

## Information Technology Infrastructure Hardware Device Learning Application Uses Augmented Reality

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### Abstrak

Mahasiswa kesulitan untuk belajar dengan berani karena alat untuk belajar praktikum perangkat keras Infrastruktur Teknologi Informasi khususnya perangkat keras Infrastruktur Teknologi Informasi tidak tersedia di rumah masing-masing, sehingga diperlukan aplikasi yang dapat mendukung kekurangan tersebut, oleh karena itu diperlukan aplikasi pembelajaran perangkat keras merancang Infrastruktur Teknologi Informasi menggunakan augmented reality dalam pembelajaran perangkat keras Infrastruktur Teknologi Informasi, aplikasi penelitian ini bertujuan untuk memberikan pembelajaran tentang materi perangkat keras Infrastruktur Teknologi Informasi dan komponen-komponennya pada mata pelajaran perangkat keras Infrastruktur Teknologi Informasi. Aplikasi ini dirancang dengan menggunakan metode Development Life Cycle (MDLC). Augmented reality dibuat dengan metode markerless berbasis android menggunakan software Unity engineering, dan 3D blender adalah software untuk membuat objek 3D untuk perangkat dan komponen hardware Infrastruktur Teknologi Informasi, text-editor yang digunakan untuk script Unity adalah Visual Studio Code yang menggunakan bahasa C# , untuk membuat icon menu menggunakan software Paint tool sai. Aplikasi ini akan memperkenalkan 7 perangkat hardware Infrastruktur Teknologi Informasi yaitu komputer, mouse, keyboard, printer, server, speaker, wifi dalam bentuk augmented reality.

**Kata Kunci:** Peserta Didik, Praktikum Perangkat Keras Infrastruktur Teknologi Informasi, Unity, Augmented Reality, Markerless, Visual Studio.



### Abstract

Students find it difficult to study boldly because the tools to study Information Technology Infrastructure hardware practicum, especially Information Technology Infrastructure hardware devices, are not available in their respective homes, so an application is needed that can support these deficiencies, therefore a hardware learning application is designed Information Technology Infrastructure using augmented reality in learning Information Technology Infrastructure hardware, this research application aims to provide learning about the materials for Information Technology Infrastructure hardware devices and components in Information Technology Infrastructure hardware subjects. This application is designed using the Development Life Cycle (MDLC) method. Augmented reality is made with an android-based markerless method using Unity engineering software, and 3D blender is software for creating 3D objects for devices and Information Technology Infrastructure hardware components, the text-editor used for Unity scripts is Visual Studio Code which uses C# language, to create menu icon using the Paint tool sai software. This application will introduce 7 Information Technology Infrastructure hardware devices, namely computers, mice, keyboards, printers, servers, speakers, wifi in the form of augmented reality.

**Keywords:** *Learner, Information Technology Infrastructure hardware practicum, Unity, Augmented Reality, Markerless, Visual Studio.*

## INTRODUCING

Education is an effort to improve the quality and efforts to develop the potential of human resources (HR) so that they can have an impact on life. Where is the implementation of education itself in the learning process [1]. Augmented Reality (AR) which is a technology concept that can combine virtual objects, both 2D objects and 3D objects, in real time and projected in real time into real time. Technological innovation in the field of education is utilizing Augmented Reality (AR) technology in designing a learning media for Biology subjects.

Information technology infrastructure (IT) hardware is the physical device or hardware used in an information technology system. This includes devices such as computers, servers, networks, storage devices, and other input/output devices. This hardware is used to run information technology applications and store data. For example, a computer can be used to run software applications such as office applications or games, while a server can be used to store data that can be accessed by users on a network. Other information technology infrastructure hardware includes routers, switches, firewalls, and storage devices such as hard drives or cloud storage.

### Mathematics

Augmented reality is a technique that combines two-dimensional and three-dimensional virtual objects into a real three-dimensional sphere and then projects these virtual objects in real time [2]. Augmented reality has been applied in various fields, such as medicine, entertainment, military, planning, mechanical technology and others. Augmented reality has been launched on widely used devices such as mobile phones [3].

Information technology infrastructure is a collection of hardware and software used to support information systems and business activities. Information technology infrastructure hardware includes components that function to store, process, and transmit data. Some examples of information technology infrastructure hardware are computers, mouse, keyboards, printers, servers, speakers, wifi..

There are several methods that can be used in augmented reality, namely marker-based tracking and non-marker-based tracking. Tracking Cursing Markers These markers are usually in the form of black and white box illustrations with a thick black border and white background, which in this study used markers that contained imaging patterns for information technology infrastructure devices, in the form of computers, mouse, keyboards, wifi, speakers, printers and servers.

Unity 3D engine is a game programming engine for building 3D games. Game engine is a segment that is in the background of every game. Mesh is the default shape of 3D objects. Mesh creation is not done in unity. Meanwhile, game objects are materials for various parts.

Blender is a 3D object design software that seems to be the most popular among other open source software. The tools provided are simple, but cover all the requirements for creating animated films. For character animation, for example, Blender offers editing services despite the fact that it's not as good at enterprise-level programming as 3D Studio Max. Blender is a software whose capabilities can be modified by anyone.

Vuforia will analyze the marker as an image using the marker detector and display 3D information of the detected marker. This software development kit uses computer vision technology that can recognize and track target images in real time. The target image is an image that can be tracked and detected by the image while working, that is, vuforia will recognize the target image by comparing the characteristics of the physical image with the captured image stored in the application database [4]. Visual Studio Code (VC Code) can be defined as a lightweight and powerful OpenSource text editor created by Microsoft [5]. SAI or Easy Paint Tool SAI is a raster graphics drawing and editing software for Microsoft Windows developed and published by Systemax Software. [5].

## METHOD

### System Analysis

In developing a system, there are several things that we must pay attention to first, for that we need a system analysis to be carried out and developed, namely analysis of the current system, analysis of system recommendations, user analysis.

### System Requirements Analysis

At this stage, hardware and system requirements analysis will be carried out to train an application. The analyzed system is a system that contains information about everything related to making applications. Needs analysis is used to fulfill requirements specification documents in accordance with what teachers and students want as users of the new system. At this stage, it contains several things that must be prepared to develop augmented reality media, educational media to study Information Technology Infrastructure hardware, starting from the software and hardware used to the research locations to be used.

### System Design Method

The MDLC (Multimedia Development Life Cycle) methodology is a methodology that can be used for software development. The MDLC method was chosen because the manufacture of teaching materials must go through well-designed and consistent stages so that the resulting applications are of good quality and can be used as learning media. Android's open source code and licensing licenses allow products to be unconditionally modified and distributed by utility creators, remote administrators, and app developers. When Google.inc bought Android.inc, everyone underestimated the beginning of Android, as it was [6].

### Flowchart

Flowchart is a table with certain symbols that describe in detail the sequence of processes and the relationship between a process (instructions) and other processes in a program.

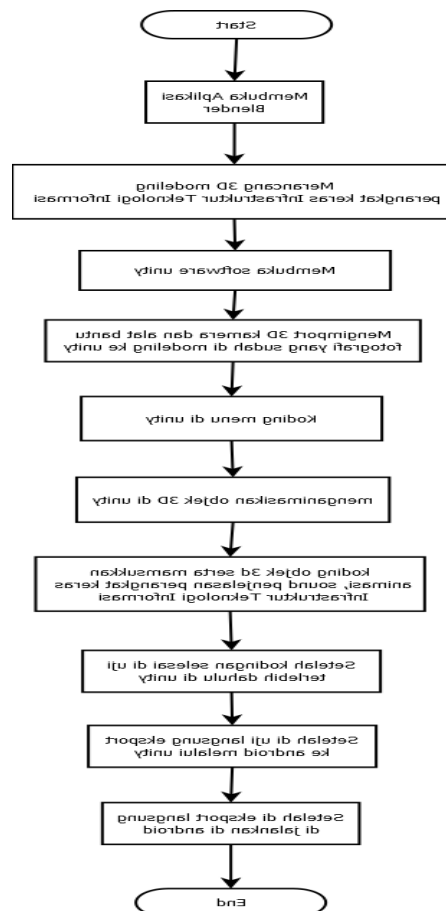
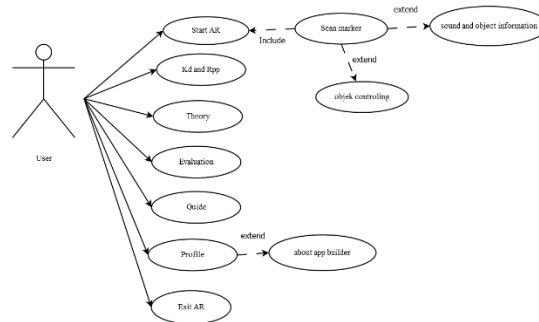


Figure 1. Flowchart of Information Technology Infrastructure hardware learning application using augmented reality

### Use Case Diagram

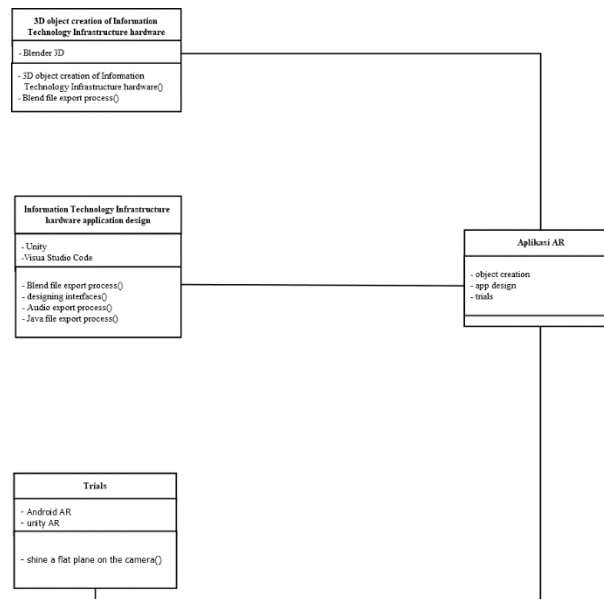
A use case diagram is a diagram that shows several use cases and actors. This diagram is important to organize and show the behavior of the framework that is needed and expected by users [7].



**Figure 2. Use Case Diagram of Information Technology Infrastructure hardware learning application using augmented reality**

### Class Diagram

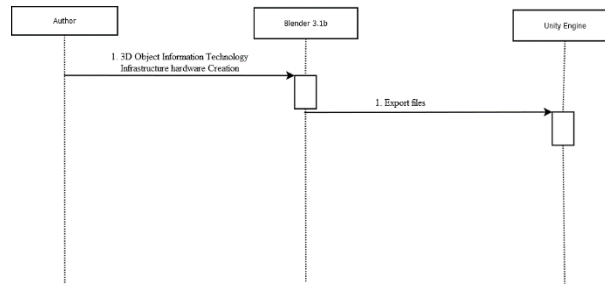
A class diagram is the relationship between classes and describes in detail each layer in the design model of a system, also showing the rules and responsibilities of the entities that determine the behavior of the system. Class diagrams typically include: class (classes), relational associations, generalizations and aggregations, properties (properties), activities (activities/methods) and visibility, level of access of external objects to activities or properties. The following is a class diagram of Information Technology Infrastructure hardware learning application using augmented reality:



**Figure 3. Class Diagram of Information Technology Infrastructure hardware learning application using augmented reality**

### Sequence Diagram

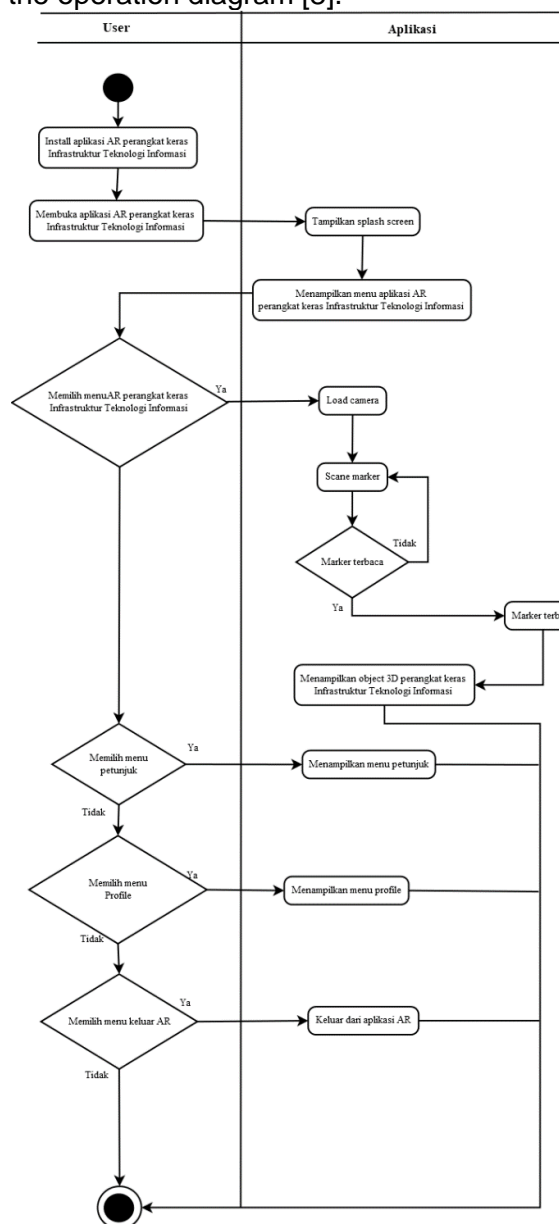
Sequence diagram is a diagram that describes the interactions between an object in chronological order. Its purpose is to show a series of messages that are sent between objects and the interactions between objects that occur at a certain point in the execution of the system. The following is a sequence diagram of Information Technology Infrastructure hardware learning application using augmented reality:



**Figure 4. Sequence Diagram Modeling 3D Application of Information Technology Infrastructure hardware learning application using augmented reality**

**Activity Diagram**

An activity diagram is a chart that depicts or shows an ongoing process. The following is a picture and description of the operation diagram [8].



**Figure 5. Activity diagram of Information Technology Infrastructure hardware learning application using augmented reality**

## RESULTS AND DISCUSSION

The result of the system design is the result of the layout that has been done previously on the interface design in the form of an interface display of the system to be built. The results of this system interface are used to determine whether the designed system can function in accordance with the previously implemented design

### Splash Screen Information Technology Infrastructure hardware

The splash screen display will display the logo of unity. The following is the splash screen design of Information Technology Infrastructure hardware learning application using augmented reality.



Figure 6. The results of the splash screen design of Information Technology Infrastructure hardware learning application using augmented reality.

### Main Menu Information Technology Infrastructure hardware

On the main menu, menus will appear that can be selected by the user interface. That is, there is a Start AR button menu to start displaying 3D objects, the rps button will display Information Technology Infrastructure hardware rps material, the material button will display Information Technology Infrastructure hardware material, the evaluation button will display practice questions or quizzes, the guide button will display a guide use. AR Breathing, Menu about displays hardware usage information AR Information Technology Infrastructure and exit button to exit the application. Here's what the main application menu looks like:



Figure 7. The results of Information Technology Infrastructure hardware learning application using augmented reality.

### Information Technology Infrastructure hardware guide menu

The tutorial menu contains a 2d canvas which has a background and guide in the form of an AR app manual, the help menu button is just a home button.



Figure 9. The results of the menu design guide Information Technology Infrastructure hardware learning application using augmented reality.

### Menu Material Information Technology Infrastructure hardware

This menu displays a PDF of biological breathing material, there are not many scripts in this menu, because it uses the pdf plugin asset:

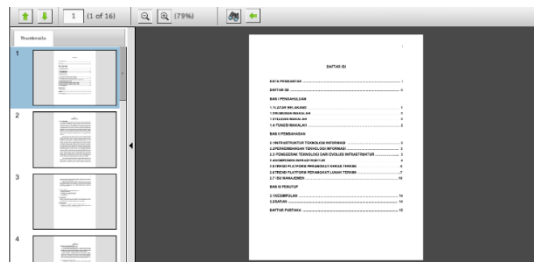


Figure 10. Results of the menu design for Information Technology Infrastructure hardware learning application using augmented reality.

### Menu RPS Information Technology Infrastructure hardware

This menu displays PDF kd and rpp material for the biological respiratory system, there are not many scripts in this menu, because it uses pdf plugin assets:

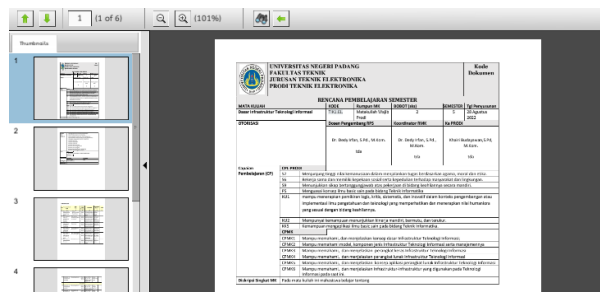


Figure 11. The results of the rps menu designs Information Technology Infrastructure hardware learning application using augmented reality.

### Menu Evaluation Information Technology Infrastructure hardware

The evaluation menu contains quizzes on biology subjects, the script in the evaluation menu uses a notepad as a database of questions that will be called using coding that creates an object as a regulator of the question system and the evaluation menu display:



Figure 12. Results of the menu design Evaluation of Information Technology Infrastructure hardware learning application using augmented reality.

### Menu Exit Information Technology Infrastructure hardware

This AR app exit menu using public void btn\_family() in the TransitionCanvas script will be called via the On Click() button component.

### Menu AR Information Technology Infrastructure hardware

The AR menu of Information Technology Infrastructure hardware will direct the user to point the camera at a unique object, so that the camera can track the object, so that the Information Technology Infrastructure hardware can be displayed on the smart phone and

there is and on the camera there is also one button, namely the button to return to play menu.



**Figure 13. AR menu design results Information Technology Infrastructure hardware learning application using augmented reality.**

## CONCLUSION

The conclusion obtained from the results of Information Technology Infrastructure learning hardware applications using Augmented Reality, the resulting application is an Augmented Reality-based learning media application for Information Technology Infrastructure hardware materials using the Multimedia Development Life Cycle method and augmented reality with the markerless method, making it easier students in online learning.

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