Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Designing android-based learning media using the rapid application development method

Reni Rahmadani[1], Khofifah Qalbun Salima[2], Adilla Ulfhi[3], Tansa Trisna Astono Putri[4], Muhammad Dominique Mendoza[5]
[1,2,3,4,5]Department of Electrical Engineering,Universitas Negeri Medan, Medan, Indonesia

Article Info
Keywords:
Learning Media,
Multimedia Android,
Rapid Application Development (RAD),
Unified Modeling Language (UML)

ABSTRACT
Android-based learning multimedia is a learning media used in the learning process because it can be used anytime and anywhere. Several barriers to learning have been identified in basic computer and network courses. Based on observations made on the introduction of computer hardware and software, the barriers found are the relatively low level of student knowledge of the subject matter, student involvement in the learning process is also low and the learning media still uses power point containing learning theories derived from books. This research uses UML as a multimedia development tool along with RAD (Rapid Application Development) methodology. Based on the results of trials conducted on students, the results obtained that students feel very interested in learning using android-based interactive multimedia in basic computer network subjects on computer hardware and software introduction material.

Corresponding Author:
Reni Rahmadani
Department of Electrical Engineering,Universitas Negeri Medan
Jalan Willem Iskandar Pasar V Medan Estate
renirahmadani@unimed.ac.id

INTRODUCTION

The development of science and technology has resulted in many changes in various fields, the rapid development of technology has brought changes marked by the use of computers. Through the software (software) available in it, computers are utilized in developing a product in the form of an application with various user needs (Tao, et. all, 2018). Based on observations made in basic network and computer subjects, especially in the introduction of hardware and software, teachers still use Power Point media in conveying theories sourced from books published by the Directorate of Vocational Development of the Ministry of Education and Culture of the Republic of Indonesia. The problem in the learning process of introducing computer hardware and software is the limitation of interactive learning resources to increase student stimulus and the lack of effective learning applications (Pellas, et. all, 2021). This results in the emergence of difficulties for students in absorbing material and the lack of student accessibility to adequate and interactive learning resources (Nurhayati, 2019).

The use of media in the learning process cannot be said to be good if the media used by the teacher cannot affect student learning outcomes (Hutabri, 2019). Improving learning outcomes is important by providing learning materials that are interesting and can

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

stimulate students (Sutarto & Fathurrochman, 2020). To produce an effective learning process, learning media is used as a method of communication between teachers and students (Yulianti & Sulistiyawati, 2020).

The Rapid Application Development (RAD) method is a system development approach to developing software that follows a linear, sequential process and emphasizes shorter development cycles (Wijethungaarachchi & Dayarathna, 2020). Being content-rich, this multimedia is expected to help professors in making theoretical information more interesting for students during their self-study process. The multimedia is expected to increase the stimulus and learning outcomes of students in learning computer hardware and software material.

METHODS

This multimedia application was built using the Rapid Application Development (RAD) method. UML (Unified Modeling Languange) is used as an android-based media development tool. UML, sometimes referred to as a standard language for developing software blueprints, is described as a standard language for visualizing, designing, and documenting systems (Elkashef & Hassan, 2020). Use case and sequence diagram are used in this research. Use case diagrams can characterize the kind of interaction that takes place between a system user and the system, as well as show the relationship of interaction between the system and actors (Jacobson & Booch, 2021) (Madni & Sievers , 2018). While sequence diagrams provide a detailed explanation and illustration of how things interact inside a system (Maylawati, et. all, 2018). The sequence diagram will further show the time of execution for any messages or instructions that are sent (Jouault, et. all, 2020). Rapid application development (RAD) places a strong emphasis on short and efficient development cycles (Flewelling, 2018). RAD application development uses an iterative approach to create a system where the system's operational model is built from the beginning of the development process to ensure user needs are met(Sohaib, et. all, 2019).

RAD stages consist of planning, analysis, design, implementation, testing (Stanković, et. All, 2020)

a. Planning
   This stage begins with analyzing the needs of users, namely teachers and students. It was found that users need interactive learning multimedia for basic computer network subjects on the introduction of computer operating systems, namely hardware and software.
b. Analysis
   The next stage is analysis, the needs of interactive learning media are adjusted to the competency standards, basic competencies, and learning materials. These needs are analyzed to describe applications that match the characteristics and needs of student
c. Design
   Design is done to make it easier for programmers to build applications according to user needs. In this study, the design was made using UML diagrams to visualize the design of interactive media.

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

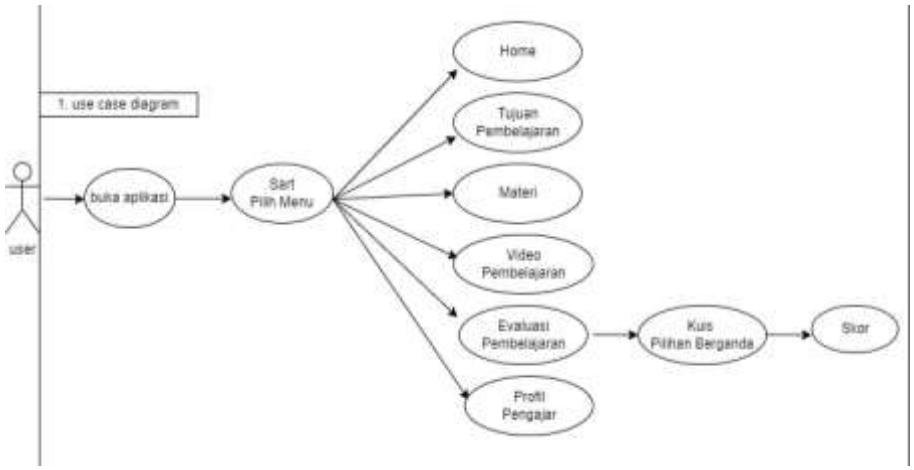

Figure 1. Use Case Diagram of the Multimedia Application

Figure 1 shows use case diagram of the application. It is shown the relationship between the user and the interactive multimedia application.

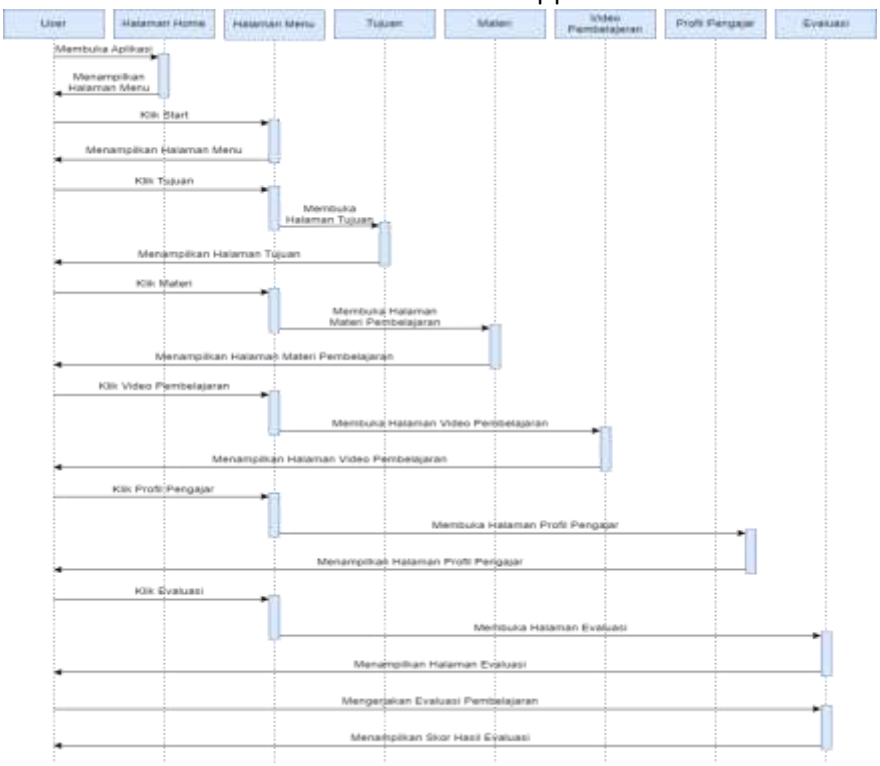

Figure 2. Sequence Diagram of the Multimedia Application

Figure 2 shows a sequence diagram that shows the flow/steps that occur when the user shows the interaction between objects in the system and the time of execution.

d. Implementation

At the implementation stage, the UML diagram that has been made at the design stage is translated into a programming language to build a multimedia learning application.

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

e. Testing
After the application has been built, testing of the multimedia application is carried out to ensure that all functions are running properly. The results of the testing stage show that the multimedia application functions according to the input given.

RESULTS AND DISCUSSION

Multimedia in basic computer network subjects developed contains material on the introduction of hardware and software. This multimedia contains learning objectives, material in the form of theory and images, learning videos, evaluations and teacher profiles.

Figure 3. Initial Page of the Multimedia Application

Figure 3 shows the initial page of the learning multimedia on display after the user opens the application.

Figure 4. Home Page of the Multimedia Application

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Figure 4 shows the Home display in the application, the home page is the page before the student presses the start button. On this page will show information in the form of learning materials.

Figure 5. Menu Page of the Multimedia Application

Figure 5 shows the Menu Page, the menu page is the page that appears on the application after the star button on the home page is pressed. On this page there are button options to go to the learning stage in the form of home buttons, objectives, materials, learning videos, evaluations and teacher profiles.

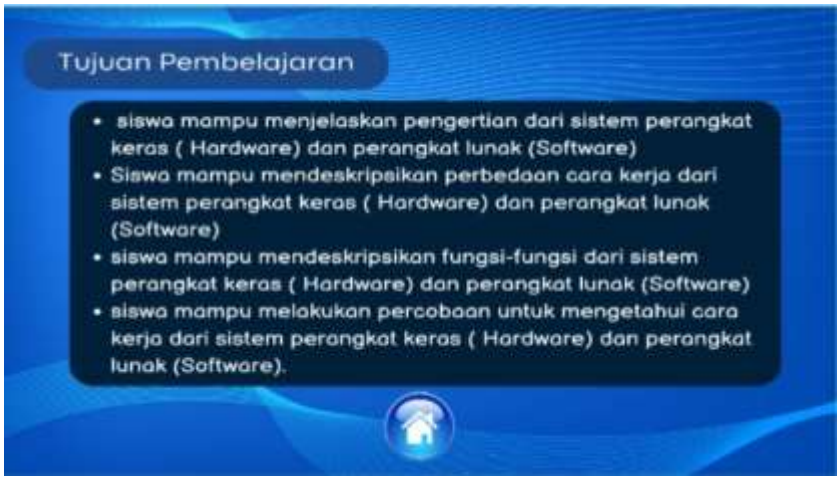

Figure 6. Learning Objective Page of the Multimedia Application

Figure 6 shows Learning Objectives, this page appears when the user presses the destination button on the menu page. On this page shows the learning objectives that will be achieved from the learning outcomes that have been implemented.

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

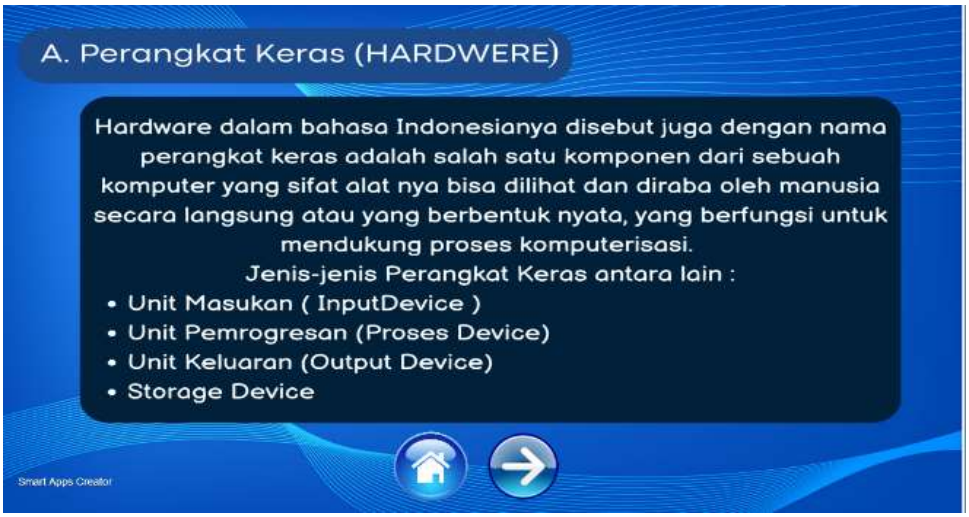

Figure 7. Material Page of the Multimedia Application

Figure 7 showing the learning material, the page will hold all learning materials for the introduction of hardware and software roles accompanied by images of computer hardware and software.

Figure 8. Learning Video of the Multimedia Application

Figure 8 shows the learning video, this page appears when the user presses the video button on the menu page. On this page will display hardware and software learning videos, this video serves as a support for learning materials.

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Figure 9. Evaluation Page of the Multimedia Application

Figure 9 shows the learning evaluation in the form of multiple choice quizzes, this page appears when the user presses the evaluation button on the menu page. On this page will display questions 1-10 introduction to hardware and software devices, quizzes are carried out as an evaluation of the extent of student understanding of the material taught.

Figure 10. Result Page of the Multimedia Application

Figure 10 shows the results of the learning evaluation quiz that students have completed. The correct/incorrect results of the quiz will be immediately calculated and information on the number of scores obtained will be displayed.

CONCLUSION

Based on the research conducted, android-based multimedia learning applications with hardware and software learning can be built using the Rapid Application Development method. According to the findings of student trials, students are highly motivated to learn how to use interactive multimedia based on Android devices in the discipline of basic computer networks, especially in terms of learning computer hardware and software.

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Students can utilize this android-based multimedia in the hope that they can learn and assess their own learning outcomes.

REFERENCE

Elkashef, N., & Hassan, Y. F. (2020). Mapping UML sequence diagram into the web ontology language OWL. International Journal of Advanced Computer Science and Applications, 11(5).

Flewelling, P. (2018). The The Agile Developer's Handbook: Get more value from your software development: get the best out of the Agile methodology. Packt Publishing Ltd.

Hutabri, E. (2019). Penerapan Metode Rapid Application Development (RAD) Dalam Perancangan Media Pembelajaran Multimedia. Innovation in Research of Informatics (INNOVATICS), 1(2).

Jacobson, L., & Booch, J. R. G. (2021). The unified modeling language reference manual.

Jouault, F., Besnard, V., Calvar, T. L., Teodorov, C., Brun, M., & Delatour, J. (2020, October). Designing, animating, and verifying partial UML Models. In Proceedings of the 23rd ACM/IEEE International Conference on Model Driven Engineering Languages and Systems (pp. 211-217).

Madni, A. M., & Sievers, M. (2018). Model-based systems engineering: Motivation, current status, and research opportunities. Systems Engineering, 21(3), 172-190.

Maylawati, D. S., Darmalaksana, W., & Ramdhani, M. A. (2018). Systematic design of expert system using unified modelling language. In IOP Conference Series: Materials Science and Engineering (Vol. 288, No. 1, p. 012047). IOP Publishing.

Nurhayati, D. A. W. (2019). Students 'Perspective on Innovative Teaching Model Using Edmodo in Teaching English Phonology: A Virtual Class Development. Dinamika Ilmu, 19(1), 13-35.

Pellas, N., Mystakidis, S., & Kazanidis, I. (2021). Immersive Virtual Reality in K-12 and Higher Education: A systematic review of the last decade scientific literature. Virtual Reality, 25(3), 835-861.

Sohaib, O., Solanki, H., Dhaliwa, N., Hussain, W., & Asif, M. (2019). Integrating design thinking into extreme programming. Journal of Ambient Intelligence and Humanized Computing, 10, 2485-2492.

Stanković, M., Stević, Ž., Das, D. K., Subotić, M., & Pamučar, D. (2020). A new fuzzy MARCOS method for road traffic risk analysis. Mathematics, 8(3), 457.

Sutarto, S., Sari, D. P., & Fathurrochman, I. (2020). Teacher strategies in online learning to increase students' interest in learning during COVID-19 pandemic. Jurnal Konseling dan Pendidikan (JKP), 8(3), 129-137.

Tao, F., Cheng, J., Qi, Q., Zhang, M., Zhang, H., & Sui, F. (2018). Digital twin-driven product design, manufacturing and service with big data. The International Journal of Advanced Manufacturing Technology, 94, 3563-3576.

Wijethungaarachchi, L. M., & Dayarathna, S. P. I. U. (2020). An Analysis of Applying Software Development Methodologies in Military Software Development.