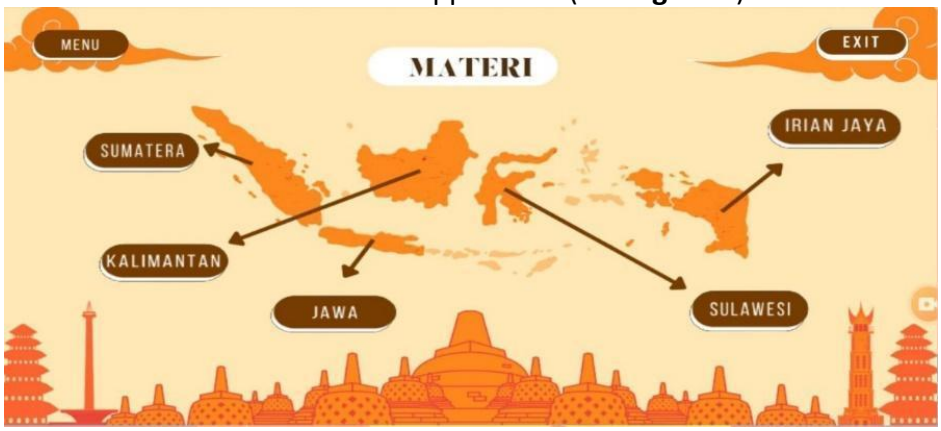

Figure 7. Material Menu Page

3.4.7 Material Page

The material page presents material related to the geographical characteristics of Indonesia as an archipelago and its influence on aspects of life. On each island that is pressed will proceed to the material page, from each island has two material pages. The first material page contains the name of the island, its area, and a variety of traditional clothing as shown in **Figure 8** below. In addition, there is also a MENU button that can be used to go to the menu page, the EXIT button to exit the application, the MENU button to the left to return to the previous page and the arrow button to the right to go to the next page.

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Figure 8. Customised clothing material page

While the second material page contains the name of the island, the majority of the occupations of its inhabitants, a variety of traditional houses as shown in **Figure 9** below. In addition, there is also a MENU button that can be used to go to the menu page, EXIT button to exit the application, left arrow button to return to the previous page, right arrow button to go to the next page, MATERI button to go to the material menu page and 3D SCAN button to go to the 3D scan page (AR).

Figure 9. Custom House Material Page.

3.4.8. Scan 3D (AR) Page

On this Scan 3D (AR) page, students are asked to scan the major islands of Indonesia, namely the islands of Sumatra, Kalimantan, Java, Sulawesi, Irian Jaya. The following markers are used to bring up AR traditional houses from each island when scanning. If, scanning the island of Sumatra according to the marker, an AR image of the island of Sumatra will appear, as shown below (see **Figure 10**).

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Figure 10. Marker from Sumatra Island.

If you scan the island of Borneo according to the marker, an AR image of the island will appear, as shown below (see **Figure 11**).

Figure 11. Marker from Kalimantan Island.

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If you scan the island of Java according to the marker, an AR image of the island of Java will appear, as shown below (see **Figure 12**).

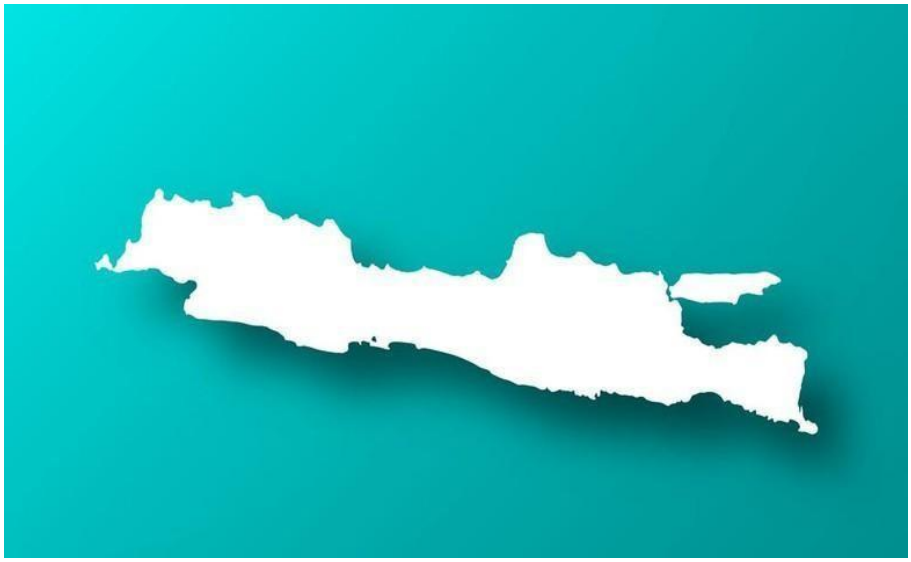

Figure 12. Marker from Jawa Island.

If you scan the island of Sulawesi according to the marker, an AR image of the island will appear, as shown below. (see **Figure 13**).

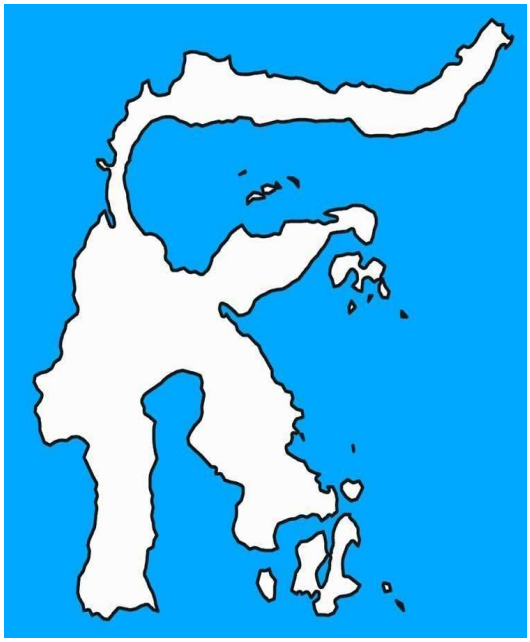

Figure 13. Marker from Sulawesi Island

If you scan the island of Papua according to the marker, an AR image of the island of Papua will appear, as shown below. (see **Figure 14**).

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Figure 14. Marker from Irian Jaya Island

From each of the big Indonesian island markers above, if scanned, it will bring up an AR model of one of the traditional houses from each island. If, scanning the island of Sumatra according to the marker, the AR of the traditional house from Sumatra will appear, namely the Gadang traditional house, as shown below (see **Figure 15**).

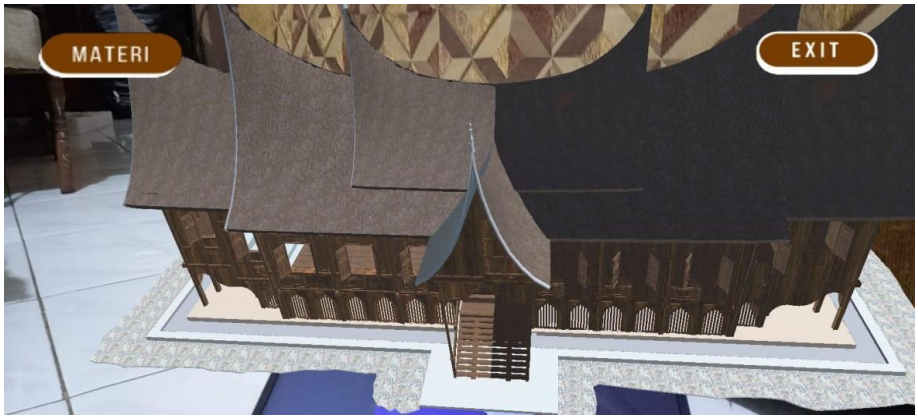

Figure 15. AR Model of Sumatran Traditional House

If you scan the island of Kalimantan according to the marker, an AR of a traditional house from Kalimantan will appear, namely the Betang traditional house, as shown below. (see **Figure 16**).

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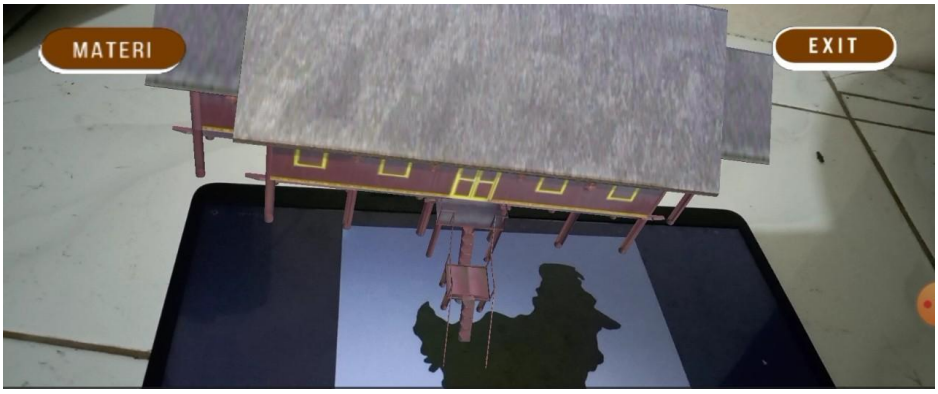

Figure 16. AR Model of Kalimantan Traditional House

If you scan the island of Java according to the marker, an AR of a traditional house from Java will appear, namely the Joglo traditional house, as shown below (see **Figure 17**).

Figure 17. AR model of Javanese traditional house.

If you scan the island of Sulawesi according to the marker, an AR of a traditional house from Sulawesi will appear, namely the Tongkonan traditional house, as shown below (see **Figure 18**).

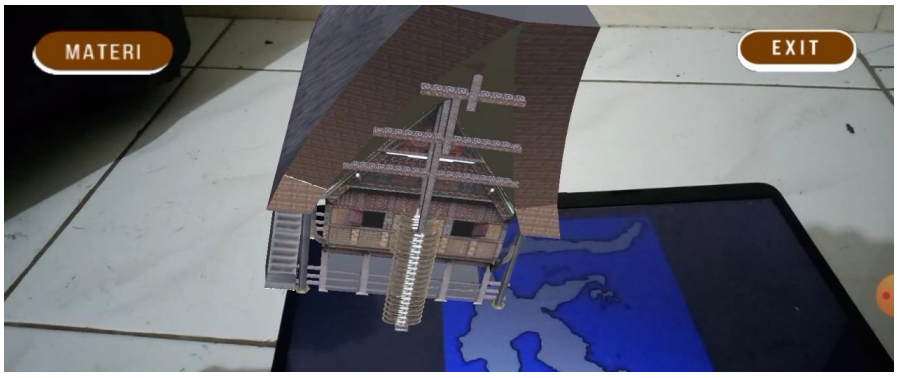

Figure 18. AR Model of Sulawesi Traditional House

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If, scanning the island of Papua according to the marker, an AR of a traditional house from Papua will appear, namely the Honai traditional house, as shown in Figure 19 below. When scanning this AR, students can also enlarge, reduce, provide rotation effects, and change the position of the AR display of traditional houses. In addition, on this 3D Scan (AR) page there is a MATERI button to go to the material menu page and an EXIT button to exit the application.

Figure 19. AR Model of Papuan Customary House

3.5. Testing

At this stage testing is carried out, to see if there are errors or errors found when the Geoscan learning media is run. In testing this Geoscan application, we try to install the application into Android and try to run all the functions and features and check whether there are errors or errors or not. If there are errors or errors, improvements will be made to the Geoscan application through unity. This is done continuously until the Geoscan application is really running well and there are no errors.

3.6. Distribution

The last stage of the MDLC method is distribution, but researchers only get to testing in making this Geoscan Application.

4. CONCLUSION

Research that uses the Multimedia Development Life Cycle (MDLC) research method (MDLC) by Luther obtained the following research results.

4.1. Concept

At this stage, it produces a concept formulation of making learning media called Geoscan related to the geographical characteristics of Indonesia as an archipelago and its influence on aspects of life in class V Theme 1. The target of this learning media is grade V elementary school students. This learning media is made with the concept of attractive, easy to use, innovative, interesting, interactive. This Geoscan learning media is made with the aim of

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attracting interest and increasing students' enthusiasm for learning because the material is packaged in an interesting and varied way, so that students are not easily bored and have no difficulty in understanding the material.

4.2. Design

The design stage is a stage used to make specifications related to programme architecture, style, design, appearance and material requirements for making programmes (Mustika, 2018). At this stage, the design of learning media is carried out. In this learning media design planning consists of this media menu consisting of a start page, menu page, info page, material menu page, material page, 3D scan page (AR), and developer page.

4.3. Material Collecting

At this stage, the materials needed to create Geoscan learning media are collected. The materials used are images, learning materials related to the geographical characteristics of Indonesia as an archipelago and its influence on aspects of life obtained from the internet, application designs designed through canva, 3D model assets in the form of suitable traditional houses and sound for backsound obtained from the internet.

4.4. Assembly

The assembly stage is the stage where the learning media is made based on the planning that has been made and the materials that have been obtained. At this stage, the creation of Geoscan learning media using the Unity application is carried out.

4.5. Testing

At this stage testing is carried out, to see if there are errors or errors found when the Geoscan learning media is run. In testing this Geoscan application, we try to install the application into Android and try to run all the functions and features and check whether there are errors or errors or not. If there are errors or errors, improvements will be made to the Geoscan application through unity.

4.6. Distribution

The last stage of the MDLC method is distribution, but researchers only get to testing in making this Geoscan Application. This learning media is equipped with dubbing features, attractive displays, and this geoscan application that students can play. These advantages are certainly enough to answer the objectives of the learning media that the author developed. Suggestions for further research are to integrate augmented reality models in learning media to make it more interesting and varied. In addition, it is also necessary to add professions so that students' insights are broader.

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5. AUTHOR NOTES

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirm that this paper is free from plagiarism.

6. REFERENCES

Alawi, M., Ramdani, F., and Pramono, D. (2018). Pengembangan sistem informasi geografis cagar budaya di malang raya berbasis WEBGIS, 3D, dan GAMIFIKASI. *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer, 2*(4), 1464-1474.

Aprilinda, Y., Endra, R. Y., Afandi, F. N., Ariani, F., Cucus, A., and Lusi, D. S. (2020). Implementasi augmented reality untuk media pembelajaran biologi di sekolah menengah pertama. *Explore: Jurnal Sistem informasi dan telematika (Telekomunikasi, Multimedia dan Informatika), 11*(2), 124-133.

Darung, A., Setyasih, I., and Ningrum, M. V. R. (2020). Pengembangan media pembelajaran geografi menggunakan poster infografis. *Geoedusains: Jurnal Pendidikan Geografi, 1*(1), 27-41.

Deslianti, D., and Sonita, A. (2022). Game edukasi ragam budaya indonesia berbasis android. *JTIS: Journal of Technopreneurship and Information System, 5*(2), 27-32.

Dewi, P. S., and Sintaro, S. (2019). Mathematics edutainment dalam bentuk aplikasi android. *Triple S (Journals of Mathematics Education)*, *2*(1), 1-11.

Lahay, R. J., and Mohamad, N. (2020). Peta puzzle 3d berbasis mobile augmented reality sebagai prototipe media pembelajaran geografi. *Jambura Geo Education Journal*, *1*(1), 26-31.

Lesmono, I. D., and Mulyadi, M. (2019). Perancangan animasi interaktif pengenalan peta indonesia sebagai media pembelajaran untuk anak sekolah dasar. *Evolusi: Jurnal Sains Dan Manajemen*, *7*(2), 43-51.

Muhammad, M., Maradjado, C. A., and Nurdin, N. (2021). Perancangan aplikasi pengenalan rumah adat berbasis android. *Jurnal Elektronik Sistem Informasi dan Komputer*, 4(2), 23-36.

Mustika. (2018). Rancang bangun aplikasi sumsel museum berbasis mobile menggunakan metode pengembangan multimedia development life cycle (MDLC). *Jurnal Mikrotik*, *8*(1), 1–14.

Nurhayati, N., and Rahardi, R. (2021). Kemampuan berpikir kreatif mahasiswa dalam mengembangkan media pembelajaran matematika saat pandemi covid-19. Jpmi (Jurnal Pembelajaran Matematika Inovatif), 4(2), 331-342.

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Panginan, E. K., and Irwansyah, I. (2020). Fenomena aplikasi kredit dan pinjaman online kredivo di indonesia. *Jurnal Komunikasi dan Kajian Media, 4*(1), 12-26.

Pramono, A. (2017). Media pendukung pembelajaran rumah adat indonesia menggunakan augmented reality. *Jurnal Eltek*, *11*(1), 122-132.

Puspitasari, A. D., Hidayat, R. A., and Pritasari, A. C. (2021). Miniature map of the indonesian colomination period as a medium of elementary learning in class v theme 7 sub theme 1. *International Journal of Community Service, Informatics, Technology, Research in Education, Art and Humanities*, *1*(2), 1-12.

Rahmatullah, R., Inanna, I., and Ampa, A. T. (2020). Media pembelajaran audio visual berbasis aplikasi canva. *Jurnal Pendidikan Ekonomi Undiksha*, *12*(2), 317-327.

Rukmana, I., and Susila, M. N. (2017). Perancangan aplikasi multimedia flash peta provinsi indonesia di sdn gurubug 1 tangerang. *Jurnal Teknik Informatika*, *3*(1), 8-16.

Sabirin, F., Mustofa, M., and Sulistiyarini, D. (2022). Pengembangan media pembelajaran 3D untuk mata kuliah geologi dasar. *Jurnal Pendidikan Informatika dan Sains*, *11*(1), 57-70.

Sakti, B. P. (2020). Peningkatan hasil belajar pada tema karakteristik geografis indonesia di kelas v sekolah dasar menggunakan model mind mapping. *Prima Magistra: Jurnal Ilmiah Kependidikan, 1*(2), 218-229.

Sudarwanto, B., and Murtomo, B. A. (2013). Studi struktur dan konstruksi bangunan tradisional rumah 'pencu'di kudus. *Jurnal Lingkungan Binaan Indonesia, 2*(1), 35-42.

Sumarni, T., Damayanti, S. E., and Saputra, H. (2021). Implementasi metode marker based tracking pada augmented reality sebagai media pembelajaran rumah adat tradisional (studi kasus: sd negeri sindangjaya cianjur). *Naratif: Jurnal Nasional Riset, Aplikasi dan Teknik Informatika, 3*(2), 25-29.

Sumayana, Y., Akbar, A., and Marlina, D. (2021). Penggunaan Media Pop Up Book Untuk Meningkatkan Motivasi dan Hasil Belajar Siswa Dalam Pembelajaran IPS Materi Karakteristik Geografis Indonesia: Bahasa Indonesia. *Jurnal Educatio* FKIP UNMA, 7(4), 2076-2081.

Yana, Y., Handoyo, B., and Putra, A. K. (2021). Pengembangan buku ajar digital geografi sma berplatform aplikasi 3d page flip dengan pendekatan steam (science, technology, engineering, art, mathematic) materi keragaman budaya di indonesia. *Jurnal Pendidikan Geografi: Kajian, Teori, dan Praktek dalam Bidang Pendidikan dan Ilmu Geografi, 26*(2), 92-98.

DOI: https://doi.org/10.17509/seict.v4i1.59647
p- ISSN 2774-1656 e- ISSN 2774-1699