

Digitizing Arudh and Qowafi Classics as Android-Based Student Learning Media Using Flutter

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The book Arudh & Qawafi is the work of the Caretaker of the At-Tarbiyah Guluk-Guluk Sumenep Islamic Boarding School, namely K.H. Wakid Yusuf, S.E. The book discusses Arabic literature in the form of Syi'ir and Nadham. The 2nd son of K.H. Nurul Huda Basyir has several religious texts, one of which is the book Arudh & Qawafi which is regularly reviewed by students majoring in Language (Arabic Literature). The religious texts or the works of the caregivers are still in the form of printed media, namely books, therefore in this digitalization era, the role of the santri to develop the field of information technology is very necessary. This study aims to build an Android-based application in order to make it easier for students, alumni, and sympathizers to access the Arudh&Qawafi Book practically. The development of this application applies the Extreme Programming (XP) software development methodology. Extreme Programming has several advantages, namely that it can perform updates without impacting the overall system design. This method is one of the methodologies that supports the acceleration of the development of a system with a minimum number of teams and produces software that meets the needs, including the planning phase, design phase, coding phase, and testing phase. By using the open source Flutter Framework, the Arudh & Qawafi book application can be accessed via mobile more effectively and efficiently. From the results of the Likert scale calculation on the questionnaire, it shows the results of 87% with user information strongly agreeing with the Arudh and Qawafi book application by K.H. Wakid Yusuf, S.E.

Keywords: Arudh, Qawafi Books, Android, Extreme Programming, Flutter.**1. Introduction**

The era of globalization marked by the development of science and information technology has made it possible to digitize religious texts. In today's technological era, digital media opens up new ways to document objects [1]. Likewise, in this era of Information and Communication Technology (ICT), the skill of utilizing and using the Internet for searching, transferring, storing, and matching information based on the use of electronic computers and software has become a necessity [2] [3]. Digitization is sharing media or converting physical documents into digital documents. In the era of the Industrial Revolution 4.0, digitization has become a manufacturing process by utilizing computer technology and the internet [4] [5].

The book Arudh and Qawafi is written by the second generation of KH. Nurul Huda Basyir, the caretaker of the At-Tarbiyah Islamic Boarding School Guluk-guluk Sumenep Madura, namely KH. Wakid Yusuf, S.E. Arudh science and Qawafi science is a science that studies Arabic literature in the form of syi'ir or nazham [6] [7]. We often find Arabic syi'ir-syi'ir in various types of Arabic readings and literature. For example, nazham 'Imrithi and nazham Alfiyah, which discuss the ins and outs of the Arabic language and assess the beauty of sentences, both prose/natsar and syi'ir/nazham, the Arabic writers have determined 13 branches of knowledge related to a language called "Ulumul Arabiyah". "Ulumul Arabiyah" - Arabic linguistics - consists of the science of lughah, Nahwu, Sarf (morphology), Isytiqaq, 'Arudh, Qawafi, Qardhus Syi'ri, khat, Insha', Mukhadarat, Badi', Bayan, and Ma'am science and. Of the thirteen branches of science, this book examines the aspects of Arudh and its Qawafi which will help consumers to more easily understand the meaning of syi'ir, assess the beauty of syi'ir and make syi'ir [8] [9]. Android is a collection of software (software) for mobile, which includes the leading mobile applications, middleware, and operating system. Android is also an operating system developed for Linux-based mobile devices. Initially, this operating system was developed by Android Inc., which was later purchased by Google in July 2005. So, in this case, the research aims to create a "Digitalization of Caretaker KH. Wakid Yusuf (Arudh & Qawafi Book) based on Android using Flutter." With the digitization of this work, the book can be accessed via mobile with an attractive appearance by applying the Flutter Framework. Flutter is an SDK (Software Development Kit) or open source framework developed by Google to create or develop applications that can run on mobile-based multi-platforms with only one Dart programming language [10].



2. Literature Review

Based on several previous studies, digitizing the work of TGKH. Muhammad Zainudin Abdul Madjid mobile-based as an interactive learning media for the preservation of the legacy of the founder of Nahdlatul Wathan is one solution that will help his students who incidentally do not have the book and are hindered by distance and time [6] [7] [8]. One of the advantages of the Nadham Batu Ngompal e-book is that this e-book uses the OPF Filip book format so that when we open it it is as if we were opening the original book, and in addition to providing the text, this e-book also provides voice facilities for reading poetry in the book. . So in addition to reading, we can also listen to the sound of chanting poems in the contents of the book at once. Then there is also research on Application Development systems using the Prototype method consisting of three stages, namely; Listen to Customer, Build/Revise Mock-Up and Customer Test-drives Mock-Up. This application uses the Java programming language by utilizing the Butter Knife, which is a library that is used to simplify writing view components on Android. The Papuan tribal language dictionary application that was developed can already be run on Android smartphones by being able to perform the function of translating vocabulary. Able to translate from Indonesian to Papuan tribal language which consists of three dialects, namely Okbibab-Oksibil-Kiwirok and translation between dialects. And there is also this research discussing the digitization of TGKH's work. Muhammad Zainudin Abdul Madjid, mobile-based as an interactive learning media for the preservation of the legacy of the founder of Nahdlatul Wathan is one solution that will help his students who incidentally do not have the book and are hindered by distance and time. This Nadham book is often used by students, congregations and the public in learning tajwid, circulated in book form. Along with the development of information technology, the work of the Nadham Batu Ngompal book needs to be made in digital form. This journal uses data collection methods, data that are actually used, accurate, and relevant to real results. By making the "Nadham Batu Ngompal E-book" application, it helps students and worshipers to read Beliu's works from anywhere. One of the advantages of the Nadham Batu Ngompal e-book is that this e-book uses the OPF Filip book format so that when we open it it is as if we were opening the original book, and in addition to providing the text, this e-book also provides voice facilities for reading poetry in the book. So in addition to reading, we can also listen to the sound of the chanting of the poems in the book at once [11].

Android is an operating system for smartphones and tablets. The operating system can be illustrated as a 'bridge' between the device (device) and its users, so that users can interact with their devices and run applications available on the device. Flutter is an SDK for developing high-performance mobile applications, applications for iOS and Android, from a single codebase created by Google under an open source license. Supported by Google, flutter can develop very quickly and can compete with Xamarin, React Native, and other mobile frameworks. Flutter extends this with support for stateful hot reloads, where in most cases, changes to the source code can be applied immediately in a running application without requiring a restart or loss of state. To build a Flutter application, it is necessary to understand the Dart language. Dart is a programming language created by Google to replace Javascript. Dart is a programming language developed by Google and is the official programming language for Flutter, a UI toolkit and multiplatform application from Google. Flutter itself has been used by various large companies such as Google, Alibaba.com, and Tencent because it can save time and effort by simply requiring a single codebase to develop applications on various platforms, instead of having to spend time creating separate codebases for each platform. Visual Studio Code is an open source code editor application developed by Microsoft for Windows, Linux, and MacOS operating systems. Visual code can be used to develop mobile, web, desktop and cloud applications. Visual Code makes it easy to write code that supports several types of programming, such as C++, C#, Java, Python, PHP, GO [12] [13]. Visual Code has the ability to identify the type of programming language used and provide color variations according to the function in the code series. Visual Studio Code has also been integrated into Github [14].

Dart is an object-oriented, class-based language with a C-style syntax. Darts can be compiled to native code or JavaScript. It supports interfaces, mixins, abstract classes, reified generics, and type inference [15]. Dart is an interesting programming language which is getting more and more popular day by day. The language is scalable and can be used to write simple scripts or full-featured applications. Use Case Diagrams are usually referred to as behavior diagrams that are used to describe a series of actions (use cases) that several systems or systems (subjects) must or can perform in collaboration with one or more external users of the system (actors). Each use case must provide some observable and valuable result for the actors or other stakeholders of the system. Use Case Diagrams are used to capture dynamic aspects of the system. In general, it aims to collect the needs of a system, get views from outside the system, identify factors that affect the system both internally and externally, show the interaction between actors and the system. Class diagrams provide an overview of the relationship between the tables in the database [16]. Each class has attributes and methods or functions according to the process that occurs [17]. From the design of the diagram, it will be known how the relationship between the tables in the database and what input processes are in it. Activity Diagrams describe the workflow (workflow) or activities of a system or business process. After creating a Use Case model, each scenario in the Use Case will be described more clearly in the activity diagram. Activity diagram is a modeling that describes a working system of an object or a system, an activity diagram is described with a structured flow of the work process from the use case that is being processed from the starting point to the end point, each activity is described with notations according to its function [17] [18]. Sequence diagrams are used to describe the behavior of actors in a system in detail over time. This diagram shows a number of examples of objects and messages that are placed between objects in a use case [19] [17]. In each sequence diagram there is an actor's first action against the interface. Sequence diagrams are used to describe the interactions between objects in sequential time. But basically sequence diagrams are used in the abstraction layer of the object model. Its use is to show a series of messages sent between objects, as well as interactions between objects, and show something that happened at a certain point in system execution [20].

3. Methods

3.1. Research Framework

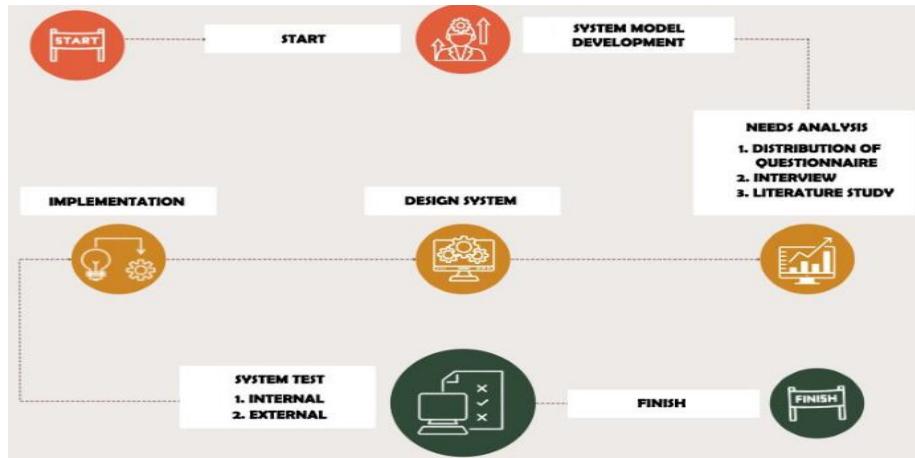


Fig 1. Research Framework

In Figure 1, the first stage of this research is to start determining the research topic and then identify the problems that occur by communicating directly with the parties at the At-Tarbiyah Guluk-Guluk Islamic Boarding School, Sumenep Madura. Then determine the title of the research based on the problems found. Next, collect data using qualitative methods that can obtain results from various stages through observation, interviews, and literature studies. So at this stage interviews, and observations at agencies are intended to obtain additional or supporting information when there are problems and improvements, especially the stages in data collection. Followed by making the application by writing code. Then the application that has been made is tested by testing to find out whether it has run according to its function. The last is to make improvements from the test results and documentation in the form of reports.

3.2. Model System Development

This research was designed and built using the Extreme Programming (XP) software development method. Extreme programming is a software development model that simplifies the various stages of system development to be more efficient, adaptive and flexible. The XP method is not only focused on coding but covers part of all areas of software development with a minimal number of teams. In addition, based on the results study's results found that the application of the XP method in application development produces software that meets the needs. The reason for using the extreme programming method is the nature of the system to be developed quickly which includes the planning phase, design phase, coding phase, and testing phase, as shown in Figure 2. below.

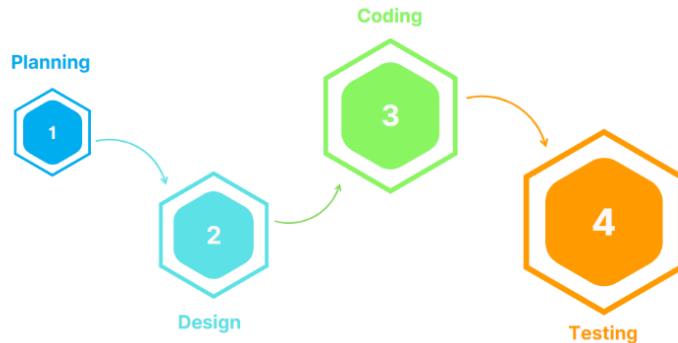


Fig 2. Extreme Programming Method

3.3. System Design

Application design that can be given convenience in the process of operating the Arudh & Qawafi Application. there are several devices in system design used in this study, namely: Use Case Diagrams, Activity Diagrams, Class Diagrams and Sequence Diagrams. The process design or flowchart described in the diagram depicted in the Use Case Diagram and described more clearly in the Activity diagram of the system actor's behavior is described in the Sequence Diagram using the Diagram.net/Dravio Online Platform.

a. Use Case Diagrams

Use case describes an interaction between one or more actors with the application to be made. The flow of user behavior in the use case in this application is that the user first enters the initial screen, if the user chooses to enter the application, the user will go to the material menu containing the knowledge of arudh & qawafi, wazan and taf'ilah, bait syi'ir, zihaf, al-'illah, taqthi', bahar, qawafi, how to practice, and quizzes. In the material menu, the user can choose one material from the various materials presented in the Arudh & Qawafi Book application.

b. Activity Diagrams

Activity diagrams describe the activities of a system or menu that is in this application. The activity diagram in the Arudh & Qawafi Book application is that when the user opens the application, the system activity will load the application to the material menu according to the command sent. In the material menu there are materials, knowledge of arudh & qawafi, wazan and taf'ilah, bait syi'ir, zihaf, al-'illah, taqthi', bahar, qawafi, how to practice, and quizzes.

c. Class Diagram

Class diagrams provide an overview of the relationship between the tables in the data base. Class Diagram The Arudh & Qawafi book application has 3 tables, namely the material class has 6 attributes, the quiz class has 6 attributes, and the result class has 4 attributes with each class having a save, edit and delete operation. While the saturation quiz class is only related to the result class.

d. Sequence Diagrams

Sequence diagrams describe the behavior of objects in the use case by describing the life time of the object and the messages sent and received between objects. Sequence diagrams on the android application Digitizing the Work of Caretakers K.H. Waqid Yusuf (Arudh and Qawafi Books) This is the user sends a command to the initial display object, so that the initial display object confirms the message and sends a reply in the form of the initial display to the user. Likewise with the next object, every object that sends a command to another object, the other object will confirm and send a reply by displaying what it confirmed.

3.4. System Test

System testing is carried out based on software specifications to avoid discrepancies that can be caused by errors from the previous stages, it can manifest applications that are feasible to use and are in accordance with the expected criteria based on the research objectives that have been built, among the tests carried out, namely:

1. Internal Testing: Black Box
2. External Testing: Direct Testing on Users

Respondents will be given the above questionnaire to be filled in accordance with the response points listed. Each response point will be given a weighted value, the best response point (Strongly Agree) will be given the highest score of 4 and the lowest (Disagree) will be given a value of 1. After that, the interval (range-prone) and percent interpretation will be determined in order to find out the assessment using the search method. interval score (I) with the formula:

$$I = 100 / \text{Total Score (Likert)}$$

So, the result of (I) is the lowest distance interval from 0% to the highest 100%. Then for each question, the number of respondents at each response point is multiplied by the weighted value. The results of all response points on each question are added up, so that it will find the total score for each question. To get the results of the interpretation, it is necessary to first know the highest score (Y) and the lowest number (X) for the assessment item with the following formula:

$$Y = \text{Likert highest score} \times \text{number of respondents}$$

$$X = \text{lowest Likert score} \times \text{number of respondents}$$

So, if the respondent's total score has been obtained, then the assessment of the respondent's interpretation of the learning media is the result of the value generated by using the % Index formula.

$$\text{Index formula \%} = \text{Total Score} / Y \times 100$$

The percentage results from the formula above will be matched with the interpretation results. So that the percentage of each question will be found.

4. Results and Discussion

4.1. Collection Result

Data collection is an important step in research and system development, with data collection techniques can support the research process to be studied, so in order to achieve research objectives, data collection must be carefully and correctly with the facts. In the analysis of system requirements, data collection techniques focus on observations and interviews at the At-Tarbiyah Islamic Boarding School Guluk-guluk Sumenep.

a. Observation Results

Based on direct observation of activities at the At-Tarbiyah Islamic Boarding School in studying the Arudh & Qawafi Book, and about how the existing problems are in order to understand what steps are taken, so that the application that will be designed runs well and as desired. From the results of observations made in At-Tarbiyah Islamic Boarding School on the Book of Arudh & Qawafi, like other Islamic Boarding Schools, this book is often studied directly by K.H. Wakid Yusuf, S.E. to his students and use books that are still in the form of print media as learning.

b. Interview Results

Interviews were conducted directly with the caretaker of the At-Tarbiyah Islamic Boarding School K.H. Wakid Yusuf, S.E. which discusses how to learn related to the Book of Arudh & Qawafi and the problems that occur. Following are the conclusions from interviews with related parties:

1. Arudh & Qawafi books are regularly reviewed by the Arabic language department (Arabic Literature)
2. Arudh & Qawafi's book was directly reviewed by K.H. Wakid Yusuf, S.E.
3. The book Arudh & Qawafi learns about how to make syi'ir.
4. Arudh and Qawafi books need to be digitized so that they can be practically accessed by students, alumni and sympathizers.

4.2. System Test Result

Interface design on the Karya Pengasuh KH application. Wakid Yusuf, S.E. (Arudh & Qawafi Books) based on Android, whose appearance is adjusted to the needs and knowledge of the user, aiming to make it easier for users to study Arudh & Qawafi Books via mobile. The design of the learning media application interface by Caretaker KH. Wakid Yusuf, S.E. (Book of Arudh & Qawafi) based on android, namely:

The Arudh & Qawafi Book Dashboard display design contains several material menus that include arudh & qawafi science material, wazan and taf'ilah, syi'ir bait, zihaf, al-'illah, taqthi', bahar, qawafi and how to practice the dashboard. As in Figure 7. as follows:



Fig 3. Arudh & Qawafi Book Dashboard Display

4.3. System Test Result

The test used is the black-box method, aiming to find out the data generated as expected by system users.

a. Internal Test

Table 1. Table of Internal Test Results

No	Test	Target achieved	Button Function	Information	
				In accordance	It is not in accordance with
1	Dashboard	Initial view	Displays the Arudh and Qawafi Book menus	✓	
		Knowledge of Arudh & Qawafi	Showing the meaning of the science of arudh and qawafi	✓	
		Wazan and Taf'illah	Showing the meaning of wazan and taf'illah	✓	
		Bait Syi'r	Showing the definition of shi'r	✓	
			Show understanding bait	✓	
			Showing elements bait	✓	
			Showing names bait	✓	
		Zihaf	Show understanding zihaf	✓	
			Showing zihaf mufrad	✓	
		Material Menu	Showing zihaf muarakkab/musdawaj	✓	
			Show understanding 'illah	✓	
			Showing 'illah ziyadah	✓	
			Showing 'illah naqsun	✓	
			Show understanding taqthi'	✓	
			Showing implementation taqthi'	✓	
			Showing dharurat syi'riyyah	✓	
			Show understanding bahar	✓	
			Showing all kinds bahar	✓	
			Showing Qawafi 1	✓	
			Showing Qawafi 2	✓	
2	How to Practice Syi'r	How to Practice Syi'r	Show how to practice Making syi'r	✓	
			Showing quiz	✓	
			Showing score	✓	
			Showing result	✓	

b. External Testing with Questionnaire

External testing was tested on 30 respondents as users in this application, below are some questions posed to users for testing the feasibility of this application.

Table 2. Table of External Tests with Questionnaires

No.	Question	Answer				Information
		SS	S	KS	TS	
1	Can the display in this application be captured easily and clearly?	16	14			
2.	Does this application have an attractive appearance?	15	14	1		
3.	Is the overall use of this application satisfactory?	12	18			
4.	Is the system of this application easy to use?	12	17	1		
5.	Is this application very useful for users?	19	11			
Total		74	74	2	0	

The first calculation starts with the formula = $T*Pn$

T = Total number of respondents who chose

Pn = Choice of likert score numbers

- a. Respondents who answered strongly agree (score 4) = $74 * 4 = 296$
- b. Respondents who answered agree (score 3) $74 * 3 = 222$
- c. Respondents who disagree (score 2) $2 * 2 = 4$
- d. Respondents who disagree (score 1) $0 * 1 = 0$

Total score = $296 + 222 + 4 = 522$

Calculation Score Interpretation

Z = Highest score likert * number of questions * number of respondents = $4 * 5 * 30 = 600$

X = lowest Likert score * number of questions * number of respondents
 $= 1 * 5 * 30 = 150$

Next is to look for the interval distance (range of distance) and the percent interpretation in order to find out the assessment by the method of finding the percent score interval

Interval formula = $100 / \text{number of choices likert scores}$

$$= 100 / 4 = 25$$

So the interval distance from the lowest 0% to the highest (100%) is 25. Here is the interval table with a distance of 25 from the lowest (0%) to the highest (100%).

Table 3. Index

No	Percentage Value	Information
1	0% - 25%	Disagree
2	26% - 50%	Disagree
3	51% - 75%	Agree
4	76% - 100%	Strongly agree

Final calculation using Index% Formula

$$\text{The formula index \%} = \frac{\text{Total Score}}{Y} * 100 = \frac{522}{600} * 100 = 87\%$$

So from the external test results, it shows that 87% of the categories that are often chosen can be concluded that the user strongly agrees with the Arudh and Qawafi book application by K.H. Wakid Yusuf, S.E.

5. Conclusion

Based on the results of the above review through the analysis and application design in the previous chapters, the following conclusions can be drawn:

1. With the Arudh & Qawafi book application, the public, especially the students, alumni, and sympathizers can learn Arabic literature (syi'ir and nadham) contained in the Arudh & Qawafi book via mobile.
2. The Arudh & Qawafi book application also makes it easier for users to learn Arabic literature (sya'ir-sya'ir) materials with an attractive appearance.
3. Based on the Likert scale calculation on the questionnaire, the results showed 87% with user information strongly agreeing with the Arudh and Qawafi book application K.H. Wakid Yusuf, S.E.

Acknowledgement

Say thanks to the editors and reviewers for all suggestions, input and have helped in the process of publishing the manuscript. Thank you also goes to those who have supported the research and provided moral and material assistance.

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