AR UNTUK MEDIA PEMBELAJARAN INTERAKTIF MATERI HUKUM KEPLER DENGAN *UNITY3D PLATFORM* MENGGUNAKAN METODE MDLC

TUGAS AKHIR

Diajukan Sebagai Salah Satu Syarat
untuk Memperoleh Gelar Sarjana Komputer pada
Program Studi Sistem Informasi

Oleh:

MUHAMMAD RAIHAN PRATAMA HADI
12050313250

UIN SUSKA RIAU

FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU
PEKANBARU
2024

LEMBAR PERSETUJUAN

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12050313250

Telah diperiksa dan disetujui sebagai Laporan Tugas Akhir
di Pekanbaru, pada tanggal 11 Juli 2024

Ketua Program Studi	Pembimbing
Eki Saputra, S.Kom., M.Kom.	**Dr. M. Luthfi Hamzah, B.IT., M.Kom.**
NIP. 198307162011011008	**NIP. 199001242019031017**

LEMBAR PENGESAHAN

AR UNTUK MEDIA PEMBELAJARAN INTERAKTIF MATERI HUKUM KEPLER DENGAN *UNITY3D PLATFORM* MENGGUNAKAN METODE MDLC

TUGAS AKHIR

Oleh:

MUHAMMAD RAIHAN PRATAMA HADI
12050313250

Telah dipertahankan di depan sidang dewan penguji
sebagai salah satu syarat untuk memperoleh gelar Sarjana Komputer
Fakultas Sains dan Teknologi Universitas Islam Negeri Sultan Syarif Kasim Riau
di Pekanbaru, pada tanggal 25 Juni 2024

Pekanbaru, 25 Juni 2024
Mengesahkan,

Dekan	**Ketua Program Studi**
Dr. Hartono, M.Pd.	**Eki Saputra, S.Kom., M.Kom.**
NIP. 196403011992031003	**NIP. 198307162011011008**

DEWAN PENGUJI:

Ketua : Arif Marsal, Lc., MA.

Sekretaris : Dr. M. Luthfi Hamzah, B.IT., M.Kom.

Anggota 1 : Angraini, S.Kom., M.Eng., Ph.D.

Anggota 2 : Eki Saputra, S.Kom., M.Kom.

Lampiran Surat:
Nomor : Nomor 25/2021
Tanggal : 10 September 2021

SURAT PERNYATAAN

Saya yang bertanda tangan dibawah ini:

Nama : Muhammad Raihan Pratama Hadi

NIM : 12050313250

Tempat/Tgl. Lahir : Pekanbaru / 21 Februari 2001

Fakultas/Pascasarjana :Fakultas Sains dan Teknologi

Prodi : Sistem Informasi

Judul Disertasi/Thesis/Skripsi/Karya Ilmiah Lainnya*:

AR Untuk Media Pembelajaran Interaktif Materi Hukum Kepler Dengan Unity3d Platform Menggunakan Metode MDLC

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NIM. 12050313250

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Pekanbaru, 11 Juli 2024

Yang membuat pernyataan,

MUHAMMAD RAIHAN PRATAMA HADI

NIM. 12050313250

LEMBAR PERSEMBAHAN

Dengan menyebut nama Allah yang maha pengasih lagi maha penyayang

Assalamu'alaikum Warahmatullahi Wabarakaatuh.

Alhamdulillahi Rabbil 'Alamin, segala puji bagi Allah *Subhanahu Wa Ta'ala* sebagai bentuk rasa syukur atas segala nikmat yang telah diberikan tanpa ada kekurangan sedikitpun. Shalawat beserta salam tak lupa pula kita ucapkan kepada Nabi Muhammad *Shallallahu 'Alaihi Wa Sallam* dengan mengucapkan *Allahumma Sholli 'ala Sayyidina Muhammad Wa'ala Ali Sayyidina Muhammad*. Semoga kita semua selalu senantiasa mendapat syafaat-Nya di dunia maupun di akhirat, *Aamiin Ya Rabbal' Alaamiin*.

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Pekanbaru, 11 Juli 2024

Peneliti,

MUHAMMAD RAIHAN PRATAMA HADI

NIM. 12050313250

UNIVERSITAS ANDALAS
FACULTY OF INFORMATION TECHNOLOGY
INTERNATIONAL SYMPOSIUM ON INFORMATION TECHNOLOGY AND DIGITAL INNOVATIONS (ISITDI) 2024
Limau Manis, Pauh, Padang City, West Sumatra 25175
Website: http://isitdi.conference.unand.ac.id/

LETTER OF ACCEPTANCE

May 20, 2024

Dear Authors,

On behalf of the INTERNATIONAL SYMPOSIUM ON INFORMATION TECHNOLOGY AND DIGITAL INNOVATIONS (ISITDI) 2024's committee, we are pleased to inform you that your paper with registration number "**1571029985**", entitled:

"Unityedu: Augmented Reality For Interactive Learning Media On Kepler's Laws Using Unity3D Platform Using Multimedia Development Life Cycle (MDLC) Method"

Written by **"Muhammad Raihan Pratama Hadi"**

has been reviewed and **ACCEPTED** for an oral presentation at the INTERNATIONAL SYMPOSIUM ON INFORMATION TECHNOLOGY AND DIGITAL INNOVATIONS (ISITDI) 2024.

We congratulate your achievement. The technical issues about the presentation will be informed later. Thank you very much for submitting and we look forward to your participation in the ISITDI 2024.

Kindest regard,

Chairman of ISITDI 2024

Dr. Eng. Ir. Budi Rahmadya, M.Eng

Unityedu: Augmented Reality For Interactive Learning Media On Kepler's Laws Using Unity3D Platform Using Multimedia Development Life Cycle (MDLC) Method

Muhammad Raihan Pratama Hadi
Deaprtement of Information System
Faculty of Science and Technology
dept. name of organization
Universitas Islam Negeri Sultan Syarif Kasim
Pekanbaru, Indonesia
12050313250@students.uin-suska.ac.id

Muhammad Luthfi Hamzah
Deaprtement of Information System
Faculty of Science and Technology
dept. name of organization
Universitas Islam Negeri Sultan Syarif Kasim
Pekanbaru, Indonesia
muhammad.luthfi@uin-suska.ac.id

Angraini
Deaprtement of Information System
Faculty of Science and Technology
dept. name of organization
Universitas Islam Negeri Sultan Syarif Kasim
Pekanbaru, Indonesia
angraini@uin-suska.ac.id

Eki Saputra
Deaprtement of Information System
Faculty of Science and Technology
dept. name of organization
Universitas Islam Negeri Sultan Syarif Kasim
Pekanbaru, Indonesia
eki.saputra@uin-suska.ac.id

***Abstract*— In recent times, AR applications have gained prominence across various domains, leveraging the advanced capabilities of smartphone cameras and processing power. From Mobile AR games to educational tools, they present educators with the challenge of creating interactive learning materials, particularly in intricate subjects such as Physics. This study aims to address this challenge by developing an AR application designed to facilitate students' comprehension of Kepler's Laws in a more interactive manner. Using the Unity 3D platform and Vuforia Augmented Reality SDK, the application underwent compatibility testing to assess its performance across different versions of the Android operating system. Results indicated enhanced functionality with higher Android versions. Moreover, black box testing was employed to evaluate menu functionality, demonstrating a 100% success rate. This research underscores the potential of AR technology in enriching educational experiences and emphasizes the importance of rigorous testing methodologies to ensure optimal application performance across diverse platforms.**

Keywords— Augmented Reality, Unity 3D, Vuvoria SDK, Multimedia Development Life Cycle, Interactive Learning Media

I. INTRODUCTION

In endeavors to elevate education quality, it's imperative to address several key aspects, notably by enhancing the proficiency of both educators and students. Due to the rapid pace of technological advancements, it's imperative to foster technology-related skills at an early stage in education [1]. Technology has become a crucial aspect of our daily lives, profoundly affecting almost every field, including education [2]. With technological progress and increasing educational innovation, numerous studies have explored the integration of mobile technology in education and evaluating its influence on learning outcomes [3]. Moreover, the methods and media utilized during teaching and learning activities significantly impact students' academic achievements [4]. Continuous advancements in instructional methods are observed within education technology, particularly with the utilization of AR as a significant visualization tool. AR enhances human perception by superimposing computer-generated data onto real-world objects, facilitating user interaction [5]. There are five types of AR applications: object modeling (OM), discovery-based learning (DBL), AR books, game-based learning (GBL), and skills training [6]. AR applications have been effectively integrated into various educational levels, disciplines, and educational environments, offering many benefits for learners since they were first developed [7]. This educational technology enables users to access and enhance information about their surroundings using a mobile device with ease [8]. AR has garnered significant attention within the research community due to its ability to offer distinctive learning experiences that are not attainable through other technologies or methodologies [9].

In the modern digital landscape, the incorporation of educational tools is inseparable from technological advancements, notably AR. AR significantly enhances graphic design education by enabling the virtual, lifelike, and real-time presentation of 3D design elements, making learning both effective and enjoyable [10]. The implementation of AR technology in educational contexts demonstrates substantial potential [11]. AR applications offer students the chance to actively participate and interact in real-time during hands-on activities, providing them with genuine experiences [12]. The successful utilization of AR in training has been proven effective, meeting the objective of providing students with professional training through practical experience [13]. This research focuses on using AR to teach physics, specifically Kepler's laws. It's a challenge for educators to create interactive learning materials to make explaining the subject easier, especially in fields like physics, where students are trained to think logically and mathematically about natural phenomena. Previous studies have highlighted a link between students' spatial skills and their grasp of complex concepts in fields like education, science, and technology, such as the

principles of force and motion in physics. [14]. AR technology has emerged as an effective tool in learning, particularly in the context of physics education. AR technology is a method or technology for incorporating virtual objects into the real world through a device in a realistic way [15], by integrating digital elements into the physical environment through computer graphics, video, audio, GPS data, and more [16]. AR has the capability to help students in comprehending and internalizing abstract physics concepts more effectively. Students and teachers can easily utilize AR applications wherever they are, with the assistance of a device, to display 3D models on a marker [17].

The topic of Kepler's laws, which is a significant part of astronomy studies, can be difficult for students due to its intricate and abstract characteristics. Conventional teaching methods, limited to textbooks and lectures, may struggle to effectively illustrate Kepler's laws visually and interactively. To overcome this, AR technology has emerged as an intriguing solution. AR enables students to visualize astronomical objects and phenomena in real-world settings, enhancing their learning experiences and facilitating a deeper grasp of Kepler's laws. Utilizing AR in teaching Kepler's laws has the potential to improve students' grasp of astronomical concepts and positively influence education overall. By integrating this sophisticated technology, we can establish a more dynamic and captivating learning atmosphere, sparking students' enthusiasm for science and fostering the enhancement of critical thinking and problem-solving abilities. This corresponds with the contemporary educational emphasis on engaging and pertinent learning experiences. In the next phase of developing this application, we'll utilize the MDLC (Multimedia Development Life Cycle) method. This multimedia development process consists of six stages: concept, design, gathering materials, assembly, testing, and distribution [18]. Previous studies have demonstrated that MDLC is capable of generating a high-quality multimedia application [19].

The main objective of this study is to develop an engaging and user-friendly AR application to understand and master the concepts of Kepler's laws. This study is also expected to provide a positive contribution to educators by implementing engaging learning methods using AR technology. However, this study has not yet reached the distribution stage and it is hoped that future research will allow this application to be used by students and educators, as well as assess the potential of the application in creating an immersive learning experience.

Therefore, combining AR technology with the Unity3D platform and the MDLC method in the development of interactive learning media for Kepler's laws is an innovative step that can help solve problems in physics education. This will assist students in better understanding and internalizing complex physics concepts in a more enjoyable and effective manner. In this context, the objective of this study is to develop an AR application using the Unity3D platform with the MDLC method, aimed at assisting students in understanding and mastering Kepler's laws. This study is anticipated to positively impact the advancement of physics education through the use of innovative AR technology.

II. LITERATURE REVIEW

A. Augmented Reality Foundation

AR lets users see the real world with virtual elements layered or blended into it. Therefore, AR enhances reality rather than fully replacing it [20]. R Foundation enables the development of cross-platform AR applications using Unity. Within an AR Foundation project, we can selectively activate AR features by incorporating the corresponding manager components into the scene.

B. Unity 3D Engine

Unity 3D, created by Unity Technologies, is a multi-platform game engine designed for developing video games and simulations for PCs, mobile devices and consoles. We utilized the Unity3D game engine, which is the most appropriate for virtual game development. Its primary features include support for the C# programming language for creating two- and three-dimensional (2D, 3D) graphics games, along with a flexible licensing policy [21]. Unity stands out as one of the leading game engines currently in use, especially within the game development sector [22]. The Unity 3D platform supports the utilization of the Vuforia SDK plugin for AR application and game development [16].

C. Vuvoria SDK

Vuforia Engine stands as the leading platform for AR development, boasting compatibility with the majority of smartphones and tablets. It allows developers to seamlessly incorporate sophisticated computer vision features into IOS, Android and UWP applications, providing immersive AR experiences with objects and surroundings. [23]. Vuforia is an AR software library that relies on a consistent computer vision source with a focus on image recognition. Vuforia is a mobile software development kit developed by Qualcomm specifically for constructing AR applications. It facilitates the seamless integration of sophisticated computer vision features into applications, empowering developers to recognize images and objects or manipulate the real-world environment effortlessly. The Vuforia SDK supports various types of 2D and 3D objects, including dual target setups, images with multiple symbols, and frame markers. [24].

D. Multimedia Development Life Cycle (MDLC)

The Multimedia Development Life Cycle (MDLC) is a structured method for creating multimedia products, beginning with product analysis, progressing through development, and ending with launch. [25]. While originating from the same developmental roots as the Software Development Life Cycle (SDLC), MDLC has its own distinct characteristics related to the creation and utilization of multimedia elements. Generally, MDLC is utilized for developing multimedia products, whether they follow linear or non-linear structures.document. Please do not revise any of the current designations.

III. METHODOLOGY

The design process of the application in this research study followed the guidance of the MDLC framework (Luther 1964). This method consists of six stages that need to be completed, namely concept, design, material gathering, assembly, testing, and distribution [27]. The development of the AR application in this study was guided by the well-organized and methodical MDLC framework. This approach

involved incorporating testing and evaluation phases at each stage of development to ensure that the final product would fulfill its intended goals and requirements.

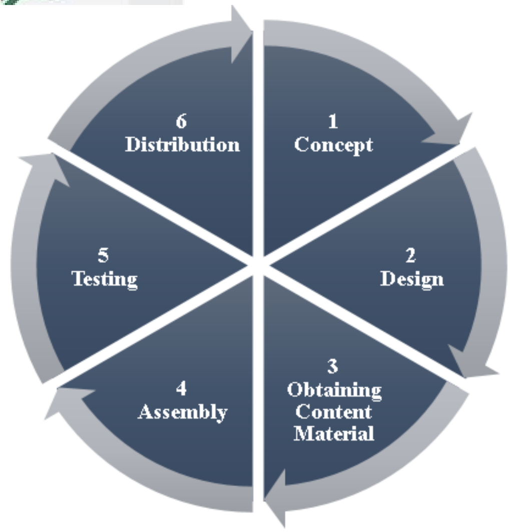


Fig. 1. Multimedia Development Lide Cycle

A. Concept : Functional Analysis

During the concept phase, the program's goals, overall specifications, and intended users are established.[28]. Furthermore, it can also specify the application type, whether it's for presentation or interactive use, and outline its intended purpose, whether for entertainment, training, or educational purposes. Afterward, an analysis of the application requirements is carried out to elucidate the features and specifications of the application. The application includes the following features:

1. Capable of displaying a rotating 3D object representing planets using markers.
2. Provides educational videos and summaries regarding the concept of Kepler's laws.
3. Includes quiz and daily test to enhance understanding of Kepler's laws.

The minimum system requirements for a mobile application depend on the specific operating system and hardware it is design for. To run the application on a device, the following basic requirements must be met in table I.

TABLE I. MINIMUM REQUIREMENT SYSTEM

Component Type	Minimum Requirement System
Android Version	7.0
RAM	2 GB
Storage	500 MB
Camera	5 MP
CPU	a quad-core 1,3 GHz

For recommended specifications in table II.

TABLE II. RECOMMENDED SPECIFICATIONS

Component Type	Minimum Requirement System
Android Version	8.0
RAM	4 GB
Storage	1 GB
Camera	10 MP and above
CPU	quad-core 2,0 GHz

The specifications for hardware and software needed to support the application's development are described in Table III.

TABLE III. HARDWARE AND SOFTWARE SPECIFICATIONS

Component Type	Minimum Requirement System
Operating Sysem	Windows 11- 64 Bit
Game Engine	Unity
Software Development Kit	Vuvoria SDK
RAM	Minimum 8 GB
UI Model Build	Canva

B. Design

The design stage is carried out to create specifications regarding the program's architecture, appearance, style, and material requirements. When designing the application, particular focus is placed on crafting an attractive interface and improving the overall quality to ensure a positive user experience and meet their expectations [29].

Fig. 2. Login Page

Fig. 3. Main Menu

In the main menu section, there are several other menu options that users can access, such as Visual 3D Kepler, subject matter, Animation Videos, Sample Questions, Exercises, Daily Tests, About, and Exit button.

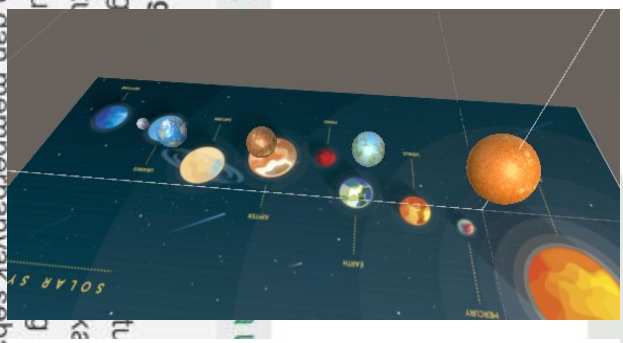
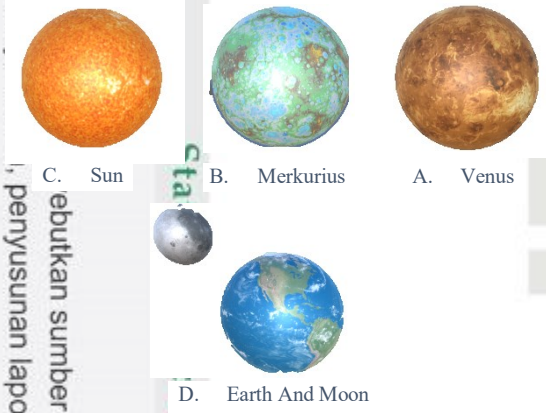


Fig. 4. AR Solar System

In Visual 3D Kepler, an AR visual of the solar system will be displayed, showcasing the rotational movement of planets along their orbits.

C. Obtaining Content Material : During this stage, materials are collected based on the needs of the multimedia system to be developed, such as photos, videos, clip art images, audio files, and more. These are a few 3D things that were gathered (Figure 5).



C. Sun B. Merkurius A. Venus

D. Earth And Moon

Fig. 5. Material Collecting 3D Object

IV. Result And Discussion

A. Assembly

We used Unity Pro 2022.2.20f1 with the Android platform to merge all the assets after gathering all the required materials. We created a functional augmented reality application by integrating 3D objects with this program. However, this application is exclusive to Android handsets and is not compatible with any other platform.

B. Testing

During this phase, conducted post-assembly, the application is executed, and its adherence to the storyboard is observed to identify potential errors or inconsistencies in the constructed multimedia system. The research employs two testing methods: a black box test to assess the application's menu functionality, and a compatibility test to evaluate its performance across different versions of the Android operating system. These tests are essential for ensuring the application's reliability, functionality, and compatibility across diverse platforms and user experiences.

Blackbox testing aims to assess program functionality and thoroughly identify errors in system execution or functions. Each test case involves providing input and observing the application's output to ensure it aligns with the intended design. This type of testing also seeks to detect potential errors, facilitating their prompt correction.. The specifications of the Android devices intended for testing will be presented in Table IV and The usability of the AR software was evaluated through black-box testing, as illustrated in Table V, with the result showing a 100% success rate.

TABLE IV. Android Specifications For Testing

Device	CPU	RAM	Rear Camera
Redmi Note 9	Octa-core (2x2.0 GHz Cortex-A75 & 6x1.8 GHz Cortex-A55)	6 GB	48 MP
Realme 8 5G	Octa-core (2x2.2 GHz Cortex-A76 & 6x2.0 GHz Cortex-A55)	8 GB	48 MP
Realme XT	Octa-core (2x2.3 GHz Kryo 360 Gold & 6x1.7 GHz Kryo 360 Silver)	8 GB	64 MP
Samsung A14	Octa-core (2x2.4 GHz Cortex-A78 & 6x2.0 GHz Cortex-A55)	8 GB	50 MP

TABLE V. Black Box Testing

Testing	Test Cases and Result	Result
Login Page	Displaying the Splash Screen and directing the user to the Login page	Succeed
Login Button	Navigating to the profile page	Succeed
Create New Account Button	Navigating to the Sign Up page	Succeed
Forget Password Button	Navigating to the Forget Password Page	Succeed
Sign Up Page	Displaying a page for registering an account for those who do not have one yet	Succeed

Testing	Test Cases and Result	Result
Sign Up Button	If the account registration is successful, it will return to the login page	Succeed
Back Button From Sign Up Page to Login Page	Displaying the login page	Succeed
Forget Password Page	Displaying a page to recover accounts	Succeed
Back Button From Forget Password Page to Login Page	When the Back button is pressed, it will return to the Login Page	Succeed
Profile	Displaying a page that shows the username and email of users registered on the Firebase server	Succeed
Log Out Button	When the user clicks or taps on the "Log Out" button, it triggers an action that ends their current session	Succeed
Main Menu	Displaying the main page, which will present an interface for accessing all available menus	Succeed
Visual 3D Kepler Menu	Displaying a 3D visualization of the rotation of the solar system	Succeed
Back Button From Visual 3D Kepler to Main Menu	When the Back button is pressed, it will return to the Main menu	Succeed
Subject Matter Of Kepler's Laws Meny	Displays Kepler's law learning materials	Succeed
Learning Video	Displaying a Kepler's laws learning video	Succeed
Backward Button	When the user clicks or taps this button, the video playback will move backward by a certain amount	Succeed
Play Button	When the play button is pressed, the video will start.	Succeed
Pause Button	When the pause button is pressed, the video will stop.	Succeed
Forward Button	When the user clicks or taps this button, the video playback will move forward by a certain amount	Succeed
Exit Button From Learning Video to Main Menu	When the Back button is pressed, it will return to the Main menu	Succeed
Example Questions Menu	Displaying Kepler's laws questions with AR	Succeed
Multiple Selection Button in Example Questions Menu	When one of the multiple-choice buttons is pressed, an animation indicating whether the answer is correct or incorrect will appear.	Succeed
Exit Button From Example Questions Menu to Main Menu	When the Back button is pressed, it will return to the Main menu	Succeed
Exercises Menu	Displaying questions about Kepler's laws	Succeed
Multiple Selection Button in Exercises Menu	When one of the multiple-choice buttons is pressed, an animation indicating whether the answer is correct or incorrect will appear.	Succeed
Exit Button From Exercises Menu to Main Menu	When the Back button is pressed, it will return to the Main menu	Succeed
Daily Tests Menu	Displaying questions about Kepler's laws same as Exercises Menu	Succeed
Multiple Selection Button in Daily Tests Menu	When one of the multiple-choice buttons is pressed, an animation indicating whether the answer is correct or incorrect will appear.	Succeed
Exit Button From Daily Tests Menu to Main Menu	When the Back button is pressed, it will return to the Main menu	Succeed
About Menu	Displaying the objectives behind developing this application	Succeed
Exit button from About Menu to Main Menu	When the Back button is pressed, it will return to the Main menu	Succeed
Exit Application Button	The button for exiting the application.	Succeed

Compatibility testing is used to assess the software's installation feasibility. This involves installing the AR application on multiple Android versions, as outlined in Table VI, with a 100% success rate in functioning .

TABLE VI. RESULT OF COMPABILITY TEST

Device	Version	Result
Redmi Note 9	12.0	Running
Realme 8 5G	11.0	Running
Realme XT	10.0	Running
Samsung A14	13.0	Running

V. CONCLUSION

The research concludes as follows: A mobile application utilizing 3D animation and AR on the Android platform has been developed, following the Multimedia Development Life Cycle (MDLC) as its development methodology. This application, based on AR with 3D animation, has been effectively tested on various Android smartphones such as Redmi Note 9, Realme XT, Realme 8 5G, and Samsung A14. Improved performance is noted with higher Android versions tested. However, the application has yet to undergo testing with students studying Kepler's laws. It's anticipated that future trials will involve student participation. Integration of interactive features promises a more immersive and thorough learning experience, enhancing users' grasp of Kepler's laws.

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LAMPIRAN A

POSTER KEGIATAN

Gambar A.1. Poster Kegiatan ISITDI *International Conference*

LAMPIRAN B

BUKTI *SUBMISSION PAPER*

#113 (1571029985): *Unityedu: Augmented Reality For Interactive Learning Media On Kepler's Laws Using Unity3D Platform Using Multimedia Development Life Cycle (MDLC) Method*

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	Drag to change order	Author name	Author affiliation (edit for paper)	Author email	Email	Delete
Authors	⠿	Muhammad Raihan Pratama Hadi	Universitas Islam Negeri Sultan Syarif Kasim, Indonesia	12050313250@students.uin-suska.ac.id		
	⠿	Muhammad Luthfi Hamzah	Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia	muhammad.luthfi@uin-suska.ac.id		
	⠿	Angraini Angraini	UIN SUSKA Riau, Indonesia	angraini@uin-suska.ac.id		
	⠿	Eki Saputra	Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia	Eki.saputra@uin-suska.ac.id		

Paper title	*Unityedu: Augmented Reality For Interactive Learning Media On Kepler's Laws Using Unity3D Platform Using Multimedia Development Life Cycle (MDLC) Method*
Conference and track	2024 2nd International Symposium on Information Technology and Digital Innovation (ISITDI) - *2024 International Symposium on Information Technology and Digital Innovation (ISITDI)*
Abstract	In recent times, Augmented Reality (AR) applications have gained prominence across various domains,...
Keywords	Augmented Reality; Unity 3D; Vuforia SDK; Multimedia Development Life Cycle; Interactive Learning Media
Topics	Digital Media, Game and Learning Technologies. (Only the chairs can edit)
Personal notes	
Roles	You are the creator and an author for this paper. You have authored an accepted paper in this conference.
Status	Accepted
Copyright	IEEE; IEEE completed Jun 18
Presented	by not specified

Gambar B.1. Bukti *Submission Paper*

Stamped for IEEE Xplore	Review manuscript	Final manuscript	Stamped for attendee proceedings	Presentation Video

ISITDI 2024

Relevance and timeliness	Technical content and scientific rigour	Novelty and originality	Quality of presentation	
completed	Average 3	Valid work but limited contribution. 3	Some interesting ideas and results on a subject well investigated. 3	Readable, but revision is needed in some parts. 3

Detailed comments

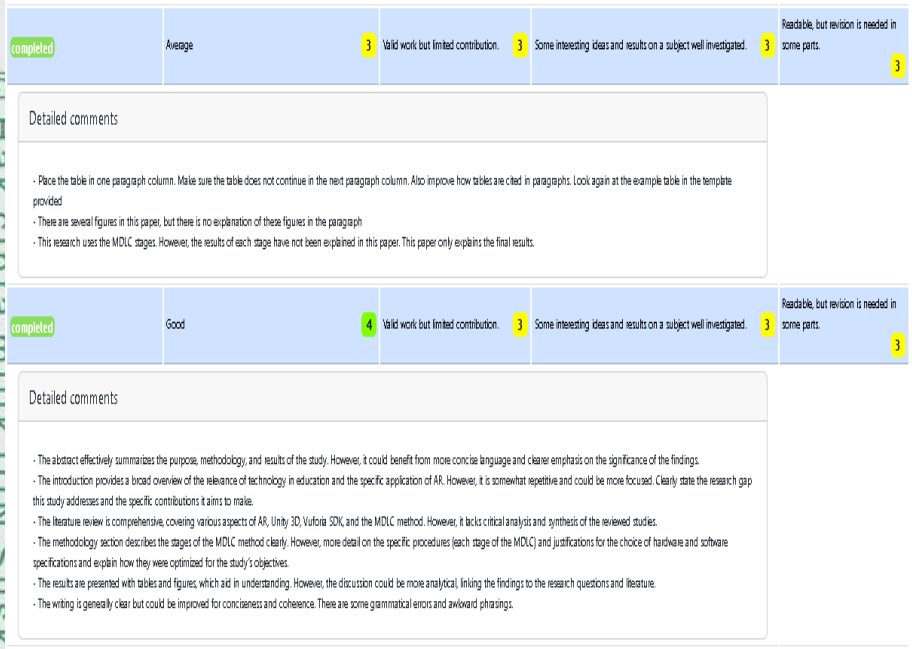
1) Reduce the repeated use of "Augmented Reality (AR)" in the manuscript. After introducing the abbreviation AR the first time, use the abbreviation alone in subsequent references. This applies to other terms with abbreviations as well.
2) The introduction does not clearly state the problem or the urgency of developing the application. Make sure to emphasize what the main problem is and why the development of this application is crucial to address it.
3) In the methodology section, research requirements are already a part of the method being used (MDLC). There is no need to separate the research requirements from MDLC, as they are included in the method's stages.
4) Here are some relevant references that can be added to the reference list:

A. D. Samala and M. Amanda, "Immersive Learning Experience Design (ILXD): Augmented Reality Mobile Application for Placing and Interacting with 3D Learning Objects in Engineering Education," Int. J. Interact. Mob. Technol., vol. 17, no. 05, pp. 22–35, Mar. 2023. https://doi.org/10.3991/ijim.v17i05.37067
A. D. Samala, et al., "3D Visualizations in Learning: An Evaluation of an AR+Core Application for Computer Hardware Education using the Hedonic Motivation System Adoption Model," TEM Journal, vol. 13, no. 1, pp. 466-475, 2024. doi: 10.18421/TEM131-48.

completed	Average 3	Valid work but limited contribution. 3	Some interesting ideas and results on a subject well investigated. 3	Readable, but revision is needed in some parts. 3

Detailed comments

Gambar B.2. Komentar Revisi



completed	Average	3	Valid work but limited contribution.	3	Some interesting ideas and results on a subject well investigated.	3	Readable, but revision is needed in some parts. 3

Detailed comments

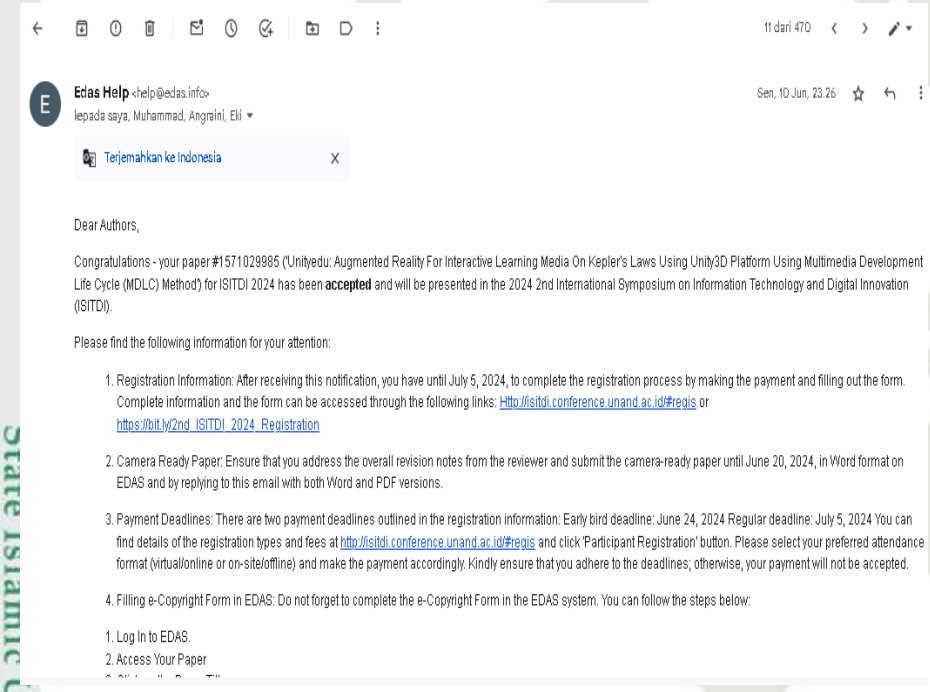
- Place the table in one paragraph column. Make sure the table does not continue in the next paragraph column. Also improve how tables are cited in paragraphs. Look again at the example table in the template provided
- There are several figures in this paper, but there is no explanation of these figures in the paragraph
- This research uses the MDLC stages. However, the results of each stage have not been explained in this paper. This paper only explains the final results.

completed	Good	4	Valid work but limited contribution.	3	Some interesting ideas and results on a subject well investigated.	3	Readable, but revision is needed in some parts. 3

Detailed comments

- The abstract effectively summarizes the purpose, methodology, and results of the study. However, it could benefit from more concise language and clearer emphasis on the significance of the findings.
- The introduction provides a broad overview of the relevance of technology in education and the specific application of AR. However, it is somewhat repetitive and could be more focused. Clearly state the research gap this study addresses and the specific contributions it aims to make.
- The literature review is comprehensive, covering various aspects of AR, Unity 3D, Vuforia SDK, and the MDLC method. However, it lacks critical analysis and synthesis of the reviewed studies.
- The methodology section describes the stages of the MDLC method clearly. However, more detail on the specific procedures (each stage of the MDLC) and justifications for the choice of hardware and software specifications and explain how they were optimized for the study's objectives.
- The results are presented with tables and figures, which aid in understanding. However, the discussion could be more analytical, linking the findings to the research questions and literature.
- The writing is generally clear but could be improved for conciseness and coherence. There are some grammatical errors and awkward phrasings.

Gambar B.3. Komentar Revisi



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Sen, 10 Jun, 23.26

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Congratulations - your paper #1571029985 ('Unityedu: Augmented Reality For Interactive Learning Media On Kepler's Laws Using Unity3D Platform Using Multimedia Development Life Cycle (MDLC) Method') for ISITDI 2024 has been **accepted** and will be presented in the 2024 2nd International Symposium on Information Technology and Digital Innovation (ISITDI).

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2. Camera Ready Paper: Ensure that you address the overall revision notes from the reviewer and submit the camera-ready paper until June 20, 2024, in Word format on EDAS and by replying to this email with both Word and PDF versions.
3. Payment Deadlines: There are two payment deadlines outlined in the registration information: Early bird deadline: June 24, 2024 Regular deadline: July 5, 2024 You can find details of the registration types and fees at http://isitdi.conference.unand.ac.id/#regis and click 'Participant Registration' button. Please select your preferred attendance format (virtual/online or on-site/offline) and make the payment accordingly. Kindly ensure that you adhere to the deadlines; otherwise, your payment will not be accepted.
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Gambar C.1. *Payment Receipt*

DAFTAR RIWAYAT HIDUP

Muhammad Raihan Pratama Hadi lahir di Pekanbaru pada tanggal 21 Februari 2002. Peneliti merupakan anak pertama dari Bapak Hadiansyah dan Ibu Ratna Sumiati. Pada tahun 2008 sampai 2014 peneliti memulai pendidikan di SDS YPPI Perawang. Setelah menyelesaikan pendidikan Sekolah Dasar peneliti melanjutkan pendidikan di SMPN 1 Tualang pada tahun 2014 dan lulus pada tahun 2017. Peneliti melanjutkan pendidikan di SMA Negeri 1 Tualang pada tahun 2017 dan lulus pada tahun 2020 dan peneliti melanjutkan pendidikan Strata 1 (S1) di Universitas Islam Negeri Sultan Syarif Kasim Riau pada Fakultas Sains dan Teknologi tepatnya pada Program Studi Sistem Informasi tahun 2020. Selama menjadi mahasiswa, peneliti pernah melaksanakan Kerja Praktek di PT. Arara Abadi. Peneliti juga mengikuti Pengabdian Kuliah Kerja Nyata atau KKN di Desa Temusai, Kecamatan Bunga Raya, Kabupaten Siak. Peneliti bergabung dalam *Study Club* yang bernama *Pro-Knowledge* pada tahun 2022. Peneliti juga pernah menjadi tim sukses Kemah Bakti Mahasiswa atau KBM Sistem Informasi sebagai panitia divisi konsumsi pada tahun 2022. Pada penelitian Tugas Akhir ini peneliti mengambil judul ”AR Untuk Media Pembelajaran Interaktif Materi Hukum Kepler Dengan *Unity3D Platform* Menggunakan Metode MDLC”.