Android-Based E-Learning Application Design in Schools

Akbar Iskandar[a]*, Mansyur[b], Ansari Saleh Ahmar[c], Muliadi[a], & Abdul Rahman[d]

[a]*Department of Informatics Engineering, Universitas Teknologi Akba Makassar, Makassar, Indonesia*
[b]*Department of Educational Research and Evaluation, Universitas Negeri Makassar, Makassar, Indonesia*
[c]*Department of Statistics, Universitas Negeri Makassar, Makassar, 90223, Indonesia*
[d]*Department of Mathematics, Universitas Negeri Makassar, Makassar, 90223, Indonesia*

Abstract

The concept of E-Learning itself is a guide between learning processes that are packaged in the form of information technology. During the pandemic, schools in Indonesia began to make changes to offline learning to online by utilizing various applications such as the Google Classroom and WhatsApp applications. Based on these conditions, the researcher tried to develop a system for use in schools in the form of Android-based e-learning using the waterfall method. Based on the results of system design and testing it appears that this system can be used at research locations because the system can run well based on the results of black box testing, while the expert judgment of 10 people said it was very good, while the user response was 150 people with a very good response of 70 percent (105 people), good 30 percent (45 people). So that by using an Android-based E-Learning application, of course learning done in schools is better than those that only use conventional models or only use Whatsapp or Google Classroom. In addition, with E-Learning the learning process that is usually carried out in schools can be done without having to go to school again, students and teachers can carry out the learning process from their respective homes using smartphones and the internet.

Keywords: Web-based e-learning, online learning, distance learning

1. Introduction

An application is a tool in the form of software that is usually made using a computer to solve existing problems (Iskandar et al., 2019); . Applications are currently made for various platforms, ranging from mobile applications intended for smartphones and tablets, desktop applications for laptops or PCs, website applications that can be used by smartphones, tablets, laptops or PCs (Iskandar et al., 2018). There are many types of applications, some are used for work, some are only limited to entertainment, some are used for the teaching and learning process in the world of education, apart from all that, the main purpose of the application is to facilitate human work, for example in E-Learning, makes it easier for teachers and students to carry out the learning process without meeting face to face.

E-learning is all that includes the use of computers to support the improvement of the quality of learning, including the use of mobile technologies. Lately, education in Indonesia has begun to decline due to the co-19 pandemic. Many schools were forced to close because they were worried about the corona virus spreading to the academic community. Along with the development of science and technology (IPTEK), learning methods have become more varied due to this outbreak. The unstoppable spread of COVID-19 certainly has an impact on people in the world. A number of researchers from various countries are racing to find a vaccine to stop the transmission of the virus.

Since March 16, 2020 the government has decided that students should study from home (Jones et al., 2022). In practice, the teaching and learning process at home, students and teachers are assisted with online learning applications. However,

---

*Corresponding author.

E-mail address:akbar.iskandar06@gmail.com

a number of difficulties were encountered by teachers when carrying out this learning from home method. Therefore, this article discusses the use of e-learning during the COVID-19 pandemic. That way, the learning process which was hampered due to the co-19 pandemic, can be resolved with the E-Learning application.

The concept of learning using E-Learning has had a significant influence on the process of transforming conventional education into digital form, both in terms of content and system (Dudung et al., 2022);(Mustapa et al., 2022). E-Learning can be used to chat either between students or between students and teachers, face-to-face lecture activities whose time is limited so that it is not enough to make small talk will be resolved with this E-Learning media(Feliz et al., 2022). E-Learning media makes learning activities more meaningful, because students and teachers can continue face-to-face learning through online small talk using E-Learning.

Apart from having small talk, E-Learning can also be used to hold discussions in certain forums that are more serious (Wut & Lee, 2022). The need for training for teachers and students so that they can optimally utilize E-Learning for the learning process. Until during a pandemic and post-pandemic the learning process is expected to run as it should. So that it is very possible for anyone to be able to use E-Learning as a medium in managing learning, both in web and mobile-based forms.

Based on observations made at SMA Negeri 12 Makassar, information was obtained that the school had not maximized technology in the learning process including the use of e-learning, so the learning process was less varied. Not because we don't want this system to work, but because the system is not yet available, so we need to design an online learning system by utilizing an Android application, namely an Android-based E-Learning application. Therefore the researchers are trying to make an Android-based E-Learning Application to help the learning process at SMA Negeri 12 Makassar. So that students who do not understand during the learning process in class can relearn the material through the system that has been provided, namely the E-Learning application.

2. Theoretical Basic

Online learning methods are considered closer to the current generation of students who are known to be very integrated with technology products (Wannapiroon et al., 2022). As is the case with E-Learning for the teaching and learning process without the need to meet face to face again at school, therefore, this facility is very much needed today by using internet media, intranets or other computer network media and other electronic equipment that can support the learning process . However, from most opinions, e-learning is always identified with the use of the internet so that it allows distance learning to occur and is not limited by place and time.

Android is an operating system made from Linux aimed at smartphones. Android was first introduced in 2008 in September which was developed by the Open Handset Alliance which is sponsored by Google (Atmaja, 2022). This Android has open source properties, where the making of Android is done free of charge and can be used by many people, so that developers can modify and develop Android even better and there are additional features, as well as enhanced security, considering that Android is open. source, and therefore easy to abuse.

Android versions have been widely released in the world, namely Android 1.0 with the name Alpha, Android 1.1 with the name Beta, Android 1.5 with the name Cupcake, Android 1.6 with the name Donut, Android 2.0 - 2.1 with the name Eclair, Android 2.2 with the name Froyo, Android 2.3 with named Gingerbread, android 3.0 – 3.2 with the name Honeycomb, android 4.0 with the name Ice Cream Sandwich, android 4.1 – 4.3 with the name Jelly Bean, android 4.4 with the name KitKat, android 5.0 with the name Lollipop, android 6.0 with the name Marshmallow, android 7.0 with the name Nougat, Android 8.0 with the name Oreo, Android 9.0 with the name Pie, Android 10 with the name Android Q, and the most recent version at this time, namely Android 11 with the name Android R (Nguyen et al., 2022); . The naming of this Android version is inspired by food names, such as Cupcake, Donut, KitKat, Oreo, Pie, etc., it's just that starting from the Android 10 version, they no longer use the food name for the Android version, as in Android 10 and Android 11, which is called Android Q and Android R (Kurnia, 2022).

Android studio is an application that is used to create android-based applications (Salama & Jabbar, 2022). The android studio application was first announced by parties from Google at the Google I/O Conference in 2013 which was then published in 2014. Before the android studio application was present, developers developed android applications using

the eclipse IDE application which is a Java IDE. After the presence of the android studio application, the developers switched from the eclipse IDE application to the android studio application in developing android applications. This Android Studio application exists for Android developers to create Android applications. There are two programming languages supported in this Android Studio application, namely Java and Kotlin. Currently, Android developers are using the Kotlin language more than Java.

Kotlin is a programming language used to create Android-based applications. Kotlin was created by a person named Jetbrains which was then implemented by Google in the Android Studio application. The name Kotlin is taken from the name of an island which is a place used as a headquarters by Jetbrains. Kotlin was first released in 2016 in February which at that time was version 1.0 the initial version of kotlin and now it has reached version 1.30.70. Kotlin is currently the programming language most often used in creating android applications (Guo, 2022). Kotlin replaces Java as the programming language that is often used in creating android applications, because the syntax used is simpler than Java.

3. Method

This research was conducted at SMA Negeri 12 Makassar with 150 trial respondents and a team of 10 experts using descriptive data analysis techniques. While the system design method uses the waterfall method in system design starting from Requirement Analysis, Design, development, testing and maintenance (Iskandar et al., 2023; Nurdiansah et al., 2022).

Before designing the system, information was collected through discussions, observations, surveys and interviews. The second stage is Design with the aim of helping to provide a complete picture of what must be done. Design is done before the coding process begins. It aims to provide a complete picture of what needs to be done and how the desired system should look. The third stage is development, making the software divided into small modules which will be combined in the next stage. Besides that, in this phase a deeper examination will also be carried out on the module that has been made, whether it has fulfilled the desired function or not. The fourth stage is Testing, testing is carried out which aims to find out whether the software is according to the desired design and whether there are still errors or not. The fifth stage is Maintenance, what is done is repairing errors that were not detected in the previous stages and adjusting the system according to needs. As an illustration of the system that will be developed in this study, it can be seen in Figure 1, namely the Use Case Diagram to show how interactions with various actors, namely teachers and students (Albaghajati & Hassine, 2022; Shafiih, 2022).

Students must first log in, then can do several activities, namely:

    a) View assignments, then collect them
    b) View learning material, then download it
    c) Fill absence

The teacher also has to log in first, then can do several activities, namely:

    a) Upload assignments
    b) Upload learning materials
    c) Create attendance

4. Result and Discussion

This section describes the results of the design and testing of the system that has been built. Is it as needed or not based on the use case diagram and interface design. The interface design of the application, we can find out the arrangement of each menu of the application, so that we can find out the processes that occur in the application later (Amiruddin, 2022). The application structure can be seen in Figure 2.

The results of the system design on the main page menu are pages that display the menus contained in the application as shown in Figure 3.
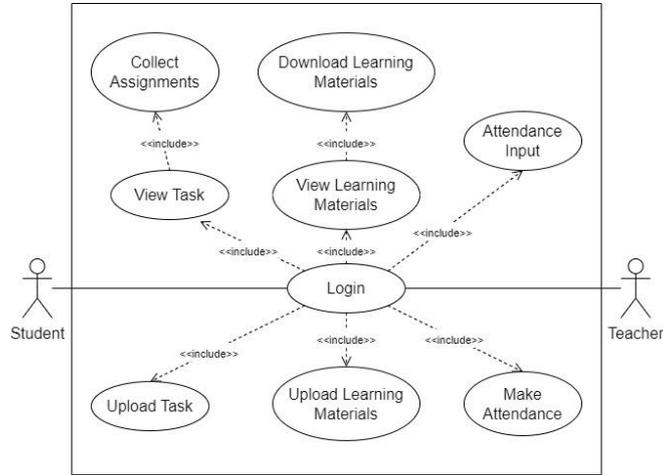
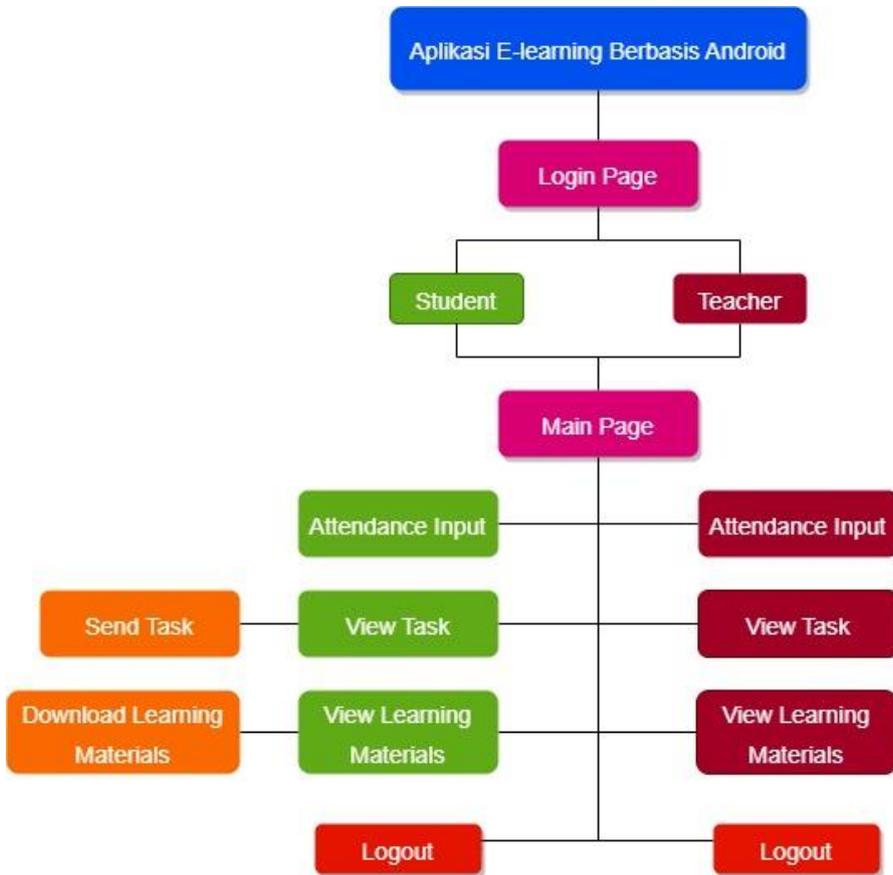**Figure 1.** Use Case Diagram for E-Learning Applications

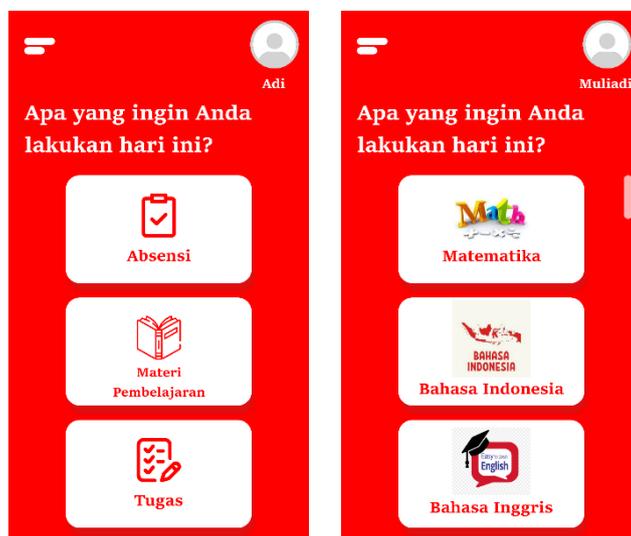Figure 2. E-Learning Application Interface

Figure 3. Main Page

The application testing technique in this study uses the blackbox testing method as a method for testing parts of the system that have been built including the login menu, main menu, dashboard menu, student menu and teacher menu (Ginantra et al., 2022). Table 1 is the result of testing the system with the research title "E-Learning Application Design in Android-Based Schools".

Table 1. E-Learning Application Testing Results

No	Testing	Which are expected	Conclusion
1.	Login	Login page can be accessed	ok
2.	Main course	Main Page can be accessed	ok
3.	Dashboards	Dashboard page can be accessed	ok
4.	Student	Student page can be accessed	ok
5.	Teacher	Teacher page can be accessed	ok

The table above shows the results of testing the application that has been developed, namely the Android-Based E-Learning Application. From these data it can be concluded that all features can run well. While the results of the expert assessment of 10 assessors stated that this application was very good to implement, as well as the user response of 150 people with a response percentage of 70 percent (105 people) saying it was very good and 30 percent (45 people) stating that this system was good . This is in line with the results of the study (Yu, 2022); (Dakhi et al., 2022)which states that using online learning applications can significantly improve learning outcomes and can have a positive influence on student activity (Baber, 2020); (Damopolii et al., 2021). So that by online learning or using E-learning teachers can find out that E-learning based learning can improve learning outcomes and students and teachers can adapt to the system that has been developed.

5. Conclusion

Based on the results of the design and analysis of the data that has been carried out, it can be concluded that the Android-based E-Learning Application at SMA Negeri 12 Makassar can be used, so that the learning process is more varied and has a positive impact on student learning activities. besides that the experts and trial respondents stated that this system was very good to use.

References

Albaghajati, A., & Hassine, J. (2022). A use case driven approach to game modeling. *Requirements Engineering*, 1–34.

Amiruddin, E. G. (2022). Web Based Aviation Communication Tool Information System. *Ceddi Journal of Information System and Technology (JST)*, *1*(1).

Atmaja, I. M. D. (2022). Design and Use of Quickappninja-Based Android Games in Mathematics Learning Through Google Meet. *Journal of World Science*, *1*(6), 438–464.

Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID-19. *Journal of Education and E-Learning Research*, *7*(3), 285–292.

Dakhi, O., Irfan, D., Jama, J., Ambiyar, A., Simatupang, W., Sukardi, S., & Zagoto, M. M. (2022). Blended Learning And Its Implications For Learning Outcomes Computer And Basic Networks For Vocational High School Students In The Era Of COVID-19 Pandemic. *International Journal of Health Sciences*, *6*.

Damopolii, I., Lumembang, T., & \.Ilhan, G. O. (2021). Digital Comics in Online Learning During COVID-19: Its Effect on Student Cognitive Learning Outcomes. *International Journal of Interactive Mobile Technologies*, *15*(19).

Dudung, A., Hasanah, U., Salman, I., Priyanto, S., & Ramdhan, T. (2022). Achievement of student graduates: The role of e-readiness, e-learning and e-book. *International Journal of Data and Network Science*, *6*(2), 375–382.

Feliz, S., Ricoy, M.-C., Buedo, J.-A., & Feliz-Murias, T. (2022). Students' E-learning domestic space in higher education in the new normal. *Sustainability*, *14*(13), 7787.

Ginantra, N. L. W. S. R., Asana, I. M. D. P., Parwita, W. G. S., & Eriana, I. W. E. (2022). Mobile-based customers management system in ayunadi supermarket. *ADI Journal on Recent Innovation*, *4*(1), 86–101.

Guo, L. (2022). *The First Line of Code: Android Programming with Kotlin*. Springer Nature.

Iskandar, A., Kartowagiran, B., Haryanto, H., Suyanto, S., Mustapa, M., & Munawir, M. (2023). *Web Based Tolada Village Information System Design*.

Iskandar, A., Rizal, M., Kurniasih, N., Sutiksno, D. U., & Purnomo, A. (2018). The Effects of Multimedia Learning on Students Achievement in Terms of Cognitive Test Results. *Journal of Physics: Conference Series*, *1114*(1). https://doi.org/10.1088/1742-6596/1114/1/012019

Iskandar, A., Utami Sutiksno, D., Kurniasih, N., Palimbong, D., & Paulus Saleky, A. (2019). Designing android-based learning media and assessment in improving students achievement. *Journal of Physics: Conference Series*, *1175*(1). https://doi.org/10.1088/1742-6596/1175/1/012231

Jones, C. M., Compton, W. M., Han, B., Baldwin, G., & Volkow, N. D. (2022). Methadone-involved overdose deaths in the US before and after federal policy changes expanding take-home methadone doses from opioid treatment programs. *JAMA Psychiatry*, *79*(9), 932–934.

Kurnia, Y. (2022). *Aplikasi Pembelajaran Bahasa Inggris Interaktif Berbasis Android*. Universitas Islam Riau.

Mustapa, M., Rahmah, U., & Asjart, M. (2022). Development of Learning Media for Introductory Information and Communication Technology Courses. *Ceddi Journal of Education*, *1*(1), 23–27.

Nguyen, P. T., Di Rocco, J., Rubei, R., Di Sipio, C., & Di Ruscio, D. (2022). DeepLib: Machine translation techniques to recommend upgrades for third-party libraries. *Expert Systems with Applications*, *202*, 117267.

Nurdiansah, N., Harlina, S., & others. (2022). WEB Based Social Assistance Recipient Selection Application Based on Community Education Level With C4. 5 Algorithm. *Ceddi Journal of Education*, *1*(1), 6–12.

Salama, R., & Jabbar, A. A. (2022). Developing an Android-Based Mobile App to Solve Transportation Issues. *International Journal of Interactive Mobile Technologies*, *16*(21).

Syafiih, M. (2022). Digitizing Arudh and Qowafi Classics as Android-Based Student Learning Media Using Flutter. *International Journal of Engineering, Science and Information Technology*, *2*(2), 129–135.

Wannapiroon, P., Nilsook, P., Jitsupa, J., & Chaiyarak, S. (2022). Digital Competences of Vocational Instructors with Synchronous Online Learning in Next Normal Education. *International Journal of Instruction*, *15*(1), 293–310.

Wut, T. M., & Lee, S. W. (2022). Factors affecting students' online behavioral intention in using discussion forum. *Interactive Technology and Smart Education*, *19*(3), 300–318.

Yu, Z. (2022). A meta-analysis and bibliographic review of the effect of nine factors on online learning outcomes across the world. *Education and Information Technologies*, *27*(2), 2457–2482.