DOA MOBILE APPLICATION FOR AUTISM CHILDREN (e-DOA)

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Report submitted in partial fulfillment of the requirements
For the award of the degree of
Bachelor of Computer Systems & Software Engineering

(Graphic & Multimedia Technology) with Honors

Faculty Of Computer Science And Software Engineering

UNIVERSITI MALAYSIA PAHANG

SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion this project is adequate in terms of scope and quality for the awards of the degree of Bachelor of Computer Systems & Software Engineering (Graphic & Multimedia Technology) with Honors.

Signature :

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Date :

STUDENT'S DECLARATION

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

ACKNOWLEDGEMENT

First and foremost praise to Almighty Allah for all his blessings for giving me patience and good health throughout the duration of this research project. I would like to dedicate my highest gratitude for those who have involved directly or indirectly during this research. Special thanks to Mdm. Ku Saimah bt. Ku Ibrahim in supporting and helpful supervisor for all her comments, supervision, ideas, suggestion and all the given guidelines for me to complete this research project. It has been an interesting and exciting learning period for me. There are lots of things that I learned during this project implementation phase. To my friend from BCG, who always been supporting towards me, thank you for all the motivation words, ideas and critics during my project. It helps a lot especially during the stressful situation. Finally, to my beloved family, a million thank you to them for their moral support. Thanks for all the encouragement, supports and prayers for all this time.

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.

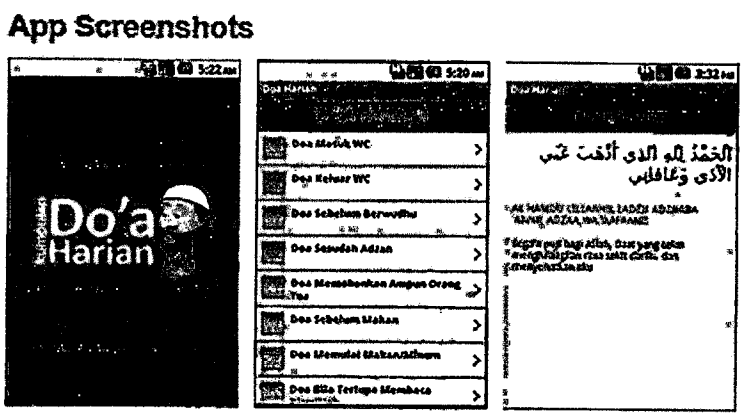

Figure2.2: Main menu page & learning page for Kumpulan Do'a Harian

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.

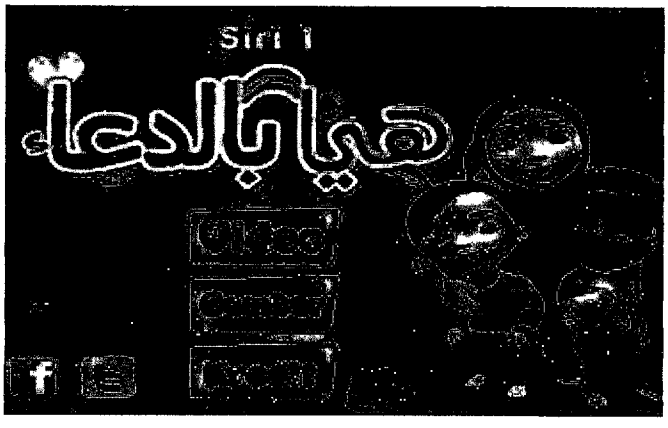

Figure 2.3: Homepage for Haiya BiDoa

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

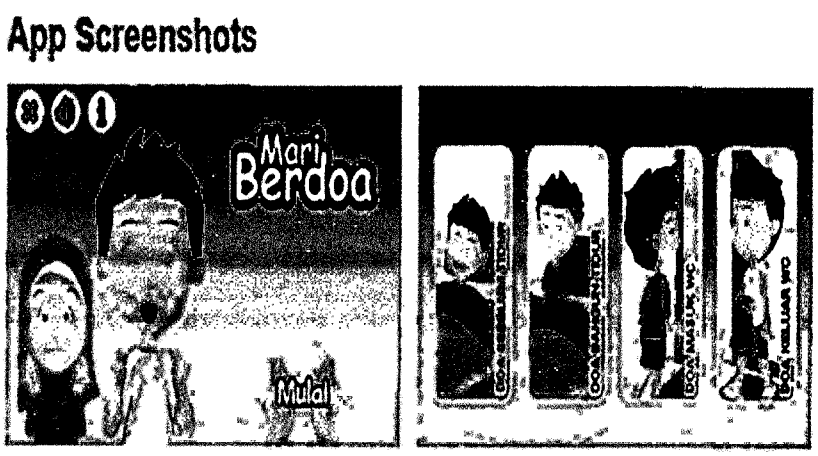

Figure 2.7: Main page & Module choice page for Kumpulan Do'a Harian

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:

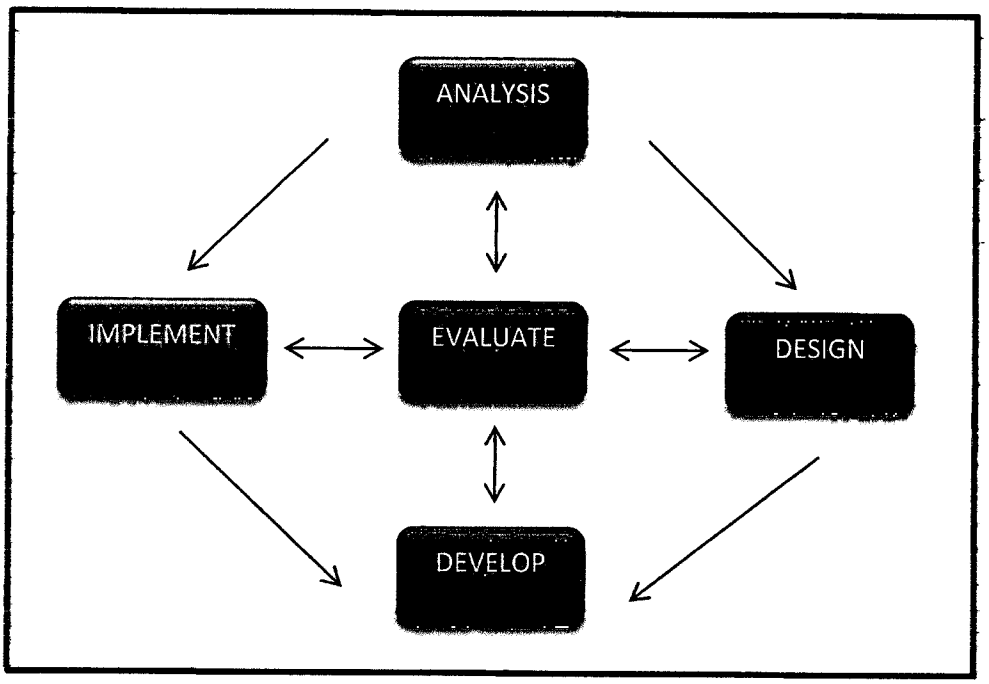

Figure 3.1: The stages involved in ADDIE methodology

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;

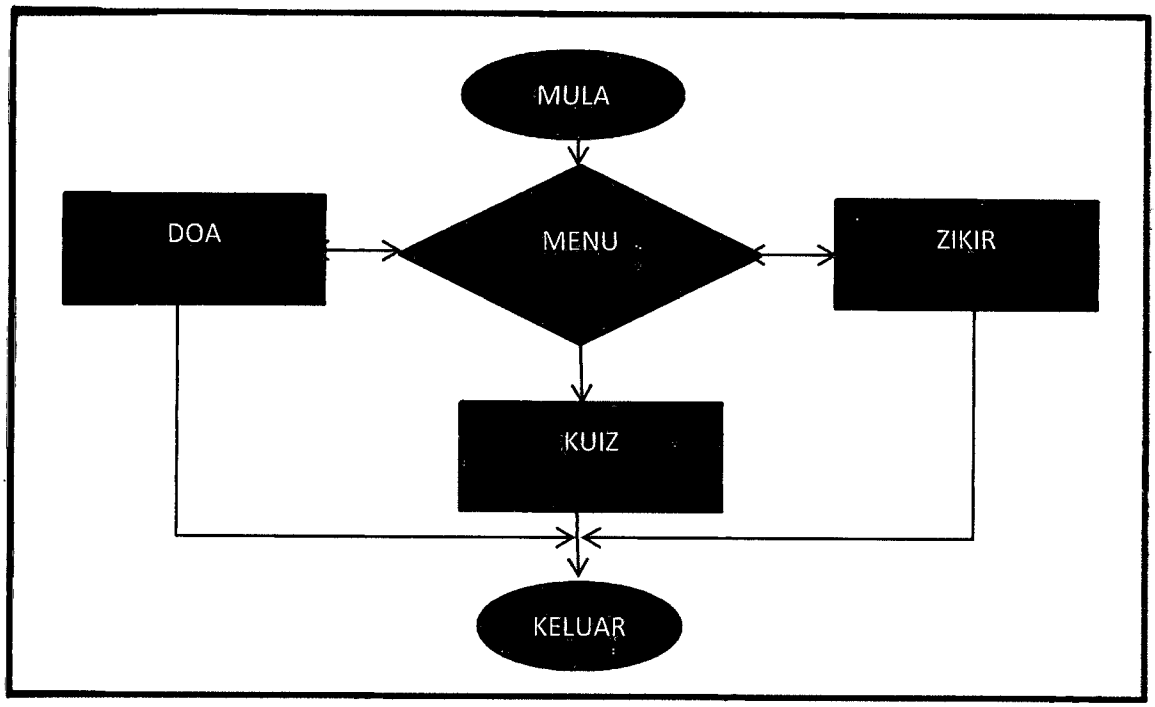

Figure 4.1: The flowchart of e-DOA mobile application

4.3 Story Board

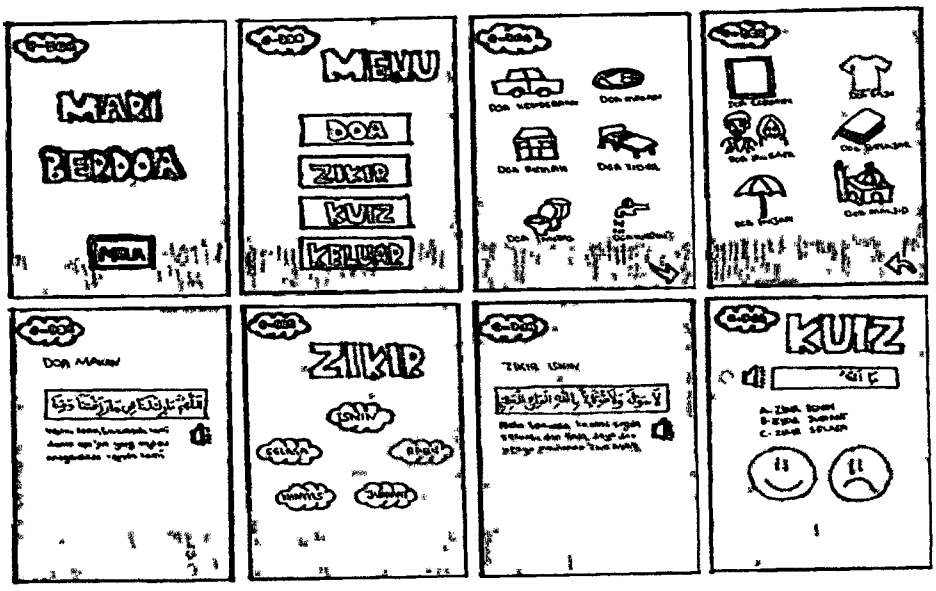

Figure 4.2: e-DOA sketch interface

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.

e-DOA starts with the 'home page' interface. Users can click the 'Mula' button to start the leraning of Doa. Meanwhile, users also can click on the female or male character button to choose their preferences on genders which have a female teaching audio and the male teaching audio.

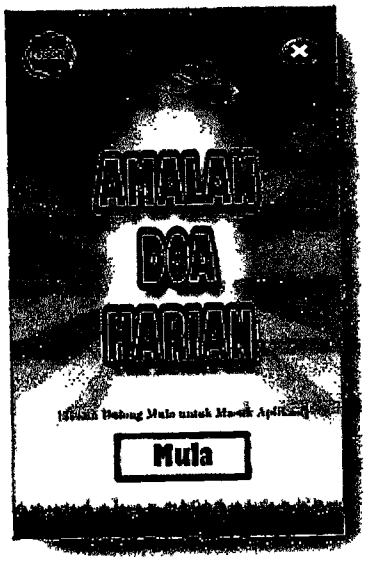

Figure 5.1 : e-DOA Home Page

After users choose to click 'Doa' button from previous menu page, user will directed into a Doa page menu and choices. Here, user can choose what type of Doa they want to learn. There also a next button where users can navigate to the next page which is the second page of the Doa menu page.

Figure 5.3 : Doa Menu Page

Once users click on one of the doa button, example 'Doa Tidur' button, it will navigate user to the 'Doa Tidur' page. On the 'Doa Tidur' page, we can see two of the Doa which is 'Doa bngun tidur' and 'Doa sebelum tidur'. Users can read only the image of the Doa or click on the sound button and listen to the audio of the Doa.

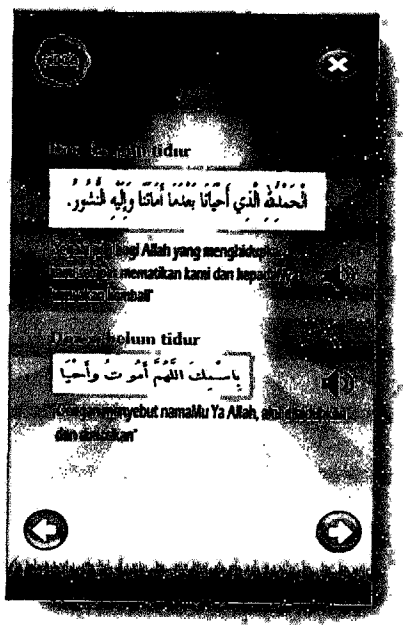

Figure 5.4: 'Doa Tidur' learning page

Meanwhile, the next module is 'Zikir' module in the 'Zikir' page . From this page,user can choose to learn Zikir on each day.

Figure 5.5: 'Zikir' Menu Page

If user click or choose 'Isnin' on the 'zZikir' menu page, so user will go to 'Zikir Hari Isnin' page. Here user can learn Zikir either by reading nor listening to the audio.

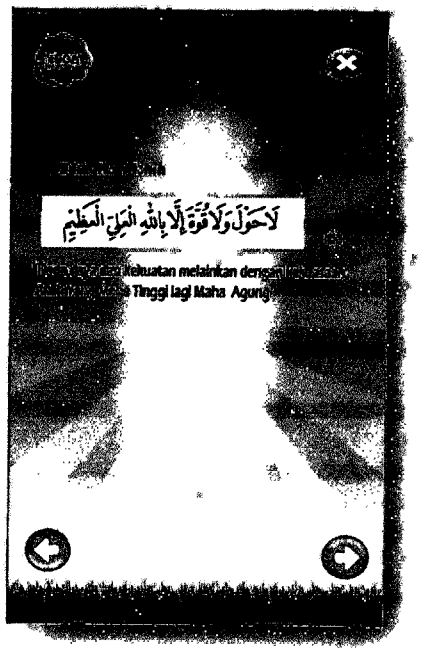

Figure 5.6: 'Zikir Hari Isnin' learning page

After user answering the question by clicking on the choosen answer, the result whether they answer it right or wrong will be pop-up. If the user anwer thequestion wrongly, user can try answer the same question again by clicking on the 'Cuba lagi' text. But, if they answer the question correctly, the clapping sound and the smiling smiley will be appear navigate ro next page/

Figure 5.7: 'Kuiz1' wrong and correct page

The last choice of the last option on the mwnu page is 'Tetapan page'. Here,users can choose the audio that they want wether boy or girl audio. There also has a tutorial on handling the application.

Figure 5.8: 'Tetapan' page

5.3 Development Environment

5.3.1 Initialization of Development

Before develop an application, we should understand our main objective and clear about the expected result from our project. Here we will discuss the development environment based on our objective and the actual result we achieved.

i. To develop a prototype of a Doa mobile application for autism (e-DOA) children.

The main objective of this application is to build a prototype of a Daily Doa practiced by a Muslim. This is because e-Doa only covers 20 types of daily Doa and 5 types of Zikir. Meanwhile, the scope user for this application is an autism. Based on researched that have been done, majority of an autism kids on these aged tend to already knowing alphabets and read but yet, based on their ability and parenting them either t home or school.

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

Voice teaching is one of the best techniques that can be used for teaching an autism kids as their behaviour or disabilities which is the repetitive disorder. When the kids learning based on the voice teaching repetitively, then can easily remember one thing. With help of voice audio used for the reading of the Doa, children can memories it as its can be learn every day because it is stored in the smartphone.

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

Teaching a Doa using mobile application is the idea approach which created to autism kids. In order to knowledge about the effictiveness of the application, we should conduct a testing to users and getting the feedback neither positive nor negative. From these method itself, we can achive the solutions for the objective above.

5.4 Coding Implementation

For the application, we used Adobe Flash software where it create a new flash document (*.fla) in the Flash document windows. As we choose android as a platform for the application, the publish settings will be set for AIR for Android. Use the AIR for Android document to create applications for Android devices. Adobe flash is using the ActionScript 3.0 for the code implementation.

```
stop();
btnmula.addEventListener(MouseEvent.CLICK, mulafunction);
function mulafunction(event:MouseEvent):void{
    gotoAndStop("menu page");
}
stop();
//closes app
import flash.desktop.NativeApplication;

exitBIn.addEventListener(MouseEvent.CLICK, exitHandler );
function exitHandler (event:MouseEvent):void
{
   NativeApplication.nativeApplication.exit();
 }
```

Figure 5.9 :The coding for 'Home Page'

5.5 Result Analysis

Based on (Stefano Federici) , in a human computer interaction studies, a multimedia application or software evaluation should be tested regarding to this measurement [8] :

a) Usability
b) Functionality
c) Accountability

5.5.1Project Outcomes

The chart below shows result findings and summarization of all the testing survey feedback.

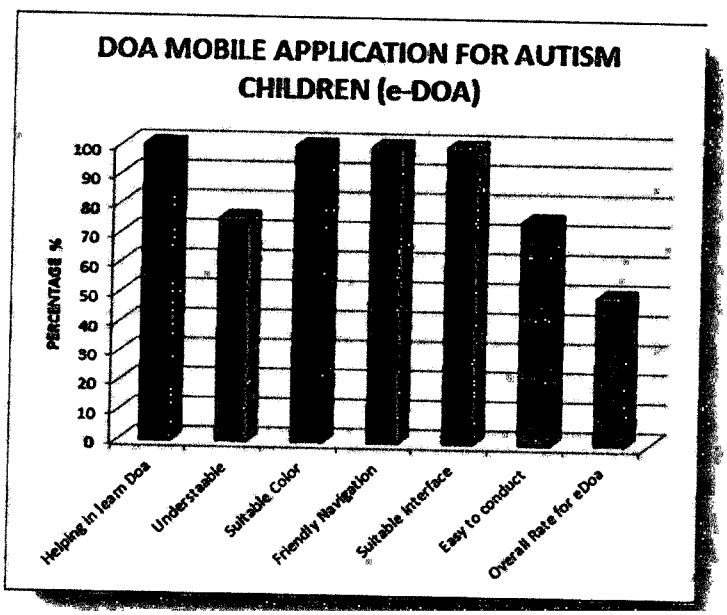

Chart1: Percentage of certain criteria of testing

Based on the graph on the result of the testing conducted to the user, we find that 100% of the application is helping autism children to learn Doa, colour used in the application is suitable for user, it has a friendly navigation tools, and the interface is suitable for autism's children. Meanwhile it is recorded on 75% as the user is

understandable about the application and is the application is easy to conduct. On the other hand overall rate for the application recorded with 50%.

5.5.2Observation Outcomes

In order to study the effectiveness of the application, we should do some observation analysis. We conducted this testing to autism children at 'Pemulihan Dalam Komuniti' PDK Putrajaya. The testing should answer some criteria which we observed for give out the result that we need based on the objective we want to achived [9] :

Criteria	Explaination
First Impression of the application	This is important to be observed as we want to know their attractiveness on the application design interface (colours,graphic,etc)
Handling the application navigaton	This is to see whether the kids understand the function of each button
Learning the Doa module	This criteria is to record the time taken for them to finish the courses. Other than that, we want to observe their behaviour when learning the doa.
Answering the quizez	This is to observed their ability and understanding after learning the courses on the application
After finish the attempt	After they finish learning, we want to observed their interest to the application

Table 5.1: The criteria of the testing evaluation

Participant Detail	
Name:	Soffiyah Bt Khaled
Age:	9 years old (Autism)
Ability:	-Asperger's Syndrom Autism Follow instruction that told to her -Memorising thing that she hear repetitively - Shy kids (sources: PDK Teacher)

Table 5.2: Participant of the testing's details

As we observed, subject is excited to see the bright colour of home page with the animated graphic. Then, she manages to navigate the interfaces to the menu page and choose to learn Doa. The time taken to the subject to finish all learning courses is 20minutes. Meanwhile she manages to answer the quizzes within 5 minutes. Before she been testing the application, she only know 'Doa Makan'.But right after she learn eDoa, with help of the audio teaching she can memorise some other simple doa such as 'Doa Selepas Makan' and 'Doa Tidur'. Some autism kids have the ability to memorising faster but some have to train and learn it repetitively so that they can remember things easily.

From these observation, we find that users can understand the application and they can manage to navigate it.So eDoa is prove to be an affective to the autism children to learnig the daily doa.

5.6 Project limitation

For any project or an application, there must have some limitation or constraints occur while developing the project or maybe the result outcomes is different from our expected result. Mobile Doa Application for an Autism Children are also have some advantages and disadvantages so that, in future there will be person can used these limitations to enhance the application in a better way.

5.6.1 Project Advantage

There a lot of advantages in the application either to the users or developers itself. This can be described as below:

i. Easy to develop

Since the application is developed by using Adobe Flash CS5.5, it has a lot of drag and drop function. Other than that, the language used (ActionScript 3.0) for android application is easy to understand and simple to constructed it.

ii. Complete 5 multimedia element

The application is developed with all multimedia element such as text, audio, graphic, video, and animation. This 5 multimedia element purposed id to attract the users interest while learning the Doa. The element choices is also suitable with children's age which from 6 to 11 years old[11].

iii. Repetitive learning

The application is created for user's learning and helping users to remember and practices Doa in their daily lives. As for a Muslims, Doa is a Sunnah and we should take an initiative to ensure our child remember and practice it in their daily lifes.

iv. Easy to understand

The application is easy to understand for autism children because it have a simple navigation flow and implemented the voice teaching or instruction. From this, we can help our scope users to easily understand the application.

5.6.2 Project Disadvantage

There is no perfect thing in the world. Same goes to the application where it has its own weaknesses on certain area or requirement.

i. Limited number of Doa

As we mentioned before the application is the prototype for the learning Doa. It only consist 20types of daily Doa practices for a muslim's autism children. Meanwhile, there are only 5days of Zikir which is Monday to Friday.

ii. Unorganized application's navigation

There have some limitation on handling the navigation button and the flow is not smooth as too many menu in the application. Besides, mobile application should be more interactive (example: users can slide the phone to go to next page. Unfortunately we didn't manage to do that function in Adobe Flash.

iii. Does not implement with a database

The application is not implemented with database because it is for learning in longer period purpose. It is not an application to test their ability to perform some activity or games.

iv. Voice audio pollution

The last limitation on this application is the voice audio teaching which has some disruption or polluted by other sound like air and the resound of the empty room.

5.7 Suggestions for Enhancement

For the idea on enhance this application, we can looked into the disadvantages of the application. From there, we can come out with a solution on how to make the application better than existed. The application can be enhance by adding the number of daily Doa. There are more than 50 daily doa that Muslim's practise every day [10].

The navigation flow structure also has to be fixed. Maybe we have to plan the flow of the of the system first at early stage before develop the application by using proper storyboard. The button used should be more effective and simple so that users with autism disabilities can understand it.

Other than that, the application would be more perfect if we implemented some database channel. It include such as create a username or do some simple games which can storing their name and points in a score so that they fell happy to use the application again.

Lastly the voice pollution that occurs in some audio recorded. We can handle this problem in the future by implement the sound recording using more high quality of sound recorder software

CHAPTER 6

CONCLUSION

Summary

As a conclusion, the objectives and project scope are identified as the solution from each problems statement. The application was developed successfully covered the objectives. It is also has been implemented using Android smartphone and using voice teaching to teach the autism children. The effectiveness of the application can be shown when the testing result is proved that 100% of the respondent agreed that eDoa helped children in teaching a daily Doa.

For instance, the application is also successfully developed follows the idea of enhancement proposed on the previous chapter in chapter2. The 5 multimedia element rules is completely implemented in the application. Besides, there also a tutorial or guidelines provided either for the navigation or quizzes. Last but not least, voice teaching techniques is also been implemented in the application

For future, maybe these applications can be enhance as it have their own project limitation because this application is only on the prototype phase.

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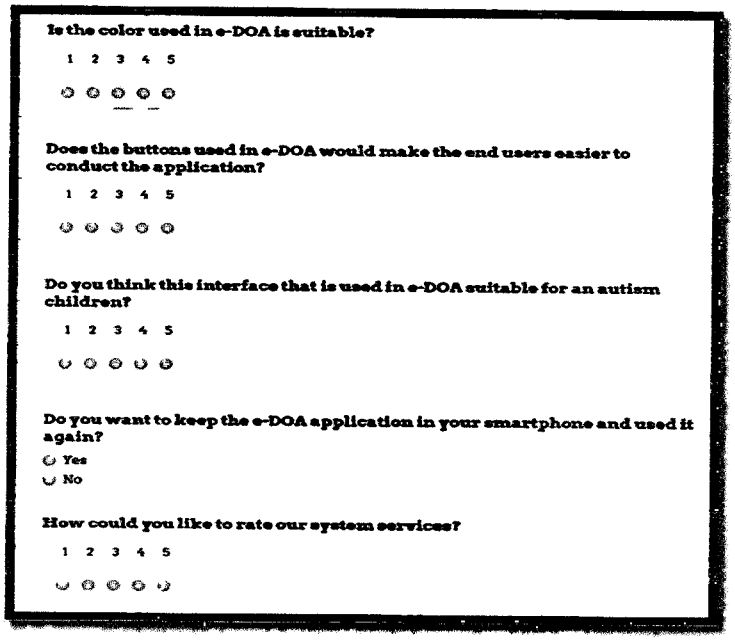
APPENDIX A

QUESTIONNAIRE



Is the color used in e-DOA is suitable?

1 2 3 4 5

Does the buttons used in e-DOA would make the end users easier to conduct the application?

1 2 3 4 5

Do you think this interface that is used in e-DOA suitable for an autism children?

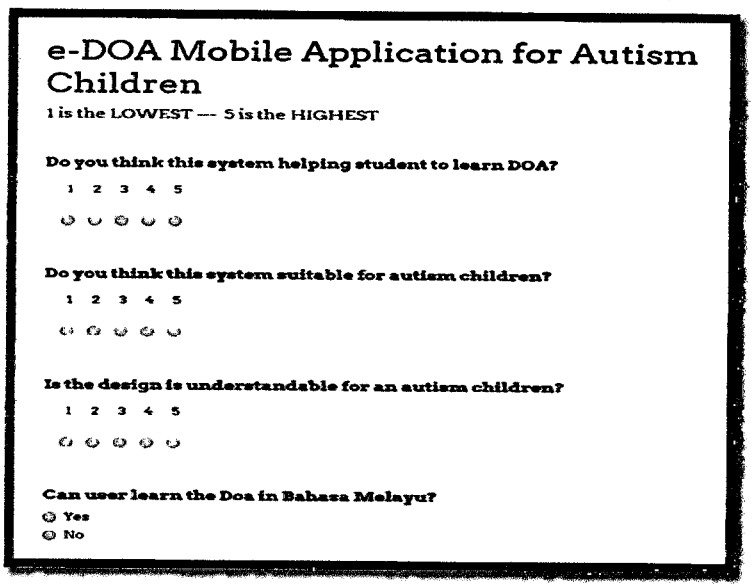
1 2 3 4 5

Do you want to keep the e-DOA application in your smartphone and used it again?

- Yes
- No

How could you like to rate our system services?

1 2 3 4 5



e-DOA Mobile Application for Autism Children

1 is the LOWEST --- 5 is the HIGHEST

Do you think this system helping student to learn DOA?

1 2 3 4 5

Do you think this system suitable for autism children?

1 2 3 4 5

Is the design is understandable for an autism children?

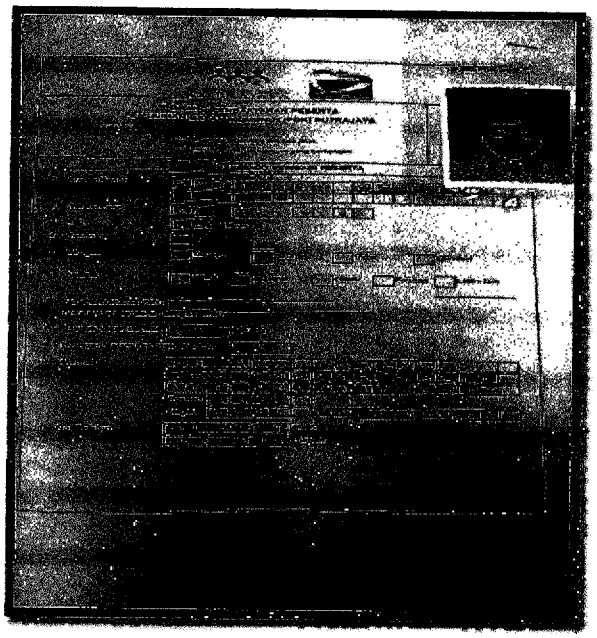
1 2 3 4 5

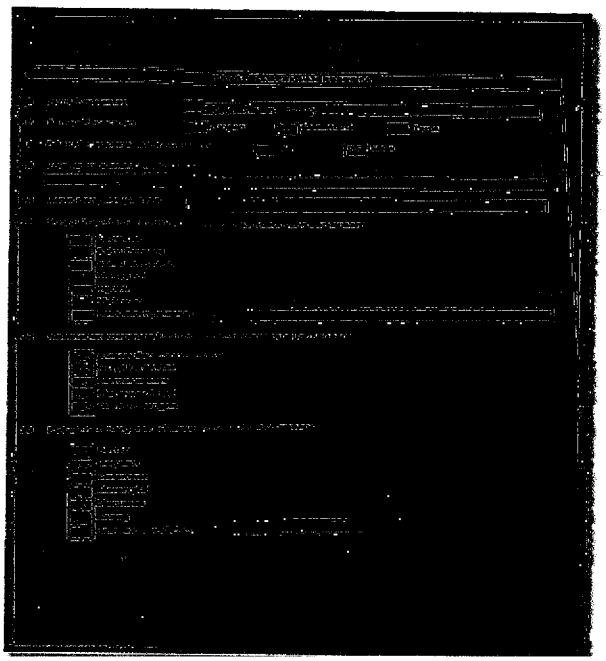
Can user learn the Doa in Bahasa Melayu?

- Yes
- No

APPENDIX B

Subject Profile





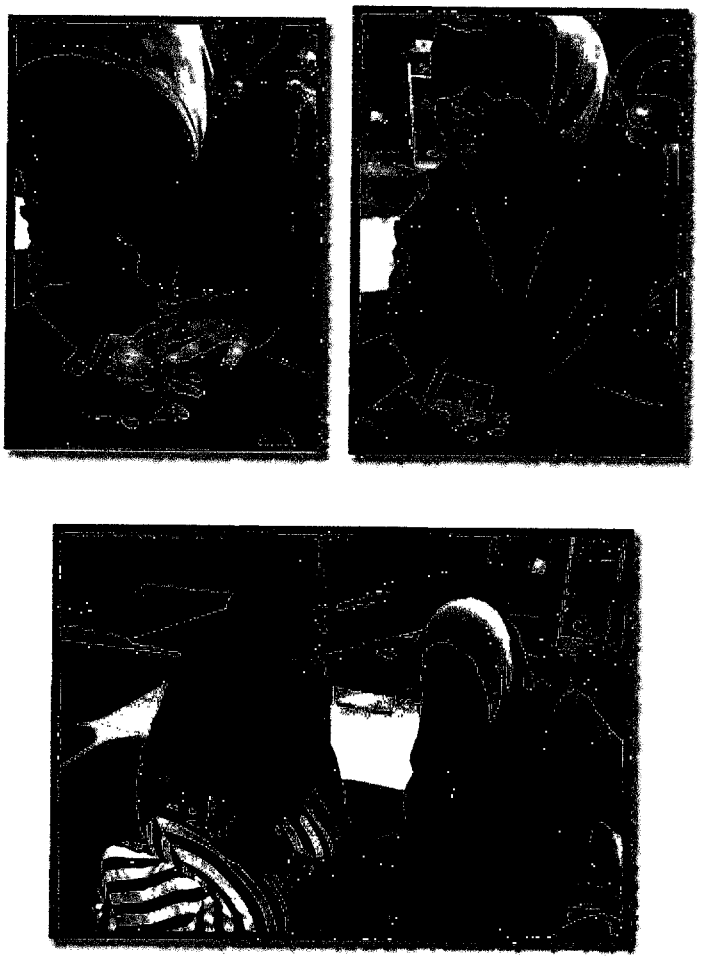


Image Soffiyah learn eDOA with helps of Cikgu Siti

APPENDIX C

PROJECT GANTT CHART