

**UNIVERSITI TEKNOLOGI PETRONAS (UTP)**

**Learning Kadazan For Kids**

by

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the requirements for the  
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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the  
Information Technology Programme  
Universiti Teknologi PETRONAS  
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BACHELOR OF TECHNOLOGY (Hons)  
(INFORMATION & COMMUNICATION TECHNOLOGY)

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(Assoc. Prof. Dr. Dayang Rohaya Bt. Awang Rambli)

UNIVERSITI TEKNOLOGI PETRONAS  
TRONOH, PERAK  
December 2012

December 2012

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the reference and acknowledgements, and that the original work contained herein has not been undertaken or done by unspecified sources or persons.

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(LORENZO HARDY HADYMOND)

## **ABSTRACT**

Learning Kadazan for Children is a mobile application on Android smart phones that is aimed as an alternative to books as learning tools where children can widen their vocabularies and improve their spellings on Kadazan words. This is an effort to counter the declining rate of this language usage in Sabah especially of the Kadazan-borned children. The development platform of this application is the Android operating system. The target users are the children of the Kadazan community from the age of seven to twelve years old. Parents who own Android smart phone may assist their children in using the application and in learning as well. Basic contents of the application are lessons and exercises on numbers, colours, phrases, greetings, and objects. The difficulty level of the exercises in the application will be par to the user's age. The development methodology used in this project is Rapid Application Development method that is suitable for prototyping purposes. Moreover, interviews with native speakers will contribute greatly to this project as they can provide more accurate details of the language itself. Prototypes will be released for testing from time to time to chosen testers to ensure correct usage of language, aesthetics values of system and ensure all functionalities are present.

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Last but certainly not the least, the writer wish to thank all who helped in developing the prototype, those who participated in the prototype testing and also for completing the usability and user perception survey and also to those who supported the idea and development of this application.

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## **ABBREVIATIONS AND NOMENCLATURES**

<b>SDK</b>	Software Development Kit
<b>ADT</b>	Android Development Tools
<b>APK</b>	Android Package File
<b>XML</b>	Extensible Markup Language

# CHAPTER 1

## PROJECT BACKGROUND

### 1.1 Introduction

Language plays a big role in a society. It portrays identity and the sense of belonging to a group of people. There are roughly 6,909 living languages in the world right now (Lewis, 2009). A lot of these languages are living, yet dying with the issue of language endangerment becoming more serious in the last two decades. According to Lewis (2009), for a variety of reasons, speakers of some languages stop using their language and began using another. This poses serious concerns not only to the language, but to the society as a whole too, as language is closely linked to cultures. Second language acquisition occurs when a person involves himself in the process of learning a new language. Second language acquisition have its own pros and cons, depending on our way of looking at it. A positive outlook on second language acquisition is that learners learn new languages to improve their careers and social life. On the other hand, with the presence and ability to speak of the new language, some learners might stop using their native languages.

The Coastal Kadazan language (Kadazan language), is the primary language of the Kadazan native people living in the West Coast of Sabah. As a Kadazan myself, I have observed and feel that the younger generations of Kadazan people are no longer interested in speaking Kadazan. Even parents whose native tongue are Kadazan, speaks of different language in their child's upbringing. This has brought up the problem of language endangerment. Even with Kadazan being taught as a subject in school, the younger generations take it as another subject to ace in their examinations. The appreciation for the language is deteriorating. The only way to preserve this language is to remind everyone in the community of this problem and start to materialise a solution.

Present methods of imparting teachings of the Kadazan language are ineffective in the sense that children and young adults are still unable to communicate using the language with their friends and family. What should be a native language became a second language to these generations. These previous methods and a technological solution will be discussed further in the next sections. The Kadazan younger

generation are up to date with the latest trends and technology, hence, it is only appropriate to use the latest technology to recapture their interest in learning the language.

Android operating system is currently holds the highest market share for smartphone platform, with 46.9% of market share (Smartphone Users Around The World, 2012). The infographic produced by Go-Gulf.com, a web design company, also included statistics on preference of operating system by age group. 50% of Android Smartphone are young adults from the age of eighteen to thirty-four.

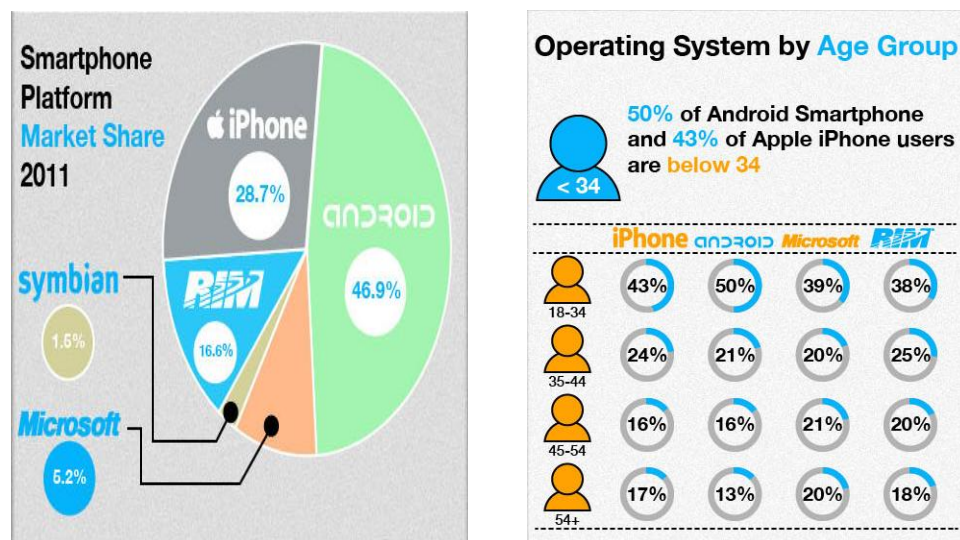


Figure 1 Infographic on Android OS

Creating an Android application on Kadazan language learning is my proposed solution to the recapture the interest of the Kadazan children and young adults to learn Kadazan language. This will be discussed further in the next chapters.

## **1.2 Problem Statement**

The usage of Kadazan language among Kadazan children is declining in recent days. One of the main factors for this problem is the children grew up with limited vocabulary and knowledge of the Kadazan language. Moreover, the reason for this is due to the Malay language being the national language of Malaysia and also the increasing need to learn the English language as a requirement in career development. This has caused parents to speak less of the Kadazan language at home to their children in order to accustom themselves to Malay and English language. Although, formal education of Kadazan language in public schools have been introduced, children treat it as another subject to ace during the exam rather than learning it as a preservation of culture. Furthermore, children rarely listen to Sabah Variety FM ( Sabah VFM ) that broadcast news headlines in the Kadazan language and plays Kadazan and Dusun songs as they prefer to listen to other radio stations broadcasting using Malay and English language.

The significance of this project (Learning Kadazan for kids) is to introduce a method of teaching basic Kadazan terms and knowledge to children with the aid of smartphone technology. It will be very useful especially for children that have never embraced the language or who are just starting to learn it. It is hoped that the children that use this application will learn the Kadazan language and can start speaking the language in their daily conversations.

## **1.3 Relevancy & Feasibility**

This project will prove to be relevant to the Kadazan community in Sabah as the latest smartphone technology is widely used by the communities there. Children will be able to learn Kadazan in a modern way in using smartphone. The final product is to be produced by the end of 9 months period of Final Year Project timeline from FYP 1 and FYP 2 combined. With experiences of Java programming, I will be able to finish the project/final product within the time limit.

## **1.4 Objectives**

The aim of this project is to produce an alternative learning tool.

The objectives of this project are :

- To develop an Android application that aid children from age seven to twelve years old to learn Kadazan language
- To provide an interactive way for children to learn new vocabulary on Kadazan words.
- To evaluate the effectiveness of the system
- To evaluate the usability aspect of the system.

## **1.5 Scope of Study**

The scope of this project will be the children from age seven to twelve years old or primary school students that are of Kadazan descent in Sabah. This will help parents who have a hard time in teaching the children Kadazan language as they also need to teach their children proper English and Malay at home. Indirectly, any Android phone users that are interested in learning basic Kadazan can also benefit from this project, but the scope will ultimately be limited to children from seven to twelve years of age in Sabah.

The development platform used in this project is the Android operating system. This is because studies have shown that the world's most owned smart phones are Android phones. Ultimately, parents and teachers that own an Android smart phone will be the target user of this product. The basic content of the application is as follows :

- Learn Basic Phrases in Kadazan
- Learn Common Greeting Phrases in Kadazan
- Learn Names of Numbers and Colours
- Learn Names of Animals

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Language Learning / Teaching

Language is the method or means of communicating with other human beings either in writing or speaking. Language plays a big role in a society as it portrays identity and sense of belonging to a group of people. It is estimated that there are roughly 6,909 living languages in the world right now (Lewis, 2009). Language learning is defined as learning to use a language. Language learning starts right from birth, when parents start communicating with their newborn. The challenge however, does not lie in learning the first language. Learning a second (or a subsequent number) language is a challenge to any individual as one language differs from another. Furthermore, learning and mastering a second language has proven to be crucial in today's society to elevate careers and communication. People have taken initiatives to attend classes, buy language learning books and even to migrate to other countries to learn about other languages.

For most people, learning a second language depends a lot on their grasp of their first language, or as defined by researchers as learners language. Oftenly, learners use their first language to make sense out of the second language. Language transfer occurs when learners fall back to their mother tongue to help create and develop their language system. Although, it helps learners to learn new terms out of the second language, learners are prone to be influenced by their mother tongue. For example, Spanish speakers learning English may say "Is raining" rather than "It is raining", leaving out the subject of the sentence. As sentence subjects can be left out in Spanish. Teaching a person a new language will require time and practice as it is, from another point of view, a process of developing a new system in the human brain.

## **2.2 Mobile Assisted Language Learning**

### **2.2.1 What is Mobile Assisted Language Learning**

Mobile Assisted Language Learning (MALL) is basically language learning on mobile platforms. Mobile platforms are devices that provide mobility to users. According to Chinnery (2006) mobile learning environments might be face-to-face, distance, or online; further, they may be self-paced or calendar-based. Mobile technologies are the latest trend in language pedagogy where teachings are imparted for users who are always on the go and they can access the application anytime and anywhere.

MALL have evolved nowadays from the usage of cassette player that plays recorded audio lessons for language learning to MP3 player that plays a MP3 audio format of podcast that does the same thing. Aside from MALL, other technology that have been around in language learning are televisions, radios, and personal computers, which are not mobile by any means. These technologies have led the way in language pedagogy where language enthusiast starts to come up with television programs to assist in understanding a particular language. A similar approach is used in radios where in local radio stations, slots were allocated daily to broadcast language teaching section.

Moreover, Subramaniam (n.d.) discussed the ways to use and apply multiple web resources for effective teaching of English Language and Literature. Furthermore, there are suggestions to improve teaching of English Language and Literature by using multimedia as an innovative tool. Moreover, some of the problems encountered while introducing multimedia as a tool for imparting education are also discussed in this paper.

Although the idea of my project is to develop an application to impart teachings on basic Kadazan language, a look into dimension of teaching other languages should be considered. Hence in this research paper, I look into the ways multimedia tools are used in teaching English and Literature to students.



Subramaniam also explained the basic needs of multimedia in any teachings. Multimedia is basically the combinations of text, sounds, video, pictures and animation that appear on any display devices. The uses of multimedia in teachings helps to communicate information in a more effective and efficient manner. Moreover, instructions can be delivered better.

One of the main points that I have gathered from the research paper that relates to my project is that vocabulary of students can increase using flashing devices/games. For example, one of the games is the memory game where a picture of an item (e.g. an apple) will be shown on the device's screen, after a few second, the user will have to guess what the item was. The visual impact of flashing words or pictures allows the children to learn using memory. Exercises provided in learning helps them to learn using their memory and revising the same words or pictures strengthen the memory. Apart from that, Dr. R. Gandhi states that teaching children needs visual and auditory impact to get their attention and interest. This particular point is something I need to consider since the target users of my project are children.

The last point that must highlighted is that any language learning application is more effective with when used/played with a companion. This should prove useful to my project as parents, relatives or the children's friends can be the perfect companions for the children.

### **2.2.2 MALL Technology**

Cell (mobile) phones is one of the MALL technology that has been around for over a decade. The earlier versions of cell phones are not as advanced as the cell phones that we have today. The main usage of a cell phone was to transmit voice calls and also to send out Short Message Service or SMS in short. According to Brown (as cited in Chinnery), one of the first projects using mobile phones in language learning was developed by the Stanford Learning Lab, which explored their use in language learning. This project is a Spanish study program that utilized voice and email with mobile phones. The modules included were vocabulary practise, quizzes, word and phrase translations, and also access to live talking tutors. Moreover, according to Thornton & Houser (as cited in Chinnery, 2006), this tiny screen sizes (of mobile phones) used in this project were deemed “unsuitable for learning new content but effective for review and practice”.

Furthermore, in the earlier days of MALL, SMS played a big role in providing vocabulary instruction to students. Thornton and Houser developed a project to teach English at a Japanese university. Mini-lessons are emailed to students, three times a day. Students get five words per week and were tested biweekly. They are also compared to a group that receive the exact same lesson on the web.

Nowadays, cell phones or mobile phones have more advanced features and capabilities. Smartphones are the mobile phones that functions on a mobile operating system. Google’s Android, Apple’s iOS, Nokia’s Symbian, RIM’s Blackberry OS, Microsoft’s Windows Phone are the top and most common mobile operating systems that people use today. Core functionalities such as voice call and SMS are still included in smartphones, but with added features, such as Internet browsing, Global Positioning System (GPS) application, Camera, Video and Music player/recorder, etc. Also, mobile phone users can have access to various kinds of application for download from their respective Operating System company.

Language learning was previously only incorporated with SMS and email function of the phone. Smartphones have allowed the scope of language learning to become wider in this term. Recently, with the high popularity of Foursquare, an social networking application that let users get points for checking in, at any location. The GPS functionality of the phone is used to show user their and nearby locations to

check in. According to UNM (n.d.), two Spanish graduate students, Michael Woods and Christi Cobo developed a project to create linguistic landscapes, incorporating it with Foursquare. It contains task such as finding bilingual signs, listening to people communicating and also record their field notes.

With far superior graphic and processor capabilities in smartphones, the display of images and videos are deemed good in comparison to personal computers. The sound quality of smartphones are also better than the old mobile phones, and this has led to enormous amount of developers stepping up to build many applications for smartphones. Developers for language learning each have their own target customers, such as the kids, tourists and language enthusiast. The improved (and still improving) specification of video, image and sounds for smartphones promised a good future for applications that assist language learning. People who wants to learn a new language needs to keep being interested in learning, especially if they want a mobile learning. Good cartoon character, good quality audio recording and variation in lessons are among the key criteria in keeping user interested in learning, and in the application. Games and exercises must also be fun and meaningful to help learn the language more effectively.

A special type of mobile phones or personal computer, which is the tablet, are also fairly new and has rising popularity all around the world. Samsung Galaxy Tab, iOS' iPad, and Blackberry Playbook are among the examples of popular tabs in the market. It is bigger than smartphones, but smaller than laptops. This technology functions almost exactly like a smartphone but with wider screens. Similar to the smartphones, a lot of applications have been developed for the tablets that enables user to enjoy wider screen to watch medias, and to play games with. A lot of language learning applications have also been developed for tablets users.

Before the smartphones and tablets were created, the Internet was the technology that people used for language learning. Emails, which users used to send digital message to another person's email helped a lot in the dissemination of lessons to students. Nowadays, such method is becoming vague, as a lot more interesting and easier approach have been developed to learn using the Internet. A lot of developers created websites that incorporate multimedias and games to impart teachings on language. Some developers also uploaded many textual lessons for users to download and print out. With Macromedia Flash, flash videos and animation which is simple to developed is used a lot to attract users' attention and interest. This has been very beneficial to language learning and with the Internet, users are not limited to just one type of language to learn.

These are some of the technology that are popular and still improving, under Mobile Assisted Language Learning. Some of the existing applications for mobile technology will be discussed in the next section.

## 2.3 Existing Mobile Application on Language Learning

There are a lot of language learning applications that have been developed for smartphones, tablets and the Internet. Some of these applications even run on all three platforms.

### 1. Literacy Zone : Interactive English Games & Activities



Figure 2 : Screenshot of Literacy Zone website

The Literacy Zone is a web-based application developed to impart learning on the English language. It is designed specifically for children. It provides a wide array of selection of games and activities to assist children in learning English. Some of the categories available are spellings, plurals, letters, and synonyms. The concept of separating the language into different modules can be applied to my application.

More over, through my observation, since the web site is designed for children, the colours used in the interfaces of the site and games are very bright. The usage of cartoon characters along each exercise also seems helpful in gaining children's interests in learning. The games are interactive, which means the children's actions through out the games produces responses from the system such as correct guesses as well as the wrong guesses. It is good to let the user know that what they are doing is wrong and to rectify the errors.

The games also have background music as well as sound effects that comes up whenever an action is pursued. This helps the user familiarize with the system and helps make the learning process enjoyable and memorable.



Figure 3 : Look out below game from Literacy Zone



Figure 4 : Spin and Spell game from Literacy Zone

## 2. Learn Bahasa Indonesia by Codegent

Learn Bahasa Indonesia by Codegent is an Android application that assist in learning Bahasa Indonesia. The table below list out the pros and cons of this application.

**Table 1 : Pros & Cons of Learn Bahasa Indonesia**

Pros	Cons
<ul style="list-style-type: none"><li>• Over 800 common words and phrases</li><li>• High quality audio recorded by native speaker</li><li>• No internet connection needed</li><li>• Greetings, General conversation, Numbers, Directions, Places, etc</li></ul>	<ul style="list-style-type: none"><li>• Some phrases are incorrect (User review)</li><li>• Some correction need to be done on the tone at the end of the words/phrases (User review)</li></ul>

This application provides a wide vocabulary and also high quality audios for users to learn. This is useful and important to users that are really eager to learn Bahasa Indonesia. Some users complained (in the user comments section of the developer's site) to being incorrect. In developing my application, I have to be careful of the correctness of terms and phrases., especially because my target audience are the children.



**Figure 5 : Screenshot of Learn Bahasa Indonesia application**

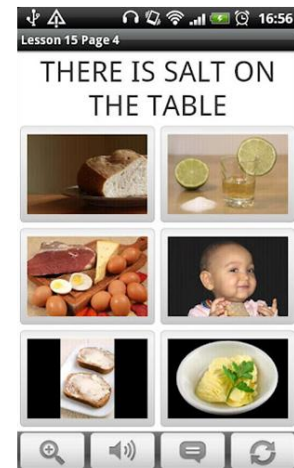
### 3. English in a Month By Learn Like Children

English in a Month by Learn Like Children is an Android application that assist in learning The English language. The table below list out the pros and cons of this application.

**Table 2 : Pros and Cons of English in a Month**

Pros	Cons
<ul style="list-style-type: none"><li>• Learn based on basic phrase and basic vocab</li><li>• High quality audio recorded by native speaker</li><li>• Offers exercises for users to practise</li></ul>	<ul style="list-style-type: none"><li>• Some images in the exercises are too small (User review)</li><li>• Only provide 3 lesson exercise. Need to purchase full version to unlock all 30 lesson exercises.</li></ul>

Basically the same as Learn Bahasa Indonesia by Codegent, I should take note of the wide vocabulary and audio to offer to users. Moreover, some users complained that images in the exercises are too small. A good quality image must be utilised in my application.



**Figure 6 : Screenshots of English In a Month**



#### 4. Spanish Smash vocabulary game by Native Tongue

Spanish Smash is an Spanish language learning application that is different than other typical language learning application. It is available for both Android smart phones and Apple devices. This application teaches Spanish by using arcade games and there is no usage of flash cards.

**Table 3 : Pros and Cons of Spanish Smash vocabulary game**

Pros	Cons
<ul style="list-style-type: none"><li>• Repetition of words through audio recorded by native speakers</li><li>• The game levels goes faster to make user think faster</li><li>• Words organized into themed packs (modules)</li><li>• Developer still updating the application with more modules</li></ul>	<ul style="list-style-type: none"><li>• Pay to play</li><li>• Some users on Android devices experienced glitches and errors using the application.</li></ul>

This application does not use flash card concept, which is different from what I want to do. Children might find it intriguing to learn through games and it will be more interesting as speed of answering questions increases by level. This help children to think faster.



**Figure 7 : Screenshots of Spanish Smash Vocabulary Game**

**5. Hello-Hello Kids Language Learning: English, Spanish, French, German, Italian, Mandarin Chinese and Portuguese.**

Hello-Hello Kids, by Hello-Hello is an animation-enriched application designed to teach vocabulary to children. The developer described the application to assist kids in learning English, Spanish, French, German, Italian, Mandarin and Portuguese. The application is available only on the Apple Ipad platform. The table below depicts the application’s pros and cons.

**Table 4 Pros & Cons of Hello-Hello Kids Language Learning**

Pros	Cons
<ul style="list-style-type: none"> <li>• More than 1 language to learn</li> <li>• Designed for kids, with appropriate usage of graphics, icons, and colours</li> <li>• Easy for user to choose which language they want to learn.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Vocabulary, only have Numbers module (User review)</li> <li>• Not worth the money, as only number learning module is available (User review)</li> </ul>



**Figure 8 Screenshots of Hello-Hello Kids Language Learning**

## 6. Little Pim French

This app was developed by Tribal Nova in collaboration with PBS and the Little Pim corporation. It is designed specially for Apple Ipad platform. Little Pim French is a French language learning application for children. The application introduces 60 words and phrases. The application also feature three interactive games that function as exercises on nouns, verbs and basic phrases.

**Table 5 : Pros & Cons of Little Pim French**

Pros	Cons
<ul style="list-style-type: none"><li>• Specified the modules they covered in the application : Eating &amp; Drinking, Playing &amp; Sharing, Waking &amp; Sleeping</li><li>• Designed for kids, with appropriate usage of graphics, icons, and colours</li><li>• Provide three levels of exercise for each module, where nouns, verbs, basic phrases are tested on level 1, 2, and 3 respectively</li></ul>	<ul style="list-style-type: none"><li>• Have to pay to use the application.</li></ul>

This application is probably the application that is most similar to Learning Kadazan for kids. The bright graphics, exercises, and simple modules are almost similar to what I intend to develop. The differences between Learning Kadazan for Kids and Little Pim French is the language to learn, and that Little Pim French needs to be purchased while Learning Kadazan for Kids will be available for download for free.



Figure 9 : Screenshots of Little Panda French

**Table 6 : Comparison Table of Existing Language Learning Application**

<b>Application Name</b>	<b>Developer</b>	<b>Pros</b>	<b>Cons</b>	<b>Teaching Method</b>	<b>Training Method</b>
<b>Learn Bahasa Indonesia</b>	Codegent	<ul style="list-style-type: none"> <li>- many modules</li> <li>- wide vocabulary</li> <li>- HQA recorded by native speakers</li> </ul>	<ul style="list-style-type: none"> <li>- Some phrases are incorrect</li> <li>-no real exercise</li> </ul>	Dictionary-like	Listen to audio
<b>English In a Month</b>	Learn like Children	<ul style="list-style-type: none"> <li>- basic and simple phrase &amp; vocabulary</li> <li>- HQA recorded by native speaker</li> </ul>	<ul style="list-style-type: none"> <li>- Some images are too small</li> <li>- Only 3 lesson available. Have to purchase full version to unlock all.</li> </ul>	Flashcard	Quiz-like / Listen to audio
<b>Spanish Smash vocabulary game</b>	Native Tongue	<ul style="list-style-type: none"> <li>- HQA recorded by native speakers</li> <li>- game speed increases with level to make user think faster</li> <li>- Many modules</li> </ul>	<ul style="list-style-type: none"> <li>- Pay to play</li> <li>- Some users on Android devices experienced glitches and errors using the application.</li> </ul>	Arcade Game	Arcade Game
<b>Hello-Hello Kids Language learning</b>	Hello-Hello	<ul style="list-style-type: none"> <li>- Offers many language</li> <li>- Colourful interface</li> </ul>	<ul style="list-style-type: none"> <li>- Only have numbers module</li> <li>- Have to purchase</li> </ul>	Flashcard	-
<b>Little Pim French</b>	Tribal Nova	<ul style="list-style-type: none"> <li>- Have specific modules</li> <li>- Colourful interface</li> <li>- Have 3 level of exercises for each module</li> </ul>	<ul style="list-style-type: none"> <li>- Have to purchase application</li> </ul>	Flashcard / Game	Game

Comparison will be discussed in the Discussion section.

## **2.4 Kadazan Language Learning**

### **2.4.1 Background of Kadazan Language**

Coastal Kadazan language is the primary language of the Kadazan native people living in the West Coast of Sabah. The Kadazan people share many similarities in their language, culture and tradition with the Dusun ethnic group, where after a political intervention in Sabah, the term Kadazandusun or Kadazan-Dusun was developed to unite the two races. Collectively, these two races form the largest ethnic group in Sabah. Amidst the similarities between the two ethnic groups, there are still some differences in the spoken and written language in terms of dialects, styles, tones and intonations.

The Kadazan language also differs depending on location as each place has added its own dialects into the language. This particular language is also known as Kadazan Tangaa', Membakut Kadazan, Papar Kadazan and Penampang Kadazan, which is identified through the origin or location of its speaker. The Kadazan language is actually derived from the Dusun family language which explains how these two ethnic groups are almost similar in terms of spoken and written language. Both these languages are Austronesian languages that have adopted many loanwords, particularly from Malay and other North Borneo indigenous languages.

The language is still used in many occasions. It is used informally in Kadazan engagement ceremony, Kadazan wedding ceremony, cultural performances, Sugandoi (Kadazan singing competition), and Unduk Ngadau (Beauty pageant held in the Harvest Festival in Sabah). Also, the Kadazan language is used informally in daily radio broadcast by Sabah VFM during the Kadazan language slots. The language is however, used in a formal manner in public schools where the language is taught, and also in the Kadazan section of the local newspaper.

Haja Mohideen (n.d.) discusses the various practical steps that may be undertaken by concerned individuals, the elders and leaders of the target minority communities themselves, language scholars and the state and federal governments to help maintain the minority indigenous languages, with particular emphasis on those from Sabah and Sarawak.

In the section that discusses the maintenance of the Kadazan language, there are a lot of approaches that have been done. There was a survey done by Lasimbang, Miller and Otigil on what type of literature the community wanted to read and learn. 71% of the respondents, which are parents, wanted old Kadazan stories, folk tales and Bible stories. Although the community noticed the severe lack of appreciation in the youths towards the Kadazan language, there was not much of new learning tools or learning mechanism developed and implemented for the community. However, among the apparent effort from the Sabah government are, for example, the understanding of Kadazan language alongside the national language in street signs and public notices.

According to Haja Mohideen, newspapers can publish special featured articles on minority Malaysian communities so that fellow Malaysians may have a greater understanding and awareness of their languages, history and cultures. The *Berita Harian*, a newspaper that is written and published in the Malay language published a series of articles on lesser known communities in their Sunday edition. In one of the Sunday edition, the basic words of the Kadazan language have been translated into BM and also the history of the language is also stated in the same column.

In Sabah, the Daily Express and The New Sabah Times, published a section of news in Kadazan every day. This has been the practice for a very long time. This effort will sustain and maintain the language in areas where it is widely used.

In relation to my project, the main factors that I have considered while conducting this research consist of factors that deteriorate the use of the language and the approaches taken to preserve and maintain the language. It is the similarities that I have found between the project and this research paper. The differences, however, is that this project capitalize the trend of using smart phones among young people nowadays, hence the approach of building an Android phone application for children to learn the language.

Trixie (2005) showed that the Kadazan and Dusun language holds many differences. Some words in Kadazan language are very different in shape to that in the Dusun language. For example, the word 'tahanan' in Kadazan, which is 'neck' in English is actually 'liou' in the Dusun language. Aside from that, there are also differences in spelling of words that sounds almost the same phonetically. One example is the word 'big' in English. In Kadazan, it is 'agazo', but in Dusun, it is 'agayo'. The letter 'z' used in almost all Kadazan words correspond to the letter 'y' almost in every word in Dusun language. This is due to the different dialects of the Dusun and Kadazan people in pronouncing the same words. This proves that in completing this project research and final product, the spellings of the words are very important and also the words used must correspond to the correct meanings.

Trixie also shows the results of parental feedbacks on Kadazandusun language in schools. In 1995, the Malaysian parliament has approved the idea of teaching the Kadazandusun language in school. The statistics of the implementation was : Kadazandusun subject was taught in over 400 primary schools through out Sabah, to about 30,000 students (aged ten to twelve, or Year 4,5 and 6 in primary school). The figure suggests that parents have accepted the implementation of Kadazandusun language in schools, amidst the political intervention of merging the Kadazan and Dusun. The parents are instead leaning more into having their 'own language' at the children's schools. Despite their acceptance of the teaching of Kadazandusun in their children's school, some parents worry that the fusion of the Kadazan and Dusun language will pose a question in identity when the children starts to practise speaking Kadazandusun with native Kadazan speakers.

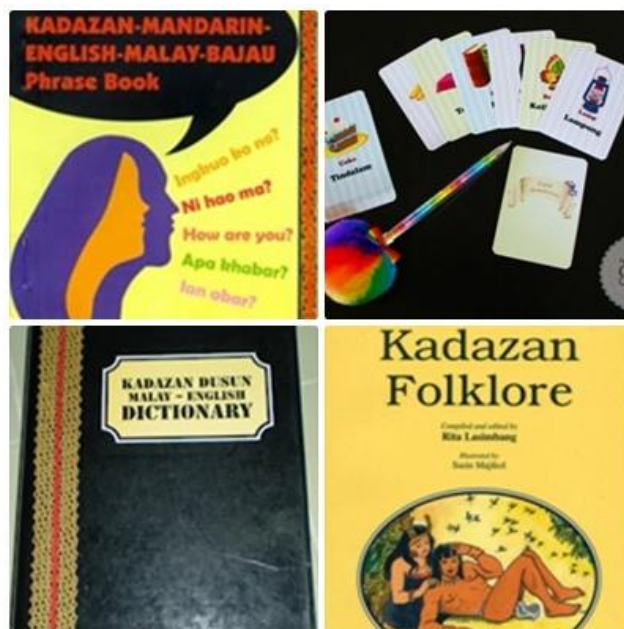
Miss Trixie also inferred that Kadazan parents want to speak Kadazan to the children, not in Dusun. The mixture of dialects would make it hard for the children to go back to their society and socialize with people of their tribe that have used Kadazan language for a long time, although the language of Kadazan and Dusun are very similar in some ways.

This shows that the 'Learning Kadazan for Kids' project have a high chance of being accepted especially towards the target market, that is, the parents of the Kadazan children (the primary target users).



## 2.4.2 Previous methods of teaching Kadazan language

Furthermore, a study of the previous methods of teaching Kadazan is needed to identify effective and ineffective teachings.



**Figure 10 : Previous methods of teaching Kadazan**

The figure above shows that the previous methods used in teaching Kadazans. The top left picture is actually a five language translation phrase book. It includes phrases from the Kadazan, Mandarin, English, Malay and Bajau language. It was published by the Kadazandusun Language Foundation in the year 2003. It is very useful to tourist as well as locals to learn these basic phrases that you usually use in daily life.

The top right picture is actually a 2012-dated photo of some Kadazan flashcards for sale on the Internet. Kastumized Design company, published this set of flashcards named English – KadazanDusun Flashcard V1.0. This company claimed to have created the first English- Kadazan flashcards in the market to assist children in learning Kadazan. As mentioned in the previous section, flash cards are useful tools in assisting learning process as it plays on the memory side of learning.

The bottom left is a Kadazan Dusun - Malay – English dictionary published in 1995 by Kadazan Dusun Cultural Association in Sabah. This is one of the earlier edition of a Kadazan dictionary. The Kadazandusun Language Foundation have ever since published more dictionaries, mainly for children and students. Dictionaries have

proved to be effective companions in studying for many students. This is because upon stumbling words that are unfamiliar, referring to dictionaries not only assist in providing the meaning, the pronunciations are also provided. Some dictionaries also provide the usage of the word in sentences.

The bottom right picture depicts a Kadazan folklore book. The author Rita Lasimbang compiled the folklores or stories told by Kadazan elders that she interviewed herself. This book was published by the Kadazandusun Language Foundation. A lot more folklore books are available in bookstore around Sabah. This type of book helps children to not only read in Kadazan, but learn valuable lessons on life through the stories.

All of the methods/tools used that are stated here are not depreciated. They are still widely used today. In fact, the significance of this project is to instill learning alternatives by using the latest technologies.

## **2.5 Discussion / Reflection**

Deducing from the various research made, Learning Kadazan for Kids that will run on Android operating system is a great idea and hopefully effective in assisting Kadazan language learning among the children. An application that is targeted for children will need to be colourful and interactive to attract their attention and to retain their interest.

There are a lot of factors to be considered in order for the application to be successful. The choice of multimedia such as sound effects, music, graphics and games need to be precise as the users for this application are children. Furthermore, the intermediate language used needs to be correct, in this case, it is the English language. The design of each of the pages or screens need to be simple and concise. Previous similar applications needs to be analysed and criterias that are identified to be critical in building an effective application, should be included in this application too.

From the comparison table in the previous section, I have found five different language learning applications that are available on the Web, Android smartphones and also Apple's Ipad, namely Learn Bahasa Indonesia, English in a month, Spanish Splash vocabulary game, Hello Hello Kids Language Learning and also Little Pim French. Three out of five of these applications used Flashcards as the teaching method for their lessons module. Flashcards are effective ways to learn and recall new words. The simple design of flashcard, which displayed a picture of an object (or term) and also the word underneath it. Flashcard is definitely a good teaching method that I can use to develop my training modules. Moreover, for my exercise or training modules, I will develop simple logic games to be incorporate the picture from the flash cards to test users' memory and understanding.

In my opinion, it is better to implement game-based exercise to keep users interested and satisfied while learning as well. Other than that, I will also create quizzes in addition to the games to create variation on training methods. Since, most of the cons in those previous applications have been user complaining on prices to pay for the application, I will have my working prototype and finished application up for free for download for user to test it out later on. The content of the application also must be correct as some of the language speakers have downloaded the previous applications and commented that the terms and grammar of the language have been wrongly used.

Audio recordings from native speakers are also good ideas to be implemented in this project. This is because listening to the native speakers will help user to listen to the way to speak the language in the correct intonation.

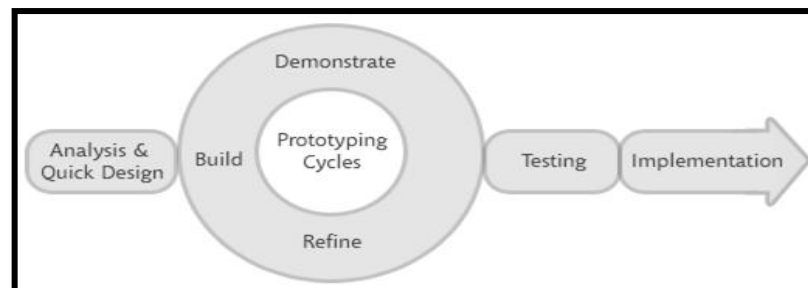
## CHAPTER 3

### METHODOLOGY

#### 3.1 Development Methodology

The main development methodology that I will use is the Rapid Application Development (RAD) method. This methodology is chosen due to the time constrain of this project, which in total is less than 10 months. This project requires a rapid prototyping which will involves methods like iterative development and software prototyping. Apart from that, this project is also a data-driven information project where it requires data as the input in order to generate results.

The benefits of using this methodology is that it allows any modifications to be made during the development phase if there is a need to review and recheck at any other phase of project development. This is important as it provides flexibility throughout completing the project such as debugging process. Under this methodology, the whole project will be divided into four main phase such as below:



**Figure 11 : Rapid Application Development structure**

- Analysis and Quick Design Phase
- Prototyping Cycles (Building, Refining, and Demonstrating process)
- Testing Phase
- Implementation Phase

### **3.1.1 Development Tools**

Basic tools needed in order to complete this project are :

- Hardware
  - Personal Computer for Coding
  - Android device (smartphone) for testing purposes.
- Software
  - JDK 1.6
  - Eclipse IDE 3.7
  - Android SDK

### **3.2 Research Methodology**

This project deals with the learning of language. I need to be able to have access to reading materials, such as articles, research papers, books and etc to be able to understand more on my topic. I will choose several person, inside and outside my family circle to enquire about accuracy and authenticity of the terminologies that I may use inside my application. Since my referals are all in Sabah, my only option of communicating with them would be through online tools such as emails and also telephone calls. I will also contact the Kadazandusun Language Foundation to get advices on developing this application as this group have been publishing books and media for children to learn Kadazan before.

#### **3.2.1 1<sup>st</sup> Stage: Project Planning**

Project planning involves identifying the problem statement and listing out objectives for the project. It is also the phase of identifying the project scope which includes the target user, proposed development platform, and feasibility of the project.

### **3.2.2 2<sup>nd</sup> Stage: Literature review**

Performing literature review is to analyze previous study on the topic, in this case, Kadazan language learning; previous study on other language learning tools, and analyzing similar existing applications. This is to come out with a proper outline for the project development, including the application content (modules) and also the user interface. Literature review helps to list out the strengths and weaknesses of previous language learning tools and also existing mobile language learning application.

### **3.2.3 3<sup>rd</sup> Stage: Data Gathering and Analysis**

In this phase, the correctness of the Kadazan vocabulary in terms of spellings and usage in the correct context and situation is analyzed. To develop the modules for the application, I have listed out the desired modules to be included in the application:

- Learn Basic Phrases in Kadazan
- Learn Names of Numbers
- Learn Names of Colours
- Learn Names of Animals

The correctness of the term will be cross-checked with a Kadazan dictionary and also will be determined through several Kadazan native speakers, which I will be contacting through emails and phone calls.

### **3.2.4 4<sup>th</sup> Stage: Determining the Main Components of the application**

The fourth phase of the research methodology is to determine the main component of the system. Learning Kadazan for Kids will mainly have two major components, which are, lessons and exercises for each modules.

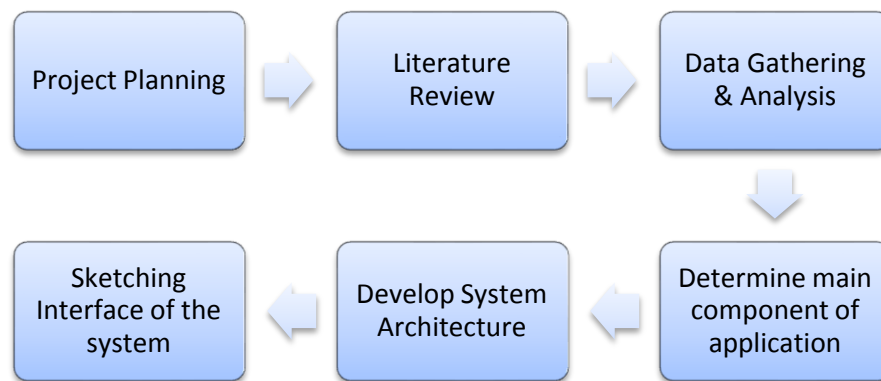
### 3.2.5 5<sup>th</sup> Stage: Developing System Architecture

The fifth stage in the research methodology will be to develop the system architecture. This is to outline a clear picture of how the application will function. Basically, the users will choose a module and get the option to choose ‘Lesson’ or ‘Exercise’ to either view the lesson or try out the exercise, respectively.

### 3.2.6 6<sup>th</sup> Stage: Sketching the Interface of the System

The last step will be to design the application interface. This is to provide a clear view of how each of the page will look like, as well as to assist in the development aspect of the project. The sketches will make it easier for me to refer to the position each button, wordings, and image in each page during the development phase. The correct labelling of colours is also an important aspect in sketching the interface.

Figure 3 below summarize the research methodology.



**Figure 12 : Research Methodology**



### **3.3 Project Activities**

As mentioned in the section 3.1, the main project phases of activities (development) will be divided into four sections which are :

- Analysis and Quick Design Phase
- Prototyping Cycles (Building, Refining, and Demonstrating process)
- Testing Phase
- Implementation Phase

#### **Analysis and Quick Design Phase**

In this stage, basic early interface and also the system architecture is designed to help guide the development process. For the analysis part, designs from existing applications are analyzed and taken into consideration. The functionalities of buttons, 'OnClick' and 'OnTouch' listener on buttons are also analyzed, in the sense that what happens before a button or the screen is clicked and touched, and also what are the changes that occurs after the click and touch events.

The analysis also consist of analyzing the usage of suitable colours and contents. Since the target users of this application will be Kadazan children from age seven to twelve, it is important to design the interface with association to children. Bright colours will be used, and also the content for each of the module, will be associated with the level of knowledge that the children currently have. This means, that the object used in the lesson activity have to be identifiable by the children.

This project will also incorporate the usage of background music and the sound of words pronunciation. The choice of correct background music and voice for the pronunciation will also be crucial in keeping the children interested in using the application. The instrumental (music only) version of popular nursery rhymes will be used as a background music for this application.

## **Prototyping Cycles**

This is basically the development phase where coding and self-testing is done based on the design done in earlier stage. The development platform as described in the scope of the project in Chapter 1 is the Android operating system. This application will be developed using the Eclipse software with the Android Software Development Kit (SDK) and additional Android Development Tools (ADT).

Eclipse allow user to configure the Extensible Markup Language (XML) file using a graphical user interface, which allows user to not solely depend on codes to set up the layout of a screen/page. The XML file or the layout of each page will be designed first using the graphical user interface, before coding out the activity to carry out with the layout.

Throughout the development process, the current design and activities will be tested on two Android devices, which are Samsung Galaxy Y and Samsung Galaxy W. These two phones have different screen size and resolution, which means that both have different density per pixel intensity (dpi). Hence, it is important to test the application on both devices to check whether there is any error occurring.

## **Testing Phase**

The testing phase is done when the application is done or when some modules inside the application is needed to be tested out before the development can progress. This is done by distributing the Android application package file (APK) which is the application installer inside an Android device. During this process, it is important that the devices that installs the application is at least running Application Programming Interface (API) of level 8. This is to ensure that there will be no issue on the interface of the application, when it is installed.

After the users have installed and used the application, they will be required to fill out a System Usability Scale questionnaire, which is a type of usability test, and also to fill out a user perception survey. These questionnaire will be hosted online using Google Drive, to enable easy access to the responses. The results will be recorded for analysis.

## **Implementation**

In this stage, the application is usually released into the market to distribute/sell. But for the purpose of this project, the application will not be released anywhere as it is only a prototype still, and will be up for evaluation from the respective parties. The application will be previewed using a high density per pixel (high dpi) device, which is a device that have 480 x 800 screen resolution.

### 3.4 Gantt Chart

**Table 7 : Gantt Chart for FYP1**

No.	Detail/Week	1	2	3	4	5	6	7		8	9	10	11	12	
1	Selection of project topic	■	■						Mid-semester Break						
2	Literature review				■	■	■	■		■	■				
3	Research, Defining Problem Statement, Data Gathering and Analysis				■	■	■	■							
4	Submission of Extended Proposal						■								
5	FYP1 Lectures					■	■			■					
6	Proposal Defence											■			
9	Submission of Interim Report														■

**Table 8 : Gantt Chart for FYP2**

No.	Detail/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Implementation & Development	■	■	■	■	■	■	■	■	■	■				
2	System Testing					■	■	■	■	■	■				
3	Submission of Progress Report				■										
4	Pre-EDX											■			
5	Dissertation											■			
6	Viva: Oral Presentation												■		
7	Final Dissertation														■

### 3.5 Key Milestones

The key milestones for the project is depicted in the table below :

**Table 9 : Key Milestones for FYP 1**

<b>FYP1 Activities</b>	<b>Date</b>
Title Selection	Week 1
Regular Meeting with Supervisor	Week 1- 14
FYP Briefing	30 <sup>th</sup> May, Wed
Proposal Submission to Research Cluster	8 <sup>th</sup> June, Fri
FYP1 Research Class “Data Collection Methods, Sampling, Data Analysis”	20 <sup>th</sup> June, Wed
FYP1 Research Class “Report Writing”	27 <sup>th</sup> June, Wed
Submission of Extended Proposal to Supervisor	27 <sup>th</sup> June, Wed
FYP1 Research Class “E-Resources”	11 <sup>th</sup> July, Wed
Viva: Proposal Defense and Progress Evaluation	25 <sup>th</sup> July, Wed
Submission of Interim Report to Supervisor	7 <sup>th</sup> Aug, Wed

**Table 10 : Key Milestones for FYP 2**

<b>FYP2 Activities</b>	<b>Date</b>
Implementation & System Development	Week 1-12
Regular Meeting with Supervisor	Week 1- 12
Submission of Progress Report	10 <sup>th</sup> Oct, Wed
Dissertation	26 <sup>th</sup> Nov, Mon
Pre-Sedex	28 <sup>th</sup> Nov, Wed
Viva	5 <sup>th</sup> Dec, Wed
Dissertation Final	19 <sup>th</sup> Dec, Wed

## **CHAPTER 4**

### **RESULT & DISCUSSION**

In this section, the results from the methodology section are displayed. In the data gathering and analysis phase, I have looked up on a Kadazan dictionary to find the exact term that I will use in developing the application. Moreover, there are two main components in this application, which are Lesson and Exercise components. The sketching of both the basic system architecture and mock user interface are also displayed in this section.

#### **4.1 Data Mining Results: English – Kadazan words**

Prior to developing the application, the vocabulary of the proposed module must be gathered from correct and reliable sources. The Kadazan words that is included in Learning Kadazan for Kids, covers only the basic words and phrases that are a part of the Kadazan language. The words are translated through a Kadazan-English-Kadazan dictionary, and cross-checked of its validity with native speakers. The words gathered are depicted in the following tables, according to its module.



**a) Number module**

<b>Number - Numbul</b>		
<b>Digit</b>	<b>English</b>	<b>Kadazan</b>
1	One	Iso
2	Two	Duvo
3	Three	Tohu
4	Four	Apat
5	Five	Himo
6	Six	Onom
7	Seven	Tuu
8	Eight	Vahu
9	Nine	Sizam
10	Ten	Opod

**Figure 13 : Kadazan Words for Number module**

**b) Colour module**

<b>Colours - Warna</b>		
<b>Colour</b>	<b>English</b>	<b>Kadazan</b>
	Blue	Tobulou
	Black	Toitom
	Red	Taagang
	Green	Totomou
	Yellow	Tohisou
	White	Topuak
	Grey	Ohuom

**Figure 14 : Kadazan Words for Colour Module**

**c) Basic Phrases**

Basic Phrases	
English	Kadazan
Hello	Kopivosian
Good Morning	Kopivosian DOUNGOSUVAB
Good Afternoon	Kopivosian DOUNGADAU
Good Evening	Kopivosian MINSOSODOP
Good Night	Kopivosian DOUNGOSODOP
Happy birthday	Kopisanangan Tadau Kinosusuon Nu
Thank You	Kotohuadan
You're Welcome	Miaga Nopo
Sorry	Siou
Goodbye	Tumodo kou no!

**Figure 15 : Kadazan Words for Basic Phrases module**

**d) Animal**

Animals - Tazam	
English	Kadazan
Chicken	Manuk
Dog	Tasu
Bird	Tombohog
Cow	Sapi
Squirrel	Bosing
Snake	Buhanut
Duck	Putik
Cat	Tingau
Buffalo	Kalabau
Sheep	Biri2
Tortoise	Buu
Fish	Sada
Goose	Ansa
Horse	Kuda
Pig	Vogok
Goat	Kambing
Turtle	Pondu

**Figure 16 : Kadazan words for Animal Module**

## 4.2 Application flowchart

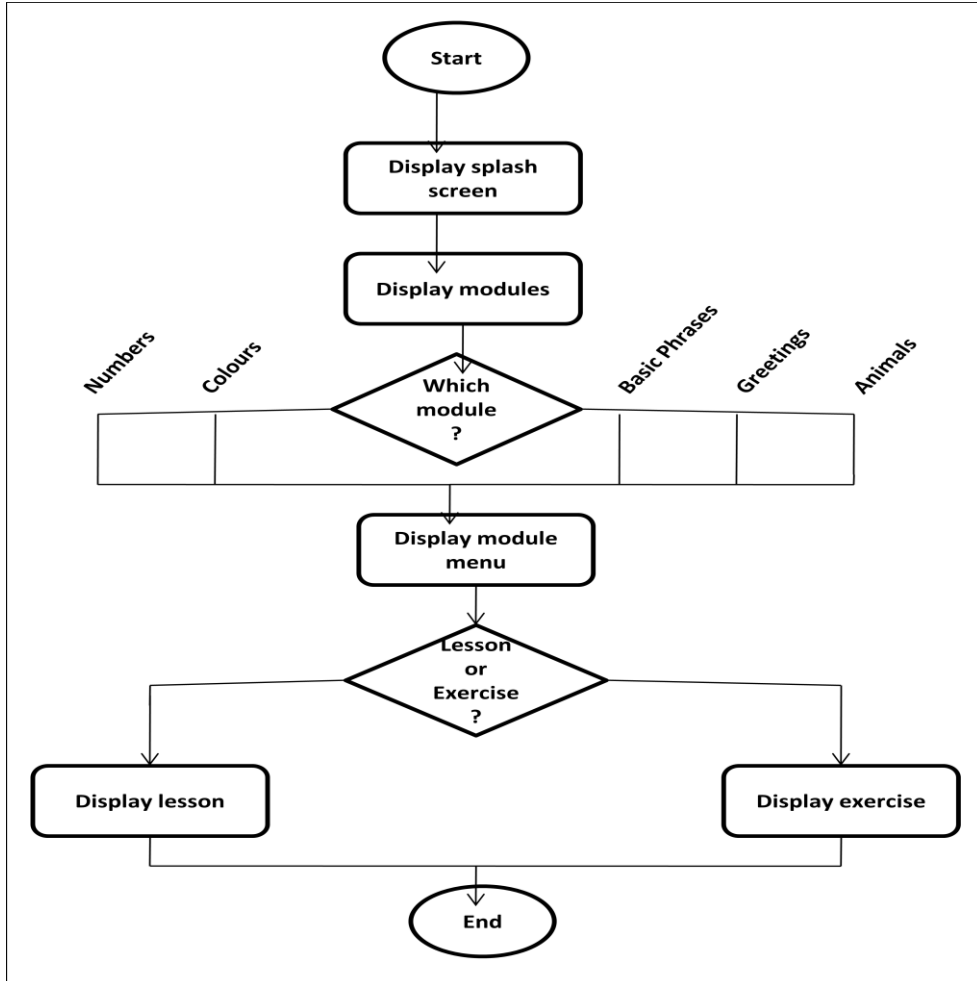


Figure 17 : Flow chart of the application

### 4.3 Prototype

The application works on Android operating system with minimum API level of 8. This means, only smartphones running Android 2.2 and above can run the application without any issue.

Once the launcher icon from the application list is clicked, the application starts with the splash screen. After the splash screen is done, user will see the Home screen or the Menu screen. This is where user gets to choose the module they want to learn. They can choose Numbers, Colours, Animals, or Basic Phrases module.



Figure 18 : Launcher icon (enlarged)

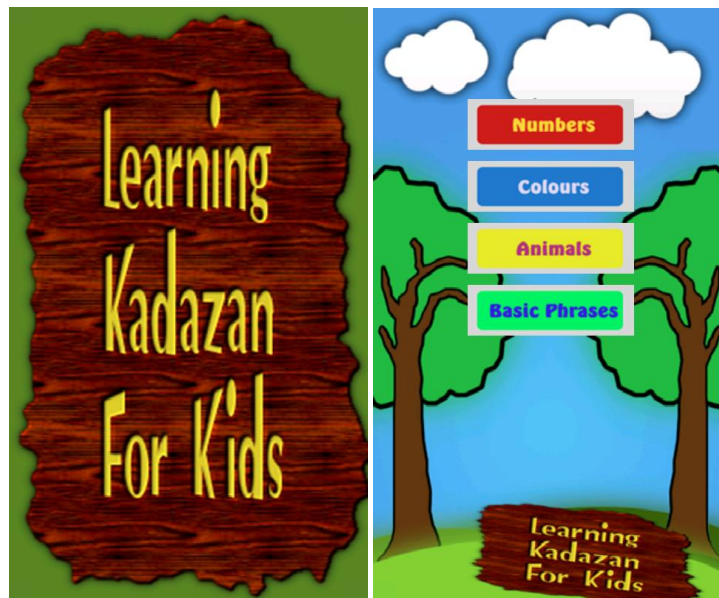


Figure 19 : Screenshot of the Splash screen and Menu screen

Each time a the module is selected, the user will see another selection screen where they will choose an activity to do, whether it is Lesson or Exercise. The selection screen are depicted as shown below.



**Figure 20 : Screenshots of Number, Colour, Animal, Phrase module selection screen**

### **Lesson Activity**

The lesson activity from each of the module will show a animated picture of the object, with the name of it below it. There is also a button at the bottom that user can click to listen to the pronunciation of the word shown. The next and previous button is also placed at the bottom of the screen to enable user to navigate through the lesson easily.

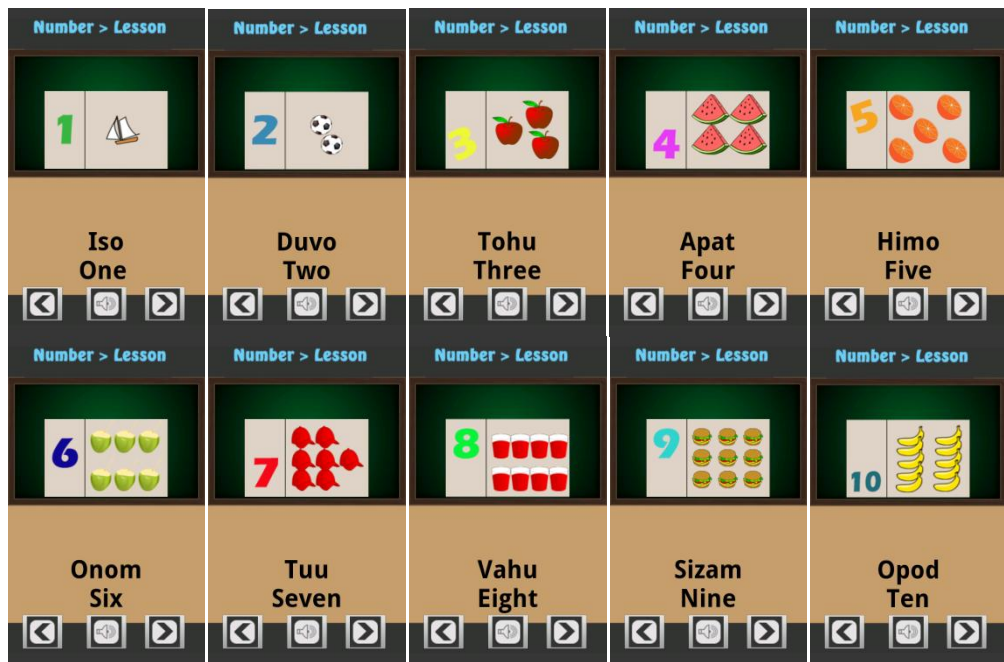


Figure 21 : Screenshots of lesson activity in the Number module

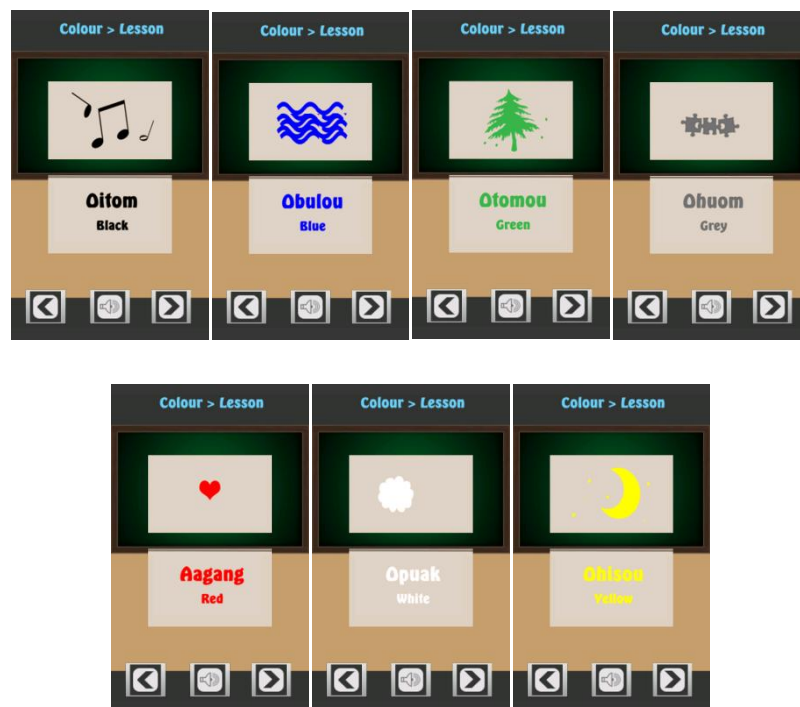


Figure 22 : Screenshots of lesson activity in the Colour Module

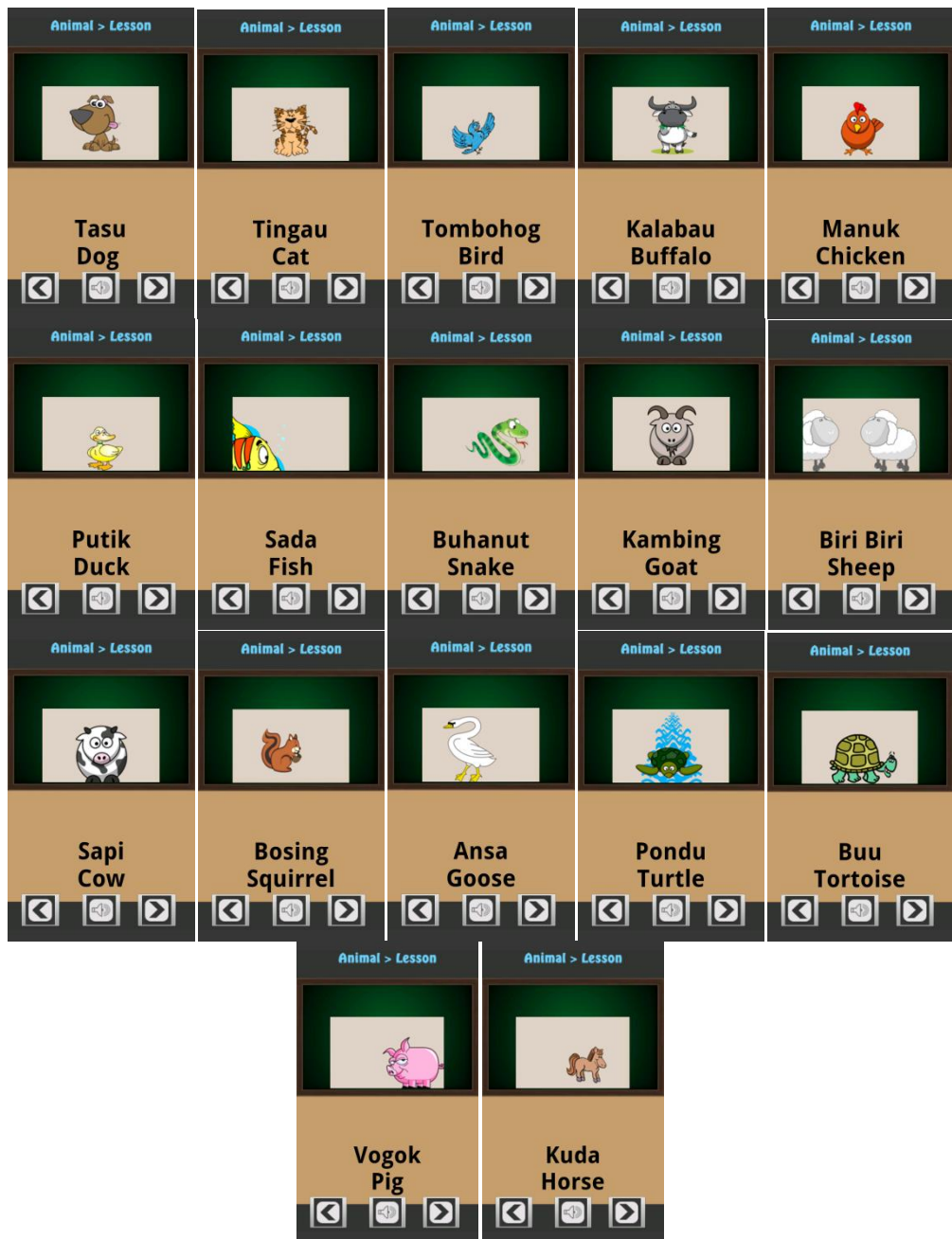
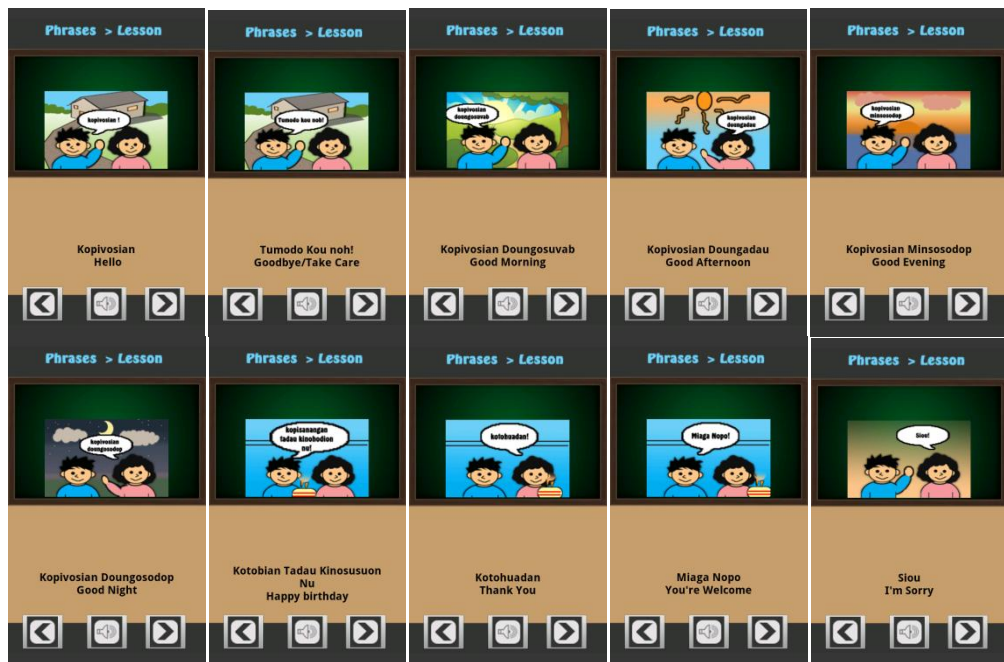


Figure 23 : Screenshots of lesson activity in Animal module



**Figure 24 : Screenshots of lesson activity in the Basic Phrases Module**

### **Exercise Activity**

The exercise activity included in each module, is different from each of the other module, in terms of type and design. The Number module exercise is to tap the gong picture according to the numbers shown in Kadazan word. The Colour module exercise is a multiple choice question to guess the colour's name in Kadazan. The Animal module exercise is to type the animal's name in Kadazan, with hints given at the screen. The Basic Phrase module exercise is where user have to choose between two picture that best depicts the phrases given in words. The following are the screenshots from each of the module.



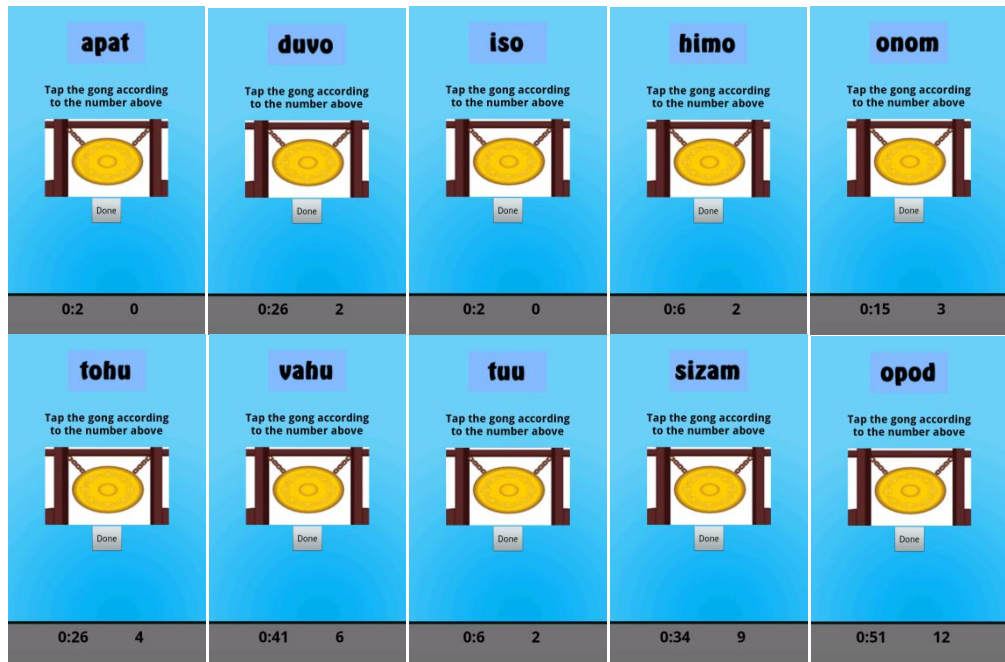


Figure 25 : Screenshots of exercise activity of Number module

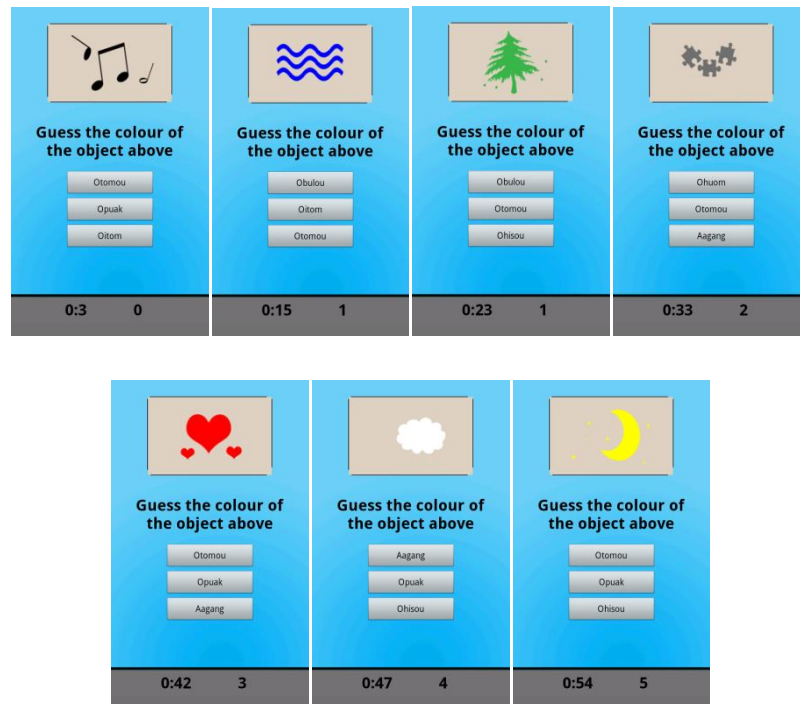


Figure 26 : Screenshots of exercise activity of Colour module


















 <p>Spell the name of the animal above</p> <p><b>Hint : sap..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : tas..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : put..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : sad..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : kam..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>
0:3 0	0:34 1	0:42 1	0:58 2	0:7 0
 <p>Spell the name of the animal above</p> <p><b>Hint : ans..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : kud..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : vog..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : bir..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : buh..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>
0:19 1	0:25 1	0:31 1	0:50 2	1:7 3
 <p>Spell the name of the animal above</p> <p><b>Hint : bos..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : buu..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : pon..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : tom..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>	 <p>Spell the name of the animal above</p> <p><b>Hint : kal..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>
1:29 4	1:47 5	2:0 6	2:14 7	2:30 8
 <p>Spell the name of the animal above</p> <p><b>Hint : tin..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>		 <p>Spell the name of the animal above</p> <p><b>Hint : tin..</b></p> <input type="text" value="type here.."/> <input type="button" value="Submit"/>		
2:52 9		2:52 9		

Figure 27 : Screenshots of exercise activity in Animal module



Figure 28 : Screenshots of exercise activity in Basic Phrases module

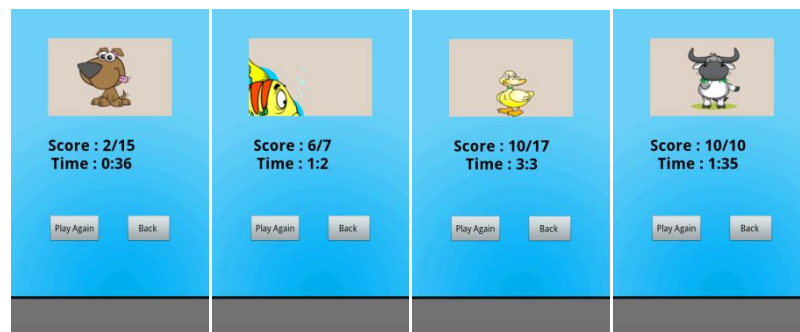


Figure 29 : Screenshots of Score screen in each module.

## 4.4 Survey Data Collection & Findings

During the development phase of the project, after two of the modules have been developed, an early usability test and user perception test was conducted on 10 participants. The target participants of the test were not the target users of this application, which are the children, but they are the parents or guardians of the children which directly supervise their children while the children were using the application.

### 4.4.1 Usability Test

The usability aspects of this application were measured using System Usability Scale. This test requires the users/participants to fill up a questionnaire after using the system. The users are required to answer each question/item by choosing from a 5 point scale ranging from “Strongly agree” to “Strongly disagree”. The results and analysis from the test are shown below.

Question 1: I think I would like to use this system

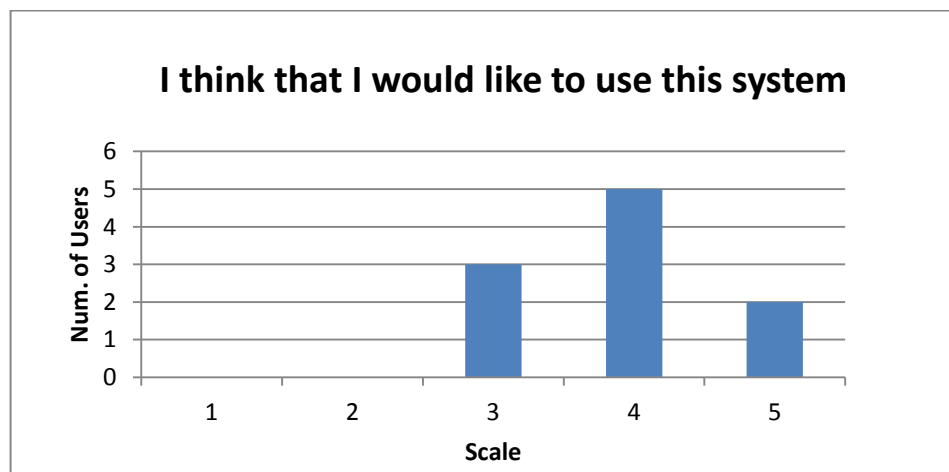
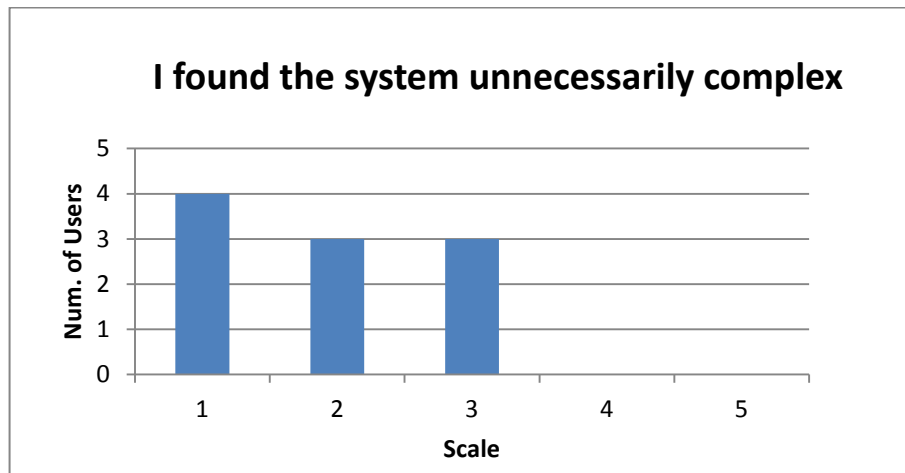


Figure 30 : Results from SUS survey Question 1

The figure above shows the result for the first question. The question asked whether user would like to use the system (application). The result shows that two users rated scale 3, five user rated scale 4, and three user rated scale 5. This shows that 80% of the users agree that they would like to use the application.

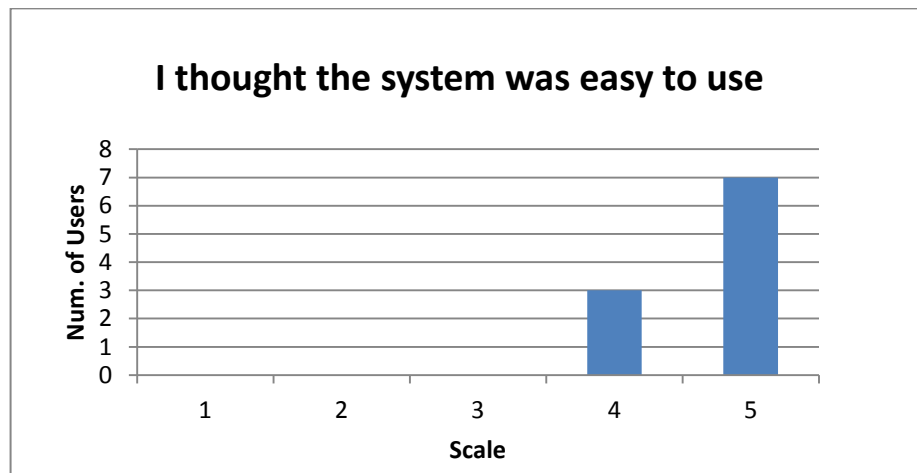
Question 2: I found the system unnecessarily complex



**Figure 31 : Results from SUS survey Question 2**

The second question asked the user if they find the system to be unnecessarily complex. The result shows that four users chose scale 1, three users chose scale 2 and three users chose scale 3. None of the users chose scale 4 or scale 5. This shows that most of the users do not think that the application is unnecessarily complex, while there can still be room for improvement on system (application) complexity.

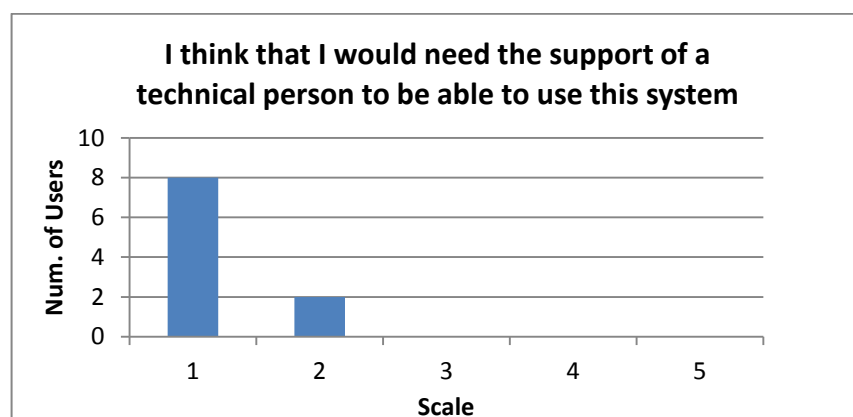
Question 3: I thought the system was easy to use



**Figure 32 : Results from SUS survey Question 3**

The third question in the SUS testing asked the user if they thought that the system (application) was easy to use. Seven of the users rated 5 on the scale, and the remaining three users rated scale 4. This shows that the users think that the application was very easy to use.

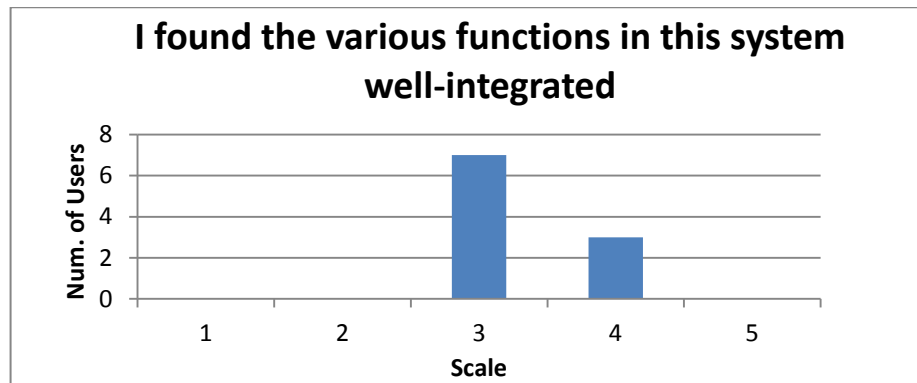
Question 4: I think that I would need the support of a technical person to be able to use this system.



**Figure 33 : Results from SUS survey Question 4**

The fourth question asked if the users think that they would require support and assistance from a technical person. The result shows that eight of the users chose scale 1, while the remaining two users chose scale 2. This shows that the users did not quite need any assistance from any technical person to use the application.

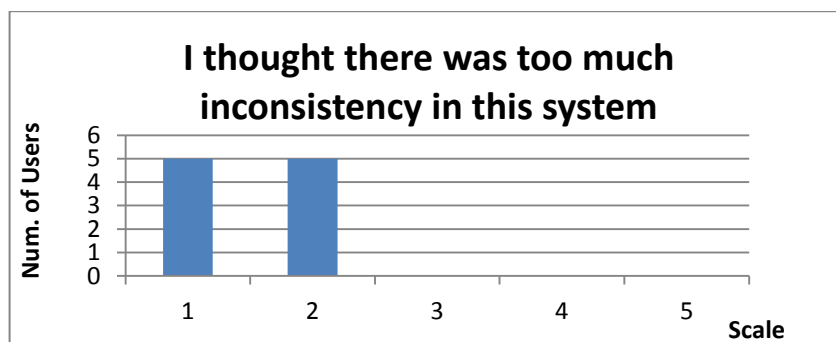
Question 5: I found the various functions in this system well-integrated



**Figure 34 : Results from SUS survey Question 5**

The fifth question asked if the users find that the various functionalities in the system (application) are well-integrated. The result shows the seven of the users chose scale 3 as their answer, while the remaining three users chose scale 4. This shows the functionalities inside the application can be integrated better.

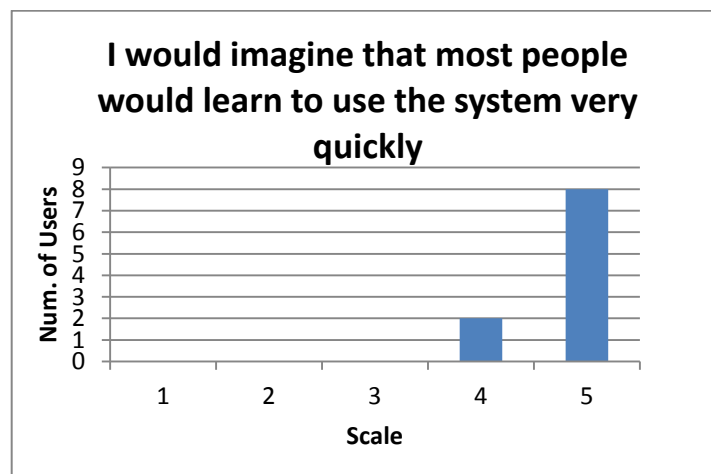
Question 6: I thought there was too much inconsistency in this system



**Figure 35 : Results from SUS survey Question 6**

The sixth question in the SUS testing asked if the user thought that there was too much inconsistency in the system (application). 50% of the users, which comprises five person, chose scale 1 while the remaining 50% chose scale 2. This shows that not half of the users thinks that the consistency in the application is good, while the rest thinks there are some inconsistency.

Question 7: I would imagine that most people would learn to use the system very quickly.

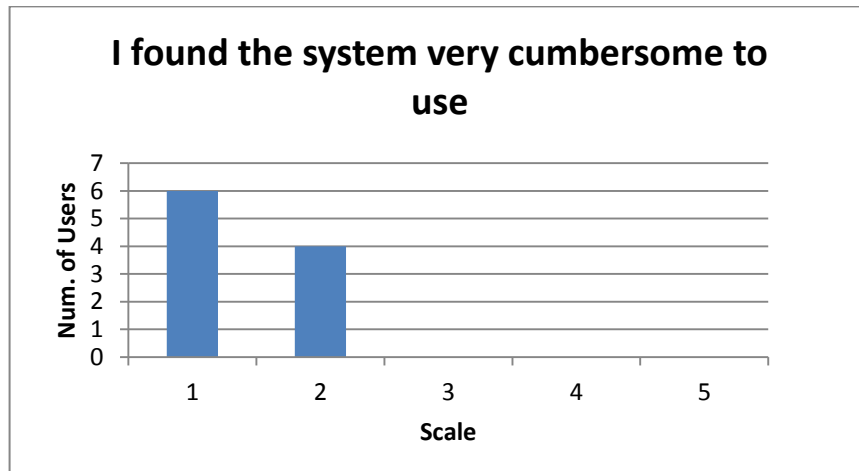


**Figure 36 : Results from SUS survey Question 7**

The seventh question asked the users if they would imagine if other users would learn to use the system (application) very quickly. The result shows that eight users chose scale 5, and the remaining two users chose scale 4. This indicates that almost all of the users thinks that other people will learn to use the application quickly.



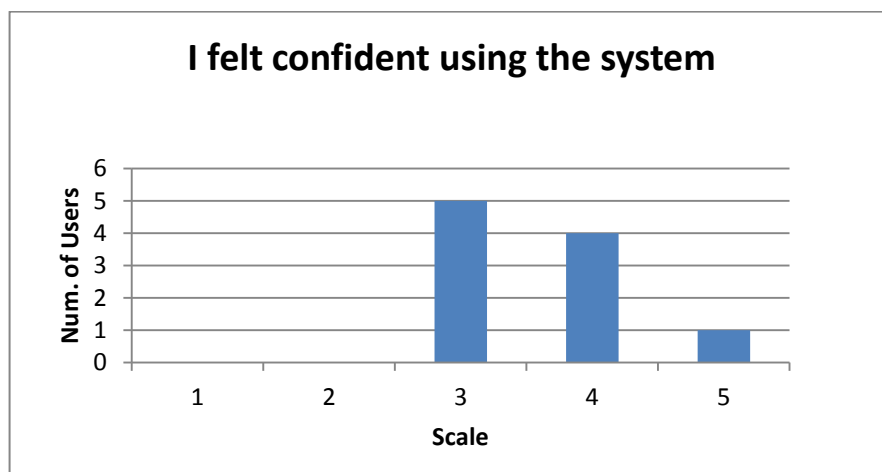
Question 8 : I found the system very cumbersome to use



**Figure 37 : Results from SUS survey Question 8**

The eighth question asked if the users find the application to be very cumbersome to use. The result shows that six of the user rated scale 1 and another four users rated scale 2 as their answer. This shows that over half of the users thinks that the users thinks that the application is not at all cumbersome to use.

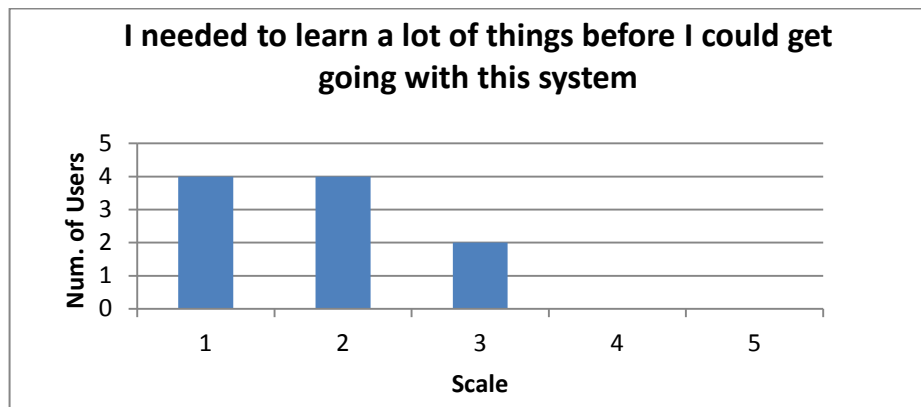
Question 9: I felt confident using the system



**Figure 38 : Results from SUS survey Question 9**

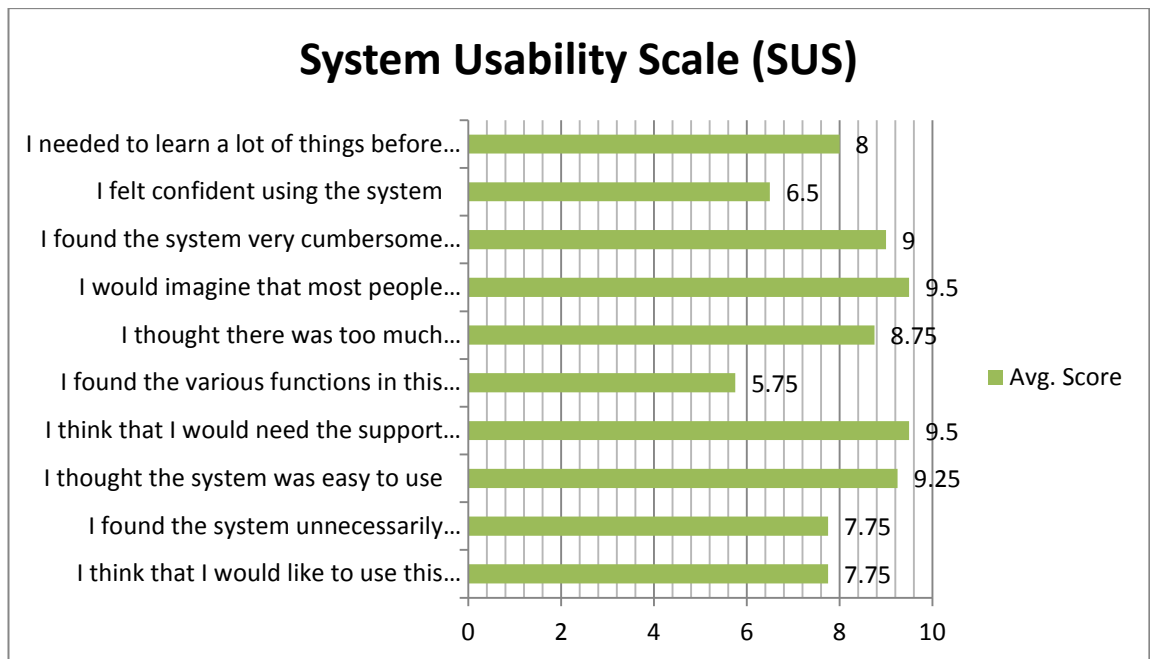
The ninth question asked the user if they were confident when they were using the system (application). The result shows that five users scored scale 3 as their answer, four users scored scale 4, and one user chose scale 5. This shows that not all the users felt confident in navigating through the system.

Question 10: I needed to learn a lot of things before I could get going with this system



**Figure 39 : Results from SUS survey Question 10**

The last question asked if the user think that they need to learn a lot of things before they could go on with the system (application). The results show that four of the users selected scale 1, another four selected scale 2, and the remaining two users selected scale 3. This indicates that some of the users still think that they have to learn a lot of things before they could get going with the system (application).



**Figure 40 : Average Score From Each Item on SUS survey**

The figure above shows the average score for each of the question, from a total of ten users. The calculation to obtain average scores for odd-numbered (1, 3, 5, 7, and 9) questions differ from the average scores for the even-numbered (2, 4, 6, 8, and 10) questions. This is because question 1, 3, 5, 7 and 9 expect users to rate more towards the higher side of the scale (3 – 5) to achieve better usability rating, while question 2, 4, 6, 8 and 10 expect the opposites.

The formulas to obtain the average scores for the questions as follows:

Odd-numbered questions

$$\text{Average score} = (\text{Scale position} - 1) * 2.5 / \text{number of users}$$

Even-numbered questions

$$\text{Average score} = (5 - \text{scale position}) * 2.5 / \text{number of users}$$

The System Usability Scale (SUS) score of Learning Kadazan for Kids from the ten users is the sum of the average score of all the questions.

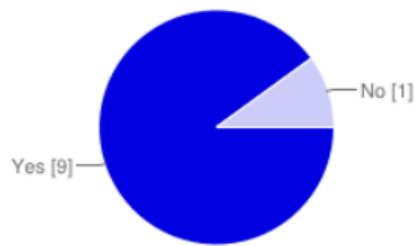
$$\begin{aligned} \text{SUS} &= 7.75 + 7.75 + 9.25 + 9.50 + 5.75 + 8.75 + 9.50 + 9.00 + 6.50 + 8.00 \\ &= 81.75 \end{aligned}$$

An SUS score of above 80 is considered as attaining 'grade A' in the usability aspect. The average score of the application showed that development process have been carefully done with regards to the usability aspect. Another reason for this high usability quality of the application is to accommodate the target users of this application, which are Kadazan children aged 7-12 years old. It is crucial that an application is easy to use and provide no burden for the users who are using it.

#### 4.4.2 User Perception

User perception is a very important aspect in the acceptance of the application. A prototype testing feedback survey was conducted simultaneously with the usability test to determine user perception. This section will show the results from the survey.

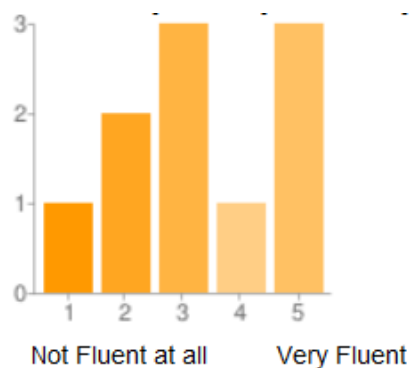
Question 1 : Are you are a Kadazan?



**Figure 41 : Results from Question 1 Prototype Testing Survey**

The figure above shows that out of ten person that took the survey, nine person are a Kadazan, while only one is a non-Kadazan. This helps to determine who are the participants of this test.

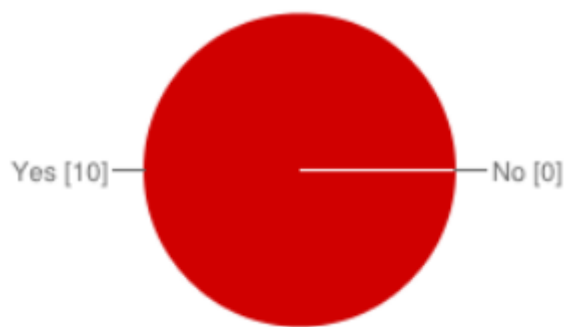
Question 2: How would you rate your fluency in Kadazan?



**Figure 42 : Results from Question 2 Prototype Testing Survey**

The second question asked the participants to rate their fluency on the Kadazan language on a scale of 1 to 5, where scale 1 indicates “Not fluent at all” and scale 5 depicts “Very fluent”. The result shows that one participant is not fluent at all in the language, two participants rated scale 2, three participants rated scale 3, one user rated scale 4, and the remaining three participants rated that they are very fluent in the language. This question helps to see the level of knowledge in the language among the participants.

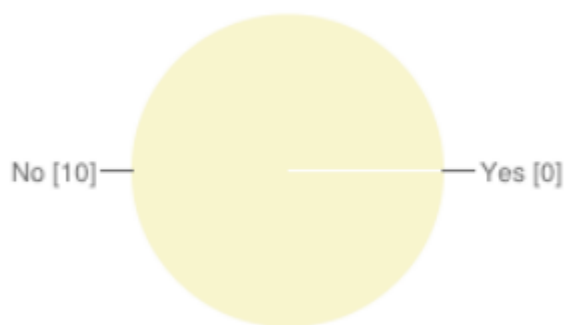
Question 3: Is the application easy to use?



**Figure 43 : Results from Question 3 Prototype Testing Survey**

The figure above shows the result for the third question that asked if the application is easy to use. 100% of the users think that the application is easy to use.

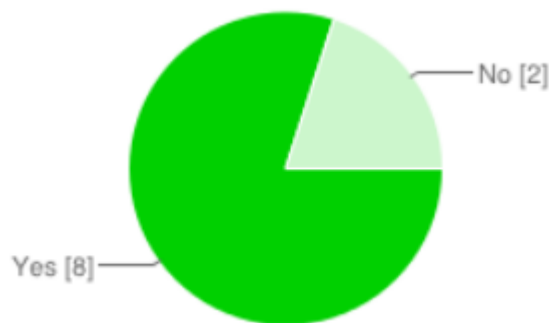
Question 4: Did you require a ‘Help’ or ‘Tutorial’ page to use the application?



**Figure 44 : Results from Question 4 Prototype Testing Survey**

The figure above shows the result for the fourth question which asked the participants if they required any ‘Help’ or ‘Tutorial’ page to use the application. 100% of the participants chose ‘No’ as their answer, which shows that the application is pretty much straight-forward and user easily learn how to use the application with intuition.

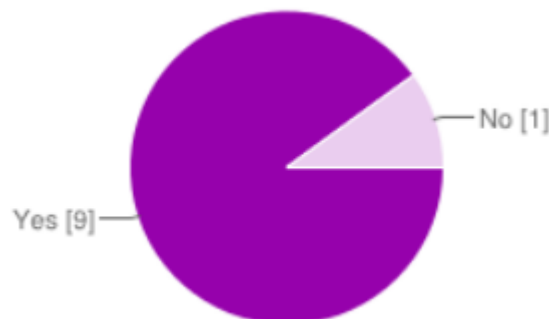
Question 5: In your opinion, is the application suitable for kids (7-12 yrs old) to learn basic Kadazan?



**Figure 45 : Results from Question 5 Prototype Testing Survey**

The figure above shows the result for the fifth question on suitability of the application to children aged seven to twelve years old to learn basic Kadazan. Eight out of ten participants said ‘Yes’ and the other two participants said ‘No’.

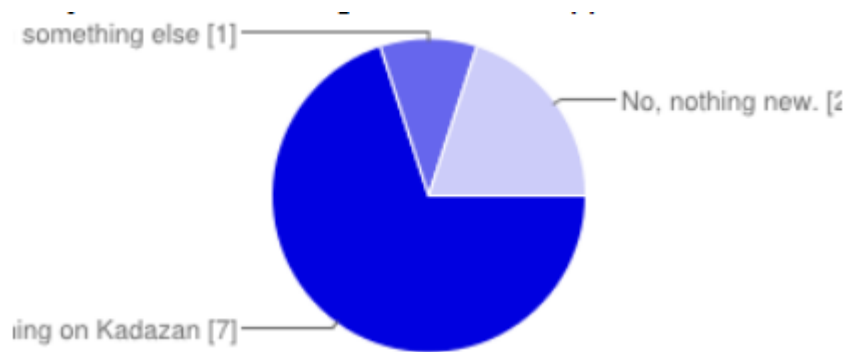
Question 6: Is the interface of the system suitable to keep kids interested in using the application?



**Figure 46 : Results from Question 6 Prototype Testing Survey**

The figure above shows the result for the sixth question which asked the participants if the interface of the system suitable to keep children interested in using the application. Nine out of ten participants indicated ‘Yes’ as their answer while one participant said ‘No’.

Question 7: Did you learn something new from the application?



**Figure 47 : Results from Question 7 Prototype Testing Survey**

The figure above shows the result for the seventh question that asked if the participants learnt something new from the application. 70% of the participants learnt something new on Kadazan, 20% learnt nothing new, and one participant learnt something new on something else.



Question 8: What would you suggest to improve/add into the application?

In this question, the field in the question is optional, which means user can choose not to answer. Out of the ten participants, seven out of the ten participants gave their feedback.

*Participant 1's* feedback:

“ The pictures and sounds are suitable for kids to learn Kadazan vocabulary. Add more module”.

*Participant 2's* feedback:

“ The app is good already. In future development, you should add courses to organize the modules into more levels and chapters. Overall, it is a nice and fun app”

*Participant 3's* feedback:

“ It is colourful and entertaining enough to keep children keep on pressing, done that with my twins. Too bad, only a few categories are available now. Hopefully, this will be implemented soon and can have full access.”

*Participant 4's* feedback:

“ If possible, use real pictures to show the objects. Give more example rather than 1 per item. Overall, good job for the kids to learn Kadazan. Effort well done! Thumbs up”

*Participant 5's* feedback:

“My daughters love the sounds and animation included”

*Participant 6's* feedback:

“ Eva keeps pronouncing animal name in Kadazan along with the app! Good job!”

*Participant 7's* feedback:

“Hope more vocabulary be inserted soon”

## **4.5 Challenges Faced During Development of Application**

### **a. Previous Kadazan Learning Application**

There is no mobile application on Kadazan language learning on any platform. As pointed out in Chapter 2, the previous learning tool for Kadazan language consisted only story books, dictionary, flash cards, and phrase books. This makes it hard to have a point of reference in developing this application.

### **b. User Testing**

The user testing aspects were also one of the challenges faced in the development process. The target users for this application are Kadazan children aged seven to twelve years old, which resides in Sabah. As I am now doing the development and project in Universiti Teknologi PETRONAS, in Perak, the travelling cost to Sabah will be expensive. I have to rely solely on the Internet to distribute the application installer and the usability test as well as the user perception survey. The challenges is to know be able to see and analyzed the users actually testing out the application.

### **c. Device Compatibility**

The application is tested on Samsung Galaxy Y and Samsung Galaxy W during the development phase. When the application installer is distributed, it is a challenge to find participants with exact devices I have used during the development or having similar screen resolution. This also relates to the previous challenge I face, that I only can rely on the Internet to distribute the installer, without being able to see the actual device installing the application.

## **CHAPTER 5**

### **CONCLUSION**

#### **5.1 Recommendations**

More readings and extensive search of materials need to be found in order to have the correct inputs on the usage of the language. The materials available on the Internet especially articles on the Kadazan language, is very scarce. Future researchers should look into doing research in Sabah, with many available physical resources.

This project only covers the scope of Android smart phones users. In the future, it is possible to create similar application for other smart phones platform, such as Apple's Iphone, RIM's Blackberry and other Symbian smart phones. It is also possible to create a stand alone system for PCs to educate on the language more.

#### **5.2 Conclusion**

Learning Kadazan for Children is a project that is designed to produce an Android application as a final product to assist children in the Kadazan community learn basic Kadazan vocabulary. The target users of this application are the children of the Kadazan community from the age of 7-12 years old. It will be an alternative to books as learning tools for Kadazan language. Children will be able to learn new vocabulary on numbers, animals, colours and some basic phrases and they can also learn on spellings on those Kadazan words. Moreover, the pronunciation of the words that are provided can help the users learn how to correctly pronounce each words. The prototype testing have been proven to be successful with user acceptance based on the usability test and user perception. Parents and children alike both liked the idea of the project and supported the development fully. Furthermore, if this application prototype can be improved and finalized, this might possibly be the first Kadazan learning application available for smart phones. With all these criterias considered, I hope that this project will be able to help the Kadazan community in keeping the language alive for generations to come with this application.

## REFERENCES

### Journal Papers and Books

- i. B. Lee (2012) , The Design and Development of Mobile Collaborative Learning Application Using Android, Computer Science Department, University of Northern Virginia, VA, U.S.A
- ii. M. Tangit (2005), Planning Kadazandusun (Sabah, Malaysia) : Labels, Identity & Language, University of Hawai'i, Manao, Hawaii, U.S.A
- iii. R. Lasimbang (2004), To Promote the Kadazandusun Languages of Sabah, Kadazandusun Language Foundation (KLF), Penampang, Sabah, Malaysia
- iv. R. Lasimbang; F. Otigil, authors. (1992), Language competence and use among Coastal Kadazan children: a survey report, Kadazandusun Language Foundation (KLF), Penampang, Sabah, Malaysia
- v. H. Mohideen, The Maintenance of Malaysia's Minority Languages, International Islamic University Malaysia
- vi. G. Subramaniam , Application of Web Resources for English Language & Literature Teaching, Postgraduate & Research Department of English, Government Arts College(Autonomous), Chennai
- vii. Lewis, M. Paul (ed.), 2009. Ethnologue: Languages of the World, Sixteenth edition. Dallas, Tex.: SIL International. Online version: <http://www.ethnologue.com/>.
- viii. George M. Chinnery (2006), Emerging Technologies, University of Maryland Baltimore County, USA.

### Online references

- i. Coastal Kadazan Language 21<sup>st</sup> June 2012, Retrieved From :  
[http://en.wikipedia.org/wiki/Kadazan\\_language](http://en.wikipedia.org/wiki/Kadazan_language)
- ii. Smartphone Users Around The World – Statistics and Facs [Infographic]  
12th October 2012, Retrieved From : <http://www.go-gulf.com/blog/smartphone>
- iii. Kadazandusun Language 22<sup>nd</sup> June 2012, Retrieved From :  
<http://kdca.org.my/archives/167>
- iv. Kadazandusun Language in Sabah Schools 22<sup>nd</sup> June 2012, Retrieved From :  
<http://www.klf.com.my/klinsabah.htm>
- v. Kadazan – Dusun – English – Malay – Bajau Phrase Book detail 19<sup>th</sup> July 2012,  
Retrieved From : <http://elib.uum.edu.my/kip/Record/ums000181893>
- vi. Kadazan Folklore 19<sup>th</sup> July 2012, Retrieved From :  
<http://elib.uum.edu.my/kip/Record/iium188922>
- vii. Kadazan – English – Malay Dictionary 19<sup>th</sup> July 2012, Retrieved From :  
<http://elib.uum.edu.my/kip/Record/um734967>
- viii. English – KadazanDusun Flashcard V1.0 19<sup>th</sup> July 2012, Retrieved From :  
<http://www.kastumized.com/portfolio/english-kadazandusun-flashcard-v1-0/>
- ix. Learn Bahasa Indonesia. 18 July 2012 Retrieved from :  
<https://play.google.com/store/apps/details?id=com.codegent.apps.learn.indonesia&hl=en>
- x. Spanish Smash Vocabulary Game. 6th October 2012 Retrieved from :  
[https://play.google.com/store/apps/details?id=com.nativetongue.spanishsmash.g  
ame&feature=search\\_result](https://play.google.com/store/apps/details?id=com.nativetongue.spanishsmash.game&feature=search_result)

- xi. Little Pim French. 5th October 2012 Retrieved from :  
<http://bestappsforkids.com/2011/11/little-pim-french/>
  
- xii. Hello-Hello Kids Language Learning. 5th October 2012 Retrieved from :  
<http://itunes.apple.com/us/app/hello-hello-kids-language/id377705780?mt=8#>
  
- xiii. English In A Month. 18 July 2012 Retrieved from :  
[https://play.google.com/store/apps/details?id=com.elky.likechildren.enfree&feature=more\\_from\\_developer](https://play.google.com/store/apps/details?id=com.elky.likechildren.enfree&feature=more_from_developer)

## **APPENDICES**

# Learning Kadazan For Kids

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## ABSTRACT

**Learning Kadazan for Children is a mobile application on Android smart phones that is aimed as an alternative to books as learning tools where children can widen their vocabularies and improve their spellings on Kadazan words. This is an effort to counter the declining rate of this language usage in Sabah especially of the Kadazan-borned children. The development platform of this application is the Android operating system. The target users are the children of the Kadazan community from the age of seven to twelve years old. Parents who own Android smart phone may assist their children in using the application and in learning as well. Basic contents of the application are lessons and exercises on numbers, colours, phrases, greetings, and objects. The difficulty level of the exercises in the application will be par to the user's age. The development methodology used in this project is Rapid Application Development method that is suitable for prototyping purposes. Moreover, interviews with native speakers will contribute greatly to this project as they can provide more accurate details of the language itself. Prototypes will be released for testing from time to time to chosen testers to ensure correct usage of language, aesthetics values of system and ensure all functionalities are present.**

**Keywords:** *Kadazan, Language Learning, Android application.*

## I. INTRODUCTION

For a variety of reasons, speakers of some languages stop using their language and began using another [1]. This poses serious concerns not only to the language, but to the society as a whole too, as language is closely linked to cultures.

The Coastal Kadazan language (Kadazan language), is the primary language of the Kadazan native people living in the West Coast of Sabah. Through observation and experience, the author feels that the younger generations of Kadazan people are no longer interested in speaking Kadazan. Even parents whose native tongue are Kadazan, speaks of different language in their

child's upbringing. This has brought up the problem of language endangerment.

Second language acquisition occurs when a person involves himself in the process of learning a new language. Even with Kadazan being taught as a subject in some schools, the younger generations take it as another subject to ace in their examinations. What should be a native language became a second language to these generations. The appreciation for the language is deteriorating. The only way to preserve this language is to remind everyone in the community of this problem and start to materialise a solution.

Present methods of imparting teachings of the Kadazan language are ineffective in the sense that children and young adults are still unable to communicate using the language with their friends and family. However, these generations are up to date with the latest trends and technology, hence, it is only appropriate to use the latest technology to recapture their interest in learning the language. Android operating system is currently holds the highest market share for smartphone platform, with 46.9% of market share [2]. Creating an Android application on Kadazan language learning is the proposed solution to the recapture the interest of the Kadazan children and young adults to learn Kadazan language.

### A. Problem Statement

The usage of Kadazan language among Kadazan children is declining in recent days. One of the main factors for this problem is the children grew up with limited vocabulary and knowledge of the Kadazan language. Moreover, the reason for this is due to the Malay language being the national language of Malaysia and also the increasing need to learn the English language as a requirement in career development. This has caused parents to speak less of the Kadazan language at home to their children in order to accustom themselves to Malay and English language. Although, formal education



of Kadazan language in public schools have been introduced, children treat it as another subject to ace during the exam rather than learning it as a preservation of culture. Furthermore, children rarely listen to Sabah Variety FM ( Sabah VFM ) that broadcast news headlines in the Kadazan language and plays Kadazan and Dusun songs as they prefer to listen to other radio stations broadcasting using Malay and English language.

### *B. Objective*

The aim of this project is to produce an alternative learning tool. The objectives of this project are :

- To develop an Android application that aid children from age seven to twelve years old to learn Kadazan language
- To provide an interactive way for children to learn new vocabulary on Kadazan words.
- To evaluate the effectiveness of the system
- To evaluate the usability aspect of the system.

### *C. Scope of Study*

The scope of this project will be the children from age seven to twelve years old or primary school students that are of Kadazan descent in Sabah. The development platform used in this project is the Android operating system. The basic content of the application is as follows :

- Learn Basic Phrases in Kadazan
- Learn Names of Numbers
- Learn Names of Colours
- Learn Names of Animals

## **II. LITERATURE REVIEW**

### *A. Language Learning/Teaching*

Language learning is defined as learning to use a language. Language learning starts right from birth, when parents starts communicating with their newborn. The challenge however, does not lie in learning the first language. Learning a second (or a subsequent number) language is a challenge to any individual as one language differ from another. For most people, learning a second language depends a lot on their grasp of their first language, or as defined by researchers as learners language. Oftenly, learner use their first language to make sense out of the second language.

### *B. Mobile-Assisted Language Learning*

Mobile Assisted Language Learning (MALL) is basically language learning on mobile platforms. Mobile platforms are devices that provide mobility to users. Mobile learning environments might be

face-to-face, distance, or online; further, they may be self-paced or calendar-based [3]. Mobile technologies are the latest trend in language pedagogy where teachings are imparted for users who are always on the go and they can access the application anytime and anywhere. MALL have evolved nowadays from the usage of cassette player that plays recorded audio lessons for language learning to MP3 player that plays a MP3 audio format of podcast that does the same thing.

Multimedia(text, sounds, video, pictures and animation) are needed in any teachings to communicate information in a more effective and efficient manner [4]. Moreover, instructions can be delivered better. For mobile phone, language learning was previously only incorporated with SMS and email function of the phone. Smartphones have allowed the scope of language learning to become wider in this term.

Nowadays, smartphones with GPS function allow users to learn a new language based on their locations. For example, Michael Woods and Christi Cobo developed a project to create linguistic landscapes, incorporating it with Foursquare. It contains task such as finding bilingual signs, listening to people communicating and also record their field notes [5].

### *C. Existing Mobile Application on Language Learning*

Five mobile applications on different types of platforms were tested and analyzed on their pros and cons. These applications teach users to learn languages such as English, Spanish, Indonesian, and French [6][7][8][9][10].

Three out of five of these applications used Flashcards as the teaching method for their lessons module. Flashcards are effective ways to learn and recall new words. The simple design of flashcard, which displayed a picture of an object (or term) and also the word underneath it. Flashcard is definitely a good teaching method that I can use to develop my training modules. Moreover, for my exercise or training modules, I will develop simple logic games to be incorporate the picture from the flash cards to test users' memory and understanding.

### *D. Kadazan Language Learning*

The Kadazan people share many similarities in their language, culture and tradition with the Dusun ethnic group. Amidst the similarities between the two ethnic groups, there are still some differences in the spoken and written language in terms of dialects, styles, tones and intonations [11]. For

example, the word ‘tahanan’ in Kadazan, which is ‘neck’ in English is actually ‘liou’ in the Dusun language. Aside from that, the letter ‘z’ used in almost all Kadazan words correspond to the letter ‘y’ almost in every word in Dusun language. The Kadazan language also differs depending on location as each place has added its own dialects into the language. The language is still used in many occasions. The formality of the language depends on the type of occasion or event held.

Although the community noticed the severe lack of appreciation in the youths towards the Kadazan language, there was not much of new learning tools or learning mechanism developed and implemented for the community [12]. Previous methods of teaching Kadazan include story books, phrase books, dictionaries and flashcards.



Figure 1: Previous methods of teaching Kadazan

### III. METHODOLOGY

#### A. Development Methodology

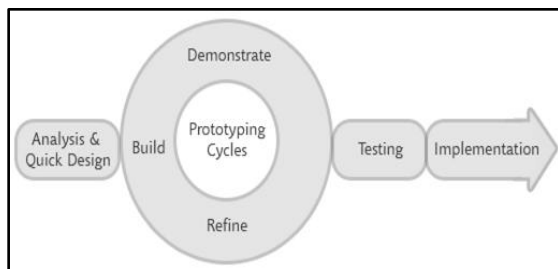


Figure 2: Rapid Application Development Model

The main project phases of activities (development) will be divided into four sections which are :

- Analysis and Quick Design Phase
- Prototyping Cycles (Building, Refining, and Demonstrating process)
- Testing Phase
- Implementation Phase

Analysis of existing application designs and design phase occur first, followed by the development of the application using Eclipse with Android SDK and ADT. Prototype are tested throughout the development phase using Android device to ensure every aspect of the design and functionalities are functioning well. Testing phase is done by distributing application package file, or the installer to real users to gather their feedbacks and usability ratings.

#### B. Research Methodology

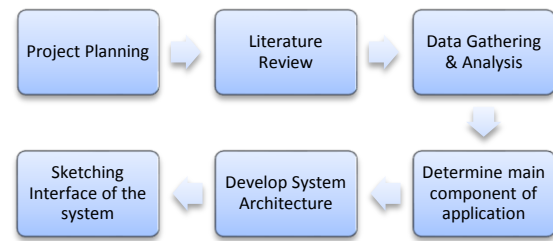


Figure 3: Research Methodology

**Figure 3** shows the steps taken for the research aspects of the project. Project planning involves the identification of project objectives, problem statement and also the project scope. The literature review step is done by analyzing research papers done on language learning and analyzing pros and cons of existing mobile applications on language learning. Data gathering involve selecting and collecting Kadazan vocabulary to be included in the application. The next step is determining the main components of the application, which are lessons and exercises. After that, the software flow chart is developed, and finally the interface of the system is sketched and finalized.

#### C. Development Tools Required

- Personal Computer for Coding
- Android device for testing purposes.
- JDK 1.6
- Eclipse IDE 3.7
- Android SDK

### IV. RESULTS AND DISCUSSION

#### A. Application Flowchart

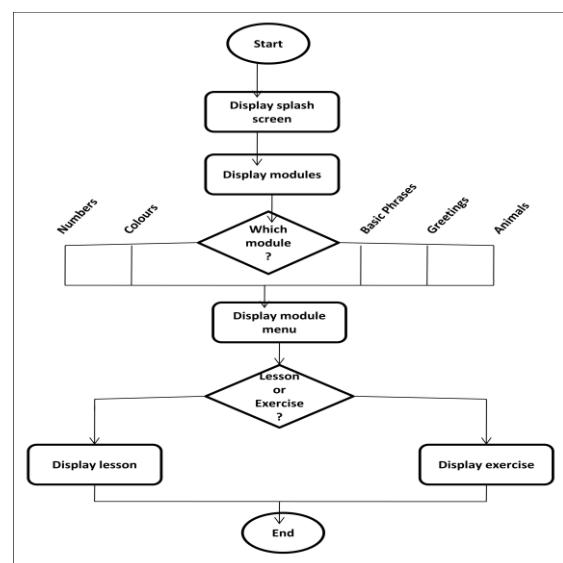


Figure 4: Application Flowchart

Figure 4 shows how the application will work. On the launch of the app, user is brought to the splash screen and then the menu. The user chooses any of the four modules that they want to learn on. Upon selection, user will be brought to another selection screen where they have to select the activity they want to do, which is either lesson or exercise.

### B. Prototype

The application works on Android operating system with minimum API level of 8. This means, only smartphones running Android 2.2 and above can run the application without any issue. The figures below are some of the application screenshots.



Figure 5: Prototype Interface

### C. Usability Testing

Ten participants tested the application on their own phones and answered a System Usability Scale (SUS) test. The test consist of answering a set of 10

question by rating answer from scale 1-5. Here are the results of the usability testing.

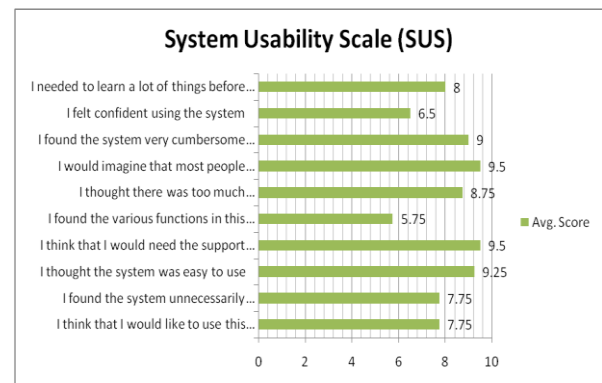


Figure 6: SUS Result

The figure above shows the average score for each of the question, from a total of ten users. Question 1, 3, 5, 7 and 9 expect users to rate more towards the higher side of the scale (3 – 5) to achieve better usability rating, while question 2, 4, 6, 8 and 10 expect the opposites.

Scoring formula:

#### Odd-numbered questions

$$\text{Average score} = (\text{Scale position} - 1) * 2.5 / \text{num of users}$$

#### Even-numbered questions

$$\text{Average score} = (5 - \text{scale position}) * 2.5 / \text{num of users}$$

The System Usability Scale (SUS) score of Learning Kadazan for Kids from the ten users is the sum of the average score of all the questions.

$$\begin{aligned} \text{SUS} &= 7.75 + 7.75 + 9.25 + 9.50 + 5.75 + 8.75 + 9.50 + 9.00 + \\ &\quad 6.50 + 8.00 \\ &= 81.75 \end{aligned}$$

An SUS score of above 80 is considered as attaining 'grade A' in the usability aspect. The average score of the application showed that development process have been carefully done with regards to the usability aspect. Another reason for this high usability quality of the application is to accommodate the target users of this application, which are Kadazan children aged 7-12 years old. It is crucial that an application is easy to use and provide no burden for the users who are using it.

### D. User Perception Test

The ten users were also request to provide feedback on the application, after using it. Stated below are some of the feedbacks gathered.

- “ The pictures and sounds are suitable for kids to learn Kadazan vocabulary. Add more module”.
- “ If possible, use real pictures to show the objects. Give more example rather than 1 per item. Overall, good job for the kids to learn Kadazan. Effort well done! Thumbs up”
- “My daughters love the sounds and animation included”

-“ It is colourful and entertaining enough to keep children keep on pressing, done that with my twins. Too bad, only a few categories are available now. Hopefully, this will be implemented soon and can have full access.”

“ The app is good already. In future development, you should add courses to organize the modules into more levels and chapters. Overall, it is a nice and fun app”

## V. CONCLUSION

### A. Recommendation

This project only covers the scope of Android smart phones users. In the future, it is possible to create similar application for other smart phones platform, such as Apple’s Iphone, RIM’s Blackberry and other Symbian smart phones. It is also possible to create a stand alone system for PCs to educate on the language more.

### B. Conclusion

Learning Kadazan for Children is a project that is designed to produce an Android application as a final product to assist children in the Kadazan community learn basic Kadazan vocabulary. The target users of this application are the children of the Kadazan community from the age of 7-12 years old. It will be an alternative to books as learning tools for Kadazan language. Children will be able to learn new vocabulary on numbers, animals, colours and some basic phrases and they can also learn on spellings on those Kadazan words. Moreover, the pronunciation of the words that are provided can help the users learn how to correctly pronounce each words. The prototype testing have been proven to be successful with user acceptance based on the usability test and user perception. Parents and children alike both liked the idea of the project and supported the development fully. Furthermore, if this application prototype can be improved and finalized, this might possibly be the first Kadazan learning application available for smart phones. With all these criterias considered, I hope that this project will be able to help the Kadazan community in keeping the language alive for generations to come with this application.

## VI. ACKNOWLEDGMENT

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## REFERENCES

- [1]. Lewis, M. Paul (ed.), 2009. *Ethnologue: Languages of the World*, Sixteenth edition. Dallas, Tex.: SIL International. Online version: <<http://www.ethnologue.com/>> .
- [2]. Smartphone Users Around The World – Statistics and Facts [Infographic]. Retrieved From : <<http://www.go-gulf.com/blog/smartphone>>
- [3]. George M. Chinnery (2006), *Emerging Technologies*, University of Maryland Baltimore County, USA.
- [4]. G. Subramaniam , *Application of Web Resources for English Language & Literature Teaching*, Postgraduate & Research Department of English, Government Arts College(Autonomous), Chennai
- [5]. Foursquare, Retrieved From : <<http://llc.unm.edu/ideas/foursquare.html>>
- [6]. Learn Bahasa Indonesia. Retrieved from : <<https://play.google.com/store/apps/details?id=com.codegent.apps.learn.indonesian&hl=en>>
- [7]. Spanish Smash Vocabulary Game. Retrieved from : <[https://play.google.com/store/apps/details?id=com.nativetongue.spanishsmash.game&feature=search\\_result](https://play.google.com/store/apps/details?id=com.nativetongue.spanishsmash.game&feature=search_result)>
- [8]. Little Pim French. Retrieved from : <<http://bestappsforkids.com/2011/11/little-pim-french/>>
- [9]. Hello-Hello Kids Language Learning. Retrieved from : <<http://itunes.apple.com/us/app/hello-hello-kids-language/id377705780?mt=8#>>
- [10]. English In A Month. Retrieved from : <[https://play.google.com/store/apps/details?id=com.elky.likechildren.enfree&feature=more\\_from\\_developer](https://play.google.com/store/apps/details?id=com.elky.likechildren.enfree&feature=more_from_developer)>
- [11]. M. Tangit (2005), *Planning Kadazandusun (Sabah, Malaysia) : Labels, Identity & Language*, University of Hawai’i, Manao, Hawaii, U.S.A
- [12]. H. Mohideen, *The Maintenance of Malaysia’s Minority Languages*, International Islamic University Malaysia

## System Usability Scale

© Digital Equipment Corporation, 1986.

	Strongly disagree					Strongly agree
1. I think that I would like to use this system frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
2. I found the system unnecessarily complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
3. I thought the system was easy to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
4. I think that I would need the support of a technical person to be able to use this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
5. I found the various functions in this system were well integrated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
6. I thought there was too much inconsistency in this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
7. I would imagine that most people would learn to use this system very quickly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
8. I found the system very cumbersome to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
9. I felt very confident using the system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	
10. I needed to learn a lot of things before I could get going with this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1	2	3	4	5	

# Learning Kadazan For Kids (Prototype Testing Feedback)

Please help fill up this form after you tested the application :)

\* Required

Are you a Kadazan? \*

- Yes
- No

How would you rate your fluency in Kadazan? \*

1    2    3    4    5

Not Fluent at all      Very Fluent

## From this section onwards, questions are related to the application testing

Is the application easy to use? \* eg : navigating through categories, easy to press buttons,

- Yes
- No

Did you require a 'Help' or 'Tutorial' page to use the application? \*

- Yes
- No

In your opinion, is the application suitable for kids (7-12 yrs old) to learn basic Kadazan? \*

- Yes
- No

Is the Interface of the system suitable to keep kids interested in using the application?

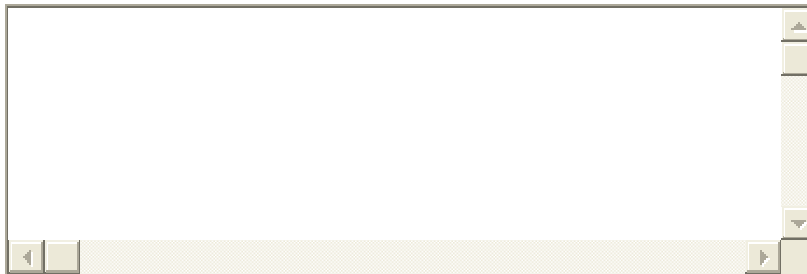
\* eg : colours of the screen, pictures, text

- Yes
- No

Did you learn something new from the application? \*

- Yes, learn something on Kadazan
- Yes, learn on something else
- No, nothing new.

What would you suggest to improve/add into the application? \* eg. more categories? more colourful? etc etc



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