Design of Android Application-Based Computer Security System Learning Media

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Abstract. In the world of education, technology has been widely employed to increase the quality of learning activities in order to attain the intended results. Students must be prepared with necessary competences in order to succeed in a highly competitive global environment. One form of technology that is used as a learning medium is Android-based media which has benefits and can facilitate many aspects of learning. Learning computer security with the topic of cryptography involves complex mathematical calculations. This makes it harder for students to grasp the lesson. For this reason, an Android-based Computer Security System learning media was created to help students understand and study learning. This research resulted in the application of learning media for Computer Security Systems using the RAD method in its development. Application testing uses a blackbox test and shows that the application runs well on the Android operating system.

Keywords: Multimedia Learning, Android, Computer Security System, Cryptography

1 Introduction

The development of the globalization era is also in line with the increasing development of information and communication technology so as to facilitate various sectors of human life. The presence of information and communication technology with various sophistication and convenience it brings is able to bring human life to have a better quality and standard of living. Along with the development of technology, an equal understanding of this technology is the basis for society to be able to enter the era of globalization. In addition, understanding the various potentials of technological development allows people to optimize the use of communication technology in various aspects of life.

In the world of education, technology has been widely utilized to improve the quality of learning activities so as to achieve the desired results. The role of education in the globalized world to participate in the fiercely competitive global world, students need to be prepared with the necessary competences.. In Indonesia, the implementation of technology in education is that technology can be utilized as a medium of learning, administrative tools, and learning resources[1].

One form of technology that is used as a learning medium is android-based media. Android is an operating system on smartphones that is widely used by students[2]. Smartphones have various benefits and can simplify many aspects of everyday life. However, students use smartphones for social media and playing games. Only a small proportion of them use smartphones for learning[3].

Computer Security is a part of Computer Science that focuses on securing the environment for using computers. There are 4 studies that focus on computer security: the development of hardware and software protocols, the study of computer ethics, and the adoption of best practices. Computer security involves complex mathematical calculations in the discussion of cryptography[4]. Students find it challenging to comprehend the subject matter as a result..

The development of interesting android-based learning media needs to be done to increase students' interest in using smartphone devices for learning needs. By learning through content-focused media, Android-based learning media is projected to promote student literacy. Content that can be added in the media such as: text, images, video, audio, and animation. This research will build android-based learning media with computer security system material. In this media there are learning materials, questions, and can do simple encryption.

2 Method

The application in this study was made using the Rapid Application Development (RAD) method. RAD is a software development cycle used to build applications in a short time[5]. This method strongly emphasizes user activeness in providing input on application design[6]. There are four stages carried out in this method, namely requirements analysis, system design, development, and implementation[7].
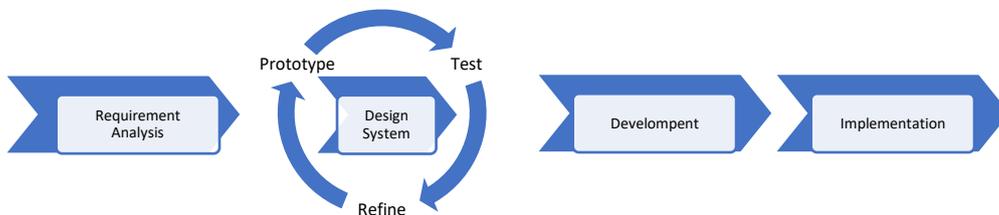

Fig 1. RAD Stages

The requirements analysis stage begins by conducting observations and interviews with users, namely students and lecturers, to obtain data. Next, the media is designed according to user needs, and a prototype is made to be evaluated. After the user agrees with the application prototype, the media is developed. The last stage of the media application is implemented and testing of all application features is carried out before being used for learning.
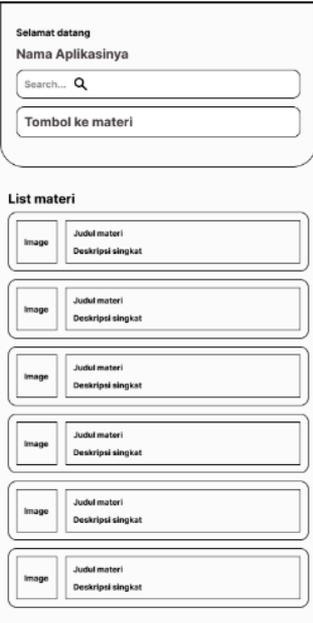
3 Results and Discussion

3.1 Requirements Analysis

Observation and interviews are the initial process at this stage[8], observations are made on the teaching and learning process, course materials, and lesson plans. The results obtained are that there is no Android-based learning media used. The most discussed learning material in lectures is cryptography. The results of interviews with lecturers and students show that cryptography material is quite difficult for students to learn because of the many mathematical calculations used.

3.2 System Design

Based on the results of the requirement analysis, a system design is made in accordance with user needs. Furthermore, a storyboard is made to facilitate the development of producing media applications as needed.

Table 1. Storyboard Application

Page	Visual	Description	Duration	Link
1		On this panel there are several actions that users can take, namely searching for material, clicking on material, and selecting material	User Dependent	Page 2.1 Page 2.2 Page 2.3 Page 2.4 Page 2.5 Page 2.6
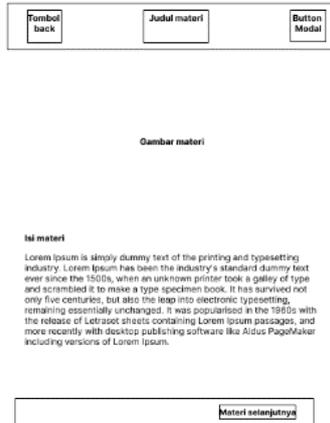
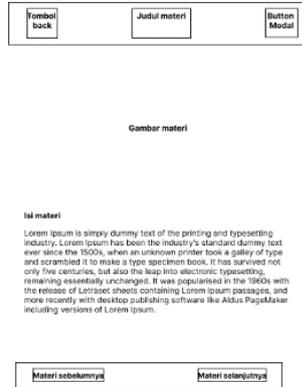| 2.1 | | This page contains material about the definition of cryptography and can open the module all the material to move quickly there is also a back button to return and the button to the material afterward | User Dependent | Page 1
Page 2.2
Page 3 |
| 2.2 | | This page contains material about the history of cryptography and can open the module all the material to move quickly there is also a back button to return and the button to the previous and subsequent material | User Dependent | Page 1
Page 2.1
Page 2.3
Page 3 |
| 2.3 | | This page contains material about cryptographic functions and can open modules of all materials to move quickly there is also a back button to return and buttons to the previous and subsequent material | User Dependent | Page 1
Page 2.2
Page 2.4
Page 3 |

| 2.4		This page contains material about cryptographic notation and can open all material modules to move quickly there is also a back button to go back and buttons to the previous and next material.	User Dependent	Page 1 Page 2.3 Page 2.5 Page 3
2.5		This page contains material about cryptographic algorithms and can open modules of all materials to move quickly there is also a back button to return and buttons to the previous and subsequent materials	User Dependent	Page 1 Page 2.4 Page 2.6 Page 3
2.6		This page contains material about Example of cryptography questions and can open the modules of all material to move quickly there is also a back button to go back and a button to the previous material.	User Dependent	Page 1 Page 2.5 Page 3
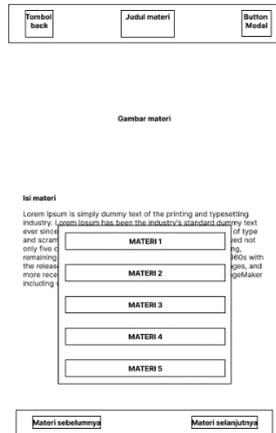
| 3 | | On this page the user can switch materials quickly starting from material 1-6 | User Dependent | Page 2.1 Page 2.2 Page 2.3 Page 2.4 Page 2.5 Page 2.6 |

There are three main pages in the application, the first is the home page which contains material menus and sample questions, the second page contains learning material which is divided into six sections. The third page contains a pop up menu to switch materials according to the user's wishes. Furthermore, a prototype is made to be tested by the user until a prototype is obtained according to user needs[9].
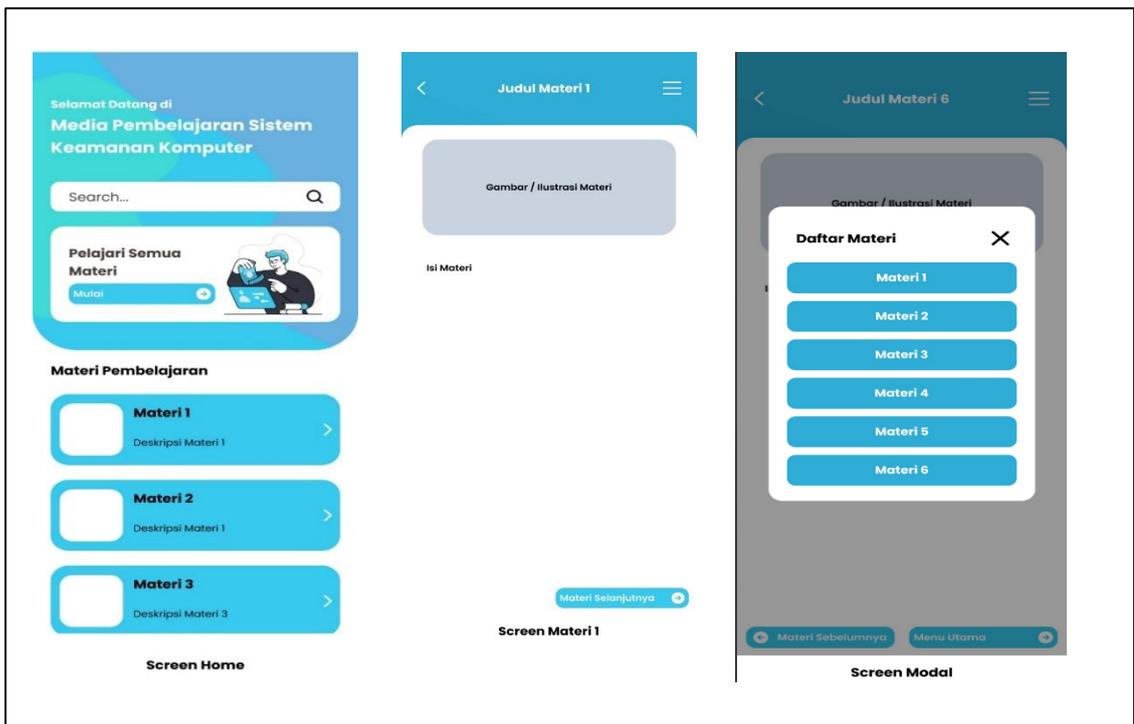

Fig 2. Application Prototype

3.2 Development

The third stage is system development, at this stage the application is made based on the agreed system design and prototype. Users are still involved in the development to ensure all features and designs are in accordance with the needs.

Fig 3. Learning Application

Before the application is ready to be used in learning, testing is carried out to ensure that all features run well and there are no errors in the program made. Application testing uses a black box test. This test looks at the output of the application in accordance with the input given[10].

Table 2. Blackbox Testing

No	Testing activity	Expected output	Test results	Conclusion
1	Enter the home page	Home Page Content is displayed	Content is displayed correctly	[x]Accepted [ ]Rejected
2	Click the search material button	Appears Material according to what is searched	Search button works	[x]Accepted [ ]Rejected
3	Click on material	Material is displayed in detail	There is content in the form of images and text in accordance with the material that is clicked.	[x]Accepted [ ]Rejected
4	Click the next material button	The material moves to the next material page	Material is displayed in order	[x]Accepted [ ]Rejected
5	Click the previous material button	The material moves to the previous material page	The material is displayed in the order in which it is presented	[x]Accepted [ ]Rejected
6	Click the home button	The page moves to the home page	Displays the home page with several material titles and also a brief description	[x]Accepted [ ]Rejected

Based on the black box test results in Table 2, it can be seen that all menu features and buttons in the application function properly so that the application can be used in learning.

5 Conclusion

The development of android-based computer security system learning media can be made using the RAD method. The stages in this research include requirements analysis, system design, development, and implementation. The material in this application focuses on cryptography material. The application's successful performance on the Android operating system, as demonstrated through blackbox testing. All the result of the blackbox on the feature shown the expected result.

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