DOA MOBILE APPLICATION FOR AUTISM CHILDREN (e-DOA)

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Bachelor of Computer Systems & Software Engineering

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I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledged. The project has not been accepted for any degree and is not concurrently submitted for award of the other degree.

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DEDICATION

Thank you ALLAH

Special dedication to my beloved mother,Asnimar Binti Aminuddin,my father Mohd Sanusi Bin Hussain and siblings for the fully support and pray for me.

For my supervisor, Madam Ku Saimah bt. Ku Ibrahim for supporting me and always guide me in the progress on the project.

And last but not least thank you to my friend s that always give me motivation and support.

Sincerely,

Nor Syafizah Mohd Sanusi

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ABSTRACT

Learning through books is not interesting to children that have autism syndrom. It has to be interesting and suitable for the childrens. By developing Doa Mobile Application (eDoa), it can be the new learning tools for these kids. The application is an android mobile application which developed to for autism children as users. It exposing, teaching and helping autism children to practice daily Doa in their daily life. eDoa has two modules of learning which are 'Doa' and 'Zikir' implemented in Malay language. It also has the 'Kuiz' module for the children answer and tests their understanding of the learning. The application is developed with a multimedia based element and using ADDIE methodology. The application used the voice teaching techniques which practically helping the autism for an instruction and learning the modules. The study has been done at PDK Putrajaya and the evaluation result is use to analyse the effectiveness of the application. The application is using repetitive learning approach as it can be used continuously.

ABSTRAK

Pembelajaran melalui buku tidak menarik kepada kanak-kanak yang mempunyai sindrom autisme. Ia perlu mempunyai daya penarik dan sesuai untuk kanak-kanak . Dengan membangunkan Doa Aplikasi Mudah Alih (eDoa), ia boleh menjadi alat pembelajaran yang baru untuk kanak-kanak ini . Aplikasi ini adalah aplikasi mudah alih 'Android' yang dibangunkan untuk kanak-kanak autisme sebagai pengguna. Ia mendedahkan , mengajar dan membantu kanak-kanak autisme untuk mengamalkan doa harian dalam kehidupan seharian mereka. eDoa mempunyai dua modul pembelajaran yang ' Doa ' dan ' Zikir ' dilaksanakan dalam bahasa Melayu. Pengguna juga boleh menjawab soalan dalam modul 'Kuiz' dan boleh memilih suara lelaki atau perempuan untuk belajar Doa. Aplikasi ini dibangunkan dengan elemen berasaskan multimedia dan menggunakan metodologi ADDIE . Aplikasi ini menggunakan teknik mengajaran melalui suara yang dikatakan boleh membantu kanak-kanak ini untuk mengikut arahan dan pembelajaran modul. Kajian ini telah dijalankan di PDK Putrajaya dan keputusan penilaian itu akan digunakan untuk menganalisa keberkesanan aplikasi. Aplikasi ini menggunakan pendekatan pembelajaran berulang-ulang kerana ia boleh digunakan secara berterusan .

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CHAPTER 1

INTRODUCTION

1.1 Introduction

e-DOA is a mobile application that develop for autism children. This application exposing and teaching an autism children about basic daily prayer or do'a. The application will be using a mobile application software platform and can be run on smartphone and other mobile devices. This mobile application purpose is to make autism children will practice Doa in their daily life.

Autism is an neurodevelopmental disorder that ussually during first three years[1]. Autism cannot be cured, but can be reduced by early identificatin and treatment. Autism can affect one who is not dependent on ethnicity, educational level, social and economic[2].

Doa is a request for help and assistance by a servant of God for benefit of us, family, and afterlife (Al-Imam al-Khattabi). In Islamic religion, prayer is the necessary (fardhu) for a Muslim. Daily prayer is a collection of prayers, but crucial in our daily work and as was practice by our prophet Muhammad[3]. Because all prayer and remembrance is in Arabic, then recommended to the reader to learn reading prayer text or remembrance of those who may or understand Arabic so that every sentence is read correctly in terms of reading and meaning as when reading changes, then means also will change.

1.2 Problem Statement

e-DOA is a mobile application that will be develop to enhance the functionality of the previous system. The application is develop based on these problems below:

i. From the previous mobile application system that teaches Doa only develop for normal children. So, e-DOA will develop the prototype of mobile application for autism children that teaches daily Doa.

ii. Learning process confined to textbooks is not interactive. This is because textbook can only be read and seen in the 2-dimension. As a result, the system is developing in 3-dimensional effect to get children attraction and give them an effect of ' realism ' so that the child will feel more fun while learning.

iii. There a lot of Doa in Muslim daily life that we have to remember. So, the application will only include 20 types of basic Doa in our daily life (reference: Jabatan Kemajuan Islam Malaysia-JAKIM 2010).

1.3 Objectives

The objectives of this project are shown below;

i. To develop a prototype of a Doa mobile application using Android smartphone for autism children.

ii. To teach autism children's about the daily Doa by using a voice teaching technique.

iii. To study the effictiveness of Doa modules teaching of for autism children by conducting a testing to users.

1.4 Scope

The scope and the limitation of the system that will be implemented are below:

i. e-DOA users

- Autism Children
- Teacher (assistant)

ii. e-DOA will be used Arabic & Malay Language

iii. e-DOA only cover 20 type of different daily Doa and 5 Zikir

iv. Software requirement

- Adobe Flash – For editing and develop the application
- Adobe Photoshop – For editing an icon and cartoons images
- Windows 7 (OS) – For project development
- Microsoft Word 2010 – Documentation
- Mobile Device (Android) – For system product testing
- Audacity – For recording the audio

1.5 Thesis Organization

This thesis consists of this project have five chapters :

Chapter 1 discuss on the introduction of the courseware. The purpose of this chapter is to briefly explain about the overview courseware that is developed. This chapter also include the problem statements, objectives and the scope of the study.

Chapter 2 briefly explan the literature review and research for project that has been choosen. The researches divided into two part which are for the current application or case study and research for techniques that will be used to develop current application.

Chapter3 explain about research methodology.This chapter describe the techniques,algorithms and related software that will be used for the project development. Besides that, it wil also discuss about the process flow in detail of this research.

Chapter 4 is about implementation and testing.Documentation is carry out during the process that involved in developing this system and the testing made to application.

Chapter 5 gives out the result analysis of the application,project limitation and the idea of enhancement in the future for the application.

Chapter 6 summarise about the developed project have to be conclude in this phase where we call conclusion part.

CHAPTER 2

LITERATURE REVIEW

2.1 Autism

Autism is an neurodevelopmental disorder that ussually during first three years[1]. Autism cannot be cured, but can be reduced by early identificatin and treatment. Autism can affect onewho is not dependent on ethnicity, educational leve, social and economic[2].

Based on survey made by me observing and interview the teachers at PDK Putrajaya;

i. Amir 23 years old.He like to hear the song.He can memories the lyrics of the song just in munites of time.Other than that he can memories the Yassin.
ii. Based on behaviour, he like to be silent and doesn't have eye contact with people much.He also have some repeatitive behaviours such as clapping hand until someone stop him and other.
iii. The picture below shows Amir sing a song title 'Puisi Cinta'

Figure 2.1: Amir singging at PDK Putrajaya

(sources:https://www.facebook.com/photo.php?v=414889395228866&set=vb.100001234283555&type=3&theater)

2.1.1 Behaviour

Restricted and repetitive behaviours (RRBs) are part of the core criteria for autism spectrum disorders (ASD). They form a heterogeneous class of behaviours that are characterised by invariant repetition and desire for sameness in the environment (Kanner, 1943)[6].

i. Restricted – (example-:Amir walk on path A and he will comeback follow path A)
ii. Repetitive – (example: Amir clapping his hand and stop until someone ask him to stop)
iii. Speech Teaching- (example: We teach him a 'Puisi Cinta Song' which in a minute he can memorise all the lyrics and the melody of the song

2.2 Mobile Application

Recent mobile phones feature an increasing number of sensors (e.g., microphones, cameras, accelerometers, and gyroscopes), multiple wireless technologies (e.g., Wi-Fi, 3G, and Bluetooth), and positioning systems (e.g., GPS, Wi-Fi triangulation), as well as advanced processing and storage capabilities [4]. In addition to these technological features, the wide adoption of mobile phones by the public has led to the rise of a new paradigm known as participatory or urban sensing [5].

2.3 Doa

Doa or Prayer in Islamic term define as a request or demand to God for helps and applying the benefit of ourselves, to God, family, religion and the afterlife (M Quraish Shihab). There a lot of Doa that comes from Al-Quran that bring various meaning for humans benefit. The ypes of daily Doa which included in the application :

- Sleep
- Going to the toilet
- Eat
- Wudhu'
- Wear Clothes
- 'Penerang Hati'
- Study
- Work
- Traveling by car
- Face a Problem

2.4 e-DOA

ii. e-DOA or electronic Doa is the application that using android mobile hand phones as a device to teach a Doa or Muslim prayer in daily lives.

2.5 Existing system

Based on my research of the existing system, there are no mobile application that has been develop specializes for the Autism children. So, these some example and analysis of the existing systems that related or purpose on learning Doa.

2.5.1 Kumpulan Doa Harian

2.5.1.1 Features

This application is a mobile-based application. It consist daily Doa , in Arabic handwriting, and the meaning. The theme color choice is green and it is in Indonesian language only.

The navigation used is simple and it the prayer is in Arabic, plus how to read and translate.

It also consist 10 prayers a day-to-day plus two prayers in Ramadan with an interactive photo. Pictures below show the main page of the application, and the modules in the application.

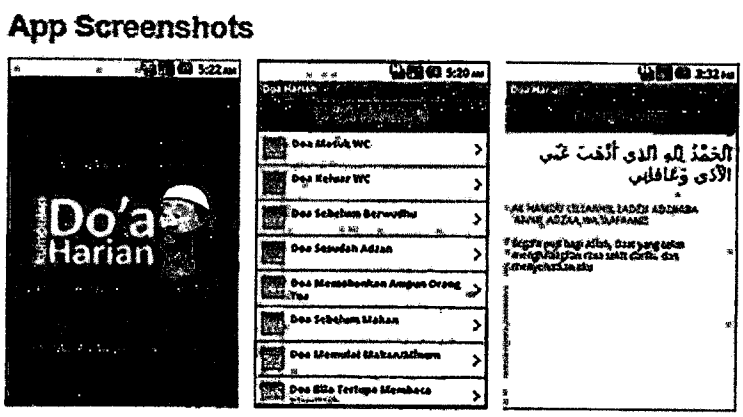

Figure2.2: Main menu page & learning page for Kumpulan Do'a Harian

2.5.1.2 Limitation

This mobile application using one type of colour layout witch are not interactive to user which is children. Kids more interact with multiple of colour layout example RGB colour choice. The application also was developed in one language which is Indonesian language. Kids from Malaysian country may be difficult to understand the used or words inside the application. Other than that, the application are not providing an animation environment which important to ensure the interactivity of one application for kids as a user. The multimedia element such as sound also is not implemented in the application.

Based on my opinion, after I download this application at google play store, I found that it is not exciting to learn the application and I would not open it again. It is important for a developer make sure that their system is acceptable and people will use it again and again.

2.5.2Haiya BidDoa

2.5.2.1Features

Collection of moslem daily prayers start from morning pray until the night pray and equipped with the Arabic-Latin transliteration to help you read the Arab. This application also consist a high quality of audio and video on how to perform prayer. The 3D animation are in Malay , English and Arabic. Pictures below show the main page of the application, and the modules in the application.

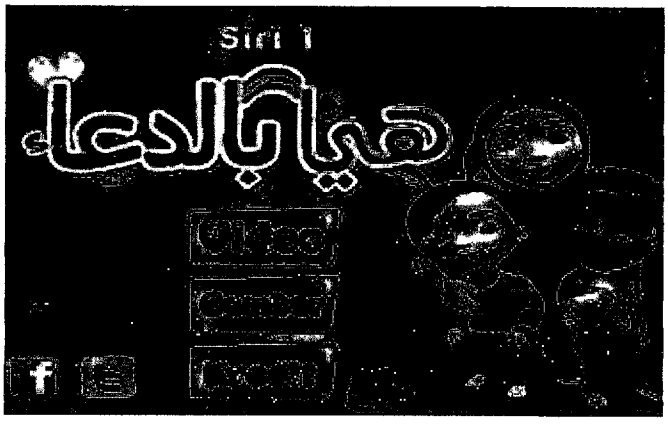

Figure 2.3: Homepage for Haiya BiDoa

The picture below shows the module choices for do'a.

Figure 2.4: Module Main page for Haiya BiDoa

The pictures below show the Do'a for eating

Figure 2.5: Learning Doa page for Haiya BiDoa

2.5.2.2 Limitation

For this application, the medium to play only available at apple store. I t is difficult for some parents that are not using an apple gadget such as iPad, iPhone etc. Based on the graphical user interface (GUI) , the design are too crowded. What I mean is, one interactive page should just have one type of multimedia element; text, audio, image, animation, video. There no need to do much for the images or graphic because the main aim is of the application is exactly for the user (kids) to learn Do'a.

2.5.3 Mari Berdoa Mobile Application

2.5.3.1 Features

This is a collection of applications DOA prayers daily basis should we practice in our daily routine. Prayers will be added from time to time. Besides, the minor bugs can be fixed on previous apps. The navigation button is simple but yet understandable. Pictures below show the main page of the application, and the modules in the application.

Figure 2.6: Home Screen for Mari Berdoa

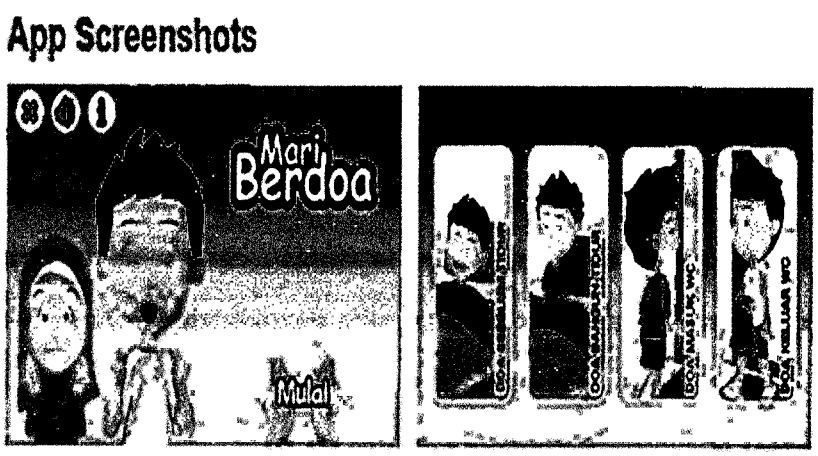

Figure 2.7: Main page & Module choice page for Kumpulan Do'a Harian

2.5.3.2 Limitation

This application is simple and may be the colour used is pale. Where we can see there are not 'wow' effect from the application which we can get that just by using a striking colour. The multimedia choice example text font is not suitable for user (kids) and it also being placed vertically.

2.5.4 Summary of Comparison with Existing System

For the conclusion of all existing systems, I come out with one table that can summarize all the advantages and limitation of the systems. From here we can see the different among all system which I can enhance for the future improvement for my system.

Application / Element/ Characteristic	5 Multimedia Element (text,image,audio video,animation)	Guideline provided	Effect or message provided for quiz	Usability	Voice teaching
Kumpulan Do'a Harian	x (audio,video, animation)	x	x	x	x
Haiyaba bidDo'a	/	/	/	/	x
Mari Berdoa	x (video)	/	/	/	/
My propose of eDoa	/	/	/	/	/

Table 2.1: Table of Comparison between Existing Courseware and My Proposed Mobile Application

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter discussed about the methodology and techniques that will be used to develop the system. Methodology is a system methods used in particular area of study [7]. For example, steps, tasks, methods, tools and techniques that brings in more details. It consists of a set of method used to produce complete software from the planning phase till the documentation phase.

3.2 ADDIE Model

The project of e-DOA mobile application for Autism Children is using ADDIE model as the methodology. ADDIE is an Analysis, Design, Development, Implementation and Evaluation [2]. It is an instructional model which mostly applied on developing educational courseware as to construct a performance-based learning aid. ADDIE was constructed based on current style of learning, because children's ways and their interests towards education are different for certain generations. From the model below, there are five (5) stages involve in the ADDIE model which are:

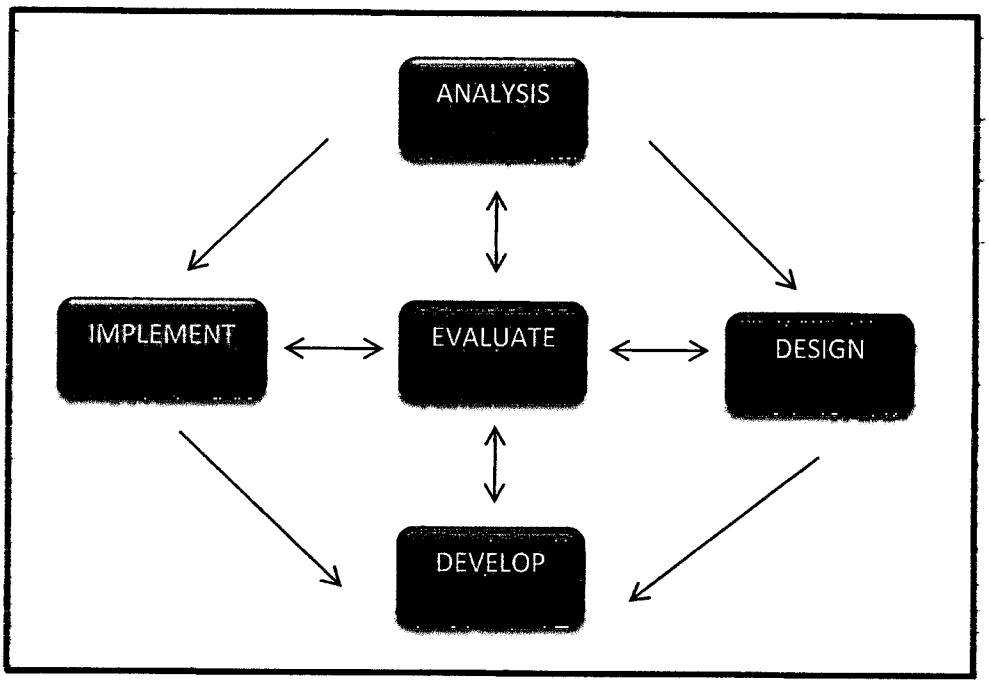

Figure 3.1: The stages involved in ADDIE methodology

3.2.1 Analysis

Analysis phase should answer all 5W1H questions (What, Why, Where, Who, When and How) before developing a courseware. A designer needs to identify and consider:

i. Learning problem before the project is construct

ii. The goals and objective of the project

iii. The audience needs for the project

iv. Existing knowledge about past systems

v. Learning environment to users

vi. Any constraints that might be occur during developing phase

vii. Timeline for the whole project phases

3.2.2 Design

Design phase leads to the development of the learning objective and the ideas. Choose a course format or the medium by which the course is presented to the learners. Design the content should include learning and assessment method. Learner participation important to review the feedback of the user whether they understand the courseware is about. Besides, the storyboard and prototypes of the details project will be done at these phase. Designer should make sure the multimedia element and the interactivity are suitable for the scope users.

3.2.3 Development

During development phase, the blueprint of the project will be integrated into the real system. The content according to what we discussed in design phase and should parallel with the project's goals. All the multimedia elements as planned should be input and apply. Besides, designers have to develop the course materials and conduct a run-through before the final release.

3.2.4 Implementation

Designer should create a sample such as instruction or manual on how to use the courseware to the user. Make sure the courseware satisfy the objectives of the project. Other than that, designer should prepare the learners with the correct tool of knowledge and arrange the learning space for them.

3.2.5 Evaluation

Evaluation is the final phase in the process in ADDIE model. The purpose of this phase is to make sure the quality of the final product. It has to be assess before and after implementation because if any error, designer can correct it before release to actual users. Evaluation phase consist two type of evaluation which are:

i. Formative evaluation is one-to-one assessment which tests the clarity, impact, feasibility. Next the assessments should be clear, consistent and follow the objective. This evaluation conducted in a small group and the field trial is in the real time rehearsal.
ii. Summative evaluation is about proving the worth. It conducted a reaction such as open ended question, anonymous, achievement test, performance test and questionnaire.

For the project, formative evaluation which will be conducted, one-to-one with users by assessing their quizzes in the application.

3.3 Project Requirement

In order to complete the project with a correct flow, requirement is needed and it helps us to choose what are the suitable hardware and software that should be used for this project.

3.3.1Hardware Requirement

These are the hardware that will be used to implement the project;

Item	Description
i. Computer or Laptop	o RAM - 4.00 GB o Processor - Intel ® Core i5-2430M CPU @ 2.40GHz o Graphic Card – Nvidia GEFORCE BT 540M CUDA 2GB o Hard Disk – 640 GB
ii. Printer	o Cannon E-500
iii. External Hard Disk or USB Drives	o 1TB

Table3.1: The list of hardware that will be used for the system development

3.3.2 Software Requirement

These are the software that will be used to implement the project;

Item (Software)	Purpose
i. Microsoft Office 2010	o Microsoft Word o Microsoft PowerPoint o Microsoft Project
ii. Windows 7	o Operating System
iii. Adobe Master Collection CS6	o Adobe Photoshop
iv. Adobe Flash	o Editing the mobile application system

v. Audacity	o To record the audio

Table3.2: The list of software that will be used for the system development

3.4 Summary

Based on the project planning, the project just in Analysis and Design phase. The phase describes the early stage of planning such as the objective, method, techniques and flow of the application that will be used in project development. So, from these planning, we can perform our next stage which is development, implementation and evaluation. Lastly we can release our product.

CHAPTER 4

DESIGN AND IMPLEMENTATION

4.1 Introduction

For design chapter, it will explain about proposed architecture, modules of this project and design of a mobile application develop for autism children (e-DOA). Proposed architecture will presents about the flow of this project, and what elements that involved in this project. As for this project, it will consist of elements of architecture; *Learning Modules* used for this project. Under *Learning Modules*, we specify this product to stand based on two parts, *Doa and Zikir. Learning* is part when our learners learn about daily Doa and simple Zikir by days, while *Quizzes is* where they answer some sort of questions regarding the Learning module.At the end of this chapter, a story board about the flow of this product.

4.2 Architecture of Learning

All system are develop based on the flowchart which acting as a overview of the system flow.So, for e-DOA these is the flow chart of the system;

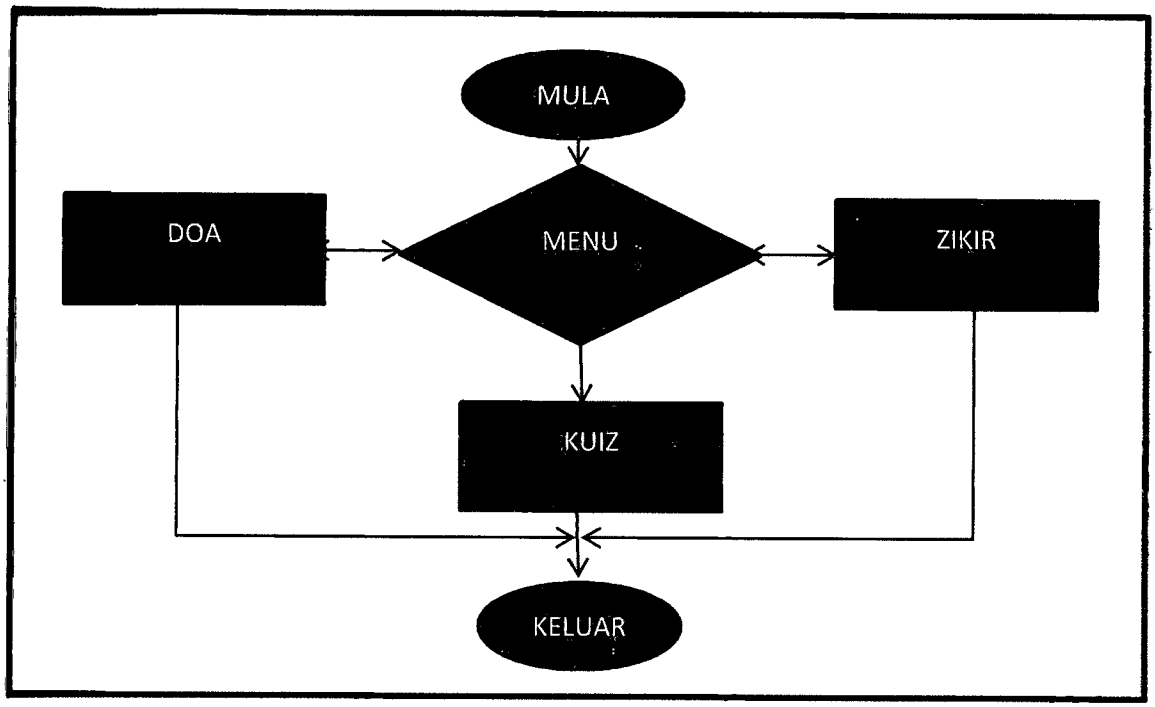

Figure 4.1: The flowchart of e-DOA mobile application

4.3 Story Board

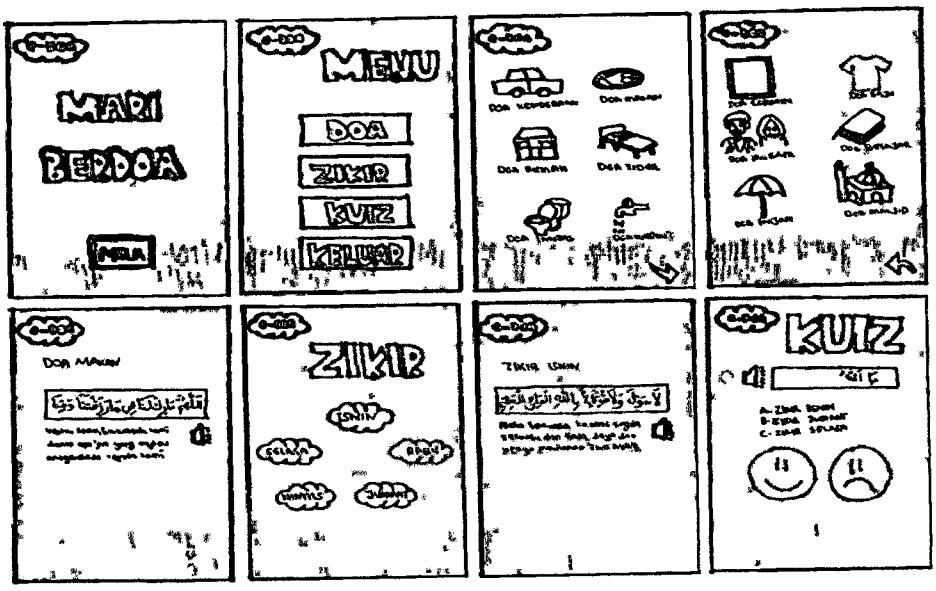

Figure 4.2: e-DOA sketch interface

4.4 Summary

This chapter, details about the proposed solutions that we are trying to apply for Implementation stage. The architecture of this project is diverting into few important elements that need to be considered which are Learning Modules and Quizzes.For the learning modules it consist a Doa and Zikir where about 25 different type of Doa between them.Each one of the Doa allocate a meaning and the children who had autism disorder may experience a fun learning with e-DOA and learn faster because we focus on the voice teaching where that is the most important aspects to be apply when conducting an application involving autism people as the scope of study.In the Quiz phase, autism children will answer a question and test their knowledge from learning module in e-DOA.

CHAPTER 5

RESULT AND DISCUSSION

5.1 Introduction

This chapter will explain about the result analysis of the application,project limitation and the idea of enhancement in the future for the application.An evaluation phase is conducted as a testing before the application can be released. By doing the testing evaluation, we can get the users feedback about our system and recorrect the weaknesses before relase the application. This is because the expected result may not be as the same as the actual result.So by performing the evaluation we can make an analysis and know our project limitation. In future maybe the application be be enchance for better result outcomes.

5.2 Interface

The interface that we implemented is based on the 5 multimedia element rules which are text, audio, video, animation and image. We also implement it based on the user scope ofwhich are interface for children. So after being research, using bright colours, specific font and images specially cartoon can attack the children users.