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MY TAJWID MOBILE APPLICATION

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2015

STUDENT DECLARATION

I hereby declare that the work in this thesis entitled MY TAJWID MOBILE APPLICATION” is the result of my research expect as cited in the references.

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SUPERVISOR DECLARATION

I hereby declare that have read this thesis and in my opinion this thesis is sufficient in term of scope and quality for the award of the degree of the Bachelor of Computer Science & Software Engineering (Graphics and Multimedia Technology).

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ABSTRACT

Mobile technology has nowadays become trend in various fields, either in business, education, health, engineering, etc. The need of mobility in accomplishing work is increasing as the technology created more advanced mobile devices that are capable in multitasking such as the smartphones. Tajweed program application for the Android operating system is an application program that provides the teaching of reading and understanding the Tajweed knowledge. There also quiz given to analyzing the understanding of the learning process. Hopefully with the e-learning program Tajweed give new source to gain knowledge especially in enhancing recitation process in Quran. Tajweed application program provides outstanding results to the public, because the system content is accurate and give priority to efficiency and effectiveness. Some of them are people who have used the mobile applications program based. So this is an exciting opportunity that can be used to assist parents or Quran teachers to teach Tajweed.

ABSTRAK

Teknologi mudah alih telah menjadi trend pada masa kini dalam pelbagai bidang, sama ada dalam perniagaan, pendidikan, kesihatan, kejuruteraan, dan lain-lain. Keperluan mudah alih dalam mencapai kerja semakin meningkat kerana teknologi yang mencipta peranti mudah alih yang lebih maju mampu melakukan pelbagai tugas seperti telefon pintar. Aplikasi Tajwid untuk sistem operasi Android adalah program aplikasi yang menyediakan pembelajaran seperti membaca dan memahami ilmu Tajwid. Terdapat juga kuiz diberikan bertujuan menganalisis pemahaman didalam proses pembelajaran. Mudah-mudahan dengan program e-pembelajaran tajweed memberi sumber baru untuk menimba ilmu pengetahuan terutama dalam meningkatkan kualiti bacaan dalam Al-Quran. Program aplikasi Tajwid memberikan hasil yang luar biasa kepada orang ramai, kerana kandungan sistem adalah tepat dan memberi keutamaan kepada kecekapan dan keberkesanan. Sesetengah daripada mereka adalah pengguna yang telah menggunakan program aplikasi berasaskan peranti mudah alih. Jadi ini adalah satu peluang yang menarik yang boleh digunakan untuk membantu ibu bapa atau guru-guru Al-Quran untuk mengajar Tajwid.

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LIST OF ABBREVIATION

SDLC	System Development Life Cycle
RAD	Rapid Application Development
HCI	Human Computer Interaction
UI	User Interface
IDE	Integrated Development Environment
GUI	Graphic User Interface
IBM	International Business Machine
PHP	Hypertext Preprocessor
XML	Extensible Markup Language
HTML	Hypertext Markup Language
EJB	Enterprise Java Beans
SE	Standard Edition
EE	Enterprise Edition
SQL	Structured Query Language
PLS TFT	Plane Line Switching Thin Film Transistor
IPS LCD	in Plan Switching Liquid Crystal Display
OS	Operating System
CPU	Central Processing Unit
GPU	Graphic Processing Unit
DFD	Data Flow Diagram
ERD	Entity Relationship Diagram

CHAPTER 1

INTRODUCTION

1.0 Introduction

Nowadays, learning Quran and Tajweed is easier to do for Muslim people. Besides learning with Quran trainers, there are various medium that can be used to learn Quran and Tajweed. Among these are using television broadcast, Video CD, installed application in computer and so on. These different way of learning gives different impacts to each user. Studying Tajweed is very important to ensure there is no mistake while reciting Quran. Without a good source and technique, the percentage of mistake in reading Quran will increase. Now there is a new solution to prevent this problem from keeps occur.

With modern technology in 2014, lots of application can be use by using smartphone. This handled device is convenient and easy to bring anywhere. Besides, it is very comfortable to interact with. Therefore, learning Tajweed also can be used by using smartphone. 'My Tajwid' application will let users to learn, train and take quiz to measure the progress and improvement in learning Tajweed. Besides that, this system give user option to redo training and quiz with different random question to improve the previous result. There are many levels provided based on the sequence of topics and user will learn, training and take the quiz. The result from the quiz will display percentage of topics

dominated for every user. Every quiz passed in each level will be given a badge as an achievement. From this, user will be more inclined to continue using this application.

‘My Tajwid’ application have potential to let user train themselves and make them keep actively exploring Tajweed. User can measure their own understanding without have to depend on the Quran trainer. Result that achieve shows level of mastery in each topic. Therefore, the aim of this application is clearly help people understanding Tajweed deeply regardless of age. This application give parent opportunity to evaluate their kids by using different account in one device. This option give parent advantage to see their children improvement in learning Tajweed.

1.1 Problems statement.

In this cutting-edge era, Quran trainers is so difficult to be found except in the Mosque. But many people who wants to learn the Quran is staying in a residential area or a rural area that is so far from the mosque. Quran recitation activities in homes trainers today are so difficult to see due to the absence of suitable and experienced trainers. To get outside trainers, the number of students who want to learn the Quran and Tajweed should also reach a satisfactory before class begin. Furthermore, not all trainers have the time and opportunity to teach the whole Tajweed, because most of them focus on basic reading of the Quran.

Compact schedule routine also is the cause of the presence in the Quran classes. Especially to students who are proactive in performing daily activities at school during the day and taking tuition subjects at night. Also there were too tired at night and did not have enough time to attend classes to learn Quran. The study location that too far is also the factor that make people unable to presence themselves consistently. In addition, the cost factor also causes some people are not able to get the opportunity to learn the Quran and Tajweed as they are incapable. This is because, not all places provide free education because the cost of living is getting higher.

Attend Quran classes every day does not guarantee understanding and improvement of students without any strengthening exercises. Time allocated to trainers is too limit to teach overall Tajweed. Parents especially want to see the progress of their children after sending

them to learn Quran and join Tajweed classroom in a particular period. For parents who have free time, they can test the progress of their own children themselves. But what about the parents who work until late at night, and those who learn on their own. It is hard for them to keep maintaining Tajweed knowledge for their kids and themselves when they were too busy and tired. Results that recorded visually is more easily to evaluate to determine the level of real progress.

1.2 Objectives.

The goal of this project is to develop a Mobile Application for studying Tajweed knowledge. The following objectives are set:

- i. To design and develop a mobile application for 'My Tajwid' using Android application development software.
- ii. To identify the need of Muslim users for a more effective learning method.
- iii. To create a self-assessment tools to record the improvement in learning Tajweed.

1.3 Scopes.

i. System user.

The system target user is to all Malaysian Muslim kids that want to learn and improve their Tajweed. They will use the system to learn Tajweed, and training to score in the quiz to unlock the next level. The system will be used by them on mobile devices either smartphone or tablet pc when they are free.

ii. Functionality.

The application functionality is to teach Tajweed and recording the improvement of users Tajweed. There are five topics that will be covered for learning and training in this application. This application saving data recorded either in the internal storage or memory card depending on user storage option. Users can choose either to study first or directly do the quiz. There are training option where user can practicing the random question given with no time limit. The quiz result will calculate the percentage of user achievement and will preview in visual measurement. The achievement have their own level depending on the scores. If the user achieve all requirement that need, their past to the next level with badge given. Badge own represent Tajweed syllabus that has been covered successfully.

iii. Application platform.

The application is developed by using android operating system as a platform for mobile devices such as smartphone and tablet pc. Android operating system is used because it is widely used by people and operates on most of mobile devices available nowadays. Mobile platform is chosen as it is convenient to use on the move while user is free.

iv. Language.

The language used for this application is the Malay Language because the target user is Malaysian people. By using our own language, the progress will run smoothly and there will no misunderstanding instruction case. Romanization Arabic words to Malay is used to let the kids can pronounce the words in Arabic Language. So that, they know well every chapter that they learn.

1.4 Thesis Organization

The overall thesis contains of seven (7) chapters all. Chapter 1 will describe on the introduction of the system. Chapter 2 will discuss about literature review that will explain about the existing system or problem and figuring solutions. Chapter 3 will discuss about methodology used for the system, and comparison to select the best methodology. Furthermore, chapter 4 will describe well about designing phase for the system. Chapter 5 will explain the process of implementation for the system. Chapter 6 will discuss about the results analysis and last chapter will conclude all as project overall summary.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

In this chapter, there will be three subtopics that will be covered. Subtopic 2.2 will describe on existing mobile application for learning Tajweed system that will cover on three (3) systems. Subtopic 2.3 will explain on comparison of existing system of those three existing systems. The discussion will come out with the feedback of the users from Google Play Store with the screen shots. The comparison will be elaborate by table as it is the best way to make a comparison.

2.2 Existing System

There are many Tajweed learning applications that can be downloaded for free from Google Play store for Android and Apple Store for iOS platforms. Below are examples of Android applications available to learn Tajweed.

2.2.1 Belajar Membaca Al-Quran

Belajar Membaca Al-Quran (version 1.1.0) is a free application that was developed by the X-Gaf Studio to teach Quran basic reading and basic Tajweed [1]. Once downloaded, the application can continue to be used without the need to download additional data. This offline application does not need registration to allow user to use. User have two options, either to learn or continue to play the game. There are game provided in this application as an advantage for user to train their understanding. This application requires 2.3 android version and above to use it. From the Figure 2.1 below, we can see this application target user is especially for kids. The bee in the application looks like it is guiding user to interact with the system. Kids mostly would be easily attracted to the application because the cartoon animation is used with audio included. Teenage and adult user also can use the system as the content is more important than the interface.

Figure 2.2 below shows a kid is using and interact with the application. The simple and attractive Graphic User Interface (GUI) components make the learning process run smoothly. Furthermore, the audio provided make the application more interesting to be used. Some background music like ‘clapping hand’ is used to congratulate users that passed the games provided. Level passed will be given a star at least based on their success percentage. The developer of this application is smart in choosing suitable colour to make it user friendly. This suitable features will avoid the vision sickness for user that is using this application especially for kids. So they can use this application as long as how much they want.



Figure 2.1: The main menu of Belajar Membaca Al-Quran Application.



Figure 2.2: A kid is using Belajar Membaca Al-Quran Application.

2.2.1.1 Review of Belajar Membaca Al-Quran Application

An application is determined good or not is depending on the feedback of the users. Feedback is important to let developer know about advantages and disadvantages of their system. User consists of different people regardless ages or races, so their opinions might be different. Some of the user might be okay and some are not so they can suggest way of improvement that can be implemented. Google Play Store for Android and Apple Store for iOS have their own feedback platform to let user rates and comments in the application feedback space. Here are the rates and comments from the users. Figure 2.3 shows that 812 votes five stars, 202 votes for four stars, 70 votes for three stars, 36 votes for two stars and 63 votes for one star for this application. Majority of the user satisfied with the application since the votes for five stars is higher than others.

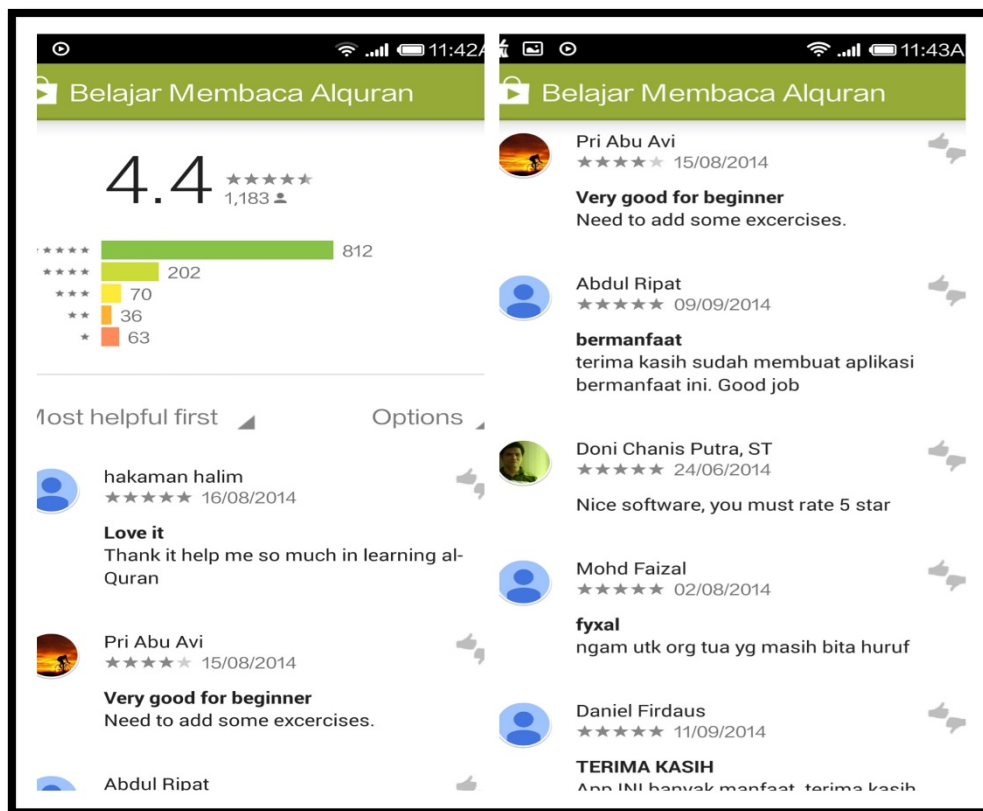


Figure 2.3: Rates and comments from the users of Belajar Membaca Al-Quran Application in the Google Play Store.

2.2.2 Tajwid Lengkap

Tajwid lengkap (version 6.0) is also a free application that was developed by the QT-media to teach the complete Tajweed with audio for each example sentences [3]. Tajwid Lengkap application is more lighter as there is no use of animation in it. Besides offline, this application can also be directly used without have to download additional data to use. Users do not need to register to use this application as there is no database used. Just download and ready to be used. This application feature is more on teaching without training option.

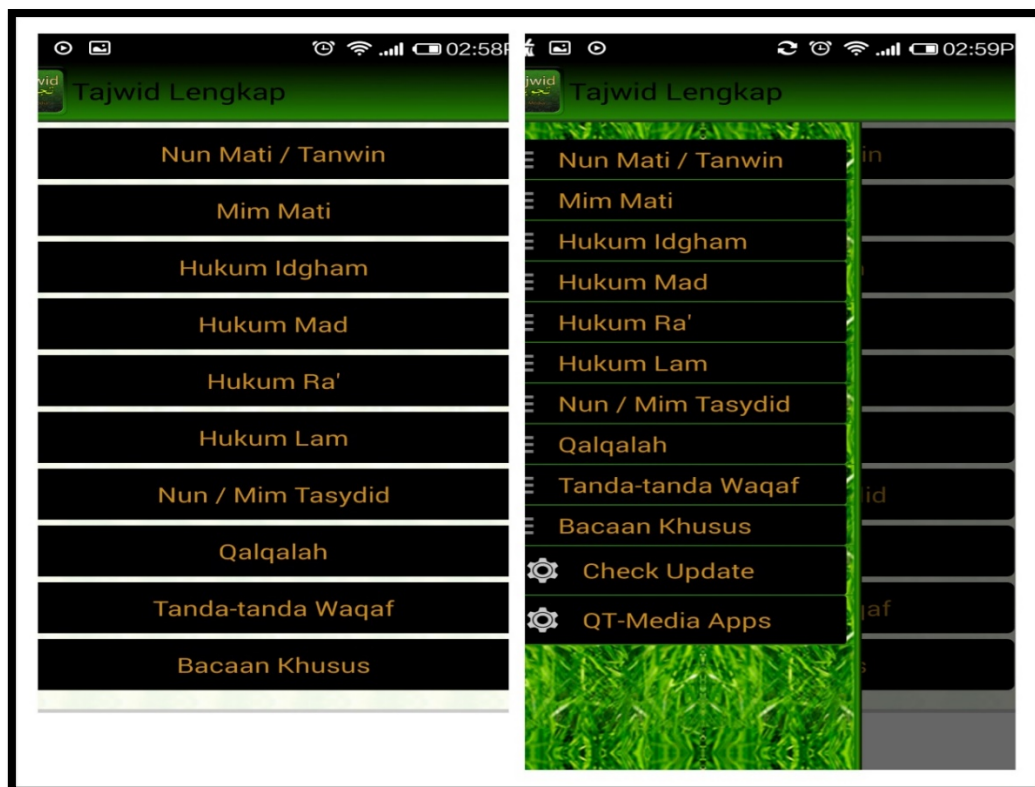


Figure 2.4: Main menu of Tajwid Lengkap Application.

2.2.2.1 Review of Tajwid Lengkap Application

Rate and comments for Tajwid Lengkap Application. From figure 2.5 there are 1825 votes for five stars, 436 votes for four stars, 145 votes for three stars, 80 votes for two stars and 97 votes for one star. Rate shows that user that satisfied with the application is more.

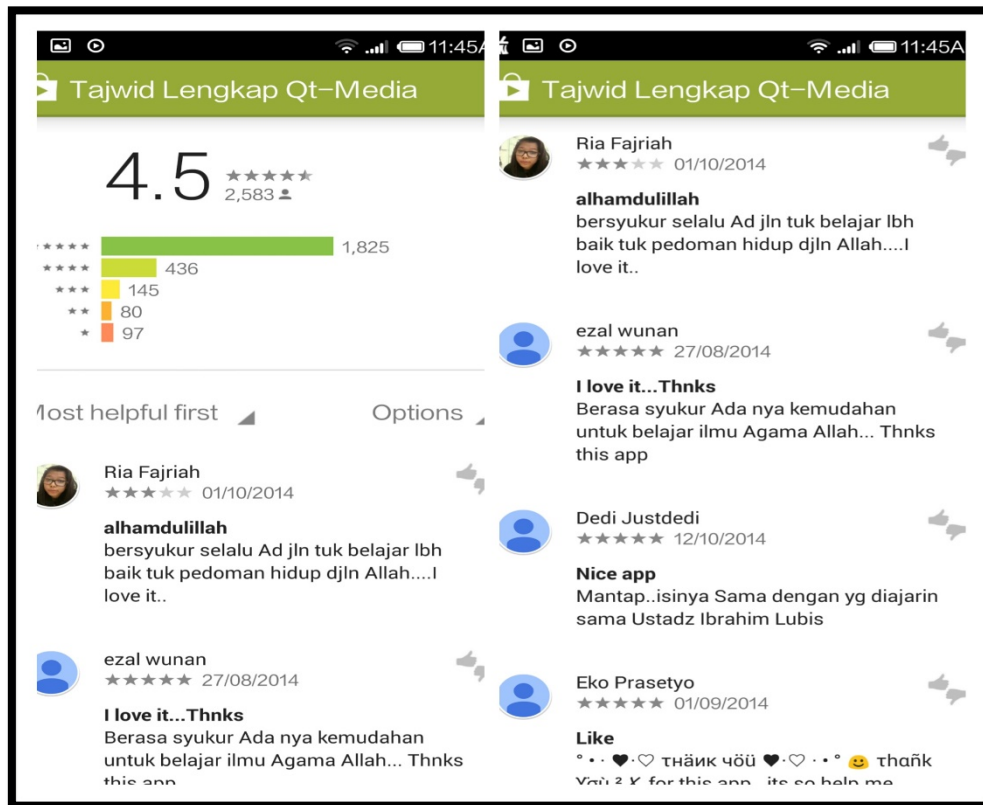


Figure 2.5: Rates and comments from the users of Tajwid Lengkap Application in the Google Play Store.

2.2.3 Belajar Tajwid

Belajar Tajwid (version 1.1) is learning Tajweed application developed by ecosolutionsystem [2]. This application uses a very simple interface and easy to interact. Users can continue to use the application after downloading without having to download additional data. In addition, this application also provides audio for each sample sentences in it. This application reach maximum functionality but have mess interface.

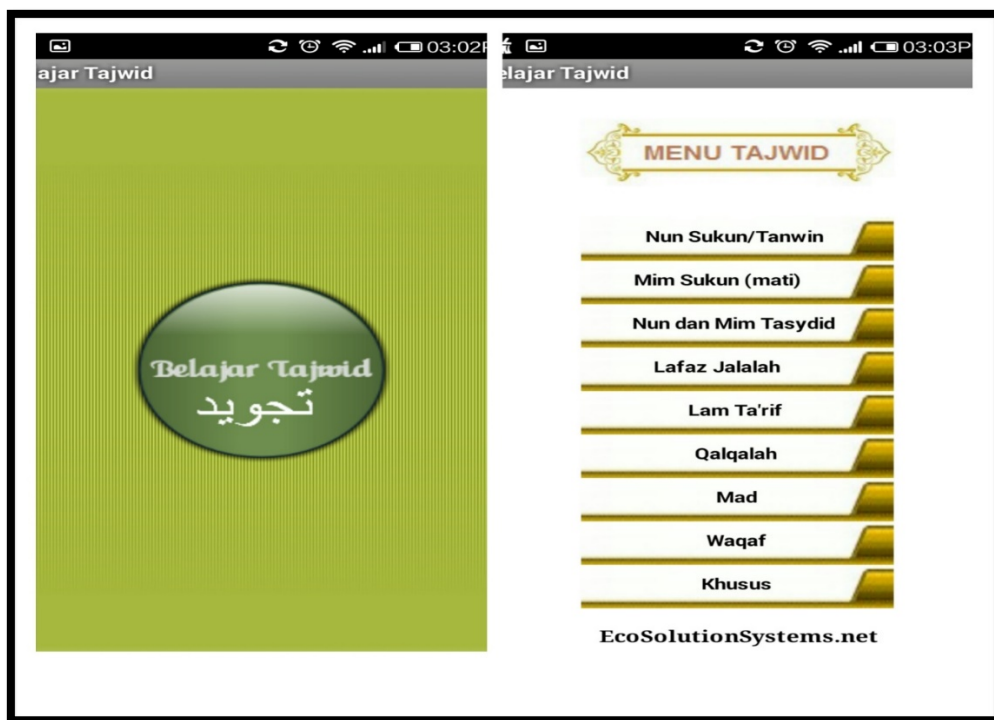


Figure 2.6: Main menu of Belajar Tajwid Application.

2.2.3.1 Review of Belajar Tajwid Application

Rate and comments from the users of Belajar Tajwid Application. Figure 2.7 shows that most of the users like this application. 1491 votes for five stars, 336 votes for four stars, 125 votes for three stars, 56 votes for two stars and 75 votes for one star.

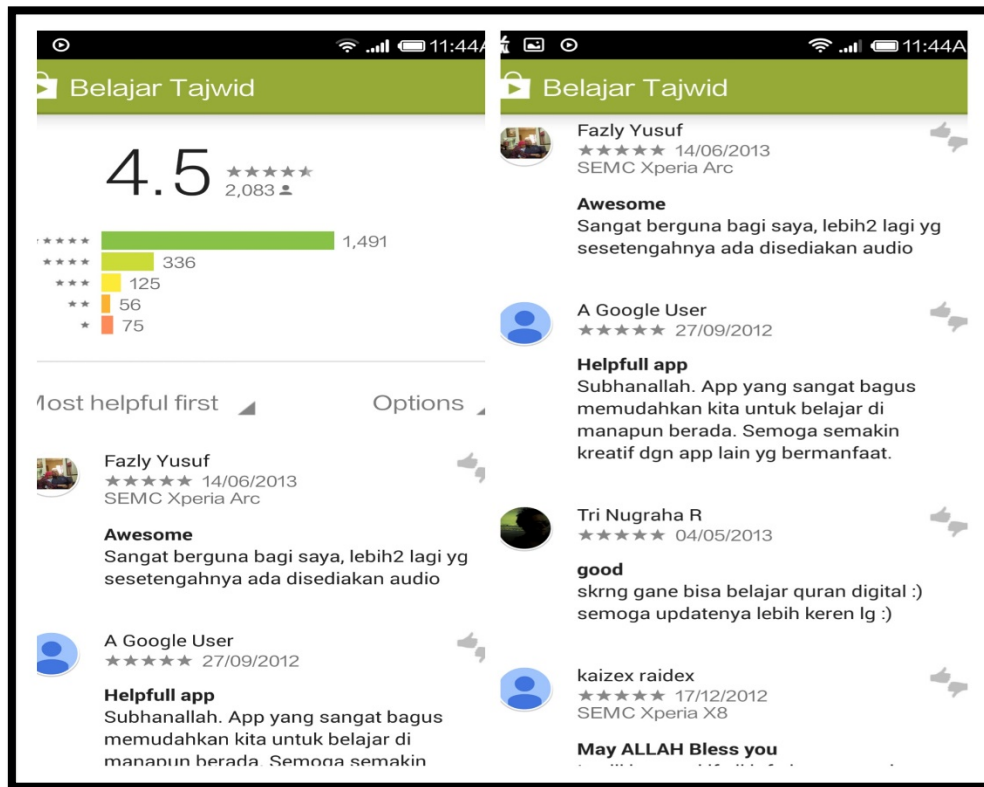


Figure 2.7: Rates and comments from the users of Belajar Tajwid Application in the Google Play Store.

2.3 The comparison of existing system

Table 2.1: The comparison between existing mobile applications for learning Tajweed System

Features / System	Belajar Membaca Al-Quran Application.	Tajwid Lengkap Application.	Belajar Tajwid Application.	My Tajwid System
Performance	Have very good and smooth performance.	Have good and smooth performance.	Have good and smooth performance but too simple.	Have very good and smooth performance.
Interface	Have very nice Interface with little animation used.	Have nice interface with suitable colour choose but yet very simple.	Interface is too simple and look messy.	Simple interface yet attractive for kids.
Graphical User Interface	Have nice and very suitable GUI tools used.	Have simple and attractive GUI tools used.	Have simple and mess GUI tools used.	Suitable GUI components used.
Functionality	More on teaching how to read Quran with basic Tajweed syllabus and provided Quiz to user.	Teaching and covering all Tajweed syllabus with audio used.	Teaching and covering all Tajweed with audio used but too slow.	Learning, training and quiz option to be choose with audio.
User friendly	Full usability.	Full usability.	Full usability but lack in understanding.	Full usability
Cost	Free	Free	Free	Free
Internet	Offline	Offline	Offline	Online

CHAPTER 3

METHODOLOGY

3.1 Introduction

To develop Mobile Application for My Tajwid system, a suitable approach must be used to ensure systematic development process. To choose a suitable approach, making a comparison among methodology is a must before applying to the project. There are many factors that affects in choosing a methodology and it is depend on the project planning and timeline. Figure below shows the common phases of System Development Life Cycle (SDLC).

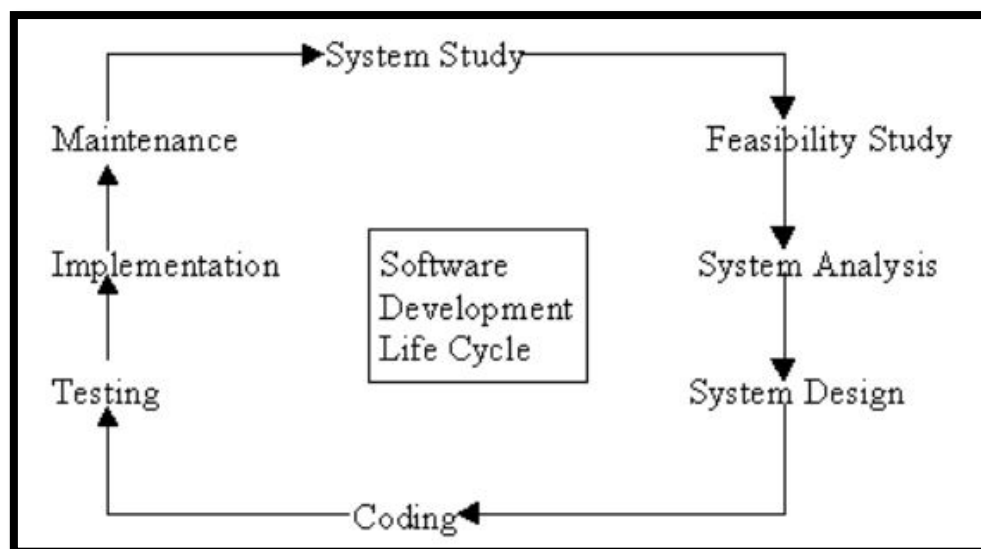


Figure 3.1: Common phases of SDLC.

3.2 Comparison of methodology

Comparison is important to choose the best approach to implement to the project. Table 3.1 shows the comparison of methodology. There are certain features that really important to care about. Because at the end, the chosen methodology really affect the whole project.

Table 3.1: Comparison of methodology

Model / Features	Waterfall	Agile	RAD
Requirement Specifications	Beginning	Frequently changed	Time box released
Cost	Low	Very high	low
Success guarantee	Low	Very high	Good
Risk involvement	High	Reduced	Very low
Expertise Required	High	Very high	medium
Risk analysis	Only at beginning	Yes	Low
User involvement	Only at beginning	High	Only at the beginning
Overlapping phases	No	Yes	No
Flexibility	Rigid	Highly flexible	High
Maintenance	Least glamorous	Promotes maintain ability	Easily maintained

3.2.1 Waterfall

Waterfall model was proposed by Royce in 1970 which is a linear sequential software development life cycle (SDLC) model. The various phases followed are requirements analysis, design, coding, testing and implementation in such a manner that the phase once over is not repeated again and the development does not move to next phase until and unless the previous phase is completely completed. Hence it is not very much useful when the project requirements are dynamic in nature.

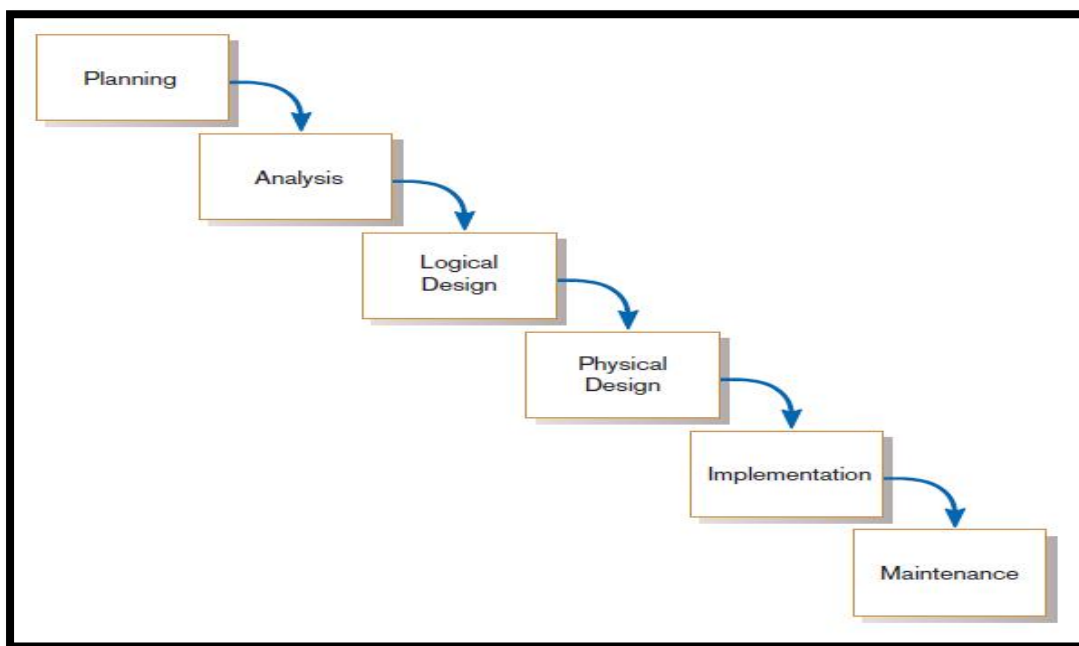


Figure 3.2: Waterfall methodology phases

3.2.2 RAD methodology

Rapid Application Development (RAD) is a development lifecycle designed to give much faster development and higher-quality results than those achieved with the traditional lifecycle. It is designed to take the maximum advantage of powerful development software that has evolved recently.

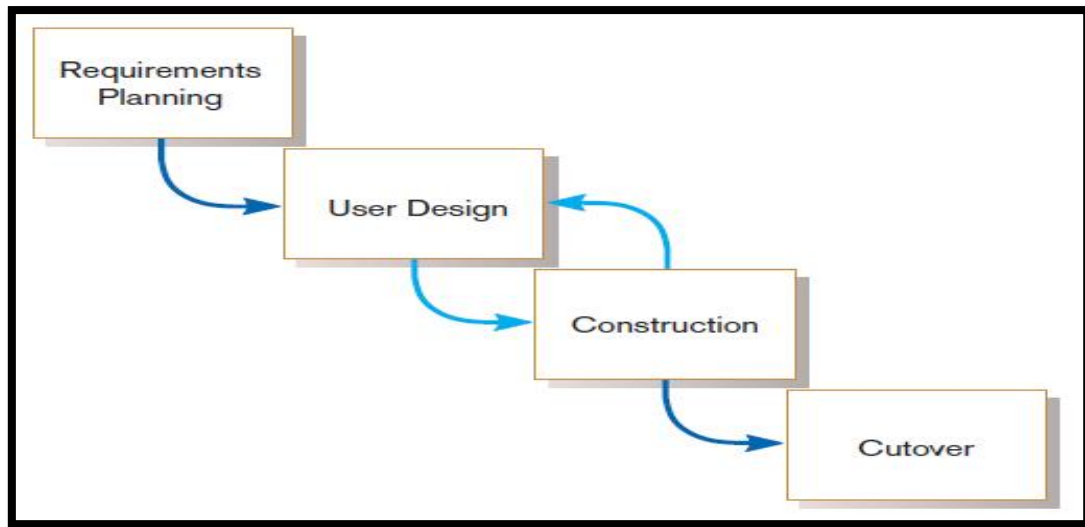


Figure 3.3: RAD methodology phases

3.2.3 Agile methodology

Agile software development is a conceptual framework for software engineering that promotes development iterations throughout the life-cycle of the project. Agile as the name refers implies something to do very quickly. Hence, Agile Testing refers to validate the client requirements as soon as possible and make it customer friendly. Agile practices are specially tailored to eliminate all kinds of waste manifesting in a product life cycle, but more especially, improving the quality of developed product is a major goal threaded into most of those practice.

There are many agile development methods. Most minimize risk by developing software in short amounts of time. Software developed during one unit of time is referred to as an iteration, which may last from one to four weeks. Each iteration is an entire software project: including planning, requirements analysis, design, coding, testing, and documentation. In Agile testing as soon as the build is out, testing is expected to get started and report the bugs quickly if any found.

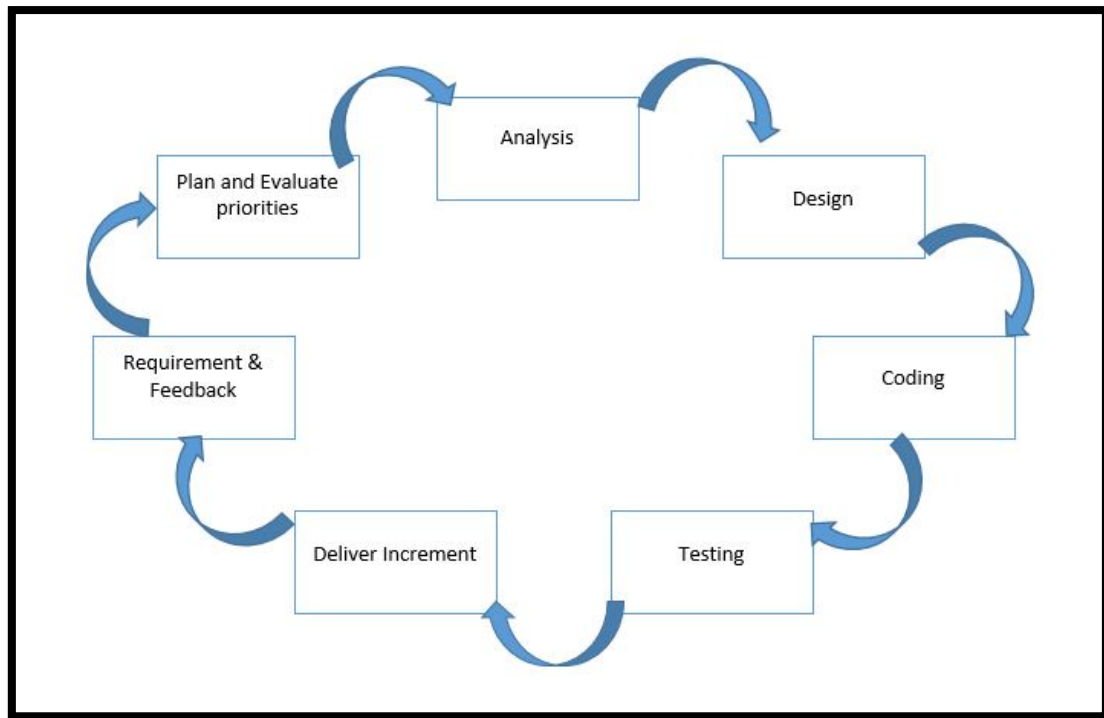


Figure 3.4: Agile methodology phases

3.2.3.1 Plan and evaluate priorities

Planning is the first step in any process or system to be developed. Idea in what aspect or scope of the system that need to build must be clear. Besides, system platform also is important to be measure such as web based application, mobile application or desktop application. For this project, with the latest technology in mobile application made more people using this platform in doing anything. So, mobile platform have more priorities nowadays because it is convenient and easy to handle with.

3.2.3.2 Analysis

This is the second phase in agile methodology that will be used in the application development. This is the phase where an idea to propose mobile application for My Tajwid system is found by collecting information based on current existing problem face by parents and Quran Teacher. The problem of making manual class for leaning Tajweed seems difficult to maintain for every day. There are lots of factor that contribute to this problem and need to be solve to prevent Tajweed knowledge being abandoned.

3.2.3.3 Design

At this phase, the basic layout design and functionalities is proposed by considering based on collection of requirement. Wireframe is used because it portrays how a page or screen of a website or system may look. This system is create specially for kids and do counted kids behaviour in interacting with smartphone devices. A questionnaire is created to get a prototype design of the system from parents and Quran teachers. While developing this phase, human computer interaction (HCI) technique for kids in interacting with screen touch devices is applied. The behaviour of kids at least 6 or 7 years old while interacting with smartphone device is studied. Then, a proper User Interface (UI) design is produced while considering the Interface Guidelines for various platforms. This is to ensure compatibility of application on various mobile devices and to design a good User Interface that match professional standard.

3.2.3.4 Coding

In this phase, the coding is started to be develop. For this project, Flash Adobe AIR for Android is choose because of its fast execution. ActionScript 3.0 has a JIT (just-in-time) compiler, putting it on a par with Java or .NET for raw performance. A working prototype is develop to validate functionality, assumptions, and helps to give understanding of the work scope. The designed prototyped is made to function.

3.2.3.5 Testing

In this phase, the system prototype of My Tajwid application is produced to test for any problem or bugs and fix in this phase. A beta version of the application will be release for wide user to get their feedback for any changes and improvements. Any suggestions or recommendation from the user can help to enhance the system before the real system is made.

3.2.3.6 Deliver increment

This process take place after the system has been developed. After the system has been testing and all requirement has been fulfilled, the system is then deliver to the client. In

this phase the system is already been updated with new requirement as increment. Any additional features will be up to date based on the situations or new requirements.

3.2.3.7 Requirement and feedback

In this phase, system is already reach to client and users hand. They will used My Tajwid system and can give the feedback from any point of view. As the agile approach is a continuously behaviour, so the any requirement for the increment might be needed.

3.3 Software and Hardware specifications

To develop android applications, an integrated development environment (IDE) is needed. IDE is a programming environment that has been packaged as an application program, typically consisting of a code editor, a compiler, a debugger, and a graphical user interface (GUI) builder [4]. IDE normally consists of a source code editor, build automation tools and a debugger to maximize programmer productivity by providing tight-knit components with similar user interfaces. There are many IDE or developments tools available for developing mobile applications either free or paid. The most commonly used software to develop Android application are Adobe Flash AIR for Android, Eclipse, and NetBeans.

3.3.1 Software Specifications

There are various development software available online for mobile application development either open source or for subscription. Adobe Flash AIR for Android, Eclipse, and NetBeans are three most common and finest software being widely used by mobile application developer.

3.3.1.1 Adobe Flash AIR

ActionScript 3 is the programming language for the Adobe Flash Player and Adobe AIR runtime environments. Programmers of all levels beginner, intermediate, and advanced. ActionScript 3.0 is a powerful, object-oriented programming language that signifies an

important step in the evolution of the capabilities of the Flash Player runtime. The motivation driving ActionScript 3.0 is to create a language ideally suited for rapidly building rich Internet applications, which have become an essential part of the web experience. Earlier versions of ActionScript offered the power and flexibility required for creating truly engaging online experiences. ActionScript 3.0 now further advances the language, providing superb performance and ease of development to facilitate highly complex applications, large datasets, and object-oriented, reusable code bases. With ActionScript 3.0, developers can achieve excellent productivity and performance with content and applications that target Flash Player.

3.3.1.2 Eclipse

Eclipse is a Java-based open source platform that allows a software developer to create a customized integrated development environment (IDE) from plug-in components built by Eclipse members [6]. Eclipse is managed and directed by the Eclipse.org Consortium. Eclipse got its start in 2001 when IBM donated three million lines of code from its Java tools. The original goal of Eclipse was to create and foster an open source IDE community that would complement the community that surrounds Apache. It is used in both open source and commercial projects at first and now became a major platform which used several programming languages including Java, C, C++, Ruby, Perl, etc. The advantage of Eclipse is that it features various plugins which makes it versatile and highly customizable. Eclipse platform works in the background, compiling code and showing up errors as when it occurs.

3.3.1.3 NetBeans

NetBeans is an open-source integrated development environment (IDE). NetBeans supports development of all Java application types (Java SE (including JavaFX), Java ME, web, EJB and mobile applications) out of the box [8]. Now, this IDE is a part of Oracle and can be used to develop software for all versions of Java ranging between Java ME, up to the Enterprise Edition. Just as Eclipse, NetBeans also features a variety of plugins. NetBeans offers various different bundles such as 2 C/C++ and PHP editions, a Java SE edition, the Java EE edition, and 1 kitchen sink edition. This IDE also offers tools and editors which can be used for HTML, HTML5, PHP, XML, JavaScript and more. NetBeans scores over

Eclipse with the features database support, with drivers for Java DB, MySQL, PostgreSQL and Oracle. Its Database Explorer allows developer to easily create, modify and delete tables and databases within the IDE.

3.3.2 Comparison of Existing IDE Features

The IDE software that is going to be used for development of Mobile Application for My Tajweed System is Adobe AIR for Android. Adobe AIR is chosen because it is a runtime environment which allows the development of rich, desktop Internet applications. Developers can use proven technologies like, Adobe Flex, Ajax, HTML, JavaScript, Adobe Flash® and Flex technologies, and ActionScript® to create applications that can be run outside of the browser on many different operating systems from the desktop to Android mobile devices, Blackberry, Tablet OS, iOS and even television. Most developers appreciate the flexibility of being able to develop applications for such a wide variety of platforms from the computer desktop to television, smartphones, tablets and netbooks. One of the biggest benefits to businesses is the ability to deliver branded, RIAs (rich Internet applications) that operate outside of the browser that helps to keep the business both connected and top-of-mind with their customers and clients.

Deployment with Adobe AIR is quick and low risk because businesses can offer engaging apps that run smoothly across all of the major computer operating systems. RIAs can help expand brand, improve customer relationships and retention, lower costs and raise revenues. When we bring our brand right to the user's desktop with useful apps that enhance their lives, we are increasing customer loyalty at the same time.

Developers who are using Flash Professional and JavaScript can give their development efforts a further fillip with the use of Adobe AIR. An experienced developer who is an expert on the Adobe Flash Player Software can improve upon the Flash experience by developing far more engaging applications than the ones that could be developed with Flash alone. With AIR there is a marked improvement in the look and feel of the application, and each element of the application is designed to capture the attention of the users. The objective of Adobe Air is to offer powerful branded experiences that reach out to more users.

For developers, with proven expertise on JavaScript, Adobe AIR helps widen the scope of their browser applications. The fact that the platform is desktop capable means developers can build the kind of applications that are more responsive and offer more value to end users. Also, armed with a WebKit engine, Adobe AIR helps developers use the same code on the browser, as well as the desktop, which makes for quick development and deployment. What's more, the delivery of the same code also ensures the stability and reliability of the rich internet application. Table 2 differentiates the features supported by the three IDE, Adobe AIR, Eclipse, and NetBeans.

Table 3.2: Comparison between different IDE features

Features Supported	Supported Languages	Supported Technologies and frameworks	Supported application servers
Adobe AIR	actionscript	.	
Eclipse IDE	Java,Ada,ABAP, C,C++, COBOL, Fortran, Haskell, JavaScript, Lasso, Natural,Perl, PHP, Python,R, Ruby (including Ruby on Rails framework),Scala, Clojure, Groovy, Scheme, Erlang	Equinox OSGi, Standard Widget Toolkit, JFace	Tomcat, GlassFish.

NetBeans IDE	Java, PHP, C/C++, HTML5.	Apache Struts 2, Wicket, ICEfaces 2.0	GlassFish, Tomcat.
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3.3.3 Hardware Specifications

To develop an application, a suitable hardware specifications is very important to be considered. Some of the hardware specifications might be not suitable for the program that need to build. Most of the application nowadays is built by using latest hardware as it perform the best performance and reach high efficiency. Less time will be used in testing the project as the hardware used is processing faster. For this application, the latest device is been used to develop the project. Table 3 shows the hardware specifications included in developing the Mobile Application for My Tajwid System.

Table 3.3: Hardware Specifications

Hardware	Functions
3) Desktop Computer Specifications: - Processor: Intel(R) Core i5-210M CPU - RAM: 6.00 GB - Graphics: NVIDIA GeForce GT 630M - HDD: TOSHIBA MK7559GSXP	Use for application development using Adobe AIR
4) Smartphone / Tablet -Name: Xiaomi MI 3W -OS: Android 4.4.4 KitKat -RAM: 2GB	Act as Android development device to run the application and test for querying data or adjusting application's compatibility

-Internal Memory: 16GB	
-Processor: Quad core 2.3Ghz	

CHAPTER 4

DESIGN

4.1 Overview

In this chapter, there will be seven (7) subtopics that will be covered. Subtopic 4.2 is a study about Cognitive Development for kids while interacting with device.

4.2 Cognitive Development

Designers of children's technology and software face distinctive challenges. Many design principles used for adult interfaces cannot be applied to children's products because the needs, skills, and expectations of this user population are drastically different than those

of adults [20]. Children now represent an important user group for software and technology, and as a result, more attention is being paid to the specifics of how to design for children. This user group is unique in several ways, their goals while using computers are typically education or entertainment rather than productivity. They have a wide range of skills and abilities, and their experience with computers begins early and continues through their lives. Children have their own needs and goals which cannot necessarily be met by adult tools.

These differences lead to the need for different designs. For example, in products whose aim is education or entertainment, user motivation and engagement are as important as task efficiency. Value is only attained if users spend time with the product and it keeps their attention. Designers of children's technology must concentrate not only on the mechanics of their interfaces but also on features that will keep children engaged. Similarly, where products aimed at adults typically make assumptions about their users like the ability to read, type, and understand abstract concepts. Products created for children must carefully take into account their intended audience, since a pre-schooler who uses a computer will have vastly different skills, abilities, and expectations than will a ten year-old. A child's stage of development will dictate what can reasonably be expected from them in terms of interaction. Any successful product will need to be adapted to the particular needs of its users, including modes of communication, input methods, tasks, and appearance. Early designers assumed that taking an interface that works for adults, adding a few animations and bright colours, automatically made it appropriate for children [20], and children were rarely involved in the development of products for kids. More recently, however, designers have recognized the differences in this user group, and have worked to give children a voice in the design process. As a result, there are now a considerable number of design guidelines specifically for children. However, these principles have often been difficult to find.

The following sections describe design principles arising from research in Human Computer Interaction (HCI), education, and psychology. While many of the design principles can be adapted to meet the needs of children from different age groups, in most cases user testing has been done with a specific age range. Where available, the age range for each research project is included in parentheses.

4.2.1 Literacy

Most adult user-interfaces assume that users are proficient readers with fairly extensive vocabularies. Most children, however, have not reached this proficiency level. Older children may not fully understand text -based instructions, while young children may not even know the alphabet yet. Conventional interfaces include menus and help functions that are text -based, making them inappropriate for young users. Interfaces that require textual input can also be problematic. Children can be very creative spellers, making it difficult for an interface to recognize text input [20]. Since reading and writing levels vary significantly, children's interfaces must be designed with a narrow age-group in mind to adequately meet the needs of its users.

4.2.2 Feedback and Guidance

Children expect to see the results of their actions immediately. If nothing happens after their input, children may repeat their action until something does occur (possibly causing a chain of unexpected and unwanted events). Although constant auditory and visual feedback can be annoying for adult users, children often expect it. Being able to use a system without instruction is also important for children's interfaces. Children cannot be expected to read a manual to learn how to use a product; the product must either be entirely intuitive or provide some form of guidance through tasks. Children may forget how to accomplish tasks requiring several steps or even simple tasks that are done infrequently. So scaffolding [20] is needed, which supports children through the necessary steps. On-screen icons need to represent familiar items and be intuitive for children. For example, use a stop sign for stopping activities and make buttons have a 3-D appearance so they appear clickable [20].

Visual or audio feedback should be present when children move their finger over clickable portions of the screen to indicate what is clickable and what is not. For audio feedback, it is desirable to have a short delay so that children can deliberately activate it, otherwise they tend to hear random audio because their finger has already moved somewhere else on the screen. Feedback should also clearly show when the computer is busy processing requests so that children know to wait for something to happen. This can be achieved through onscreen icons or audio feedback but should be easy for children to

understand. Conversely, if the computer has been waiting for input for an extended period of time, it should also indicate this with some feedback

4.2.3 Mental Development

Younger children have difficulty with abstract concepts, and may not have the in-depth content knowledge required for navigating complex interfaces. Their usual approach is trial-and-error, once they find a method that works, they are unlikely to look for a more efficient strategy or for advanced options. Druin et al.'s [20] work with SearchKids highlights how children (5-10 years) think of information spaces and how they mentally organize such information. While they may not be able to think of appropriate search terms for a query, or efficiently navigate a categorized structure, they do understand icons representing what animals eat, where they live, and their appearance. By using a visual representation of animal characteristics, children were able to create complex queries and successfully navigate a large information space.

4.3 Device comparison

My Tajwid application is a mobile platform system that specially developed for kids. In this system also, there are parental option which can only be managed by parent. This application is different than other system which have two different user that can use the system. So, regarding this issue, device chosen for interacting with this system is very important to be considered. Children behaviour while interacting with touch screen device is very important to study to help choosing best devices. In this system, parent task is managing their kid's activities where they can see results, graph achievement and login history of their kids. Here are some comparison devices choose that can be used for both user.

Table 4.1: Device Comparison

Specifications / Model	Samsung Galaxy Tab 2 10.1 P5100	Xiaomi Mi 3	Acer Liquid Z500
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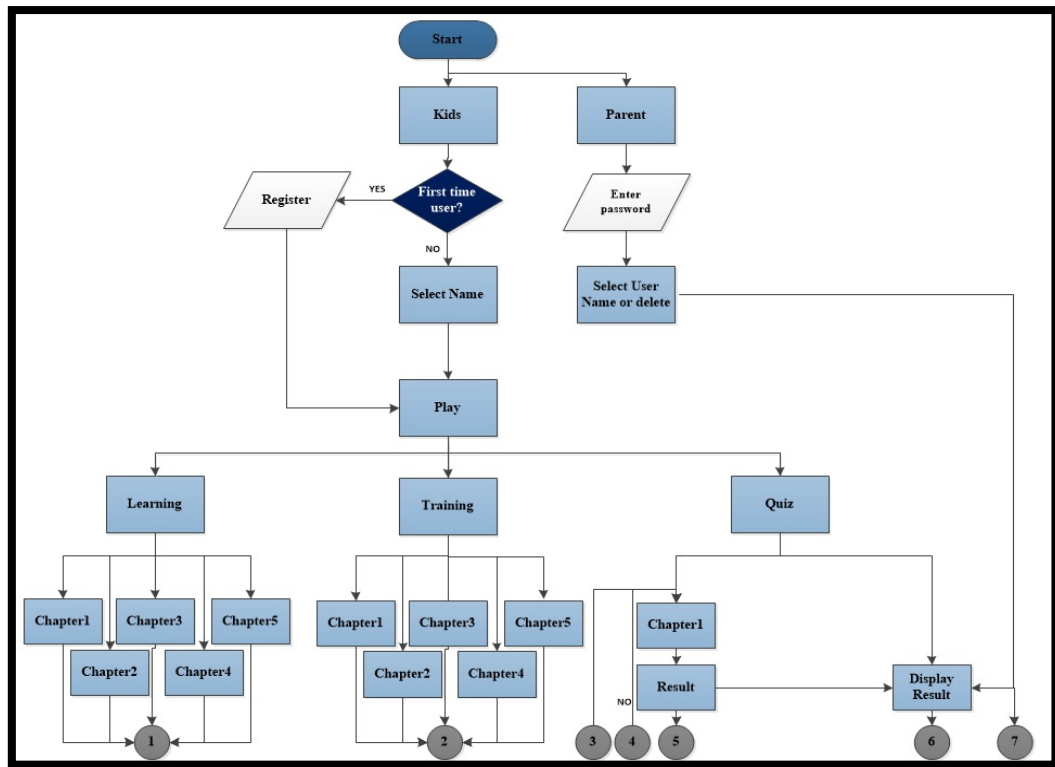
Body	Dimensions : 256.6 x 175.3 x 9.7 mm Weight: 588g.	Dimensions : 144 x 73.6 x 8.1 mm Weight: 145g.	Dimensions : 144 x 73.6 x 8.1 mm Weight: 145g.
Display	Type: PLS TFT capacitive touchscreen, 16M colours. Size: 800 x 1280 pixels, 10.1 inches Multitouch: Yes. Protection: Corning Gorilla Glass.	Type: IPS LCD capacitive touchscreen, 16M colours. Size: 1080 x 1920 pixels, 5.0 inches Multitouch: Yes. Protection: Corning Gorilla Glass 3.	Type: IPS LCD capacitive touchscreen, 16M colours. Size: 720 x 1280 pixels, 5.0 inches Multitouch: Yes. Protection: Corning Gorilla Glass 3.
Sound	Loudspeaker: Yes, with stereo speakers.	Loudspeaker: Yes.	Loudspeaker: Yes with stereo speakers.
Memory	Card slot: micro SD, up to 32 GB Internal: 16/32 GB, 1 GB RAM.	Card slot: No Internal: 16/64 GB, 2 GB RAM.	Card slot: micro SD, up to 32 GB Internal: 16GB, 2GB RAM 4GB, 1GB RAM
Features	OS: Android OS, v4.0.3 (Ice Cream Sandwich), upgradable to v4.1 (Jelly Bean) Chipset: TI OMAP 4430 CPU: Dual-core 1 GHz Cortex-A9 GPU: PowerVR SGX540	OS: Android OS, v4.3 (Jelly Bean), upgradable to v4.4.2 (KitKat) Chipset: Qualcomm Snapdragon 800 CPU: Quad-core 2.3 GHz Krait 400 GPU: Adreno 330	OS: Android OS, v4.4.2 (KitKat) Chipset: Mediatek MT6582 CPU: Quad-core 1.3 GHz Cortex-A7 GPU: Mali-400MP2
Battery	Non-removable Li-Po 7000 mAh battery. Stand-by: Up to 2000 h Talk time: Up to 10 h	Non-removable Li- Ion 3050 mAh battery Stand-by: Up to 500h	Stand-by: - Talk time: -

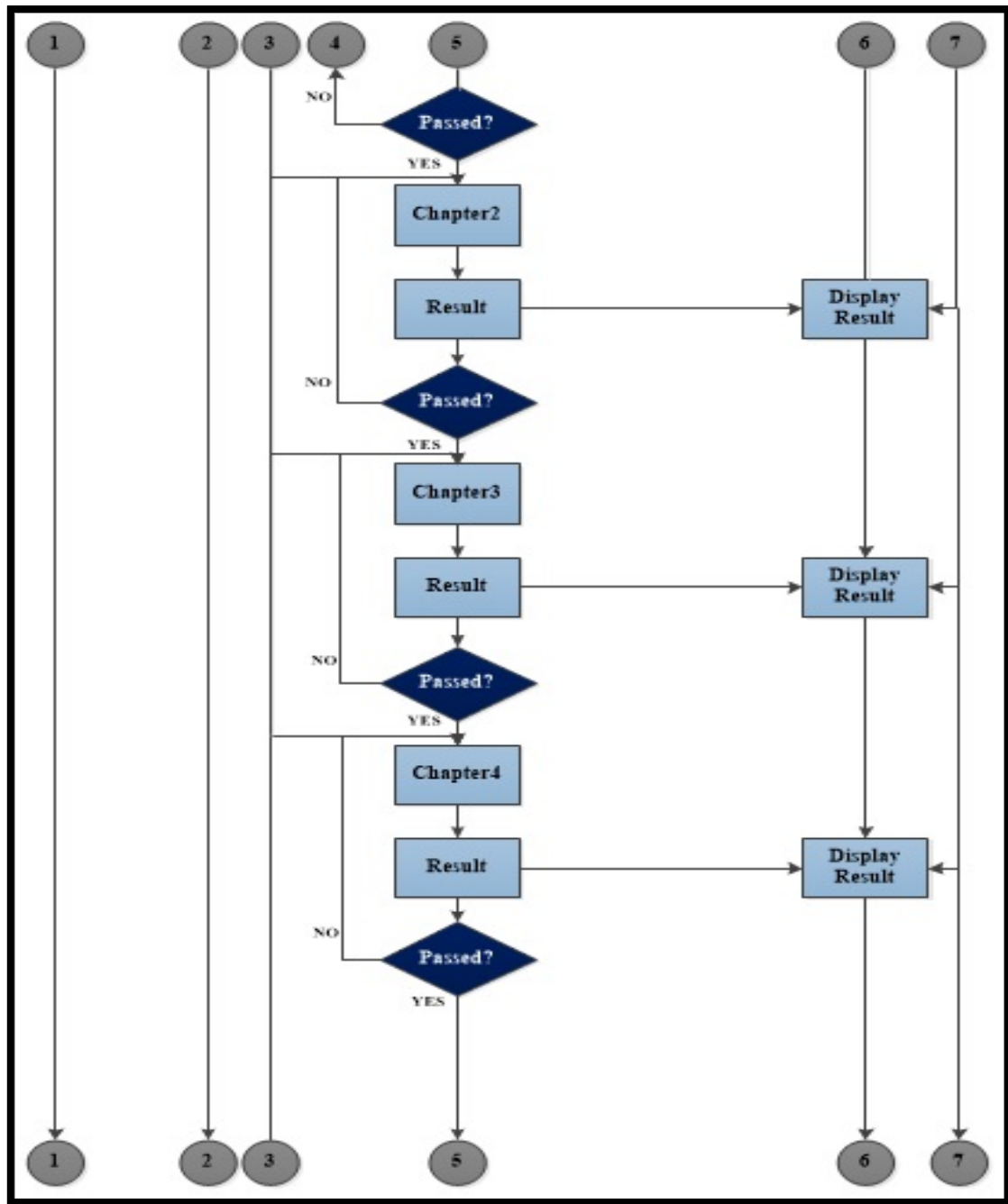
		Talk time: Up to 25h	
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From the table 4.1 above, the suitable and best device used that will be suggested is the Samsung Galaxy Tab 2. There are many reason as this device is chosen. From the specification, this device has a bigger screen than other device and it is suitable for kids as they are more comfortable with bigger view. They can see clearly, and click the button accurately. This application allow multiple user, so tablet is very suitable to share together. Parents can make the tablet device as a public used where their children can share together. Besides the battery is long lasting and allow users to interact longer with the system. This device also have stereo loudspeaker that can help user to hear clearly. Compare to other devices, the size and weight of this device help user to grasp it better. As long the specification of operating system support well, it does not significant to compare with other device.

4.4 Flow Charts

A flowchart is a formalized graphic representation of a logic sequence, work or manufacturing process, organization chart, or similar formalized structure. The purpose of a flow chart is to provide people with a common language or reference point when dealing with a project or process. So here are the flow chart of My Tajwid system.





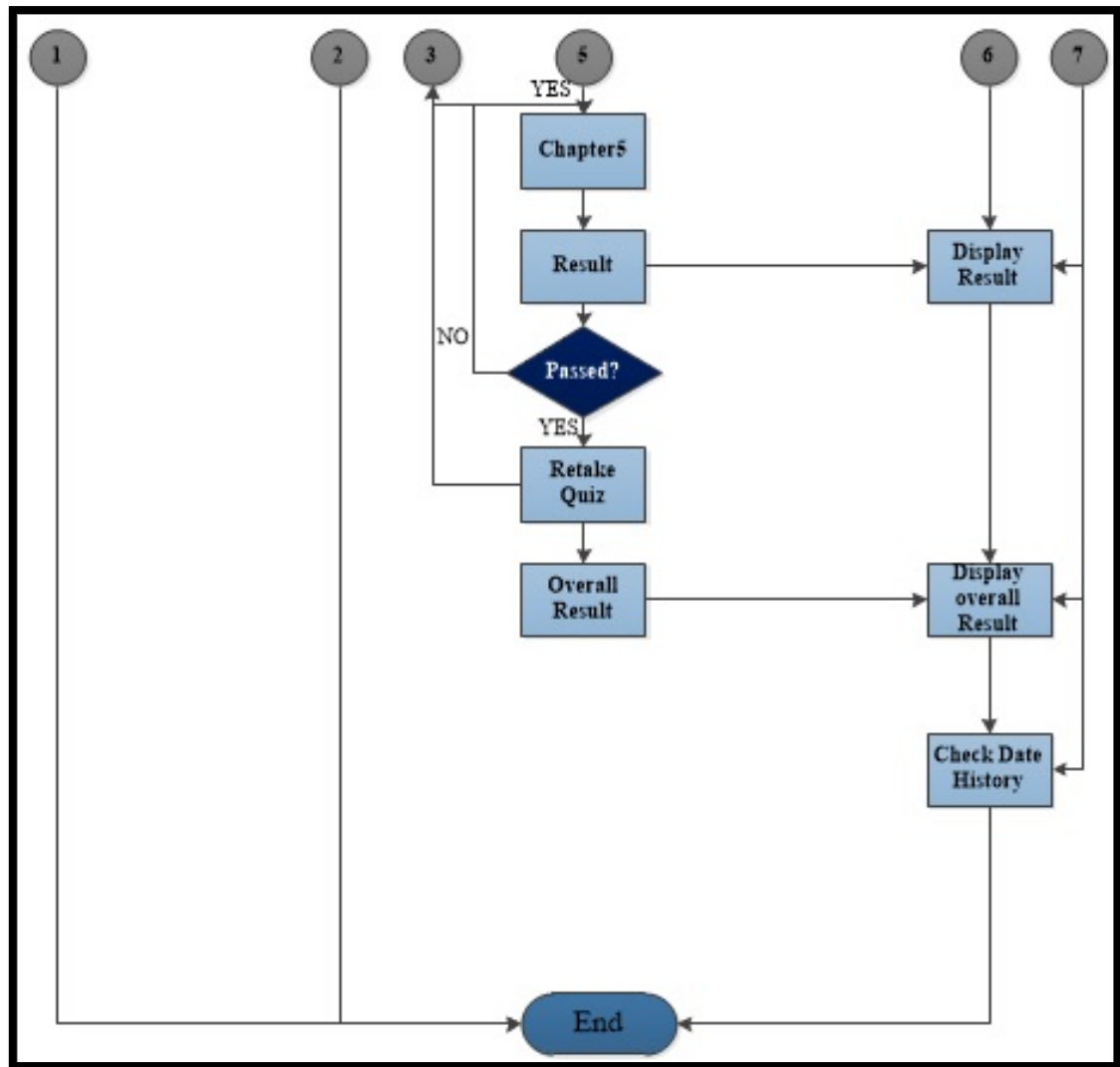


Figure 4.1: Flowchart of My Tajwid System

4.5 Physical architecture

A physical architecture is an arrangement of physical elements, (system elements and physical interfaces) that provides the designed solution for a product, service, or enterprise. It is intended to satisfy logical architecture elements and system requirements. Figure below shows physical architecture of My Tajwid system.

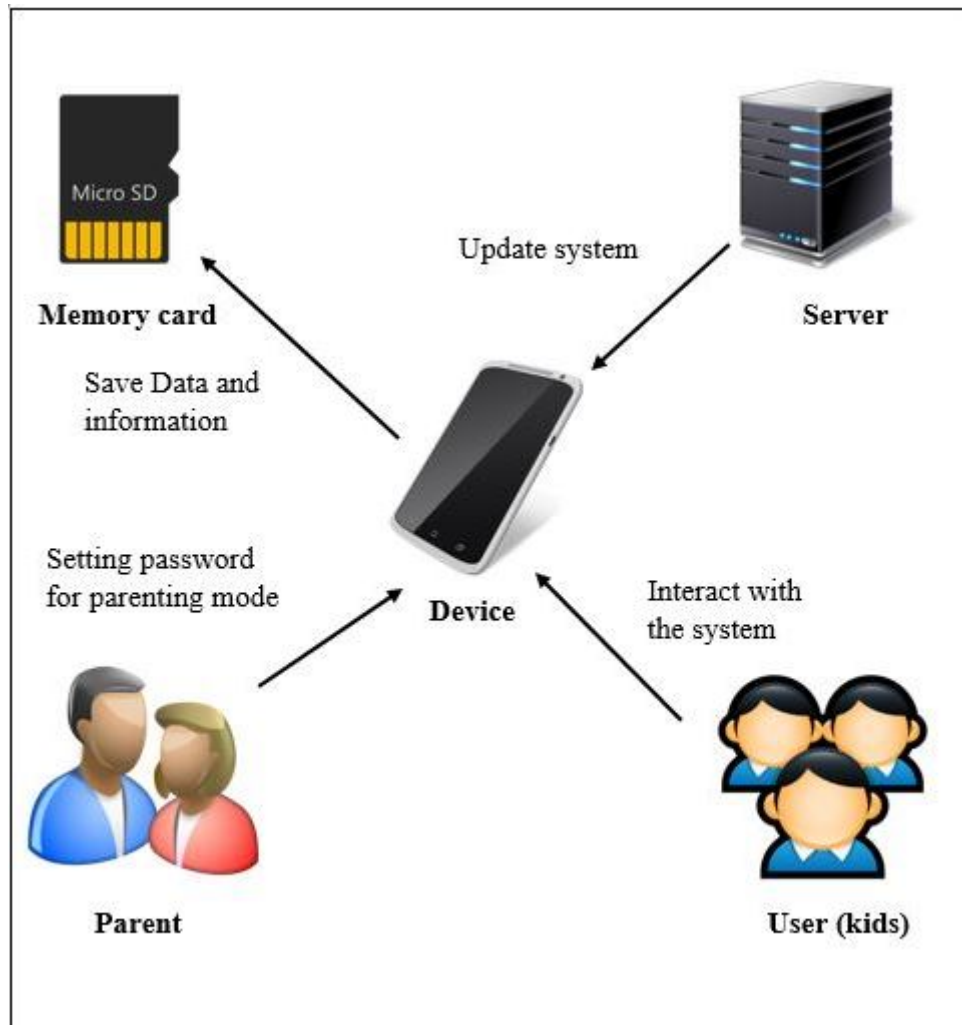


Figure 4.2: Physical architecture of My Tajwid System

4.6 User characteristics.

User characteristics and product properties are a useful source of information that help designers to foster such an understanding of target users and the product in development. When designing for a specific user group, the 'user characteristics' helps for understanding the target group and predict usability problems in practice. When designing for 'all', the 'product properties' helps to anticipate usability problems of the next generation products at the start of the product development process. For My Tajwid system, there are two different user characteristics that has been identified.

Kids

- User must be at least 6 or 7 years old.
- User must know well how to interact and handle with touch screen devices.
- User must have a good vision and not colour blind.
- User must be able to read Arabic sentences.
- User must have a good listening.

Parents

- User must have child at least 6 or 7 years old.
- User is capable to read and have a good sight.
- User can interact with the application or known well about the whole system.
- User is capable to read graph and analysing weaknesses.

4.7 Design Description

4.7.1 Context Diagram

Context Diagram is a diagram that defines the boundary between the system, or part of a system, and its environment, showing the entities that interact with it [18]. This diagram is a high level view of a system and figure above shows Context Diagram of My Tajwid system.

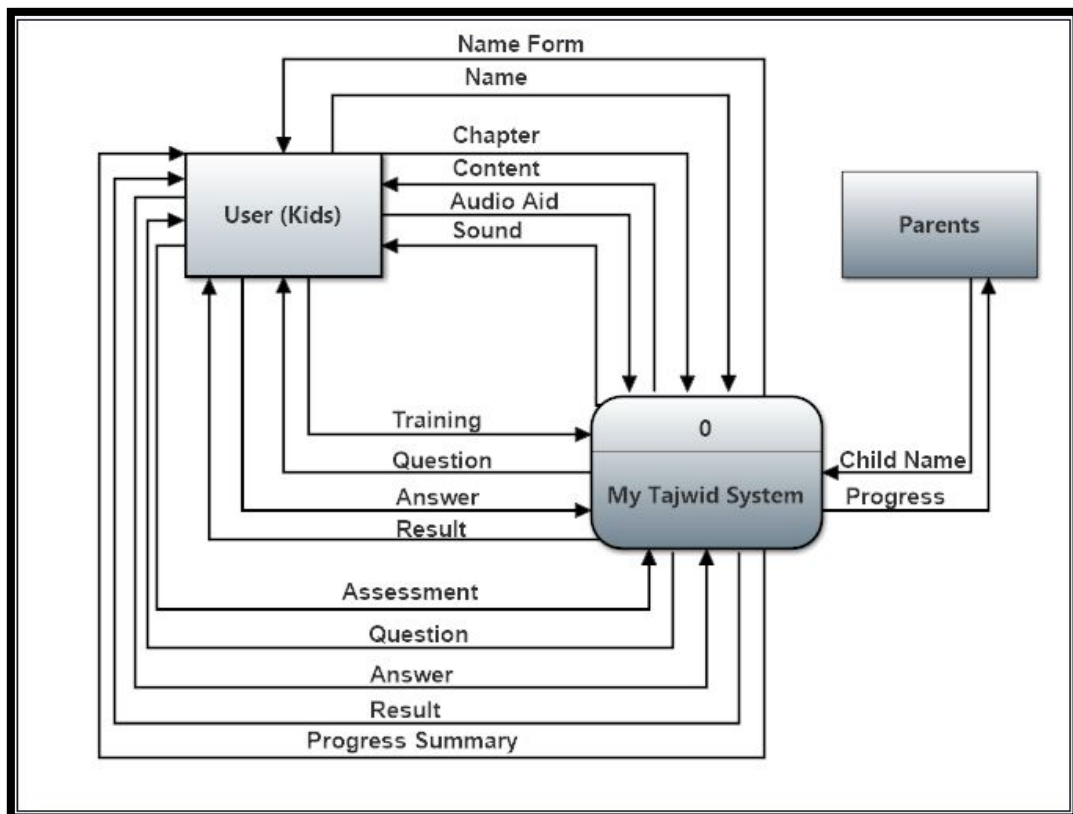


Figure 4.3: Context Diagram of My Tajwid System

4.7.2 Data Flow Diagram level 0

Data flow diagram (DFD) is one of the most commonly used graphical tool for representing the high level functionality of a system. The process shape, which is the most important components in a DFD, represents the part of the system that transform certain (data) input into outcome. It is often referred to as a group of relevant system functions, and you can always break process down to represent the smaller functional units in another DFD, known as a new level. Figure below shows Data Flow Diagram level 0 of My Tajwid system.

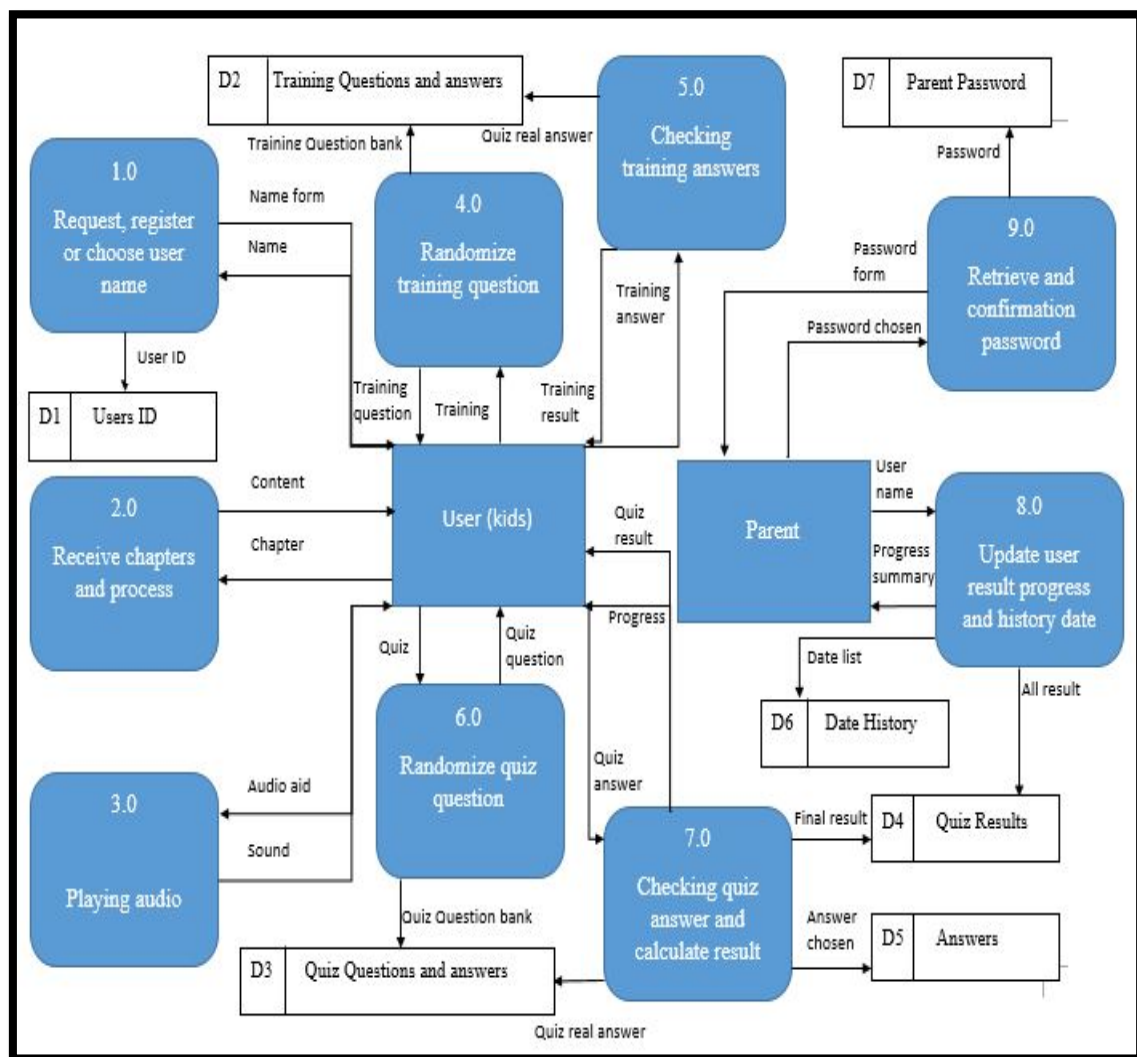


Figure 4.4: Data Flow Diagram level 0 of My Tajwid System

4.7.3 Screen Dialogue

The screen dialogue below describes the design on a high level view and provides an abstract picture of the entire system. The figure below shows Screen Dialogue of My Tajwid system.

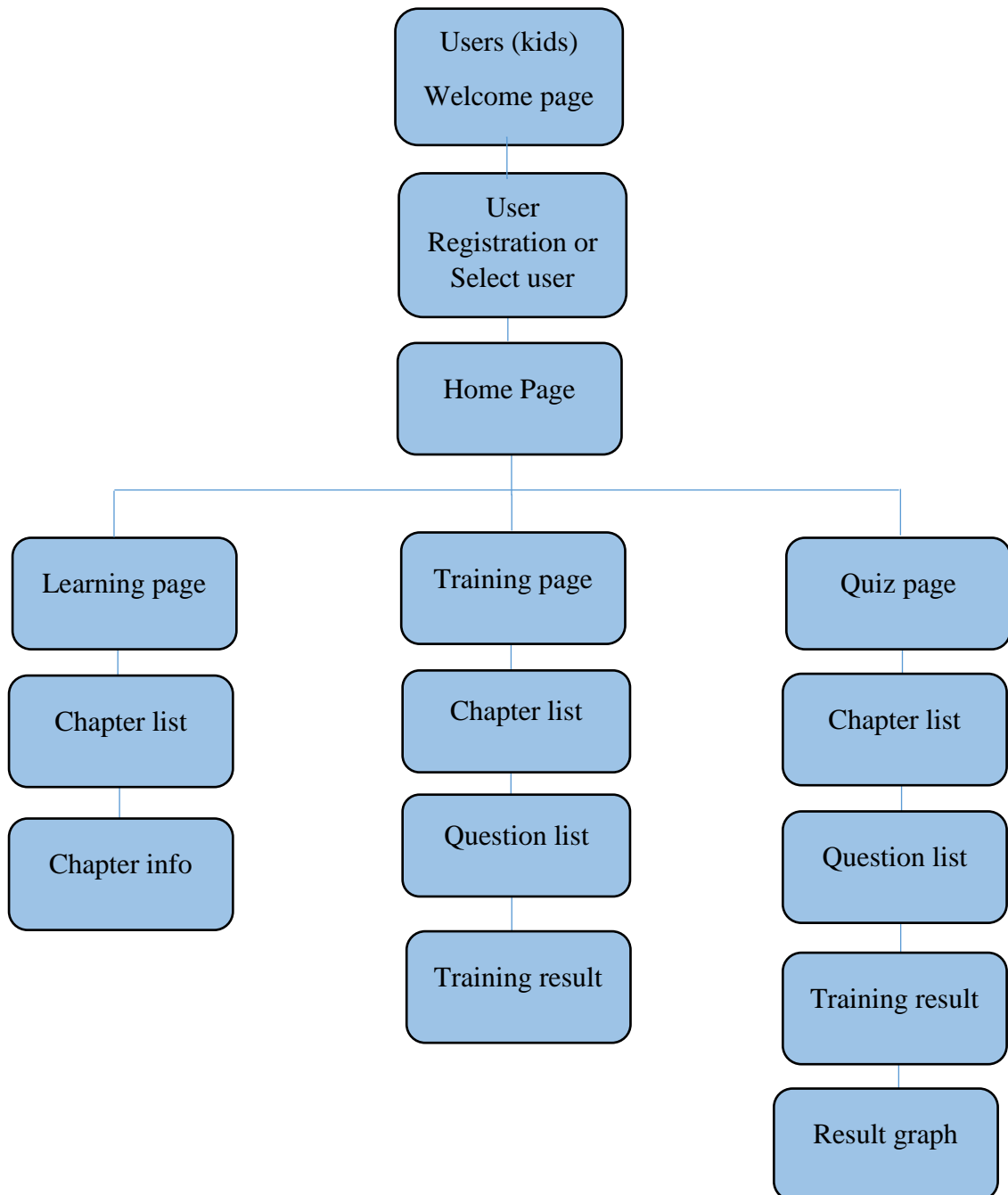


Figure 4.5: Screen Dialogue for user (kids) in My Tajwid system.

Parent

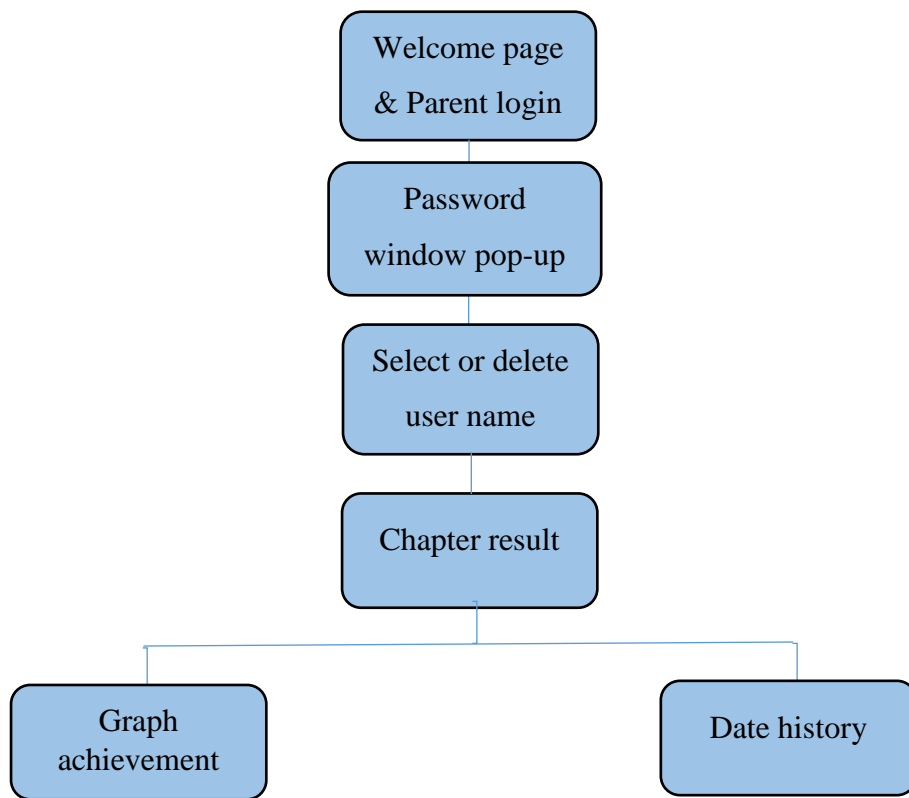


Figure 4.6: Screen Dialogue for parent in My Tajwid system.

4.7.4 Wireframe and Storyboard

A wireframe is a visual guide that portrays how a page or screen of a website or system may look [11] and storyboard is a graphic organizer that provides the viewer with a high-level view of a project. Wireframes can range from very unfinished and ‘sketchy’ in appearance, to very polished looking and reflective of how the system will look at 100% completion. Using wireframes can help determine:

- The structure of a page or screen.
- The layout of content.
- The functionality available.
- Calls to action.
- Blocks of text.
- User interface elements.
- Graphic design touches.

To put that in another way, a wireframe is a blueprint for the website or application. It helps developer to understand the relationship among the product’s content, pages, elements and functionality. Without wireframes, the developer would merely be guessing. It’s where the developer find out what works, and more importantly, what doesn’t. For My Tajwid mobile application, there are also wireframe build as a step before developing a real system. Here are some wireframe design for My Tajwid mobile application.

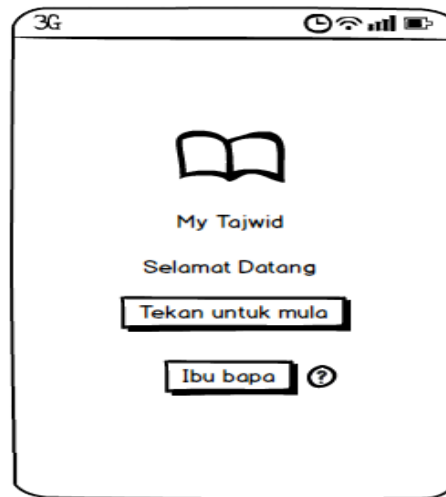


Figure 4.7: Welcome page for user (kids) and login button for parent.

Figure 4.7 above shows welcome page for both user kids and parent. Where kids use the 'Tekan untuk mula' button and for parent they have to use second button that is 'ibu bapa' button to use the application.

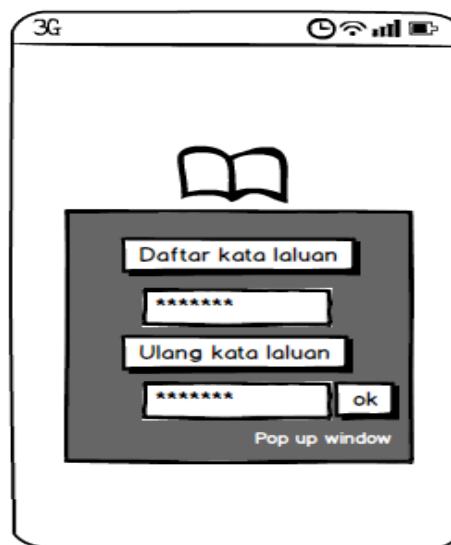


Figure 4.8: A pop-up window for parent to set the password.

Figure 4.8 above, shows that a pop-up window appear for parent to set up their password and confirming it. This is important to prevent their child from use this option.

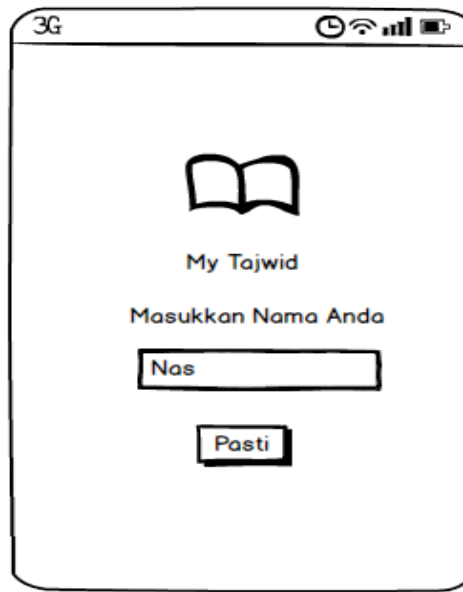


Figure 4.9: Registration page for user (kids) for the first time use.

Figure 4.9 above shows that user (kids) have to register by choose a name before using this system. User that satisfied with the name that they choose can proceed by tapping 'pasti' button. Once register, name cannot be change.

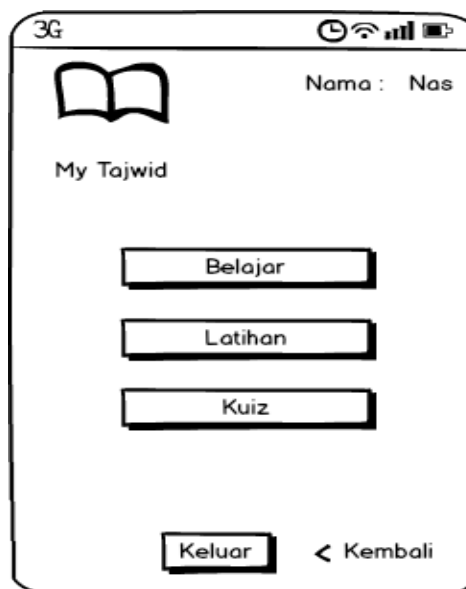


Figure 4.10: A Menu or home page for this application.

Figure 4.10 above shows menu page which provide three option those are learning, training and quiz for user (kids).

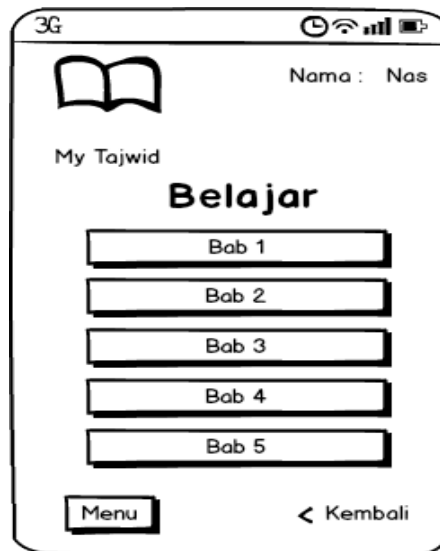


Figure 4.11: Page of learning that display five chapter.

Figure 4.11 above shows when user (kids) is clicking 'Belajar' button that will lead them to the learning page which consist of five chapters. User can choose any chapter that they want to learn. There is menu and back button where they can go to home page or choose other option.

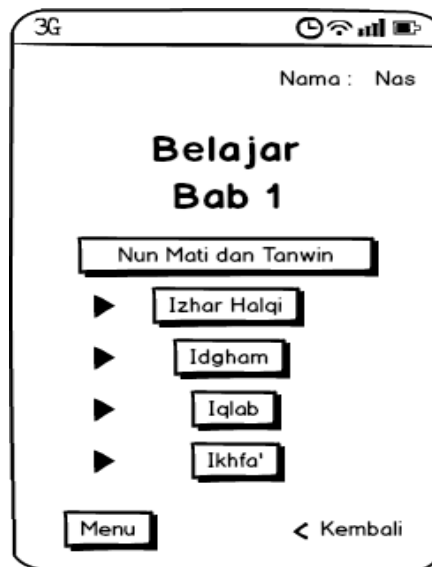


Figure 4.12: Topic provided for chapter 1 in learning option.

This figure 4.12 shows that user can choose any topic from chapter 1 in learning option.

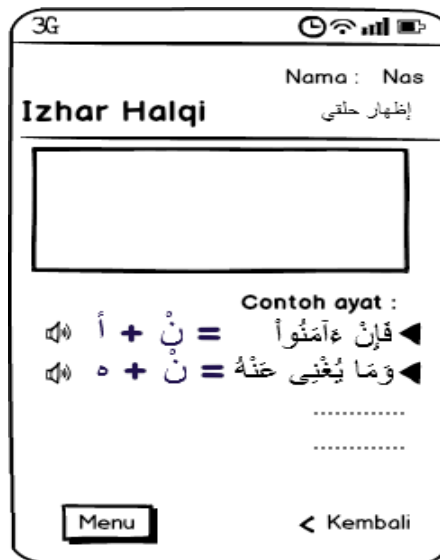


Figure 4.13: Example of the content in each topic.

Figure 4.13 above shows the content of the topic provided, where there are definitions, example of the Quran sentences that related and also voice of pronunciation.

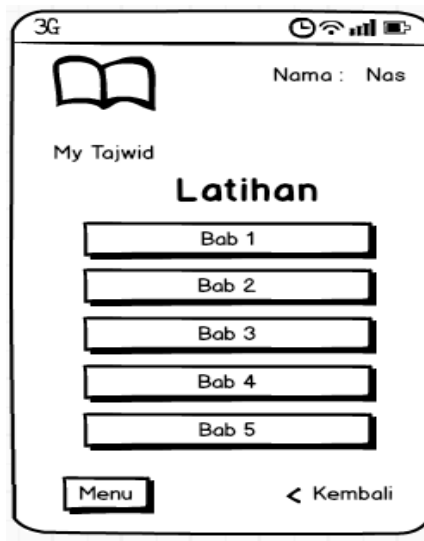


Figure 4.14: Page of training option.

This page also contain five chapters which is related from the learning option. The topic that covered is based on the learning module.

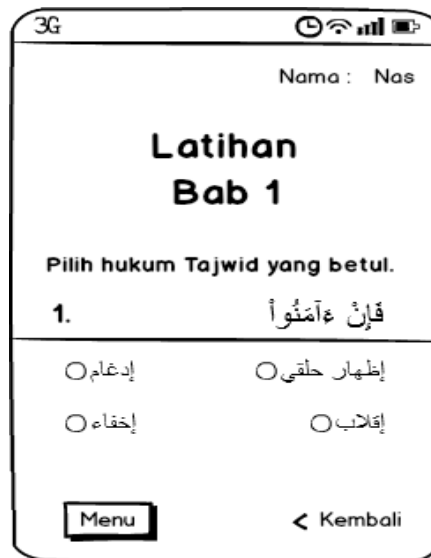


Figure 4.15: Example of the training session

This figure 4.15 shows the training session example where user (kids) must choose the correct answer to continue to the next question. The question is random and auto change once the user choose the correct one.



Figure 4.16: Result of the training.

Figure 4.16 above shows the user (kids) result with percentage that they achieved from the training. There also state their correct and wrong answers. Besides, there are stars given from their achievement that are five of them if the user got full mark.

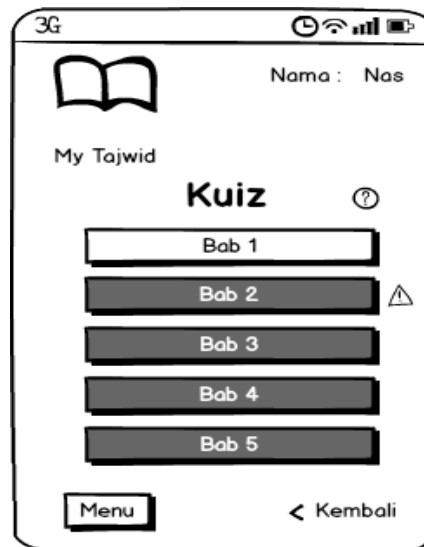


Figure 4.17: Quiz page.

This figure 4.17 shows a quiz page for user (kids) as their real assessment that will be recorded. User have to pass the first chapter to proceed to the next chapter. The grey button colour represent unlock since the first chapter is still did not pass. The help symbol will help user to understand the instructions while the alert symbol will appear when user press the chapter that they cannot access.

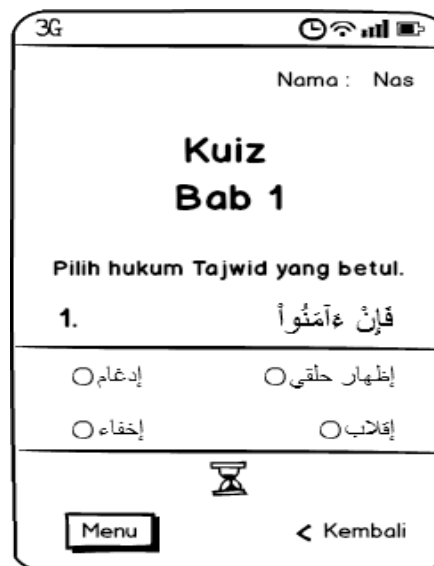


Figure 4.18: Quiz questions with the time limit.

Figure 4.18 above shows the quiz progress is running where there are limited time provided. User have to answer all the question within the time given.



Figure 4.19: Result user got from the quiz session.

Figure 4.19 shows the results that user (kids) scored with marks, grade, numbers of correct and wrong answer display. There also stars given as a badge for result they got as an achievement.

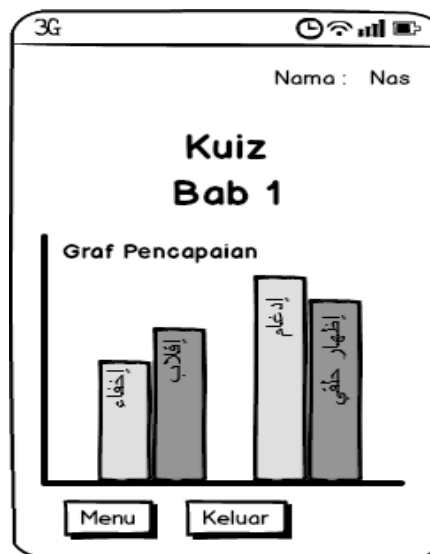


Figure 4.20: Graph bar of the overall achievement in certain time.

Figure 4.20 above shows to user (kids) their achievement graph where represent overall of their result in certain time. This graph can be changed based on the latest result.



Figure 4.21: Interface for second time login for user.

Figure 4.21 above shows the user (kids) an option to choose their name if there are other user using the application in the same device. For example, siblings in a family. They can choose or create another ID as a new user.

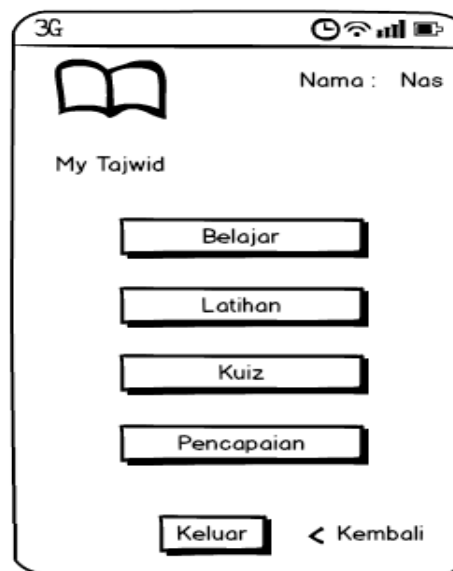


Figure 4.22: Result option button is available after taking quiz.

Figure 4.22 shows that, the second time user will have the option to look at their quiz result and graph achievement. If they did not attend the quiz yet, it will display a message that they did not attend any quiz yet.

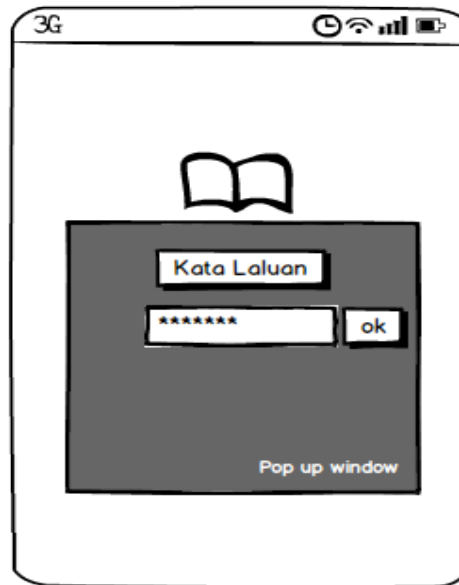


Figure 4.23: A pop-pup window for parent to enter their password.

This figure 4.23 is a special option for parent to login into the system to prevent their kids from using this option. In this option, parent can view users (kids) result, achievement graph and date history of user login. So they can really know about their kid's progress.

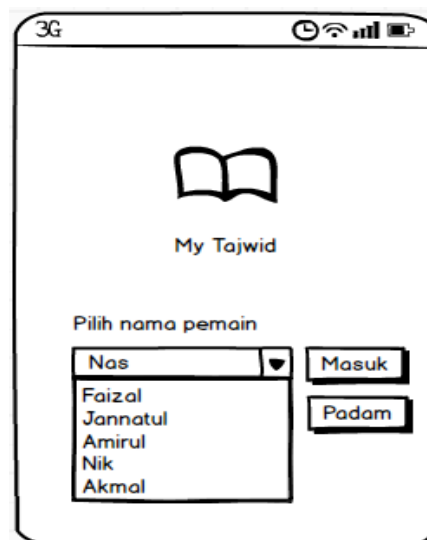


Figure 4.24: Page for parent to customize their kid's profile.

Figure 4.24 above shows page for parent to see their kid's result and achievement. Parent also can delete the username that unused.

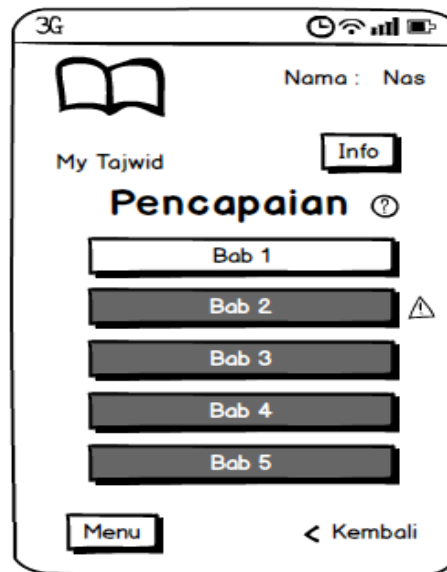


Figure 4.25: Page for parent to view their kid's result.

Figure 4.25 above shows that parent have option to see their kid's progress and the button info will shows the date history of the user (kids) login.

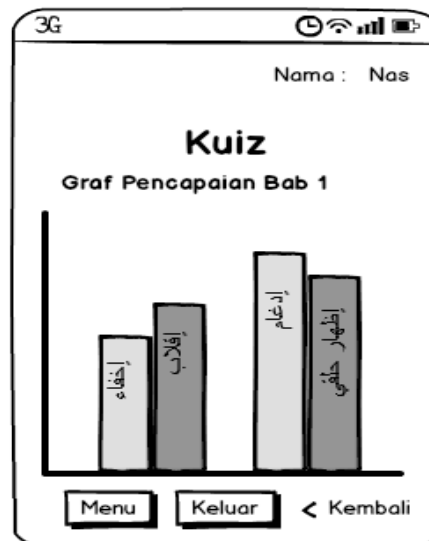


Figure 4.26: Graph of the whole progress in each chapter.

This figure 4.26 shows graph that represent the percentage of user (kids) achievement in learning Tajwid in each chapter. The subtopic will be highlighted so that parent can see the weakness of their kid's.

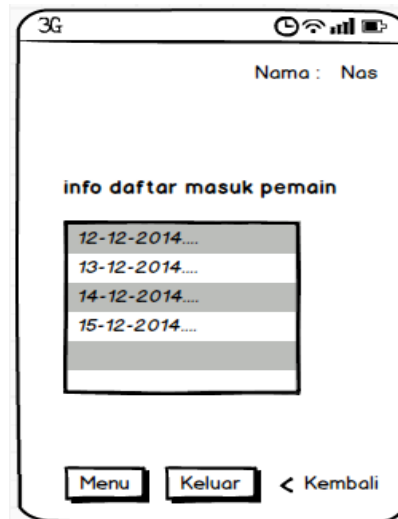


Figure 4.27: Date history of the user (kids) login activity.

Figure 4.27 above shows the date history list of user login activity. This option only can be view by parent so that they know when the last time their kids used the system.

4.7.5 Entity Relationship Diagram

An entity-relationship diagram (ERD) is a type of data modelling that shows a graphical representation of objects or concepts within an information system or organization and their relationship to one another. Figure below shows ERD of My Tajwid system.

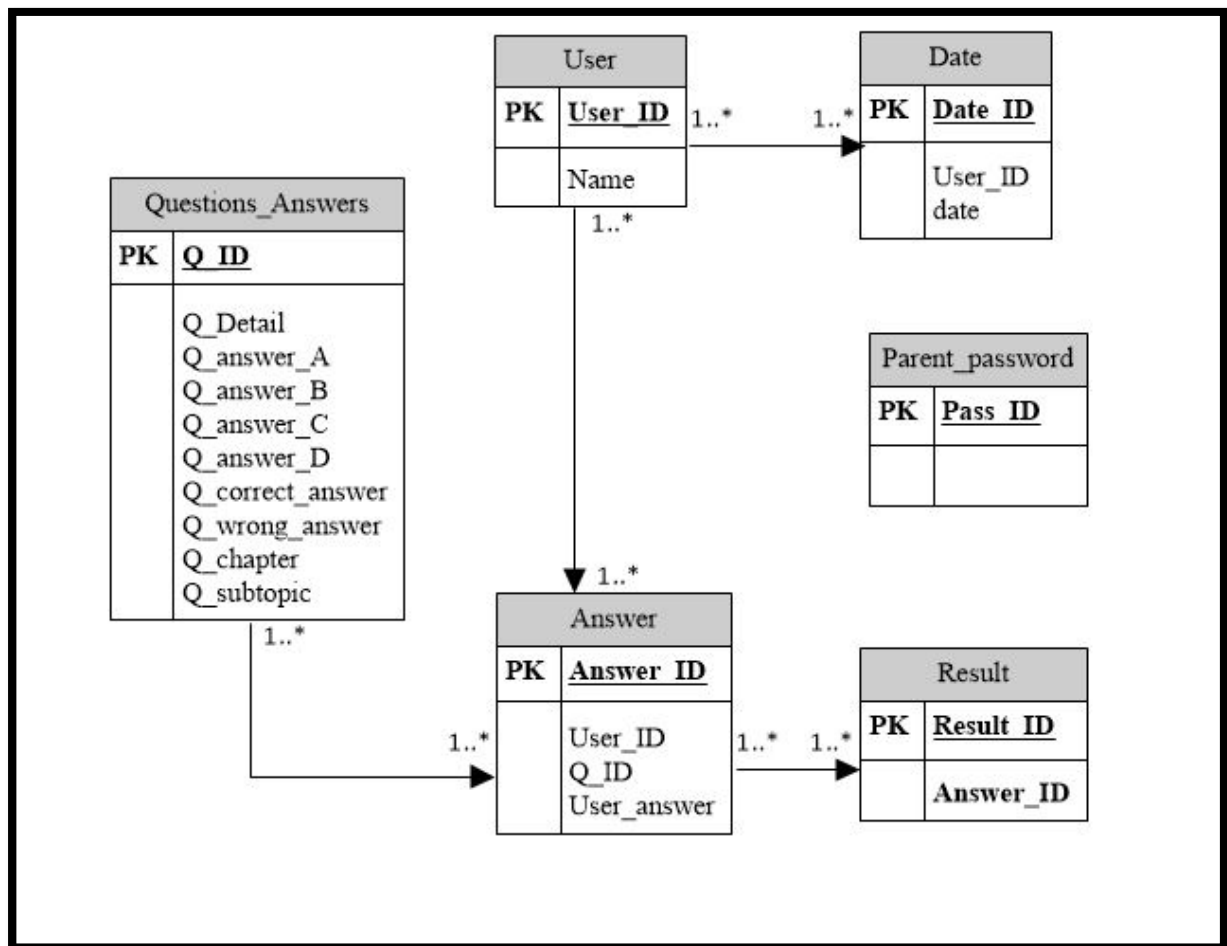


Figure 4.28: Entity Relationship Diagram of My Tajwid system.

4.7.6 Data Dictionary

A data dictionary is a collection of descriptions of the data objects or items in a data model for the benefit of programmers and others who need to refer to them. Tables below shows all Data Dictionary of My Tajwid system.

4.7.6.1 User (kids) Data Dictionary

This sub section will described all the attributes that possess by User Entity.

Table 4.2: User (kids) Data Dictionary

Data Field	Description	Data type	Constraints
User_ID	ID of the user	Varchar(15)	PK
Name	Name of the user	Varchar(15)	

4.7.6.2 Date Data Dictionary

This sub section will described all the attributes that possess by Date Entity.

Table 4.3: Date Data Dictionary

Data Field	Description	Data type	Constraints
Date_ID	ID of date	Date	PK
User_ID	User ID of date	Varchar(15)	FK

4.7.6.3 Answer Data Dictionary

This sub section will described all the attributes that possess by Answer Entity.

Table 4.4: Answer Data Dictionary

Data Field	Description	Data type	Constraints
Answer_ID	ID of the answer	Varchar(15)	PK
User_ID	User ID for answer	Varchar(15)	FK
Q_ID	Question ID for answer checking	Varchar(15)	
User_answer	User answer stored for checking	Varchar(15)	

4.7.6.4 Result Data Dictionary

This sub section will described all the attributes that possess by Result Entity.

Table 4.5: Result Data Dictionary

Data Field	Description	Data type	Constraints
Result_ID	ID of the result	Varchar(15)	PK
Answer_ID	ID of answer for calculate result	Varchar(15)	FK

4.7.6.5 Question_Answers Data Dictionary

This sub section will described all the attributes that possess by Quiz Entity.

Table 4.6: Quiz Data Dictionary

Data Field	Description	Data type	Constraints
Q_ID	ID of the quiz	Varchar(15)	PK
Q_Detail	Quiz details	Varchar(15)	FK
Q_answer_A	Quiz answer A selected	Varchar(1)	
Q_answer_B	Quiz answer B selected	Varchar(1)	
Q_answer_C	Quiz answer C selected	Varchar(1)	
Q_answer_D	Quiz answer D selected	Varchar(1)	
Q_correct_answer	Correct answer for quiz	Varchar(15)	
Q_wrong_answer	Wrong answer for quiz	Varchar(15)	
Q_chapter	Quiz chapter	Varchar(15)	
Q_subtopic	Quiz subtopic	Varchar(15)	

4.7.7 Interface charts

Interface chart for My Tajwid system.

Table 4.7: Interface chart table of My Tajwid system

Features		Users (kids)	Parents
Welcome page			
1	Start the application by touch the screen	✓	✓
2	Access the parent form by setting password		✓
3	Entering password to use parental mode		✓
Registration and login module			
1	Fill the form name and submit	✓	
2	Select name from the list of the users to play	✓	
3	Delete users from the list		✓
4	Select user name to view progress and date history only		✓
Home or Menu page			
1	Select Learning, Training and Quiz option	✓	
2	Preview the result and achievement graph from the quiz taken	✓	✓

3	Quit and Back to the login page	✓	✓
Learning module			
1	Choose any chapter to learn Tajwid	✓	
2	Choose any topic to start learning	✓	
3	Pressing speaker button to hear pronunciation	✓	
4	Quit and Back to the Menu page	✓	
Training module			
1	Choose any chapter to start the training option	✓	
2	Choose any topic to start the training option	✓	
3	See the result of the training	✓	
4	Quit and Back to the Menu page	✓	
Quiz module			
1	Choose the first chapter to start the quiz	✓	
2	See the help option by pressing 'help' icon	✓	
3	See the result of the quiz	✓	✓
4	Quit and Back to the Menu page	✓	

CHAPTER 5

IMPLEMENTATION

5.1 Introduction

Implementation phase is an important phase where an application is developed based on requirement and planning that has been discussed in before. The application interface attracts user and makes user interface easier for users. The code or engine plays a very important role in this implementation phase, where it is used to run the functions in this mobile application. Developer has to confirm that the mobile application meets its requirement and objective and also to void application errors. Matters that will be discussed in this chapter are interface of design and flow of the application.

5.2 My Tajwid Development Environment

In this subchapter, the development environment will be showed in detail. This section only describes the usage of Air 3.2 for Android. Action script 3.0 is used as it is the latest version of this language that available. The function also is better are the general properties for new things updated. This language is widely used by many developers or programmers to develop a project whether simple complex. Adobe themselves have already

giving a guide to explore this kind of language in their website, so it is convenient for every developer.

5.2.1 Initialization of Development

There are five important files that need to complete information about developing project applications such are APK File (.apk), Flash Document (.fla), SWF Movie (.swf), XML File (.xml), and Personal Information Exchange (.p12).

The APK file is an APK file is the file format used for installing software (usually games or apps) on the Android operating system. Just like Windows PC systems use an .exe file for installing software, android does the same. The Flash Document is a document file for a flash project, for example, the source file work with in the Flash authoring program. These files can only be opened with Flash (not the Flash Player). The SWF Movie is Flash delivery file, where the files that end users see. This is a compressed version of the FLA file which is optimized for viewing in a web browser, the standalone Flash Player, or any other program which supports Flash. This file type cannot be edited in Flash.

The XML File is stands for Extensible Markup Language. A markup language is used to annotate text or add additional information. These annotations are not shown to the end-user, but are needed by the ‘machine’ to read and subsequently process the text correctly. Last but not least, the Personal Information Exchange is to be used for release signing, a Software Publisher Certificate (SPC), and its private and public keys, must be stored in a Personal Information Exchange (.pfx) file.

5.3 My Tajwid Architecture

My Tajwid application is developing using Adobe Flash Professional CS6 AIR for Android with Action Script 3.0. First of all, the interface designed of the application in Adobe Photoshop CS6. We are using our own design images and import it into Adobe Flash

Professional CS6 library. Action script 3.0 for the button will be coded. Audio sound will be imported it to the Adobe Flash Professional CS6 library for the sound effect whenever some particular button. Adobe Flash Professional CS6 allows to publish content for Adobe AIR for Android. The preview a Flash AIR for Android SWF file as it would appear in the AIR application window with Simulator. Previewing is useful when the visible aspects of the application look like without packaging and installing the application. After finished developing the application, specify the settings for the AIR for Android application descriptor and installer files required to deploy it. Adobe Flash Professional CS6 creates the descriptor and installer files along with the SWF file to publish an AIR for Android file.

5.4 Database Architecture

The database is collection of information that is organized. It can easily be accessed, managed and updated. In a view, database can be classified according to type of content such a bibliographic, full-text, numeric and images. However, a database design is the process of producing a detailed data model of a database. This logical data model will generate a design in a Data Definition Language, which can then be used to create a database.

5.4.1 My Tajwid Database

The database for My Tajwid is named as mytajwidb. The base of each Relational Database Management System is a database object called table. Each database consists of one or more table, which store information database. Each table has a unique name and consist of rows and column. Database table fields have their own unique names and a data type that has been set. Table fields can have different characteristics that a particular column has a default value and other while explaining table column data types and tows contain the actual data for the column.

5.4.2 Database connection

The table shown the code of php file to connect with database. The code is important while run the application and the server must be online all the time. If the application could not connect with the table database the application will 'die'.

```
<?php
// place your DB_host, UserName, Password, and DB_Name below where shown
mysql_connect("localhost","root","") or die ("Could not connect.");
mysql_select_db("testdb") or die ("no database");
?>
```

Figure 5.1: coding to integrate PHP system with Xampp server.

5.5 My Tajwid Interfaces and Coding

A user interface, which consisting of the set of dials, buttons, operating system commands, format graphics display, and other tools provided by a computer or program to allow users to communicate and use a computer or program. Graphical user interface (GUI) provides users with a more or less “art-oriented” a way to interact with technology. GUI interface is usually more satisfying or a user-friendly computer system.

Coding is the process of writing, testing, debugging and maintaining the source code of computer programs. The source code written in the PHP programming language and

actions script 3.0 for Abode Flash CS6. The code may be a modification of an existing source or something completely new. The aim of program is to create a program that exhibits a certain desired behaviour.

5.5.1 Main Page Interface, Register and Coding

Main page interface consist of register for both kids and parents. Register button for new user, where their need to register username before start. Login button for user that already have an account in the application and directing user to the next page. The code to link the button written in ActionScript language. The main page are shown in figure 5.2 and the ActionScript 3.0 code are shown in figure 5.3



Figure 5.2: My Tajwid homepage

```

1  stop ();
2  Button1.addEventListener(MouseEvent.CLICK, click1);
3
4  function click1(event:MouseEvent) :void
5  {
6      gotoAndStop("daftar");
7  }
8

```

Figure 5.3: My Tajwid homepage coding in actionscript

5.5.2 Register Page

In the register page for users to access to this application. The user need fill their username and submit button to proceed to menu page. Any kind of username properties can be use in this application. The register page are shown in figure 5.4.

Figure 5.4: My Tajwid register page

```

stop();

////////////////////////////////////////
//Make the initial request
////////////////////////////////////////
//retrive data
function requestEntries1():void {
    //username_txt.text = "Insert Username";
    var variables_re1:URLVariables = new URLVariables();

    var varSend_re1:URLRequest = new URLRequest("daftar.php");
    varSend_re1.method = URLRequestMethod.POST;
    varSend_re1.data = variables_re1;

    var varLoader_re1:URLLoader = new URLLoader;
    varLoader_re1.dataFormat = URLLoaderDataFormat.VARIABLES;

    variables_re1.requester = "initial_request";
    varLoader_re1.load(varSend_re1);
}

```

Figure 5.5: My Tajwid register actionscript page

5.5.3 Menu Page

There are three option in the menu page which are 'belajar', 'latihan' and 'kuiz'. When user click the belajar button then it will proceed to the syllabus of the topics. It also same goes to latihan and kuiz Button which will bring user to the exercise page and quiz respectively. All of the button in the application have audio effect and change size to bigger while finger click on it. The purpose of the effect is to tell the users the difference of navigation while button on finger click and finger over.



Figure 5.6: My Tajwid menu page

5.5.4 Syllabus Page

Syllabus page is a continued page from the menu page. All three of them will bring to this pages with different function. In this page, it is depend on the option in the menu. For example, user can access all syllabus in the belajar and latihan option, but for kuiz it is locked until the first syllabus is answered.



Figure 5.7: My Tajwid syllabus page

```
stop ();

bbab1.addEventListener (MouseEvent.CLICK, click41);

function click41(event:MouseEvent) :void
{
    gotoAndStop ("bbab1");
}

back5.addEventListener (MouseEvent.CLICK, click42);

function click42(event:MouseEvent) :void
{
    gotoAndStop ("menu");
}
```

Figure 5.8: My Tajwid syllabus actionscript page

5.6 Challenges of My Tajwid

In software engineering (SE), video game development is unique yet similar to other software effort. It is unique because it combines the work of a team that includes a variety of

disciplines such as art, music, programming and more, that playing the game is interesting and sought after through the use of prototype and iterations. Thus, game development is faced with challenges that can be overcome using traditional SE practice.

The SE practice common in online game development may be approached differently to promote more diverse online game scenarios. The technical difficulties in providing online games are not trivial, requiring substantially large collaborative software compared with their non-online counterparts. The flow of collaboration in My Tajwid are first steps, create a MySQL database table and set the fields as needed. Second step, create input form elements and interfaces display window. Third step, create the PHP parse file. Last step, upload all files to server.

5.7 Conclusion

The implementation phase is very important in order to show the platform and how the application works. Using sources from books and tutorials from YouTube was helpful much to complete and finish the process of implementation phases. The processes that were used are techniques 'try and error' and 'do and learn' skills and also make many changes to decide the suitable icon, colour, image, animation, audio and font size to make sure it is satisfied and interesting to kids. The source code Action Script 3.0 in Adobe Flash Professional CS6 has been used to make an interesting application. For example, button, moving animation, choosing question, sounds were using coding.

CHAPTER 6

RESULT AND DISCUSSION

6.1 Introduction

The main of the chapter are the process of all document that is involves in the development in the system. Mostly, the chapter explain all the project development that has been created. Contains and context in this chapter are based on the systems. It explain the details on the project that in the system and also the development of the system. Basically, the system are created in Adobe Flash CS6 AIR for Android. The database is design and it's implemented in MySQL and connected in PHP format.

The developed application, My Tajwid Mobile application has met all the objectives of this project, which are:

- i. To design and develop a mobile application for 'My Tajwid' using Android application development software.
- ii. To identify the need of Muslim users for a more effective learning method.
- iii. To create a self-assessment tools to record the improvement in learning Tajweed.

From the objectives stated, the first objective is about creating a mobile application using android application development software. This objective is achieved as the system proposed has been made and the platform of android platform choose are correct. My Tajwid application was developed well and can be used in mobile device. It is design to let user interact with the system and especially kids to train themselves about tajweed overall.

The second objectives is also achieved as to identify the needs of Muslim users for more effective learning. For this case, normally people studying Tajweed by using a normal way, for example book, television, and listening to a radio. So this method actually a long way learning which means user will take time to learn tajwid. From my second objective, a requirement is collected to identify user need so that a proper design will come out. If user want an audio example, then this system will be prepared with the audio. The whole system will be design as completely as they need. As long as it will be attractive and will make user want to reuse again. Last but not least, the third objective is to create assessment tools and to record improvement of user. From this objective we know that the system has function to let user train themselves and result of the train is recorded. This system let user attempt as many as how many they want to answer the question. The marks recorded is either for training or quiz module. So, result of overall progress will remain for user and parent view.

6.2 Development of Graphical User Interface (GUI)

GUI are the most important thing in order to allow the user to interact with the system. Moreover, GUI allowed the user to provide the input that process and product the output. The GUI development are divided into several parts like homepage, menu page, register and signup page for both parents and kids, exercise and result page. All these have different criteria in developing it. The functionality is important to be highlighted in developing the GUI because it will affecting the process of learning. For example, if the button is too small for the kids and the colour choose is not suitable for kids so it will disturb the two way interaction. This development is one of the critical phase which will make developer design the whole system properly. If mistakes occur, then it will interrupting the whole process.

6.3 Result testing

There are several function in My Tajwid application that need to be tested. The GUI component like button, play important role to make the human computer interaction works

well. This system have register, sign in and signup function that need to be tested. The connection with MySQL must be functional well, so that the system and server can retrieve data updated and inserted. Testing is to ensure that the application run successfully without any error and provided that capabilities that give the right output for the users. That is guarantee that the user utilize the application systematic and continuously. Here are the overall result of My Tajwid application.



Figure 6.1 :Homepage



Figure 6.2 :Registration



Figure 6.3 :Menu



Figure 6.4 :Syllabus



Figure 6.5: Syllabus1



Figure 6.6 : Syllabus 2

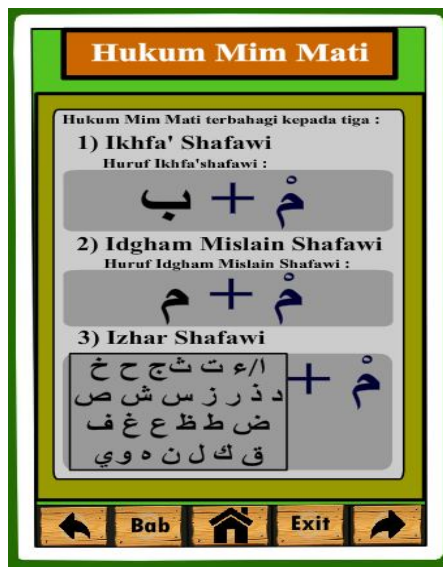


Figure 6.7 :Syllabus 3



Figure 6.8 :Syllabus 4



Figure 6.9 :Syllabus 5



Figure 6.10 :Quiz Start



Figure 6.11 :Example question



Figure 6.12:Score grade B



Figure 6.13 :Score grade A



Figure 6.14 :Score grade C



Figure 6.15 :Overall result

6.4 Unit Testing

Table 6.1: Unit Testing

No	Test case	Yes	No	Remark
1	Kids id login <ul style="list-style-type: none"> • Can access the application • Update id • Delete id • System direct to the menu 			
2	Parent id login <ul style="list-style-type: none"> • Can access into the application • Change password • Viewing kids result 			
3	Learning syllabus <ul style="list-style-type: none"> • Playing audio aid • Buttons fully functional 			
4	Exercise syllabus <ul style="list-style-type: none"> • Start the exercise • Button fully functional • Displaying result • Displaying grade 			

5	Quiz Syllabus <ul style="list-style-type: none"> • Start the quiz • Button fully functional • Displaying result • Displaying grade 			
---	--	--	--	--

6.5 Conclusion

At the end of the result and discussion phase, we know that this is the part that all progress have been completed. The output of the system have been clearly view and user can already use this system. The GUI component works well hence will not interrupt user interaction with the system. The system have been tested to several user to get their feedback and it is 100% satisfied. The methodology used suited well from the beginning plan until the project have been completed. Each phase has been carried out well and the actual outcome are same like expected outcome.

CHAPTER 7

CONCLUSION

7.1 Overall

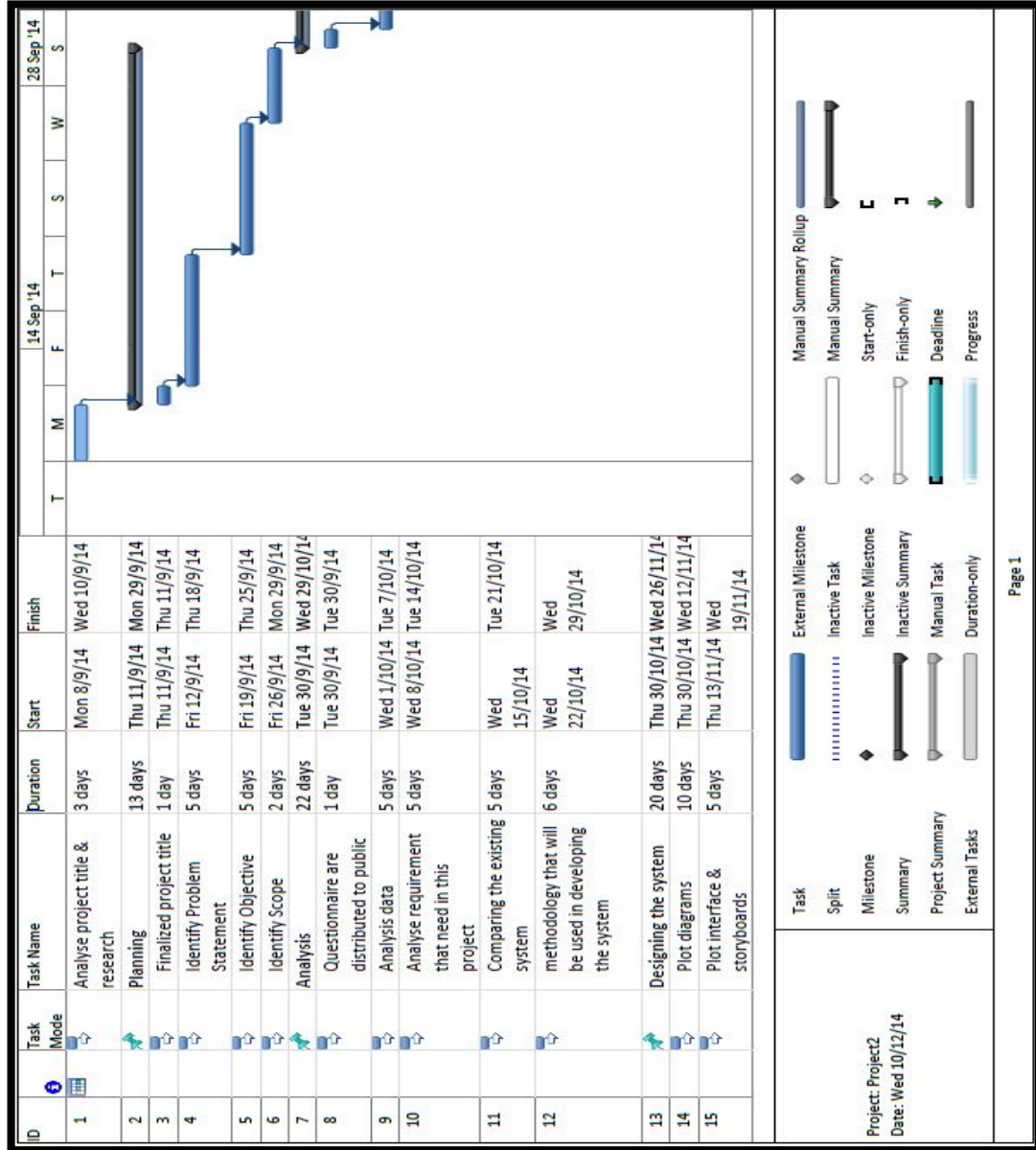
In the nutshell, My Tajwid mobile application system is a system that can help users to understand Tajweed deeply. This application have learning and exercise module which can strengthen users understanding in Tajweed knowledge. Besides, users can compare their marks with the previous exercise that they took. Even though this system is targeting kids as main user but any user can actually use the system as the knowledge syllabus is understandable for all ages. The interface is more attractive for kids but as long as the content is more important, so adult also can learn Tajweed by this application. There are audio aid provided which really important to let users know the correct pronunciation of Tajweed syllabus that they learn. At the end of Quiz session, user will know their mark with given score and grade. If user get more than 100 over 150, they will get A+. Also if user get range 50-90 marks, user will get grade B+. Last but not least if user get less marks than 50 they will get C+. They can check result obtained at the last page and can compare with the earlier result they got. As long as user keep using the application, the understanding in Tajweed will continuously growing up.


















7.2 Future Improvement

My Tajwid system have a very basic function to teach Tajweed and train user understanding by answering Quiz provided. There are lots of improvement that can be adapt in future to enhance this system. For example by adding speech recognition in this system. By adding this, user will be able to trying themselves in practicing the real pronunciation for the system to analyse it. This function is very helpful to user as it will tell user the real pronunciation or how good you are in reading the Tajweed. But it still have weakness if the system build is not good enough. Besides, for the future improvement, this system can add two types of users like kids and adults. It also have male and female version which can pick by the user. By adding this option, they can interact well comfortably, because the design itself are different. There are more interactive adaptation that can be add to My Tajwid system to make it look better depend on the advancement of life now.

Gantt chart

PSM 1



Task Mode	Task Name	Duration	Start	Finish	1st Quarter						2nd Quarter					
					Jan	Feb	Mar	Apr	May	Jun						
	Code	44 days	Mon 9/2/15	Thu 9/4/15												
	Exploring Eclipse	5 days	Mon 9/2/15	Fri 13/2/15												
	Create system interface	10 days	Mon 16/2/15	Fri 27/2/15												
	Create coding to interface	15 days	Mon 2/3/15	Fri 20/3/15												
	Enhance coding for system	10 days	Mon 23/3/15	Fri 3/4/15												
	Documentation	3 days	Mon 6/4/15	Wed 8/4/15												
	Test	36 days	Fri 10/4/15	Fri 29/5/15												
	Test the system	3 days	Fri 10/4/15	Tue 14/4/15												
	Find the error	5 days	Wed 15/4/15	Tue 21/4/15												
	Fix coding and its error	20 days	Wed 22/4/15	Tue 19/5/15												
	Re-testing the system	3 days	Wed 20/5/15	Fri 22/5/15												
	Deliver increment	2 days	Mon 25/5/15	Tue 26/5/15												
	Meets parents	1 day	Mon 25/5/15	Mon 25/5/15												
	Meet Quran Teacher	1 day	Tue 26/5/15	Tue 26/5/15												
	Requirement and feedback	2 days	Wed 27/5/15	Thu 28/5/15												
	Get parents and teachers feedback	1 day	Wed 27/5/15	Wed 27/5/15												
	Get users (kids) feedback	1 day	Thu 28/5/15	Thu 28/5/15												

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