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Application of the Scrum Method in the Android-based TPQ Learning Application

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ABSTRACT

RA Alhikmah Kandis has the main material, namely learning TPQ (Al-Qur'an Education Park), learning to recognize, read, and memorize hijaiyah letters, daily prayers, and juz amma. With the development of technology, learning can now be supported by various innovations. One of the innovations is to create a mobile-based application for student learning at RA Alhikmah. The application is based on the design results based on the needs of students, teachers, and parents. Making applications using the Scrum method, applications that are built based on a predetermined time, where if the specified time has reached its end, then the application must be finished, is suitable for the Scrum method because its manufacture is based on a predetermined timeframe. Application testing uses the black box testing method to test whether each feature is running properly so that when used by application users, there are no bugs. This application is intended for raudhatul athfal or kindergarten children who are vulnerable aged 5 to 6 years, and this application can be accessed by accompanied by teachers when at school and parents when at home. The results obtained from the application black box testing can run well in all the features in the application. The author hopes that this application can provide the benefit of giving children a new method of learning to recognize hijaiyah letters, memorizing daily prayers, and juz amma in order to provide children's learning interest so that it is more interesting for their learning interest to get to know the Koran from an early age.

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1. Introduction

Currently, technology has become a primary need for human life to support its activities. Whether it's activities in various fields such as business, health, fashion, or even the world of education, One product of technology is a mobile application. Mobile can be interpreted as easy movement from one place to another, for example, a mobile phone. This means that a telephone terminal that can move easily from one place to another without interruption or interruption of communication This application can be accessed via wireless devices such as pagers, cell phones, and PDAs, which are software composed of various programming language logics that are structured to become tools on a mobile computer system [1], which can also be

interpreted as allocating device transfers to other devices. To make it easier, the mobile application itself is more familiar with the Android application. Android is a Linux-based mobile device operating system that includes an operating system, middleware, and applications. Android provides an open platform for developers to create applications. Initially, Google Inc. bought Android Inc., which is a newcomer that makes software for cell phones or smartphones. Android can run on several types of devices developed by many different smartphone vendors [2].

Advances in mobile-based technology can also be used to create a new atmosphere in learning methods that will make the learning process more interesting, such as in building TPQ (Al-Qur'an Education Park) learning media for early childhood, which is currently being implemented at RA Al Hikmah. Kandis, TPQ itself covers getting to know, reading, and memorizing hijaiyah letters, daily prayers, and juz amma, which are part of the Al-Qur'an and must be introduced to children as early as possible in the development of learning to recognize hijaiyah letters, daily prayers, and juz amma. The development of interactive learning media is expected to make students more interested in the learning process and less easily bored if they are in class long enough during the teaching and learning process. In previous studies, it was stated that learning applications were able to attract students' attention and interest because they were presented in the form of images and animations, as evidenced by 80% of the 26 respondents agreeing with this [3]. To support the creation of learning media for recognizing hijaiyah letters, daily prayers, and jus amma at RA Al-Hikmah Kandis, a supporting method is needed in building this application; in this case, the author uses the scrum method.

The scrum method can be referred to as a method contained in the Agile model. Scrum is more interpreted as a way of developing a product that is freer and, as a whole, makes developers work as a unit that wants to achieve a common goal. In Scrum, a loop can also be said to be a Sprint, the duration of which ranges from one week to one month [4]. Scrum is also flexible for developing software, especially in building an information storage system, where, by using Scrum, the development team can make the necessary changes. Scrum is also a method used for the development of an activity that includes requirements, analysis, design, development, and delivery [5]. Scrum is not a process or technique for developing a product, but a framework that can contain various processes and techniques. Scrum has three characteristics: being light, easy to understand, and difficult to master. Empirical process control theory is the basis of Scrum, or it can be called empiricism, which focuses on knowledge gained from experience and making decisions based on that knowledge. In addition, to reduce risk and increase Scrum's predictability, it applies an Iterative (periodic) and Incremental (gradual) approach [6]. There are not many differences between Scrum and Agile, but they are not the same. Scrum is part of the Agile methodology; it can be said that Scrum is definitely agile, but agile is not necessarily Scrum. use in the development of long-term and repetitive applications as an example a few years ago the rise of viruses, with existing maps on google maps or any application that shows a map of the area, with the agile method you can add a system which areas have been affected by the spread of the virus in the application the map, another example of data in the application can be converted into data in the form of an API (Application Programming Interface) where if there is a change in data in the application the user does not need to update the application every time, if the data is already in the form of an API the data will be added by itself without having to update first, but with the application API it must be accessed with the internet [7].

2. Research Method

The methodology is used to obtain data that can be used as information to encourage problem solving in accordance with what is being studied, so in Figure 1 below, there are stages in the research carried out to find out whether the method used is feasible or not. This study uses the scrum methodology in designing its applications. Scrum is used by researchers to build applications that are in accordance with the wishes and needs of resource persons who interact directly with the teaching and learning process, such as teachers and parents, where the application will later run on the Android platform. Students can use the application, but under the supervision of teachers or parents, the stages carried out by researchers in supporting the establishment of this method in the development of applications later include identifying problems, designing systems, implementing scrum on systems that have been designed, testing applications, and drawing conclusions.

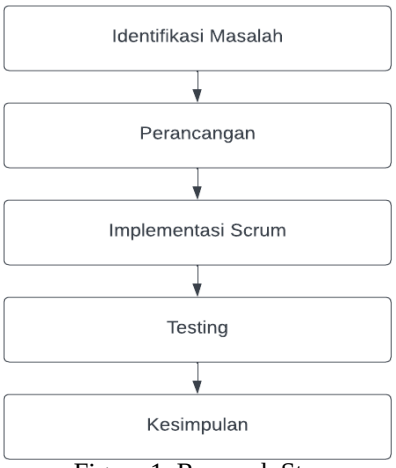

Figure 1. Research Steps

2.1.1 Identification of Problems

Identification of problems will be carried out by conducting interviews with the school regarding obstacles or problems in the teaching and learning process, as well as by building applications based on the needs of the school and teachers. Information results will be identified and will be used as supporting material in the development of an information system that will be built.

2.1.2 Design

From the need for problem identification, it is necessary to make system design modeling or applications in the form of Unified Modeling Language (UML) modeling. The UML modeling that is designed includes use case diagrams and activity diagrams and uses whimsical tools in making an initial description of the application that will be built later..

A. Unfied Modeling Language (UML)

1. Use Case Diagrams

In the diagram in Figure 2, there is only one actor labeled by the user because the application to be built is a learning media application. The intended users of this application are students, parents, and teachers. The diagram shows that the system does not have a login, sign in, register, or access to enter an account before accessing the menu in the application, which is usually found in other applications. The absence of an entry menu and register is not without reason, based on the results of the implementation of previous problems that the author However, there are problems that almost all people experience, namely ignorance of registering accounts, logging in to accounts with email, and often forgetting the passwords they created themselves. The absence of important data in this application also underlies the absence of a login menu in this application..

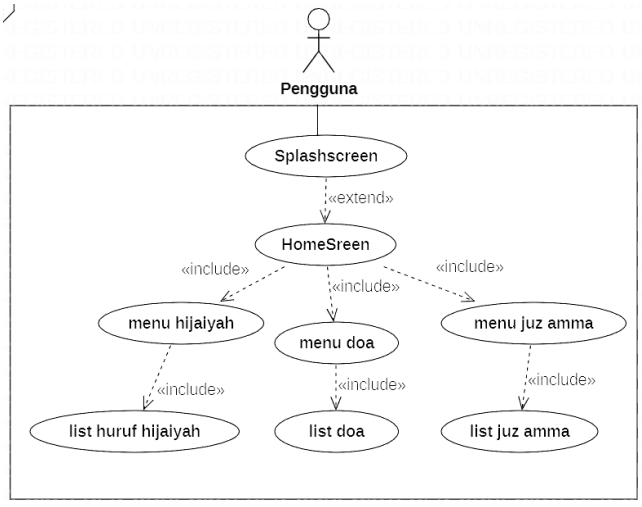

Figure 2. *Use Case Diagrams*

2. Activity Diagrams

The user and system interactions are shown in this diagram, which also shows the application system's work flow. The following diagram shows the various parts of the activity that are divided into them :

2.1 Diagram of the Activity The user's initial entry into the application is shown on the Spalsh Screen. A splashscreen, which often displays the logo of an application, will greet the user before they reach the homescreen. The flow between the user and the system will be constructed, as shown in Figure 3..

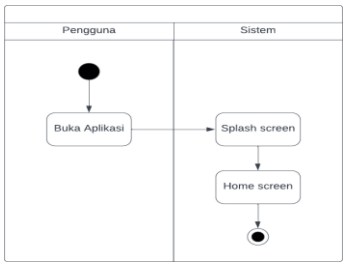

Figure 3. *Splash Screen Activity Diagrams*

2.2 Hijaiyah Letter Menu Activity Diagram

This diagram depicts an interaction between the user and the system contained on the homescreen. An instruction from the user, where the user requests a hijaiyah letter menu, will take the user to a screen that will show a list of all hijaiyah letters, where the activity will be depicted on Figure 4.

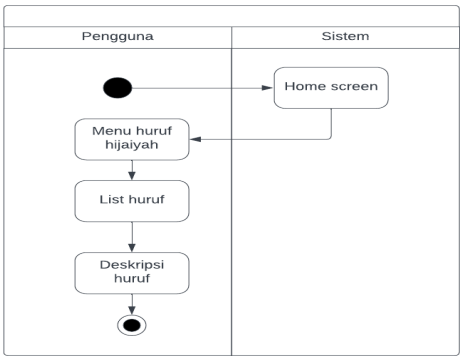

Figure 4. *Hijaiyah Letter Menu Activity Diagram*

Activity Diagram: Daily Prayer Menu

Not much different from the previous menu, this daily prayer menu is located in one layout on the homescreen. In order to see the prayers on the menu, the user simply presses the prayer menu, and the system will take the user to the prayer list screen. The activity will be explained in the Figure below. been on Figure 5.

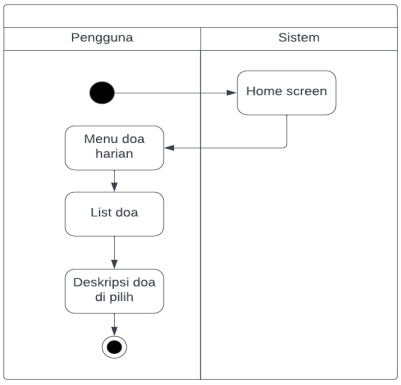

Figure 5. *Activity Diagram Daily Prayer Menu*

Juz Amma Menu Activity Diagram

Activity Diagram The juz amma menu is the same as the other menus previously described; this menu is also located on the homescreen along with the other main menus. In order to read the juz amma, the user simply has to press the juz amma menu on the homescreen, and the system will take the user to the list. the last surah or juz in the Qur'an.

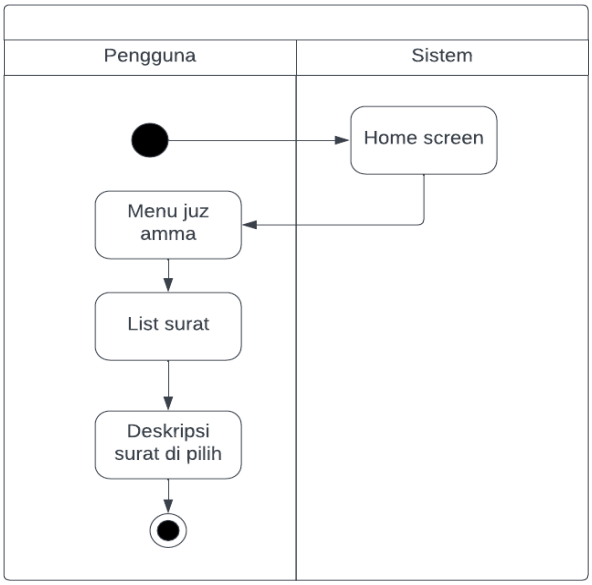

Figure 6. *Juz Amma Menu Activity Diagram*

3. Design Wireframe

The first stage is where the initial idea or rough description of the application will be built by the author. This wireframe design will be the author's reference in building the application later. This design is still rough, and later there may be changes to the appearance or additional features outside the wireframe figure 7.

Figure 7. Perancangan *Wireframe*

2.1.3 Scrum implementation

In developing applications using the Scrum method, there are several stages, including the product backlog, sprint planning, daily scrum, and spin review.

a. Product Backlog

The components that will become the system of learning applications that will be built by the author are listed in a structured way, from easy work to difficult work. The product backlog consists of features or items that will become the system of the application that will interact with the user. The outline of the features that will be used in the application is listed in the table, among them :

Table 1. *Product Backlog*

Backlog	Feature / *Item*
HomeScreen	– Hijaiyah letter menu – Daily prayer menu – Menu Juz Amma
List page per menu	– List of hijaiyah letters – List of daily prayers – List juz amma
Description page per menu	– Description of the selected letter – Description of the selected prayers – Description of the selected letter
Favorite page	– Added prayer list – Added mail list

b. Sprint Planning

This stage compiles what activities will be carried out in making the system within 1 to 4 weeks of work. In making the system that will be carried out by the author, the work on the system is carried out with a sprint duration of 2 weeks. The plan is to make the application until it is finished and can be used. Making the application will be carried out in depth 3 *sprint*

Table 2. *Sprint Planning*

No	*Sprint*	*Product Backlog*	Time (Day)
1	Sprint 1	– features hijaiyah letters – daily prayer feature – juz amma feature – List of hijaiyah letters – daily prayer list.	14
2	Sprint 2	– juz amma list – Hijaiyah letter description – description of daily prayers – juz amma description	14
3	Sprint 3	– Favorite prayer – Juz amma favorite	14

c. Daily Scrum

Detailed reports carried out by the author during running 1 sprint where everything is explained, including what has been completed, what has not been completed, and the obstacles why it has not been

completed. The daily scrum lasts 2 weeks in the previous sprint planning; therefore, the contents of the daily scrum also follow the many predetermined sprint plans.

d. Spint Review

The results of the sprint that the author has previously worked on for 2 weeks will be tested to see whether the system is running well and whether the features are in accordance with the sprint planning that has previously been set targets. If the first sprint has not been met, then it will be continued in the next sprint.

Table 3. *Spint Review*

No	*Review*	*Sprint*	Status
1	– Hijaiyah Letters feature	*Sprint1*	✓
	– Daily prayer feature	*Sprint 1*	✓
	– Juz Amma feature	*Sprint 1*	✓
	– List of hijaiyah letters	*Sprint 1*	✓
	– List of daily prayers	*Sprint 1*	✗
2	– List of daily prayers	*Sprint 2*	✓
	– List juz amma	*Sprint 2*	✓
	– Description of hijaiyah letters	*Sprint 2*	✓
	– Description of daily prayers	*Sprint 2*	✓
	– Juz Amma description	*Sprint 2*	✓
3	– Favorite prayer	*Sprint 3*	✓
	– Juz Amma's favorite	*Sprint 3*	✓

3. Result and Discussion

The results of this study are a technology-based learning application for children at RA Al Hikmah Kandis that will be used by teachers and parents to be able to develop learning media for RA Al Hikmah Kandis students in learning hijaiyah letters, daily prayers, and juz amma, with the following display :

3.1 Application Results

The results of the application discuss what features exist in the application that has been built based on the implementation and design of the research method..

a. Display splash screen and home screen: This display is the initial appearance of the application and will welcome the user when using the learning application. Home Screen Display The second display after the Splash Screen on this display aims to display the main features of this application, namely hijaiyah letters, prayers, and juz amma..

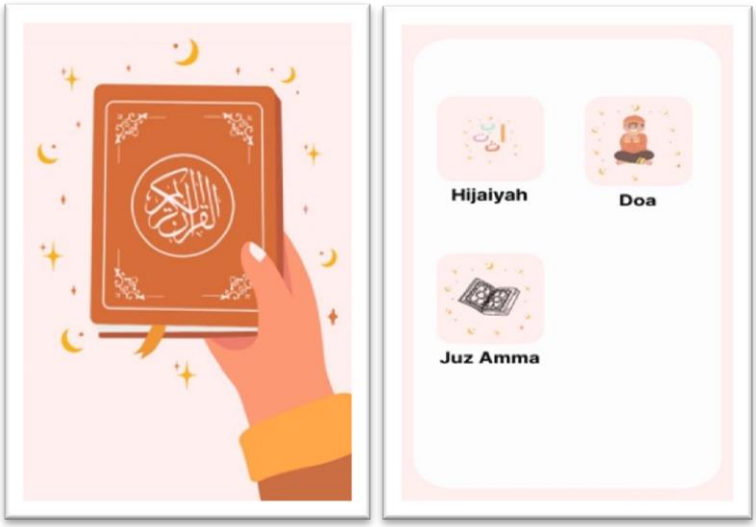

Figure 8. Display the splash screen and Home screen.

b. Hijaiyah Letter Feature Display and Hijaiyah Description Display This display shows a list of Hijaiyah letters sequentially, which can be read from the top right. While the Hijaiyah Description display clarifies what is on the Hijaiyah list, which here shows Latin writing and the sound of the pronunciation.

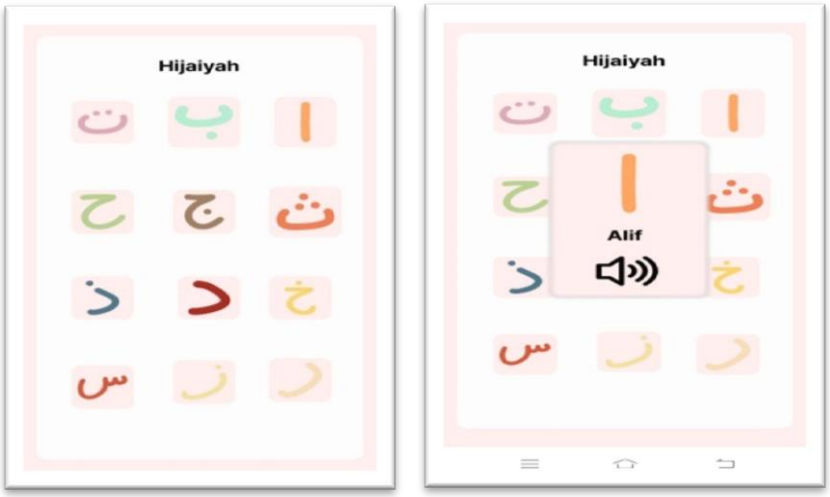

Figure 9. Hijaiyah Letter Feature Display and Hijaiyah Description Display

c. Tampilan Fitur Doa dan tampilan fitur jus amma Prayer feature display and Juz Amma feature display The prayer feature display shows a list of daily prayers that are usually read or related to life, where this prayer focuses on human activities that occur repeatedly every day. Meanwhile, the Juz Amma feature displays This display shows a list of Juz Amma from Surah Adh Dhuhaa to Surah An Naas.

Figure 10. Feature Display of Prayer Features and Feature Display of Juz Amma

d. Prayer Description Display: This view shows a prayer description according to what the user chooses when using the application.

Figure 11. Prayer Description Display

e. Juz Amma Description Display This view shows a description of the surah according to what the user chooses when using the application.

Figure 12. Display Description: Juz Amma

3.2 System Testing

Testing this learning media system includes stages that must be carried out, including interface testing. This test is carried out after the system has been built and aims to test whether the application runs properly or not before the user uses it.

3.2.1 *Interface Testing*

This interface test aims to ensure that the functions in the application are in accordance with the

predetermined design stages. This interface test uses the black box testing technique. Black box testing is a testing technique that focuses on the functionality of a system that is ready to be built.

Table 4. Interface Testing

Test Class	**Test Scenario**	**Expected results**	**Hasil**
Menu Selection	Choose Splash Screen	System Displays SplashScreen	Valid
Selection Page List Per Menu	Choose the Hijaiyah Material Menu	The system displays the Hijaiyah Material Menu.	Valid
	Choose the Daily Prayer Material Menu	The system displays the Hijaiyah Material Menu.	Valid
	Choose Amma Juice Material Menu	The system displays the Amma Juice Material Menu.	Valid
Selection of Description Pages Per Menu	Description of the selected font	System Displays Letters Description Letters selected	Valid
	Description of the selected prayer	The system displays a description of the selected prayer.	Valid
	Description of the selected surah	The system displays the description of the selected surah.	Valid
Favorite Page	Added prayer list	The system displays the added prayer list.	Valid
	Added Surah List	The system displays the added Surah list.	Valid

3.3. Test Results

Based on the test results on the creative learning media system using the black box testing technique, it can be concluded that the creative learning media system functions as expected.

4. Conclusion

It is clear from the design and testing outcomes of the learning apps for hijaiyah letters, daily prayers, and juz amma that they have been implemented that the scrum technique is working well for creating learning applications for RA Alhikmah Kandis applications. The program is ready to be delivered directly by the user based on the test results, which will improve the benefits it offers in terms of teaching kids about hijaah, daily prayers, and juz amma. In order to spark children's interest in learning effectively at home or at school, this application intends to introduce them to fresh teaching techniques.

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