

## UTILIZING THE MIT APP INVENTOR TOOLS AS A LEARNING MEDIA INFORMATION TO CREATE ANDROID-BASED APPLICATIONS

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### Article Info

#### Article history:

Received: Feb 28<sup>th</sup>, 2023  
Revised: March 7<sup>th</sup>, 2023  
Accepted: April 10<sup>th</sup>, 2023

#### Keywords:

Android,  
MIT App Inventor,  
Software,  
Technology

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### Abstract

The rapid development of digital technology currently provides many benefits to humans. For example, the development of software or various technological tools that support activities and provide convenience in human life. With the development of the times, software is increasingly sophisticated in various fields, one of which is the field of education. In supporting the learning process, the education sector must follow and adapt existing technology. As is the case with learning media that currently uses an Android-based operating system. Therefore, it is very necessary to educate and teach how to build applications using the operating system. Based on the current problems, the authors provide an educational solution with "Utilization of MIT App Inventor Tools as Learning Media for Creating Android-Based Applications". The data collection technique in this study is a systematic analysis of observations by looking for document similarities. Data collection was also carried out through a literature review by looking for references, journals and documents related to this research. With current technological developments, educational institutions, especially universities, use a lot of Android as a means of learning media. As a user of Android, Higher Education also has innovations in studying the provision of materials such as creating various Android-based applications, one of which is the MIT App Inventor. Based on the research process carried out, it can be concluded four things, namely MIT App Inventor is an alternative tool for creating Android-based applications, MIT App Inventor has a visual interface that is easier for ordinary people to learn to use, Visual design in making programs using the method *drag-and-drop* components, and *tools* MIT App Inventor also works fine.

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### To cite this article:

### INTRODUCTION

The development of technology is currently very rapid so it can provide benefits to humans [1]. Digital technology with its software or *tools* is one example of the benefits of technology that provides convenience or alternatives to humans. *Software* with the development of the times, is becoming more sophisticated in various fields, one of which is in the field of education [2].

The field of education must follow current technology which includes learning media so that it can provide benefits in the future [3].

Learning media includes the main components of learning process activities.

Learning media must also have innovation to create an atmosphere for teaching and learning activities to be attractive and effective in the learning process [4].

One of the learning media innovations is using technological devices, for example, smartphones. According to the results of a survey by the Central Bureau of Statistics (BPS), users of smartphones in Indonesia, it increases every year from 2015 to 2021. The percentage of mobile phone usage in 2015 reached 56.92% and in 2021 the percentage increased to 65.87%. The majority of smartphone users are also for activities that are entertainment in nature, for example, social media and games,

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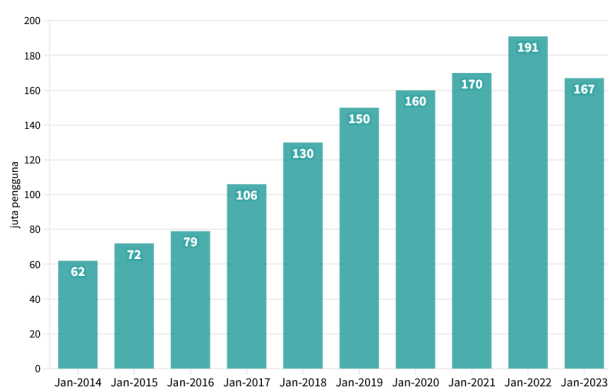
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while for use in the field of education is still very limited.

**Table 1.** Use of Smartphones for Student learning activities

No	Year	Mark /%
1.	2016	33,98
2.	2017	40,96
3.	2018	45,75
4.	2019	53,06
5.	2020	59,33

According to the Central Statistics Agency (BPS) teaching and learning activities in 2020 increased to a percentage of 59.33% from the previous year due to the impact of the Covid 19 pandemic. The use of smartphones is also not only for teaching and learning activities but also as an entertainment medium to get information, one of which is using social media



**Figure 1.** Statistics of Social Media Users in Indonesia

According to reports from *We Are Social* From the statistical picture of social media users in Indonesia, the use of social media continues to increase until now in 2023 it has reached 167 million people, which is equivalent to 60.4% of the population in the country.

The use of technology has been regulated in the Regulation of the Minister of Education and Culture of the Republic of Indonesia number 65 concerning process standards that in the 2013 Curriculum technology plays a role in increasing student independence in acquiring knowledge [5]

Technology *smartphones* for learning media, one of which is based on Android. The

use of Android in learning media is needed to educate and teach how to build applications using an Android-based operating system.

Based on the current problems, the authors provide an educational solution with "Utilization of Mit Inventor Tools as Learning Media for Creating Android-Based Applications". This research is expected to be one of the breakthroughs for educating application development smartphones based on Android as a learning medium with tools MIT Inventor.

### Application

According to the Big Indonesian Dictionary (KBBI), an application is defined as the application of a system designed to process data using the rules or provisions of a particular programming language. Another understanding too, according to Kadir (2008: 3) states that an application is defined as a program created by a computer to work on and carry out specific tasks for the user. [6]

According to Harip Santoso, an application is a group of files (form, class, rePort). The goal is to carry out activities related to one another.[7]

According to Rachmad Hakim S, an application of software with a specific purpose, for example, managing Windows, document processing, games and others.[8]

### Smartphone

According to Garini, Gadgets are small electronic devices that have many functions for users so they are considered more convenient. [9]

According to Ety Shofiah, a smartphone is a cellphone that combines Personal Digital Assistant (PDA) functions such as calendars and personal schedules. Address book, can access the internet, open email, create documents, play games, and open other applications. [10]

### MIT App Inventor

MIT App Inventor is a tool that facilitates a simple application creation process to create applications mobile without having to learn or use a programming language that is so complex [11]. *Tools* It can also be easily used by new users to create a computer program they create software Android based. The visual interface for making applications on this MIT App

Inventor with drag-and-drop visual objects for creating simple applications.

### Android

Google Inc. is a company that develops Android which is a Linux-based operating system and is open *source* [12]. Android until now there are more than one million applications that can be downloaded by Android users through online store application services, namely *Google Play Store*.

According to Rumopa, Android is a Linux-based operating system designed for touchscreen mobile devices such as smartphones and tablet computers [13]. Dixit said that Android is a mobile device used for mobile devices which includes an operating system, middleware, and core applications [14].

Reviewed by N. Nissim et al. on Tidjon proposed an active learning-based approach (ALDROID) to update an antivirus signature repository by automatically acquiring a maximum quantity of zero-day malware and then, enhancing the ALDROID's detection model using new malware samples. The authors tested their approach using the Android platform and Android's anti-virus software [15].

Mobile technology is unlikely to be able to supply the necessary service on its own but needs to be integrated with digital technology [16].

### College

According to Law No. 20 of 2003 Article 19 Paragraph 1: what is meant by tertiary institutions is the level of education after secondary education which includes diploma, undergraduate, masters, specialist and doctoral education programs organized by universities.

Indonesia has three categories of higher education institutions, namely private universities (PTS), state universities (PTN), and official universities (PTK). These educational institutions also consist of several categories such as Colleges, Institutes, Universities, and Academies. Educational institutions also have degree levels such as Diploma 1 and 2 with degrees (A.Ma), Diploma 3 with degrees (A.Md), Strata One (S1) with Bachelor degrees, Masters degrees (S2) with degrees (Master), and Strata Three (S3) with a Doctorate.

According to Law No. 12 of 2012 Article 4, Higher Education has several functions as follows:

- a. Develop capabilities and form dignified national character and civilization in the context of educating the nation's life.
- b. Develop academic activities that are innovative, responsive, creative, skilled, competitive and cooperative through the implementation of the Tridharma.
- c. Developing science and technology by paying attention to and applying human values possessed humans so that humans become complete humans.

### METHOD

The data collection technique in this study was to analyze by systematic observation by looking for document similarities. Data collection is also done by reviewing the literature by looking for references, journals, and documents related to research [17]. Nowadays involves data-collecting, analyzing and decision-making processes based on anything: that can be a machine, an algorithm, a computer program, a system or another. It has been long considered a sub-discipline of computer science, however, with its increasing applications to a large number of industries and research fields [18].

### RESULTS AND DISCUSSION

Currently technological developments in educational institutions, especially Higher Education (PT), the majority of learning media facilities use Android smartphones [19]. If Higher Education is an Android smartphone user for learning media, Higher Education also has innovation in learning to provide material for learning to make Android applications, one of the tools is the MIT App Inventor.

There are two types of properties in *Tools* this is online which can be visited on the page on the page <https://appinventor.mit.edu/> and offline which can be downloaded on the page <https://sourceforge.net/projects/ai2offline/>. The MIT App Inventor tools can be seen in the following image below.

1. Main page

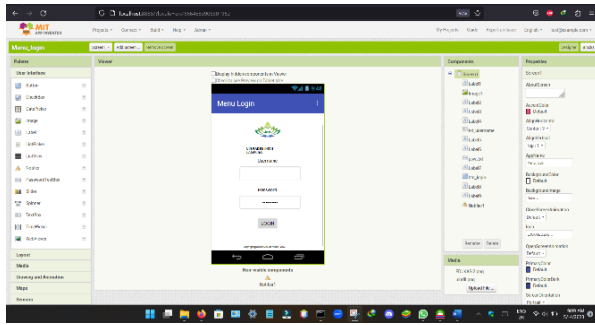


Figure 2. Main Page

The main page is divided into five sections as follows:

a. Top side



Figure 3. Upper Side

On the top there are menus such as the Project menu which is useful for viewing projects that have been made, creating new projects, and entering projects from outside that have been made with the extension (.aia) which can be entered from the computer or repository, export all or part of the created project from MIT App Inventor, *delete project* which is also useful for deleting projects that have been created or are no longer used, *save project* and *save project as* used to save the project, then exists *Checkpoint* and *Import Keystore*. Next, there is the menu *Connect* which is useful for linking project results to a device such as AI Companion which is useful for connecting projects that have been created in the form of QR codes and scanned using the MIT Inventor application which is on *smartphones*, the application can be downloaded at play store Android, then there is an Emulator submenu where project results can be seen using the default system from MIT App Inventor, USB is used to view project results using a USB cable link between laptop/computer devices and smartphone and the last submenu reset *Connection* which is useful for resetting all linkers of all devices. Next, there is a menu builder

which is useful for saving project results with the extension (.apk) to the *computer* or in the form of a QR Code. Menu to *help* us with the need for information about the MIT App Inventor tools.

b. Left side

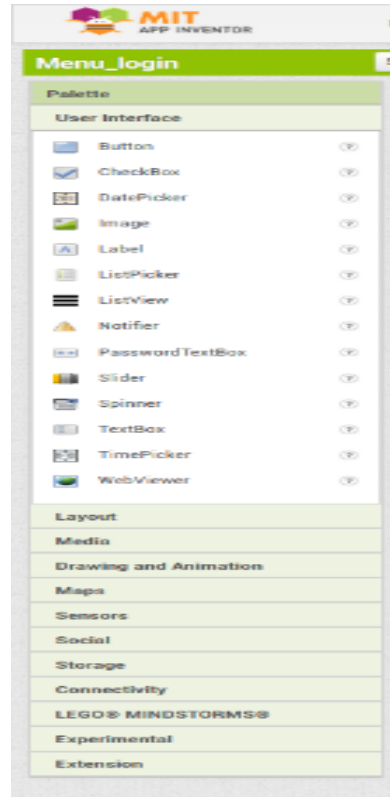
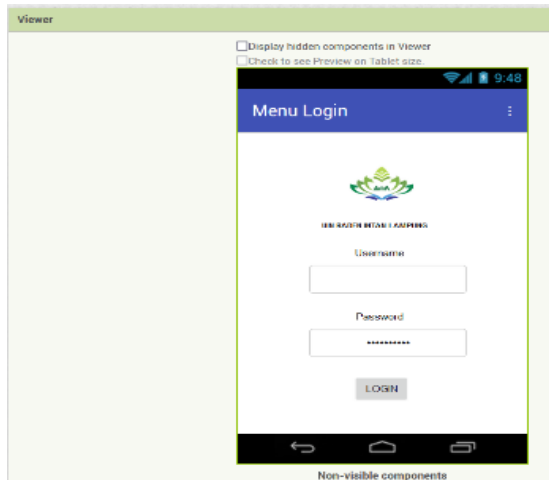


Figure 4. Left Side

On the left, there is a palette that is useful as a visual component that is included in the screen by drag-and-drop components. The components on the pallet are User Interface, Layout, Media, Drawing and Animation, Maps, Sensors, Social, Storage, Connectivity, LEGO MINDSTORMS, Experimental, and Extension.

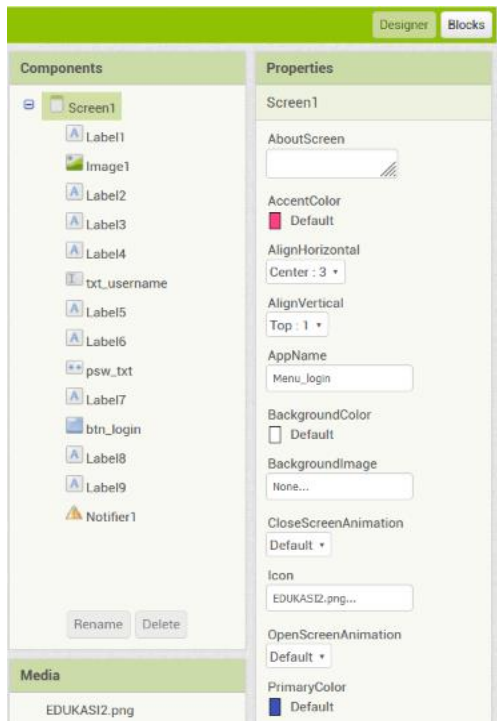
**c. Middle side**



**Figure 5. Middle side**

On the middle there is a screen project that will be created.

**d. Right side**

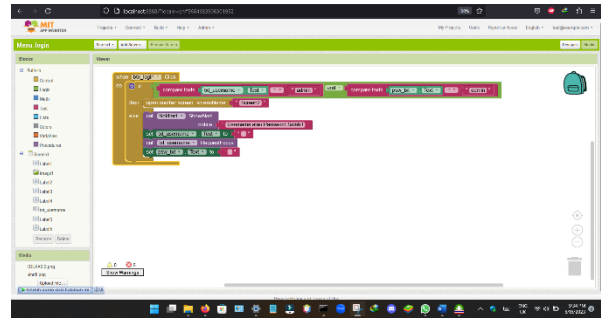


**Figure 6. Right side**

On the right there are two parts, namely the Component section which is used to monitor the Palette component used in the Screen, this component can also be renamed as needed and components can also be deleted on the screen. Furthermore, the Properties section is

useful for managing each Palette component used, such as colour settings, font size, font type and others.

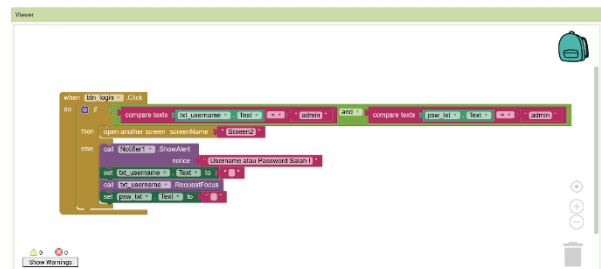
**2. Blocks page**



**Figure 7. Blocks page**

On this block page, it is used to make programs by entering algorithms according to the desired needs, such as playing puzzle games. On this page, there are also 2 sections as follows:

**a. Right side**

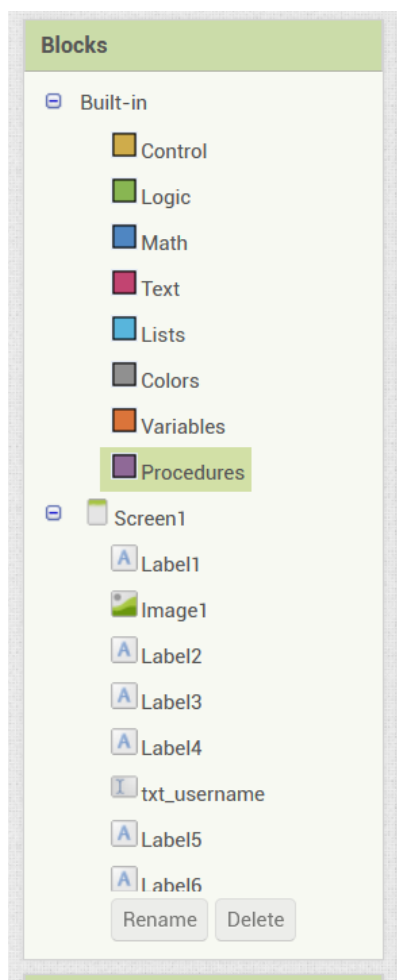


**Figure 8. Right side**

On the right, there is a viewer in which there are algorithm source code procedures created in making projects using MIT App Inventor.

**b. Left side**





**Figure 8. Right side**

On the left side of the page blocks, there are options that you want to use as needed.

### CONCLUSION

Based on the research process conducted, it can be concluded as follows.

1. MIT App Inventor be the one of *tools* alternative create Android-based applications.
2. MIT App Inventor has a visual interface that is easier for the general public to learn to use.
3. Visual Design in making programs using methods of drag and drop components.
4. The MIT App Inventor tools also work fine.

### Suggestion

1. The tools used by MIT App Inventor still have drawbacks such as the size capacity of these tools is not more than the maximum

limit of 5 mb when in use to *build* an application (.apk).

2. The results of this study can be used as an example, of teaching and learning using learning media in making Android-based applications.
3. This research can be used as reference material for further research in developing learning media for making applications.

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