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TEKNOLOGI
PETRONAS

**Android Flash Based Game for Hard Hearing Kids to
Learn Malay Language through Cued Speech and Sign Language**

(MYKIU)

BY

Lilik Anita Binti Kambyah (11966)

Dissertation submitted in partial fulfilment of

The requirements for the

Bachelor of Technology (Hons)

(Business Information System)

May 2012

Universiti Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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Approved by,

(SITI ROHKMAH BINTI SHUKRI)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

May 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 references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

(LILIK ANITA BINTI KAMBYAH)

ABSTRACT

The purpose of this project is to build android application that use as compliment to conventional education system. It use to assist hard hearing kids learning environment to be more interactive and portable. Therefore **Android Flash Based Game for Hard Hearing Kids to Learn Malay Language through Cued Speech and Sign Language (MYKIU)** developed to assists in hard hearing learning process in reading. This application is using Cued Speech and Malay Sign Language as learning approach. Advantage of **MYKIU** is act as compliment for traditional system where hard hearing kids would be able to learn through game based approach even though they are not at school. In the android market, android applications that are developed using Malay Sign Language and Cued Speech are not exist yet; most of the application is in American Sign Language (ASL) and Cued Speech that using English vocabulary. Therefore, **MYKIU** is developed to break the barrier. **MYKIU** is developed using Cued Speech and Malay Sign Language (MSL) in Malay vocabulary; this application is specifically design to assist hard hearing kids in Malaysia. The scope of the study for this project is focusing for hard hearing kids from 6 to 9 years old. **MYKIU** developed using phase development life cycle. **MYKIU** is using Action Script 3 as the programming language. It is developed using Adobe Flash CS5.5 and Adobe Photoshop Portable CS5. **MYKIU** prototype is tested in Pusat Pertuturan Kiu, Kampung Pandan. The author is able to gather 10 students age from 6 to 9 years old to test the prototype. From the testing, **MYKIU** get good response when it use by hard hearing kids.

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LIST OF ABBREVIATIONS

AS3	Action Script 3.0
MSL	Malay Sign Language
ASL	American Sign Language
KLSL	Kuala Lumpur Sign Language
PSL	Penang Sign Language
VRS	Video Relay Sensor
GBL	Game Based Learning
KTBM	Kod Tangan Bahasa Melayu

CHAPTER 1

INTRODUCTION

1.0 Background

As the title of the project suggested, **Android Flash Based Game for Hard Hearing Kids to Learn Malay Language through Cued Speech and Sign Language (MYKIU)** is an interactive and portable game based application for hard hearing kids from 6 to 9 years old to learn Malay language through Cued Speech and Malay Sign Language. The target group is hard hearing kids children; hard hearing kids is referred to individual who face difficulties to hear certain frequencies of sound either fully or partially impairment [1].

Current approach that use by teacher in most school is using Malay Sign Language (MSL). Through Malay Sign Language (MSL), hard hearing kids learn to know alphabets and words through finger spelling. Through research the author found out that Cued speech is one of the best methods to help hard hearing kids kid in their language development. Cued Speech helps hard hearing kids to develop their language through learning syllables and vocal through movement of lips and hand.

MYKIU developed as compliment for current educational system used to teach hard hearing kids. MYKIU provide mobile education to hard hearing kids and give full control to them to choose their module based on their level. MYKIU developed using Adobe Flash CS5.5 and tested in android tablet. Meanwhile Adobe Photoshop are use to edit picture that use in development of **MYKIU**.

General Strategy to Facilitate Hard hearing kids developed MYKIU as followed:

- a) Make a picture of interesting pictures containing a printed word.
- b) Select word that always used and simple (two syllables words).
- c) Use sign language to interpret the object.
- d) Use a lot of visual aids.
- e) Use more animation.
- f) Use suitable colour and font.

1.1 Problem Statement

It is crucial to ensure that hard hearing kids are able to develop their language development at early age because adult hard hearing have more difficulty to catch up during learning process if compare to the hard hearing kids when they are still at early age[2]. Current approach is using conventional technique such as books-reading, picture-matching, sign to alphabet reading, CD or Video and board games. The author identify below problem statement:

- **Hard hearing kids have difficulty in understanding relationship between printed word and object in Malay Language.**

Since hard hearing kids have difficulty on hearing therefore they have problem to know the relationship between words and the object. Therefore, hard hearing kids need other method to understand the relationship. Usually at school, teacher would explain by drawing and acting the words written. This is difficult for hard hearing kids to learn without any existence of teacher.

- **Teacher faces difficulty in explaining relationship between printed word and object in Malay Language.**

Teacher claimed that they are facing difficulty in explaining the printed word and the relationship between the object. Teacher at school face problem to draw object since they do not have the skill. Therefore it is difficult for teacher to find the relationship between them.

- **Parents have low level knowledge in provide reading material for hard hearing kids.**

Parents always left the hard hearing kids to the centre or school to help them to learn without making initiative to guide their children at home due to some constraint such as pack schedule and no suitable materials for them. Furthermore, classes are conducted every weekday in few hours. Therefore, the children are depends solely on the centre/school during the

classes conducted. Hard hearing kids children having less time to learn at school and they do not have enough material at home.

- **Less interactive and portable in Malay Language in market**

In Malaysia market, hard hearing kids are learning through the workbook and CD or DVD such as MSL Guide. MSL Guide are developed using Malay Sign Language and Malay as medium of instruction. However, there was a few number of application developed in America Sign Language in computer based or android based application. For example, Ultimate Sign Language Dictionary is English based application and developed using America Sign Language. America Sign Language having different vocabulary compare to Malaysia Sign Language. The letter structures that construct intelligible English and Malay words differ in term of its significance.

1.2 Project Significance

In existing market, most of the educational provider for hard hearing kids is exist in US market. These educational providers develop product such as Rocket America Sign Language and Ultimate Sign Language Dictionary. However there was not yet available application for hard hearing kids to learn in Malay based application. Therefore, **MYKIU** is developed based on Malay vocabulary, using Malay Sign Language and Cued Speech for the learning approach to help hard hearing kids to develop their language.

1.3 Objectives

The objective of the project is:

- i. To identify learning approach use by hard hearing kid to learn Malay Language.
- ii. To identify hard hearing kids acceptance on android game based to learn Malay Language.
- iii. To developed android game based application to learn Malay Language.

1.4 Scope of Studies

This project is targeting the hard hearing kids' age from 6 to 9 years old. Application is developed as complement for current educational system. **MYKIU** developed based on Malay based language, using Malaysia Sign Language and Cued Speech as learning approach.

1.5 Relevancy of the Project

Even tough hard hearing kids are facing difficulties to hear sound either completely or partially blocked, hard hearing kids still having the same IQ development like hearing kids. Hard hearing kids can think and having same intelligence level like hearing person. The relevancy of the project is to assist the kids to develop their language development.

1.6 Feasibility of the Project within the Scope and Time Frame

There two phase for development of the project which consist of FYP 1 and FYP 2. During the FYP 1 phase, the author would gather required information for development of the project. In FYP 2 phase, the development of the project and testing take places.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Education is facing new opportunities the enrolment rates of basic education is rising, at the end of 2005, the enrolment rate of persons with disabilities attended to compulsory school arrive at 80%, there is 18 million hard hearing kids students, accounting for 32.14% the total number of school children with special needs [1]. Increasing number of hard hearing kids student in school create opportunities for developer to make improvement in education system to meet their needs.

MYKIU aimed to offer Malay game based approach as complement from the existing method to learn to sign language and to know letter, number and simple words using Malaysia Sign Language and Malay vocabulary. Mobile learning is to meet the learners to learn any way and anything at anytime and anywhere [4]. **MYKIU** is considered as mobile learning application that provide educational anytime needed. In order to develop this program, it is important to understand the current technology, related works and behaviour of the hard hearing kids. Basically, the author should have understanding on the hard hearing Communities, Mobile Learning, Bilingual Learning Theory and Current Existing Hard hearing kids Educational Provider.

2.1 Hard Hearing Communities

2.1.1 Definition of Hard Hearing

Deaf or hard hearing can occur at any time in a person's life and impact of hard hearing kid can vary considerably depending whether hard hearing kids was acquired before or after speech development. People are therefore defined as being either pre or post-lingual hard hearing kids [5].

“Pre-lingual hard hearing kids” is a term for hard hearing kid's individuals who become hard hearing kids before learning language. Pre-lingual hard hearing kids often it more difficult to learn language, as it is an auditory vocal language,

which they can learn only from lip-reading and written word. Individual affected by pre-lingual hard hearing often acquire specialist tuition to develop certain language skill and completely have a lower than average reading ability. Approximately 30% of hard hearing kids student are functionally illiterate when they leave school, compare to less than 1% hearing student [6]. Meanwhile “post-lingually hard hearing kids” is a person who gets hearing loss because of natural result of aging. “Post-lingually hard hearing kids” be able to use spoken word and relying on lip-reading. Therefore, hard hearing kids kid who falls under category “pre-lingual hard hearing kids” having difficulty in learning language compare to “post-lingually hard hearing kids”. However, hard hearing does not affect the capability of the student to learn and does not affect the person’s intellectual behaviour. But, these kids need some special education service in order to receive an adequate education [5].

Other definition of “hard hearing” refer to the hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification”[5]. Hard hearing is condition that prevent for the student from receiving sound in all or most of its form [6]. Based on the thought, hard hearing kids will be unable to hear any sound from the surrounding and this will limit the kids be able to communicate well with the hearing individual. This situation may cause the delay in learning language and delay the communication between them.

2.1.2 Communication between Hard hearing kids Communities

2.1.2.1 Communicate Through Sign Language

Hard hearing children communicate with each other through sign language. Children who exposed to sign language late in childhood turn out to be less proficient and may never catch up in adulthood than those in early childhood. Findings suggest that hard hearing children read by using a code that is not based on sound and those hard hearing kids parents are better reader than hard hearing kid’s children of hearing parents [3]. This is because hard hearing kids parents be able to identified the children earlier and give them appropriate education for the kids and the also can teach them sign language to let them be able to communicate in daily communication.

Why they use sign language in communicating? Hard hearing kids learned communicate each other through the map between the sign and the print. This technique used by the hard hearing kids called as “chaining” [7]. They learn this sign language either through their parents or they go to school. Only small percentages of hard hearing kids in Malaysia attend school. From the statistics show that average of 0.3% of a given population being born hard hearing kid’s approximately 66,000 congenitally hard hearing kids’ people in Malaysia. About 20% of them are going to school [8].

There are three signal language uses in Malaysia which are Kuala Lumpur Sign Language (KLSL) that based on American Sign Language (ASL), Malaysia Sign Language, (MSL) and Bahasa Malaysia Kod Tangan(KTBM) that develop by Malaysia government, and Penang Sign Language (PSL) that develop by hard hearing kids outside the classroom[8]. We can see there are no universal languages that are use by hard hearing kid’s communities even in Malaysia itself. Many hard hearing kids that know signal language are not able to read or write. This cause many problems for them, for example when they visit ministry website and want to filled form. All the information in written language and the hard hearing kids unable to read because the website not provides any sign language translation for them.

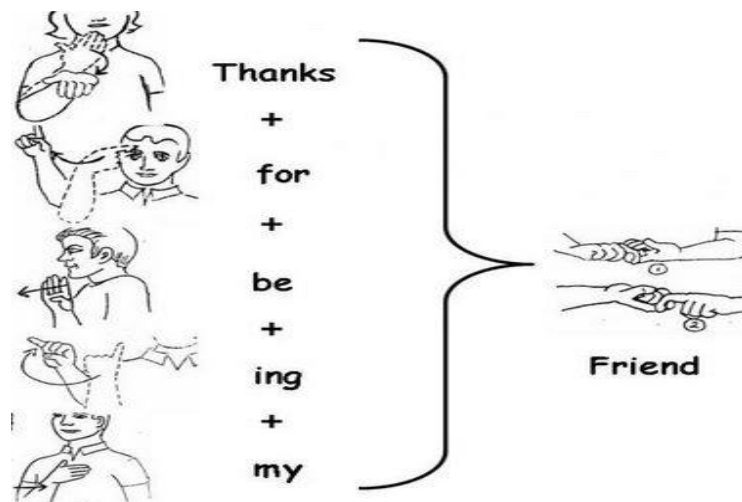


Figure 1.0 Example of Sign Language

Figure 1.0 show example on how the hard hearing kids communicates with each other using the signal language they learned. It show how a person to say “thank for being my friend” in signal language.

2.1.2.1 Communicate Through Cued Speech

Cued Speech is phonemic-based system which makes traditionally spoken language accessible by using small number of hand shapes that represent the consonant and in different location near mouth to represent the vowel [31]. Cued Speech is the communication use to overcome the hard hearing communication abilities. Through Cued Speech, hard hearing people be able to spoke like normal person with the help of hearing aids. Cued speech is different from sign language. It is Manually Coded Sign System for a spoken language. It uses to represent the lip movement on the letter and syllables. On 2005, cued speech is adapted into 6 languages and dialects. Hard hearing kids be able to learn Cued Speech through lip reading.

Cued Speech is invented in 1966 by Dr. R.Orin Cornett at Gallaudet College Washington D.C. Cued speech is invented after they discover that children with prelingual and profound hearing impairment have poor reading comprehension. Through cued speech, it would help them to break the barrier [31]. In Malaysia, Cued Speech is rarely used by the school. Most of government school in Malaysia used Malay sign language as a medium of communication and learning. In Malaysia, the author identified one hard hearing centre that use cued speech as the medium of communication and learning. This centre called as Pusat Pertuturan Kiu in Kampung Pandan. Hard hearing kids from this centre are able to communicate verbally and be able to read. Besides that, these hard hearing kids not only are able to read in Malay Language but also in English and also be able to read Quran and learn Arabic letter.

2.1.3 Learning reading method among hard hearing kids Communities

Person who never heard sound makes it much harder for the congenitally and profoundly hard hearing kids to learn to speak or read English. The fact that the average hard hearing kids high school graduate is only able to read at a fourth-grade level demonstrates the difficulty a hard hearing person can experience [9]. Children

that have only a mild hearing loss read at lower level than do hearing children [10]. This evidence shows the hard hearing kids having difficulty in learning language because they cannot speak and read the alphabet.

Idea of the individual letters with individual sounds blend to make words is known as alphabetic principles [11]. It is well established that this is the key step in learning to read [12]. From the principle, we can see that relationship between letter and sounds is the most efficient way to read printed text. The process is when we recode each word from letter into movement is a significant way to learn language. There is many ways how hard hearing kids to learn how to read:

- Finger Spell using Signal Language

Description : Usually inside the classroom the teacher will fingerspell a word, then points to the word written on the blackboard an finally the teacher uses an initialized sign for the word [14].

Advantages: For hard hearing kids who learn signal language since born is able to catch up the lesson syllabus better.

Disadvantages: The problem with this method, there is not enough teachers who have skill to teach sign language and some of student has different level in order to understand the language some student might take longer time to understand the sign language.

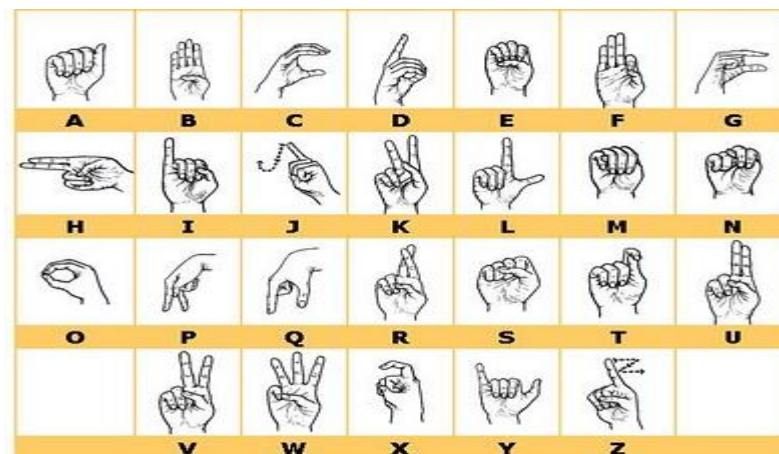


Figure 2.0 Malaysia Signal Languages

Figure 2.0 shows Malaysia Signal Language uses finger spell to recognize the alphabet from A to Z. They use different hand sign represent different alphabet. Malaysian Signal Language has different vocabulary and sentence structure compare to the America Signal Language.

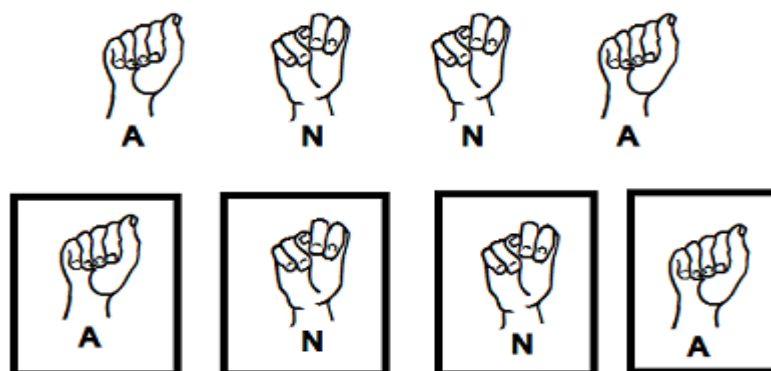


Figure 3.0 Word in Malaysia Sign Language

Figure 3.0 show how they use the finger spell to pronounce words to pronounce her name. Hard hearing kids use finger spell in order to read words and identified them meaning of the words in order to learn how to read.

- Phonic

Description: Phonic method us reading as method of reading. Hard hearing kids see the word written and how the word spells through lips movement. Then they are “sound out” the letter of words and learn what it means. Then they write the language into the written languages. Through this method hard hearing kids student be able to read and write at the same time.

Advantages: Most help for hard hearing kids who do not know signal language since born.

Disadvantages: Dull class environment and rigid syllabus period.

- Whole language

Descriptions: Hard hearing kids learn reading by focuses on seeing. Children learn to read first and they learn the meaning. Then they learn about the letter that makes how the word to build and they “sound out” the word. The different between phonic is this technique the way hard hearing kids spell the words might be wrong but it meets the meaning of the words.

Advantages: Most help for hard hearing kids who do not know signal language since born.

Disadvantages: Dull class environment and rigid syllabus period.

- Guided Reading

Descriptions: Guided reading uses different activities to increase child's reading ability. There are different approaches to guided reading. But most of them use three activities:

- a) Pre-reading activities: Hard hearing kids are shown words and ideas that will be used in the reading.
- b) Silent and oral reading: Inside a group, the children read the story.
- c) Post-reading activities: The children do activities to understand the word given.

Advantages: Most help for hard hearing kids who do not know signal language since born.

Disadvantages: Dull class environment and fixed syllabus period.

2.1.4 Learning Theory

2.1.4.1 Introduction Bilingual learning theory

Learning is commonly defined as a process that brings together cognitive, emotional and environmental influences and experience acquiring, enhancing or making changes in one knowledge, skills, values and world view [22]. Learning theory is describing how human and learns in daily life. Learning theories is suggesting where to look for solutions to practical in daily problem [23].

For this project, the author use **bilingual learning theory** approach. Through the bilingual learning theory approach would include recognizing the signed and spoken language as different and distinct and valuing both of them equally, developing pride and identify in being Hard hearing kids, exposing students to Hard hearing kids role models and peers and addressing issues and conflicts with cultural sensitivity and awareness [22]. Through this learning theory, hard hearing kids kid two languages which are Malaysia Sign Language as first language and read/write in

Malay as second language. **MYKIU** is developed by implementing this theory where hard hearing kids not identify the object into sign language and printed word.

Overall, early exposure to the natural sign language would establish an effective way to communicate and interact with the world around them [24]. Hearing people tend to rely on the correspondence between the linguistic structures of the written pieces and the retrievable speech patterns when learning to read and write; however additional cognitive steps are needed [25]. Through bilingual learning theory hard hearing kids would be able to use sign language and work with the printed word.

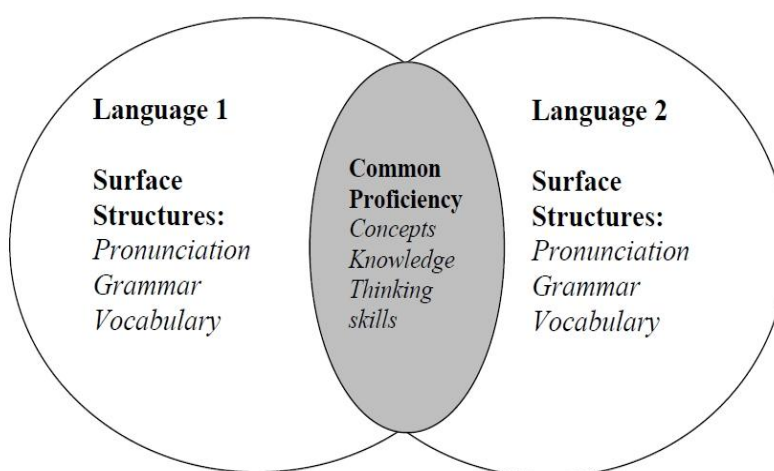


Figure 4.0: Bilingual Concept

Bilingual hard hearing kids are enjoying learning language more than the non-bilingual students. Bilingual Learning Theory is combining two languages to derive common proficiency. Figure 4.0 show where language 1 and language 2 are learning their own grammar and vocabulary. When both of languages are used in would result of common concepts and knowledge. Through MYKIU it would help the learners to understand the image and translate using Malay Sign Language and printed word.

2.2 Technology as Hard hearing kids Education Tool

2.2.1 Hard hearing kids Accessibility to Multimedia

There are two approaches to hard hearing kid's access: 'assistive' and 'direct'. Assistive access uses technology to help individual use previously develop

systems. Direct access provide access as part of develop system [15]. Until recently, text and GUI interfaces allowed similar ‘direct’ access to computer systems for hard hearing kid’s users [15]. The assistive technologies can be group into two categories:

- **Communication Systems:** These systems interpret between communication media. Thus, they perform translation of speech to text, speech to video sign language, text to computer-generate voice or video sign language. It helps two-way communication between hearing and hard hearing kids individuals. Example of communication system includes I-Communicator, TESSA and Video Relay Sensor (VRS).
- **Caption Systems:** It is synchronised textual alternative to audio or video. Caption include all aspects of audio, including description of sound using symbols an icons to represent the type of content. Caption usually displayed at the bottom of the television screen. Caption designed to help hard hearing kids to learn read or learning second language.

Caption system designed to help the hard hearing kids to read article in website and to watch news in television. We can use caption system to attract the hard hearing kids to understand how to read and communicate because they cannot hear but their sight become more sensitive, caption system is the best way to help hard hearing kids learn how to read.

2.2.2 Game-based Learning approach for hard hearing kids

Game based Learning (GBL) is a branch of games that deals with applications that defined learning outcomes. Through game based learning, it designs to balance subject matter with game play and ability of the player to retain on the game. When designing game based learning, there are few criteria need to be consider during the designing functionality. The trainee needs to identify the user interest. The material provided in the game based learning should be not tough for the targeted user.

In the future, game base learning is expected to be able to stimulate the real life scenario who will give the opportunity for user to use as an alternative of learning. For example, game based learning may be beneficial in future such as in the

airline sector where game based learning be able to give environment for the pilot training.

The old fashioned game are using concept of enhance the intellectual skill of the player by playing game based learning. For example, monopoly games are design to help the player to play with family by using intellectual skill in winning the game.

2.2.3 Mobile Learning as Education Learning Tool

Mobile learning is a digital learning approach which use constructivist learning theory, draws on integrates other learning theories and uses equipment and the environment of information and communication technology, combining virtual learning with practical learning, self learning with collaborative learning, and formal learning with informal learning [16]. Mobile learning is a flexible approach use to help student and help provide them with flexible learning environment. Mobile learning is to meet learners to learn anything at anytime and anywhere [1]. Its knowledge points is relatively independent and short, the learning content uses graphics, animation and sound to describe easily to built mobile learning [17]. Large text and video capabilities fully develop their creativity and imagination and give student better learning space so that they can understand the teaching content vivid and deeply to promote theirs coordinated development of all aspects.

Mobile learning is a revolution from the previous learning technique. M-Learning is evolution of traditional learning and distant learning to E-learning and CSCL finally led to M-learning [18]. **Figure 5.0** show how evolution of learning type. The below figure shows that M-learning is a new technique that combine and improve based on previous learning technique.

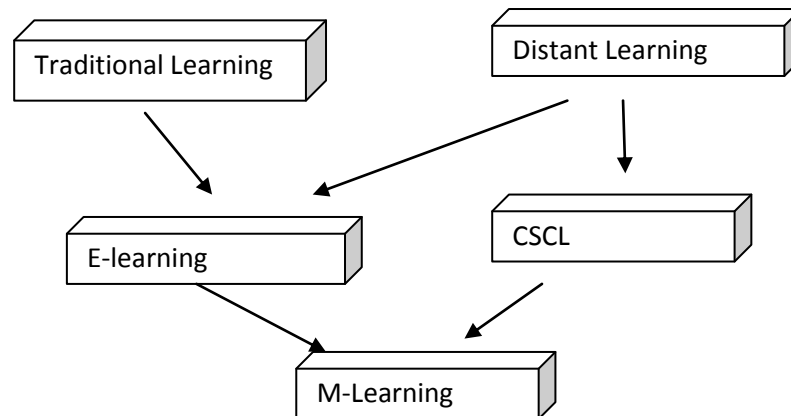


Figure 5.0 Mobile Learning

Lifelong learning is approach to providing people with the knowledge and skills they need to succeed in rapidly-changing world. Mobile learning is meets the criteria of lifelong learning:

- Highly portable : Available wherever the user needs to learn
- Individual: Adapting to the learners’ abilities and designed to support personal learning.
- Availability: Available anywhere to enable communication between peers and teachers.
- Adaptability: Learner can adapt with new knowledge.
- Useful: Can be use every day as reference.

MYKIU should meet the criteria above to works as mobile learning where it provides education for hard hearing kid’s anywhere and anytime.

2.2.4 Tablet Computer Use as Application Platform

Tablet computer is a complete mobile computer, bigger than mobile phone or PDA, integrated into a touch screen. The device uses the onscreen virtual keyboard or digital pen. Tablet computer is a mobile device and equipped with classic desktop OS and work like personal desktop. Through this device, we can create document for presentation or assignment. Most tablet computer is equipped with WIFI and 3G to

allow user to search for information. This tablet computer have wider screen compare to the mobile phone.

In education, tablet computer is the most portable device can be use to help pre-lingual hard hearing kids in learning. Tablet computer provide wider screen that ease for the student to view the content of the application. It also helps the pre-lingual hard hearing kids to learn the computer skill. Until now, number of hard hearing kids who are passed in examination is to low in school. There is a change need to be done to help them to excel in their study. By using tablet computer, mobile learning environment can be created and help the pre-lingual hard hearing kids to learn more anywhere anytime they want to.

Tablet computer are sold as low as \$35 per unit in order to encourage education centre to implement mobile learning for their student. Currently, mobile-learning are popular in certain country such as USA and India. However, mobile-learning are not popular in Malaysia yet.

2.3 Current Existing Hard hearing kids Educational Provider

Since the initial of sign language introduced by Juan Pablo De Bonet, but organize educational system are introduced by 1750[3]. However in Malaysia, Malaysian Sign Language are introduce on 1998 and strong influence by the America Signal Language [3]. From time to time, there is more and more educational institution to help hard hearing kids to get proper education. Many companies have slowly realized the potential of building application and devices to help the hard hearing kids to learn signal language based on the word. The applications are listed below with its country and product in the following table:

Country	Product	Type
United State	The Ultimate Sign Language Dictionary	Computer Based
United State	ASL Ultimate	Android based application
British	British Sign Language	Web Based
United State	Dawn Sign Press	Web Based

United State	University of South Florida	Web Based/Online Class
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Table 1.0: Current Product Available

As seen from the table, most of the company are located in United States and the application is designed based America Sign Language and English vocabulary. Besides that, the application design using Cued Speech is design for the English vocabulary. There is limited application even in web based using Cued Speech approach as learning approach for hard hearing kids.

2.4 Current Application for Hard hearing kids

Hard hearing kids learning application are limited in the market; most of them are in American vocabulary. The author found out that there is very limited in existence of application using cued speech in the market yet and found out few technologies using sign language however most of them in other language such as English and British.

2.4.1 The Ultimate Sign Language Dictionary



Figure 6.0 Ultimate Sign Language Dictionary

This application includes over 2,700 sign language and 7,000 English word equivalents. It also consists of 15,000 files of pictures, text and video [19]. **Figure**

6.0 show the use the application to search word and learn how the signal language is. Below application is designed using English vocabulary and America Sign Language [19]. It is a computer based application. The advantages of this application are it does not provide tutorial or game based application for hard hearing kids to test on their understanding.

2.4.2 ASL Ultimate

Figure 7.0 show the ASL Ultimate interface, this application is android based application. ASL Ultimate is containing of more than 1,400 words and this corresponding to sign [28]. This application provides clear description of the sign language. It provides a search engine for the user to search for the words and correspondence of the sign language [28]. The advantage of the application is words are arranged based on the categories, this ease the user to search for the required words. Besides it provide description for each sign. However, this application do not provide tutorial for the user to test their understanding.



Figure 7.0 ASL Ultimate Interface

2.4.3 British Sign Language

Figure 8.0 shows British Sign Language interface, this application is a web based application [29]. It using British vocabulary to help the hard hearing kids user to understand and learn sign language. The disadvantage of this application is not portable and needed internet when using the application.



Figure 8.0 British Sign Language Interface

2.4.4 Dawn Sign Press

Figure 9.0 shows the Dawn Sign Press interface is a web based application that using American Sign Language [30]. The disadvantage of this application is not portable and need internet connection to access the content.



Figure 9.0 Dawn Sign Press Interface

2.4.4 University of South Florida Website

University of South Florida provide a page to learn cued speech however is limited. Their website provides online class for hard hearing to learn cued speech online. This application is not focus on hard hearing kids but general to hard hearing communities. This cued speech is limited in English vocabulary. Figure 10.0 shows the interface of University of South Florida Website.

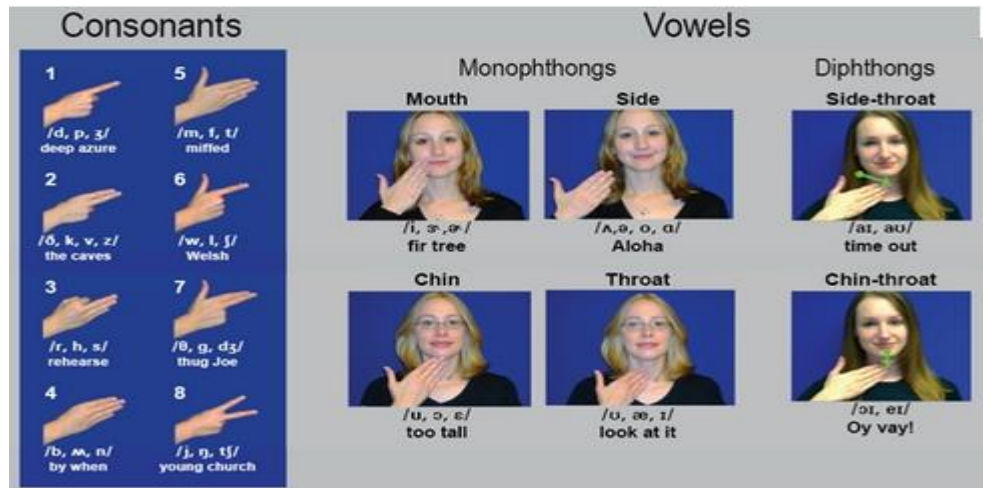


Figure 10.0: University of South Florida Website

2.5 Comparison between Proposed Application (MYKIU) and Existing Products

This section would review on the functions, features, system strength and limitation between the above four existing application and proposed application (MYKIU). Summary of the function and features are tabulated in Table 2.0.

Type/Features	The Ultimate Sign Language Dictionary	ASL Ultimate	British Sign Language	University of South Florida Website	Dawn Sign Press	Proposed Solution (MYKIU)
Sign Language	American Sign Language	American Sign Language	British Sign Language	Cued Speech	American Sign Language	Malay Sign Language And Cued

						Speech
Medium of instruction	English	English	British	English	English	Malay
Alphabet	No	No	No	Yes	No	Yes
Number	No	No	No	No	No	No
Word	No	Yes	Yes	Yes	Yes	Yes
Amount of words, letter and alphabet	15,000	1,400	More than 1,000	More than 1000	More than 1,000	50
Exercise	No	No	No	Yes	No	Yes
Audio	No	No	No	No	No	No
Picture	Yes	Yes	Yes	Yes	Yes	Yes
Operating Platforms	Computer-based	Android Application	Web-based	Web-based	Web-based	Android application
Mobility	High	Very High	High	High	High	Very High
Availability	High	Very High	Medium		Medium	Very High

Table 2.0: Comparison between MYKIU and Existing Products

Based on **Table 2.0**, **MYKIU** are considering the features and strength of the four existing application in the market. The key different of **MYKIU** is this application is developed to focus for hard hearing kids from 6 to 9 years old. This application is having very high mobility and availability because **MYKIU** was design for android tablet games application.

CHAPTER 3

METHODOLOGY

3.0 Introduction

As the above discussion have identified a few technology that relate to hard hearing kids on helping them in education that can be further improvement, reconstruct or redefined, the following methodology will practically mention the ideas the author suggests on build portable and interactive Malay game based android application, objective of the project as stated as follows:

- i. To identify learning approach use by hard hearing kid to learn Malay Language.
- ii. To identify hard hearing kids acceptance on android game based to learn Malay Language.
- iii. To developed android game based application to learn Malay Language.

3.1 Project Methodology

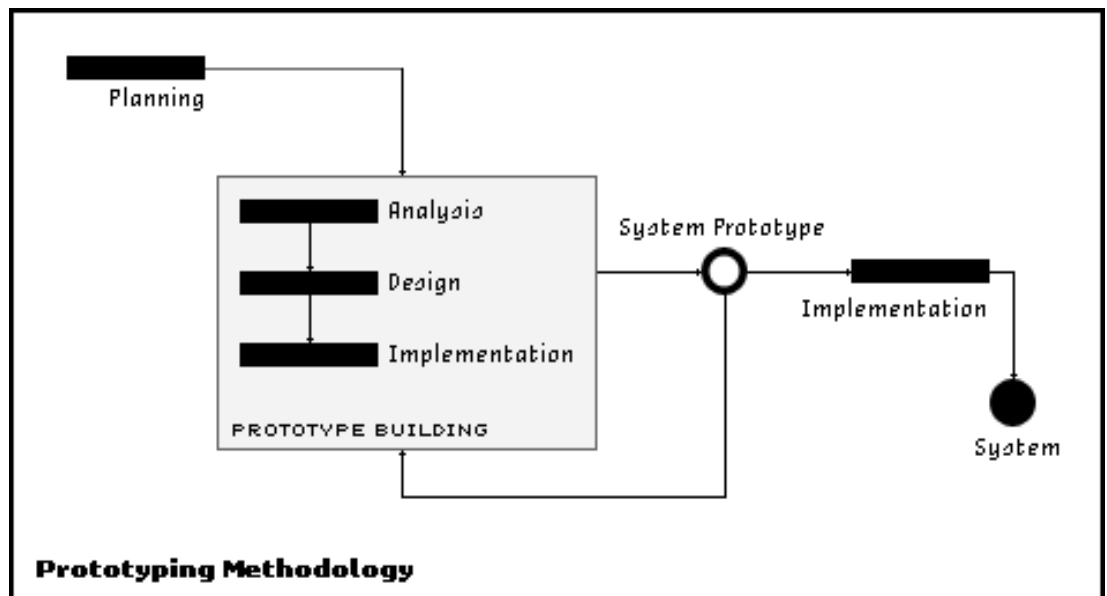


Figure 11.0 Prototyping development life cycle

This project adopt prototyping development system life cycle. It segmented into planning, analysis, design and implementation. **Figure 11.0** show the prototyping development lifecycle where the author needs to plan and build the prototype. This prototype would be needed to be tested until it meets the user satisfaction and implemented the application at the end.

In the development of **MYKIU**, the author plan to come out with prototype and would be tested by hard hearing kids on the usability of the application. The author would gather all the feedback and analyse the data to come out with final application of **MYKIU**.

The elaboration for each phased are mention as follows:

- Initial Planning

In planning phase, the author needs to identify below items:

- i. Identify the problem statement, objective, feasibility studies, project relevancy and scope of work.
- ii. Build Gant Chart to plan and schedule the project.
- iii. Search for hard hearing kids centre contact details around Perak and Kuala Lumpur.

MYKIU prototype development

- Analysis

In analysis phase, the author needed to gather information on the hard hearing kid's behaviour in learning and components needed in development of the **MYKIU**. The below item needed to be identified by the author:

- i. Conduct literature review on the learning behaviour of hard hearing kids, definition of hard hearing kids and previous application that uses by hard hearing kids to learn words, alphabet and letter through sign language.
- ii. Identify the suitable operating platform for **MYKIU**.

- iii. Identified the suitable programming tools to developed **MYKIU**.
- iv. Study and learning the programming language (Adobe Flash CS5.5).
- Design and Development

In this phase, the author needs to design the interface of MYKIU. Below is the items needed for author to identify:

- i. Design user interface GUI. Below showed the propose design of **MYKIU** by using Microsoft Power Point for FYP 1:



Figure 12.0: Home Page MYKIU

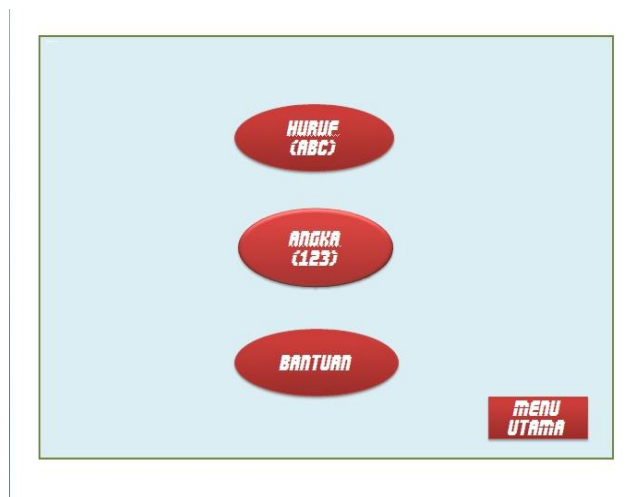


Figure 13.0: Categories of MYKIU

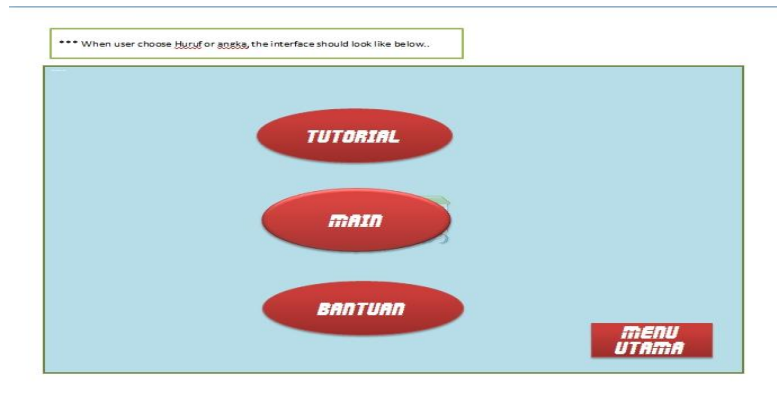


Figure 14.0: Sub-Category of MYKIU

Figure 12.0, figure 13.0 and figure 14.0 show the first menu interface for MYKIU. There were three categories and each category consists of tutorial, help and introduction.



Figure 15.0: Game Design

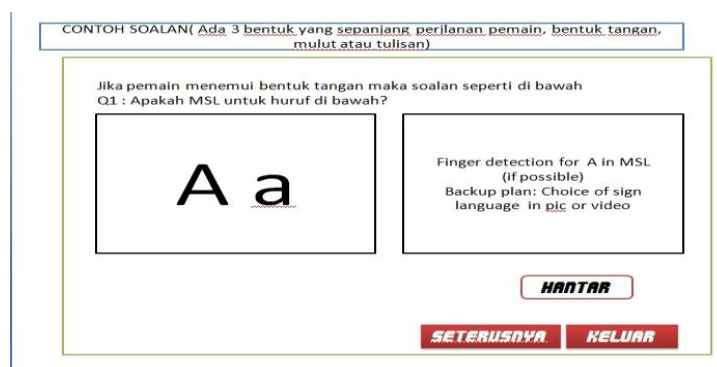


Figure 16.0: Answer Design

Figure 15.0 and Figure 16.0 show how the questionnaire is design for hard hearing kids. They need to choose the sign language of the shows letter.

- ii. Develop flow chart for the **MYKIU**.
- iii. Developed **MYKIU** application prototype. Example of the code for the application are written as follows:

```
//HomepageCodeExample

movieClip_2.addEventListener(MouseEvent.CLICK, fl_MouseClickHandler_21);

function fl_MouseClickHandler_21(event:MouseEvent):void

{trace("Mouse clicked");

gotoAndStop (136);

}

Multitouch.inputMode = MultitouchInputMode.TOUCH_POINT;

movieClip_2.addEventListener(TouchEvent.TOUCH_TAP, fl_TapHandler_14);

function fl_TapHandler_14(event:TouchEvent):void

{   movieClip_2.alpha *= 0.5;

    gotoAndStop (136);

}

//Game CodeExample

stop()

Multitouch.inputMode = MultitouchInputMode.TOUCH_POINT;

movieClip_160.addEventListener(TouchEvent.TOUCH_TAP, fl_TapHandler_619);

function fl_TapHandler_619(event:TouchEvent):void

{   movieClip_160.alpha *= 0.5;

    gotoAndStop(2);

}

Multitouch.inputMode = MultitouchInputMode.TOUCH_POINT;
```

```

D.addListener(TouchEvent.TOUCH_TAP, fl_TapHandler_382);

function fl_TapHandler_382(event:TouchEvent):void
{
    D.alpha *= 0.5;

    B.visible = false;

    D.visible=false;

    Y.visible=false;

    arrow2.visible = true;

    salah.visible= true;

}

Multitouch.inputMode = MultitouchInputMode.TOUCH_POINT;

Y.addListener(TouchEvent.TOUCH_TAP, fl_TapHandler_383);

function fl_TapHandler_383(event:TouchEvent):void
{
    Y.alpha *= 0.5;

    B.visible = false;

    D.visible=false;

    Y.visible=false;

    arrow2.visible = true;

    salah.visible= true;

    // End your custom code

}

Multitouch.inputMode = MultitouchInputMode.TOUCH_POINT;

B.addListener(TouchEvent.TOUCH_TAP, fl_TapHandler_384);

function fl_TapHandler_384(event:TouchEvent):void
{B.alpha *= 0.5;

    B.visible = false;

```

```
D.visible=false;

Y.visible=false;

arrow1.visible = true;

betul.visible= true;

// End your custom code

}

Multitouch.inputMode = MultitouchInputMode.TOUCH_POINT;

arrow1.addEventListener(TouchEvent.TOUCH_TAP, fl_TapHandler_387);

function fl_TapHandler_387(event:TouchEvent):void

{

    arrow1.alpha *= 0.5;

    gotoAndPlay (284);

}

Multitouch.inputMode = MultitouchInputMode.TOUCH_POINT;

arrow2.addEventListener(TouchEvent.TOUCH_TAP, fl_TapHandler_424);

function fl_TapHandler_424(event:TouchEvent):void

{

    arrow2.alpha *= 0.5;

    gotoAndPlay (1409);

}
```

- **Implementation**

In this phase, the author needed to test and implemented the application to get the hard hearing kids feedback on the **MYKIU**. Below items needed to be identified by the author:

- i. **MYKIU** application conduct bug-fixing.
- ii. Prepare set of questionnaire to test **MYKIU** application.

MYKIU divided into four categories which is consists of sign language (“bahasa isyarat”), cued speech (“bahasa kiu”), comprehension 1 (“pemahaman 1”) and comprehension 2 (“pemahaman 2”).

Pre-Testing Questionnaire

Set of Questionnaire is set as follows:

MYKIU is android application for hard hearing kids from 6 years old to 9 years old to teach them to understand Malay words and structure. **MYKIU** is use as a compliment for hard hearing kids in their learning.

Introduction for Each Category

Objective of questionnaire: To test the understanding of introduction (“pengenalan”) to teach hard hearing kids to help them to have overview on the each games.

- 1) Did hard hearing kids giving good response when using introduction (“pengenalan”) as the medium of learning?

Below 5 5 Above 5

- 2) Give comment to improve the introduction (“pengenalan”).

Game 1 for Each Category

Objective of questionnaire: To evaluate the game 1 either it helps the hard hearing kids to learn Malay language.

- 1) How many question answer correctly for each stages?

1-2 2-4 5

- 2) How long it takes to answer each question?

30 second below 30 second to 1 minutes more than 1 minute

3) Did hard hearing kids giving good response when playing the game?

Below 5 5 Above 5

4) Give comment to improve the game 1

Game 2 for Each Category

Objective of questionnaire: To evaluate the game 1 either it helps the hard hearing kids to learn Malay language.

1) How many question answer correctly for each stages?

1-2 2-4 5

2) How long it takes to answer each question?

30 second below 30 second to 1 minutes more than 1 minute

3) Did hard hearing kids giving good response when playing the game?

Below 5 5 Above 5

4) Give comment to improve the game 2

Post Testing Questionnaire

Answer question 1-10: Please tick appropriate answer to the question.

1. Gender:

() Male () Female

2. Age:

() 6 () 7 () 8 () 9

3. Question below to identify the usage and exposure of computer and mobile phone at home:

Question	Yes	No
Did you use computer and mobile phone at home?		
Did you know how to use computer and mobile phone?		
Did you agree that mobile phone help you to learn better?		

4. Below criteria meet your requirement after using MYKIU.

Characteristic	Strongly Agree	Agree	Average	Not Agree	Strongly Not Agree
Interative					
Animation					
Video					
Picture					

5. Did you understand sillabus use by MYKIU?

() Yes () No

6. Did MYKIU help you to understand letter, words and sentence structure?

() Yes () No

7. What age you start to read?

() below 6 () 7 () 8 () above 9

8. Did you family spent time at home to teach you on how to read?

() Yes () No

9. How long your parents spent time at home to teach you to read?

() 1 hour per day

() Every weekend

() Once a month

() None

() Others: _____

10. Any comment on MYKIU.

iii. **MYKIU** conducts system testing. The author planned to conduct user testing in hard hearing kids centre on the middle of July 2012. Follows is how the interview would be conducted:

- Testing would involve 10 hard hearing kids students in the classroom. Each hard hearing kids student needed to test the application one by one.
- Each of the hard hearing kids would be assisted by one person to assist the behaviour of hard hearing kids when using the application. Each of students is given 15 to 20 minutes to play with the **MYKIU**. Before hard hearing kids students used the application, the person in charge to assist them needed to brief the kids.
- Set questionnaire is given to the assessor to evaluate the hard hearing kids' performance.

MYKIU development after testing

Feedback gathered from the prototype are analyzed and used to improve the **MYKIU** prototype. Then, **MYKIU** is developed based on the feedback given by them. Afterwards, implementation of final **MYKIU** application is conducted as follows:

- Implementation

Final testing on **MYKIU** is conducted by the author as follows:

- i. Conduct application bug-fixing testing. This testing needed to be conducted to ensure there was no bug in **MYKIU**.

3.2 Gant Chart

Figure 17.0 followed is the Gant Chart for the whole project development:

Time/ Task	Sept 2011	Oct 2011	Nov 2011	Dec 2011	Jan- May 2012	May 2012	Jun 2012	July 2012	August 2012
Initial Planning	█	█			█				
Analysis		█	█	█	█				
Design And Developm ent					█	█	█	█	
Implemen tation and Testing 1					█			█	
Implemen tation and Testing 2					█				█
Final Prototype					█				█

Figure 17.0 FYP Gant Chart

3.3 Required Tools

Below is the required hardware and programming tools needed in the development of MYKIU:

Software Development Tools

a) Adobe Photoshop CS5 Portable

Adobe Photoshop CS5 Portable is use to edit the picture to remove white background of images. For example of images is as follow:

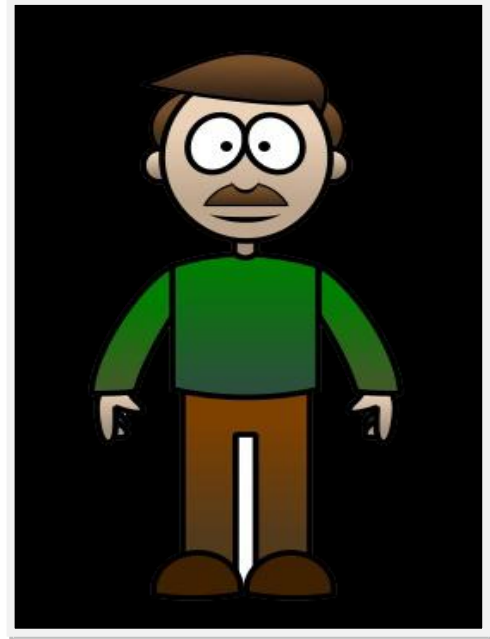
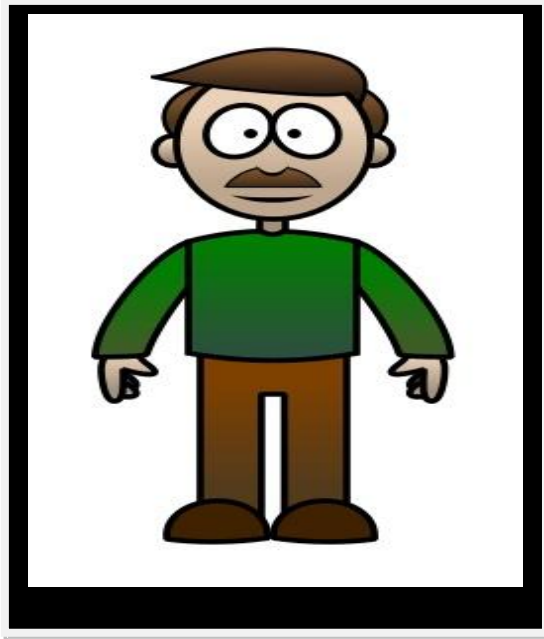


Figure 18.0 Picture of Dad before Edit Figure 19.0 Picture of Dad after Edit

Figure 18.0 show image of dad before edit using Adobe Photoshop CS5 Portable where there is white background. By using magic wand tools in Adobe Photoshop CS5 portable it removes the white background into invisible in Figure 19.0.

b) Adobe Flash CS5.5

Adobe Flash CS5.5 is used in overall development of **MYKIU** application. It developed the game and all the content inside the game. It use ACS Script 3.0 as the programming language.

Hardware:

a) Android Tab 7.0 Plus

MYKIU are test and implement by using Android Tab 7.0 Plus with 3.2 version. This device also use for testing with hard hearing kids to identify the hard hearing kids interactivity to the application.

b) HP Compaq Presario V3000

HP Compaq Presario V3000 is use to do coding and develop the MYKIU application.

CHAPTER 4

ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter would discuss on the objective of each game and also would discuss on the progress of **MYKIU** prototype.

4.1 Prototype Progress

MYKIU is android application developed to provide interactive educational anytime and anywhere for hard hearing kids by using cued speech and Malay sign language as learning approach to help them to learn and identify words and letters.

Figure 20.0 show the homepage of **MYKIU**. The background contain of school bus represent that this design for kids.



Figure 20.0: Home page of MYKIU

Figure 21.0 show the categories that should be learn by hard hearing kids by the end of the day. There were 4 categories in this application consist of sign

language (“bahasa isyarat”), cued speech (“bahasa kiu”), comprehension 1 (“pemahaman 1”) and comprehension 2 (“pemahaman 2”).



Figure 21.0: Categories of MYKIU

Cued Speech Category

This category consists of two sections where it consists of introduction (“pengenalan”) and 1 game. **Figure 22.0** show the interface of cued speech category.



Figure 22.0: Interface of cued speech category

Figure 23.0 consists of the Introduction (“pengenalan”) that teaches hard hearing kids to learn cued speech. This menu would be consisting of cued speech of letters and syllables.



Figure 23.0: Cued Speech of Letters and Syllables

In cued speech learning, hard hearing kids tested through cued speech game. Learn cued speech game purpose is to test hard hearing kids understanding on cued speech. From this game, it would help hard hearing kids to understand and memorize the cued speech. **Figure 24.0** below shows the cued speech of letters and syllables game interface.



Figure 24.0: Cued Speech of Letters and Syllables Game

Sign Language Category



Figure 25.0: Sign Language Category

Figure 25.0 shows Sign Language Category which consists of letter introduction (“pengenalan huruf”) and word introduction (“pengenalan perkataan”). **Figure 26.0** shows letter introduction (“pengenalan huruf”) which teaches hard hearing kids where they learn through flash card concept where it shows the respective letter using Malay sign language.

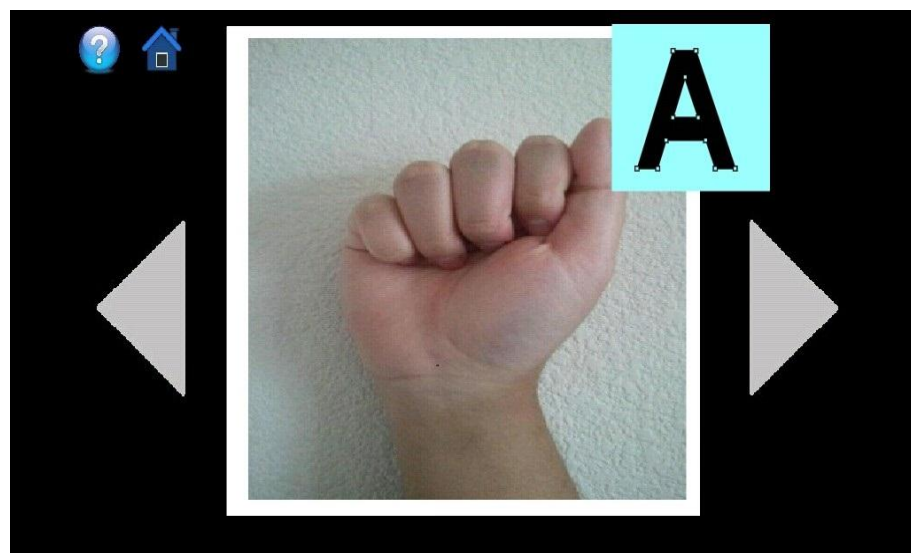


Figure 26.0: Flash card of the letter (‘huruf’)

Figure 27.0 shows the categories of the two syllables words (“perkataan”) into family, fruits and transportation. This would help hard hearing kids to learn Malay sign language of two syllables words into category. **Figure 28.0** shows the example of two syllables words in family categories.



Figure 27.0: Category of two syllables words



Figure 28.0: Flash card of the two syllables words (“perkataan”) (“Mengenali huruf”) game is to help kids to know the letter of the Malay sign language showed. There would be 3 options of answer for hard hearing kids to

choose the correct answer. Figure 29.0 and Figure 30.0 show interface of “mengenal huruf” game.



Figure 29.0: Malay Sign Language shows



Figure 30.0: Game 1 Interface

(“Mengenal perkataan ”) game is to help kids to know the word of the Malay sign language showed. There would be 3 option of answer for hard hearing kids to choose the correct answer. Figure 31.0 show interface “mengenal perkataan”.



Figure 31.0: Interface “mengenal perkataan”

Comprehension 1 Category



Figure 32.0: Comprehension 1 Category

Figure 32.0 shows the comprehension 1 category consists of introduction (“pengenalan”) and three games. First game would help hard hearing kid to learn word by combine with syllables shown in **Figure 33.0**. Second game would help hard hearing kid to learn words and the object shown in **Figure 34.0**. Meanwhile, third game would help the hard hearing kids to learn how to get build correct

sentences shown in Figure 35.0 . Through this category it would help hard hearing kids to learn and identify words.

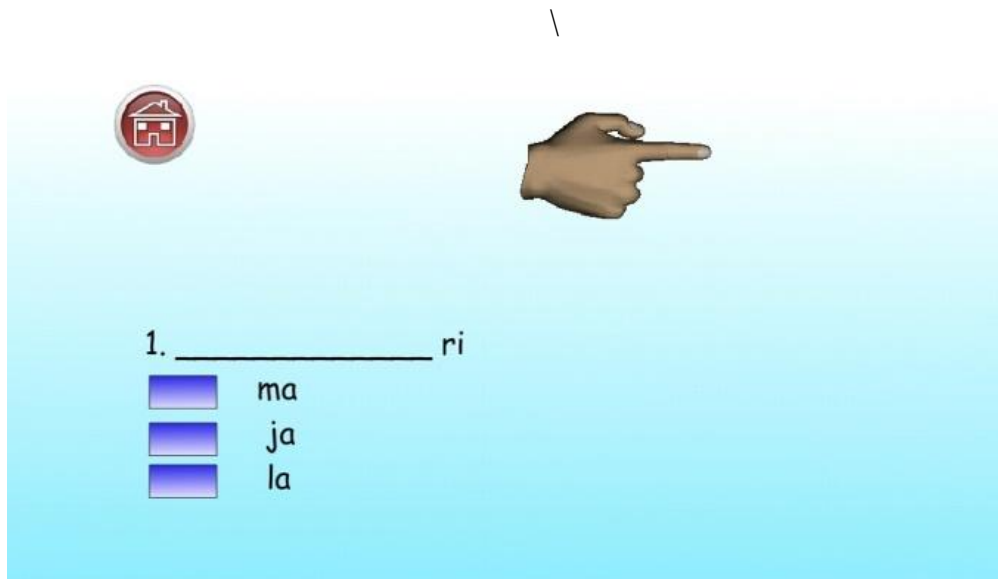


Figure 33.0: Example of choosing syllable to build word



Figure 34.0: Example of interface to choose suitable word



Isi tempat kosong dengan perkataan yang paling sesuai.

1. Tiga peserta Kem Motivasi Jati Diri itu murid dari sekolah ini.
_____ akan berada di kem itu selama dua hari.

- Kami
- Anda
- Kalian
- Mereka

Figure 35.0: Example of interface to choose suitable word for sentence structure

Comprehension 2 Category



Figure 36.0: Comprehension 2 Category

Figure 36.0 show interface of Comprehension 2 category. This category would help hard hearing kids to learn how to built sentences. There would two games in this category. First game would help hard hearing kids to choose the correct sentences according to the animation. Figure 37.0 show the example of first game interface.

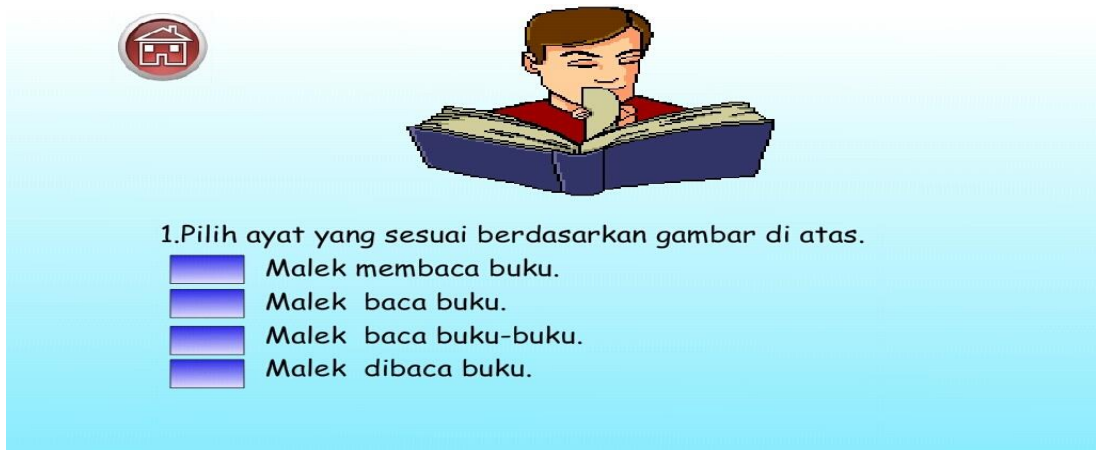


Figure 37.0: Game 1 Interface

Meanwhile second game would help hard hearing kids to build sentences based on the images. Figure 38.0 show the example of second game interface.



Figure 38.0: Game 2 Interface

4.2 Result and Survey

Pre-Testing result

From the survey that conducted in Pusat Pertuturan Kiu on 16th July 2012. The author disturbed the questionnaire to the teachers to get their opinion and feedback on prototype that developed. The author is able to gather 10 students aged from 6 to 9 years old to test the prototype (MYKIU).

Below is summarizing result that taken from the survey conducted in Pusat Pertuturan Kiu:

- 1) Did hard hearing kids giving good response when using introduction (“pengenalan”) as the medium of learning?

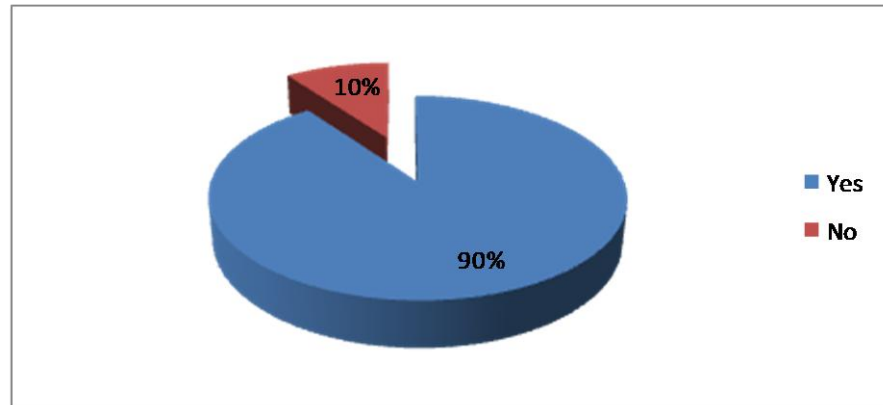


Figure 39.0: Chart of Number of Student Response when using introduction menu

From the author and teacher observation, the hard hearing kids are very proactive in learning. Based on Figure 39.0, 9 out of 10 hard hearing students would repeat the sign and repeat the word according Cued Speech and Malay Sign Language. This conclude that hard hearing kids is very interested and learning the introduction (“pengenalan”)

- 2) How many question answer correctly for each stages?

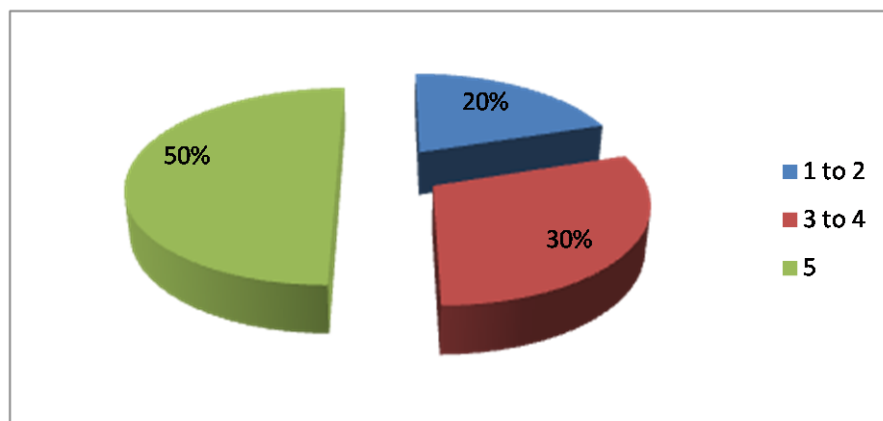


Figure 40.0: Chart of Number of Student Response when using game menu

Based on Figure 40.0, 5 out of 10 students (50%) are able to answer correctly 5 over 5 questions in each stage of the game. Meanwhile 3 out of 10 students (30%) are able to answer 3 to 4 questions correctly in each stage of the game. Only 2 students out of 10 students are able to answer 1 to 2 questions correctly in each stage of the game. From this statistic, it can measure that MYKIU provide appropriate syllabus for hard hearing kids in learning.

3) How long it takes to answer each question?

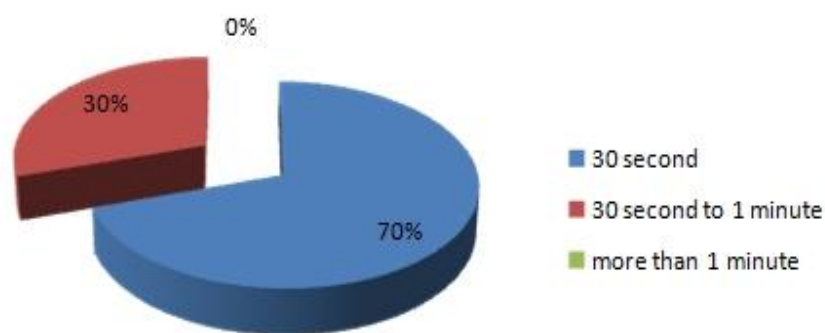


Figure 41.0: Chart of time taken for each student to answer one question

Based on Figure 41.0, most of the student (70%) is taking less than 30 second to answer the question. Meanwhile, 30% of them need 30 second to 1 minute to answer a question. Through, this analysis the author be able to identify that MYKIU prototype provide suitable interface, instruction and appropriate syllabus for hard hearing kids for 6 to 9 years old.

Figure 42.0 shows the picture overview during the testing conducted in Pusat Pertuturan Kiu. Hard hearing kids participate proactively when using **MYKIU**.



Figure 42.0: Overview on Student Respond using MYKIU

Post Testing Result

Post testing is conducted in Pusat Pertuturan Kiu on 6th August 2012. Set of questionnaire are distributed to the hard hearing kids age 6 to 9 years old. The author successfully gathers information from 6 hard hearing students.

Below show the result from the post testing:

1. What age you are able to start to read?

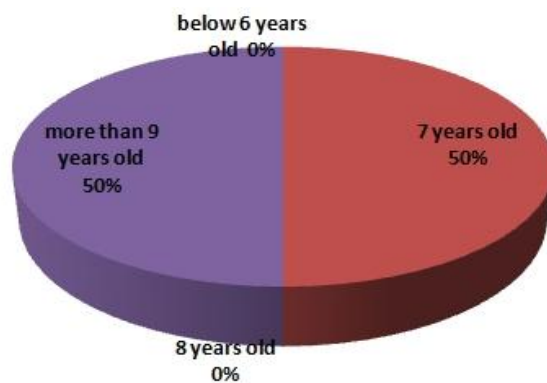


Figure 43.0: Age be able to start to read

Figure 43.0 shows age when the hard hearing kids start to read letters, words and sentences. Even though, there were quite number of hard hearing kids be able at early age of 7 years old, however quite of number (50%) of them be able to read late.

2. How long your parents spent time at home to teach you to read?

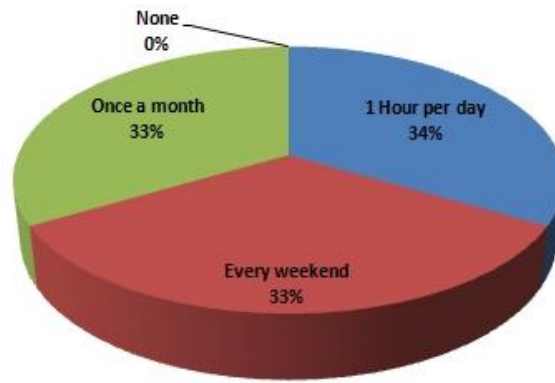


Figure 44.0: Time spend to teach hard hearing kid to read

Figure 44.0 shows how long their parents spend time at home to teach their kids. From the survey, parents are not be able to spend a lot of time to teach them at home.

3. Did you use computer and mobile phone at home?

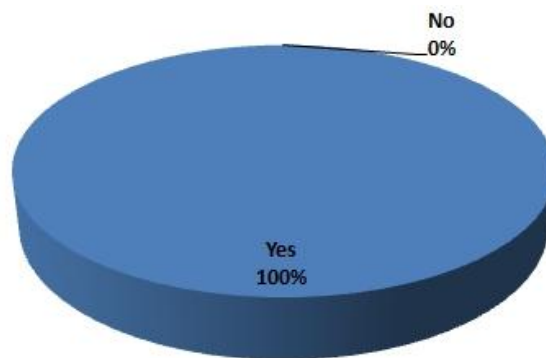


Figure 45.0: Time spend to teach hard hearing kid to read

Figure 45.0 shows that 100% of the hard hearing kids are expose to mobile technology and computer at home.

4. Did you how to use computer and mobile phone at home?

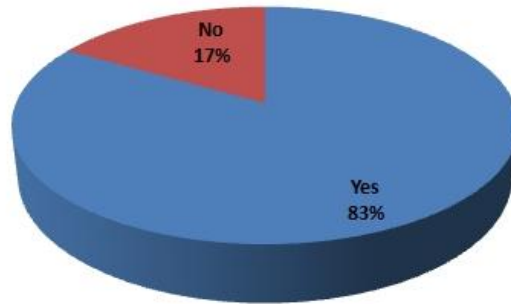


Figure 46.0: Usage of computer and mobile phone

Figure 46.0 show that 83% of hard hearing kids know how to use mobile technology and computer at home.

5. Did you agree that mobile learning help you to learn better?

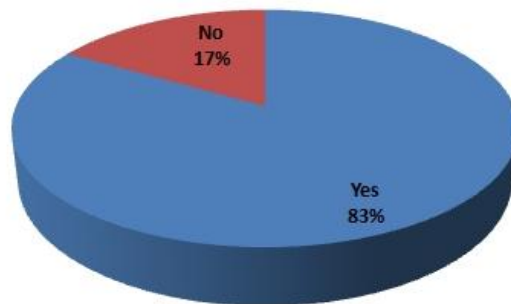


Figure 47.0: Mobile learning help learning better

Figure 47.0 shows that 83% of hard hearing kids are agree to use mobile technology as medium of learning.

6. Below criteria meet your requirement after using MYKIU.

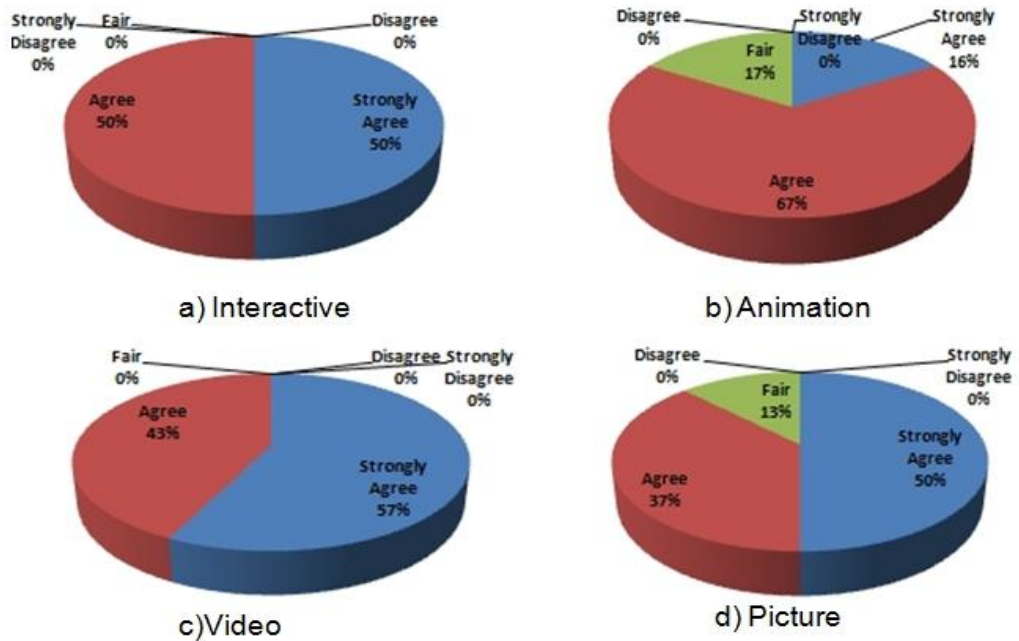


Figure 48.0: MYKIU criteria

Figure 48.0 shows that 83% of hard hearing kids are agree to use mobile technology as medium of learning.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.0 Conclusion

Through the research, it can be concluded that few technology is developed in order to hard hearing kids in learning especially in for Malaysia hard hearing kids students. Thus, it is important to keep developing new technology to help these hard hearing kids' students. Currently, hard hearing kids are learn better by using bilingual learning approach where they were learning signal language as a way to communicate and learn to know printed letter, number and words at the same time. Teacher helps to assist in hard hearing kids children using few ways such as phonic, see the movement of lips and sign language to learn to letter, number and words. **MYKIU** development is depending on the bilingual learning theory to educate the hard hearing kids. This application is a android mobile game based which can be installed in tablet computer to provide education anywhere and anytime.

From the application design, it is important to examine the effectiveness of **MYKIU** as educational tool to help the hard hearing kids. It is important to examine how to ensure the effectiveness of the product as well as not only to capture the target users' (children aged 6 to 9 years old) interest, but also the parents and hard hearing kids children who assist to help them at home. Teacher and hard hearing kids parents also need to be involve in giving opinion on **MYKIU** will not be a product that is merely a game but also could help parents and hard hearing kids children in analyzing the performance and progress of the children.

5.1 Recommendation

There are few recommendations are needed to improve the **MYKIU** as followed:

- Improve the human interaction interface

Human interaction interface is important consideration in designing the interface of GUI. Human interaction interface is study, planning and designing between people and computer. The author should give more

attention on improving the interface of **MYKIU** by getting feedback from the user for the interface that has been design by the author.

- Sign language and lips movement recognition

For further improvement in the future, **MYKIU** is can come out with sign language movement or lips movement recognition. The enhancement can be done where the player need to show the sign language or lips movement recognition based on printed word or images, the tablet computer would detect the movement, if correct it would unlock the game.

- **MYKIU** works as a compliment not as replacement.

Hard hearing kid's, parents and hard hearing teacher need to understand that the actual purpose of this system is not to replace the role of school/centre but this application is working as compliment where **MYKIU** would provide mobile game based approach that makes the education more interactive and portable.

- Add on the more animation and animation video

Hard hearing kids can learn words or sentences by understanding the relationship between the written words and sentences through animation. Therefore, the author should improve the animation element in **MYKIU**.

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CHAPTER 6

APPENDIX

Borang Soal Selidik MYKIU (Pre-Testing)

MYKIU ialah aplikasi android untuk membantu kanak-kanak pekak berumur 6 tahun sehingga 9 tahun. Objektif aplikasi ini adalah untuk membantu pembelajaran kanak-kanak pekak lebih lancar. **MYKIU** dibina sebagai aplikasi bantuan kepada sistem pembelajaran sedia ada.

Menu Pengenalan

Objektif soal selidik: Mengenalpasti keberkesanan pengenalan kepada kanak-kanak pekak untuk mengenal huruf, perkataan dan struktur ayat.

1. Adakah kanak-kanak pekak memberi maklum balas yang baik ketika menggunakan pengenalan sebagai medium pengajaran?

Bawah 5 5 Atas 5

2. Berikan komen anda untuk membaiki pulih menu pengenalan ini?

Permainan 1

Objektif soal selidik : Mengenalpasti keberkesanan permainan dengan menguji kefahaman kanak-kanak pekak melalui jumlah soalan yang dapat dijawab dan masa diperlukan untuk menjawab soalan.

1. Berapakah bilangan soalan yang dapat dijawab dengan betul untuk setiap peringkat?

1-2 2-4 5

2. Berapa lamakah masa diambil untuk menjawab setiap soalan?

30 saat ke bawah 30 saat ke 1minit lebih dari 1 minit

3. Adakah kanak-kanak pekak tersebut memberi maklum balas yang baik ketika bermain permainan ini?

Bawah 5 5 Atas 5

4. Adakah “pengenalan” cukup untuk membantu kanak-kanak pekak memahami huruf,nombor atau perkataan?

Bawah 5 5 Atas 5

5. Berikan komen anda untuk membaik pulih permainan ini?

Permainan 2 : Mengenal Huruf/Angka/ Dua Suku Kata Perkataan Di Dalam Konteks Perkataan

Objektif soal selidik : Mengenalpasti keberkesanan permainan dengan menguji kefahaman kanak-kanak pekak melalui jumlah soalan yang dapat dijawab dan masa diperlukan untuk menjawab soalan.

1. Berapakah bilangan soalan yang dapat dijawab dengan betul untuk setiap peringkat?

1-2 2-4 5

2. Berapa lamakah masa diambil untuk menjawab setiap soalan?

30 saat ke bawah 30 saat ke 1minit lebih dari 1 minit

3. Adakah kanak-kanak pekak tersebut memberi maklum balas yang baik ketika bermain permainan ini?

Bawah 5 5 Atas 5

4. Adakah “pengenalan” cukup untuk membantu kanak-kanak pekak memahami huruf,nombor atau perkataan?

Bawah 5 5 Atas 5

5. Berikan komen anda untuk membaik pulih permainan ini?

BORANG KAJI SELIDIK MYKIU (Post-Testing)

Borang Kaji Selidik ini disediakan oleh Lilik Anita Binti Kambyah, pelajar tahun akhir, jurusan Business Information System (BIS), di Universiti Teknologi PETRONAS, Tronoh Perak berkenaan Projek Tahun Akhir.

Kajian ini dilakukan keatas kanak-kanak cacat pendengaran yang berusia 6 hingga 9 tahun. Tujuan kajian ini dijalankan adalah untuk mengenal pasti potensi dalam menggunakan MYKIU untuk proses pembelajaran. Oleh itu, kajian ini memerlukan penyertaan guru-guru untuk menggunakan MYKIU untuk mendapatkan maklum balas mengenai produk demikian. Justeru, jawapan yang tepat digalakkan supaya produk yang dihasilkan akan lebih berkualiti.

NAMA PESERTA: _____

Soalan ini diisi berdasarkan maklum balas kanak-kanak kurang pendengaran dengan bantuan daripada guru atau ibu bapa.

Soalan 1 – Soalan 10: Sila Tandakan () di dalam kotak yang berkenaan. Pilih satu (1) jawapan yang berkenaan sahaja.

1. Jantina:
() Lelaki () Perempuan
2. Umur:
() 6 tahun () 7 tahun () 8 tahun () 9 tahun
3. Soalan di bawah untuk mengetahui kekerepan penggunaan alat berkomputer dan komunikasi di rumah.

Soalan	Ya	Tidak
Adakah anda pernah menggunakan alat berkomputer dan komunikasi di rumah?		
Adakah anak anda tahu menggunakan alat berkomputer dan komunikasi di rumah?		
Adakah anda menyokong alat berkomputer dan komunikasi sebagai alat pembelajaran?		

4. Setelah menggunakan MYKIU. Adakah ciri-ciri di bawah menepati criteria MYKIU.

Ciri-Ciri	Sangat Setuju	Setuju	Sederhana	Tidak Setuju	Sangat tidak Setuju
Interaktif					
Animasi					
Video					
Gambar					

5. Adakah anda memahami setiap sillabus yang digunakan oleh MYKIU?
 Ya Tidak

6. Adakah MYKIU membantu anda dalam pembelajaran untuk membaca tulisan huruf, perkataan dan struktur ayat?
 Ya Tidak

7. Pada usia berapakah anda mula mula membaca?
 bawah 6 tahun 7 tahun 8 tahun atas 9 tahun

8. Adakah keluarga anda meluangkan masa untuk mengajar anda membaca di rumah?
 Ya Tidak

9. Berapa lamakah keluarga anda meluangkan masa untuk mengajar anda membaca di rumah?
 Lebih kurang 1 jam sehari
 Setiap hujung minggu
 Sekali sebulan
 Tiada
 Lain-lain: _____

10. Apakah komen atau cadangan mengenai MYKIU?

Android Flash Based Game for Hard Hearing Kids to Learn Malay Language through Cued Speech and Sign Language (MYKIU)

Lilik Anita Binti Kambyah
Computer & Information Sciences Department
Universiti Teknologi PETRONAS
Bandar Seri Iskandar, 31750, Tronoh, Perak, Malaysia

ABSTRACT

Android Flash Based Game for Hard Hearing Kids to Learn Malay Language through Cued Speech and Sign Language (MYKIU) developed to assist in hard hearing learning process in reading. This application is using Cued Speech and Malay Sign Language as learning approach. Advantage of MYKIU is act as compliment for traditional system where hard hearing kids would be able to learn through game based approach even though they are not at school. In the android market, android applications that are developed using Malay Sign Language and Cued Speech are not exist yet; most of the application is in American Sign Language (ASL) and Cued Speech that using English vocabulary. Therefore, MYKIU is developed to break the barrier. MYKIU is developed using Cued Speech and Malay Sign Language (MSL) in Malay vocabulary; this application is specifically design to assist hard hearing kids in Malaysia. The scope of the study for this project is focusing for hard hearing kids from 6 to 9 years old. MYKIU developed using phase development life cycle. MYKIU is using Action Script 3 as the programming language. It is developed using Adobe Flash CS5.5 and Adobe Photoshop Portable CS5. MYKIU prototype tested at Pusat Pertuturan Kiu, Kampung Pandan. The author able to gather 10 students age from 6 to 9 years old to test the prototype. From the testing, MYKIU get good response when it use by hard hearing kids.

I. INTRODUCTION

Current approach that use by teacher in most school is using Malay Sign Language (MSL). Through Malay Sign Language (MSL), hard hearing kids learn to know alphabets and words through finger spelling. Through research the author found out that Cued speech is one of the best methods to help hard hearing kids kid in their language development. Cued Speech helps hard hearing kids to develop their language through learning syllables and vocal through movement of lips and hand.

Android Flash Based Game for Hard Hearing Kids to Learn Malay Language through Cued Speech and Sign Language (MYKIU) is an interactive and portable game based application for hard hearing kids from 6 to 9 years old

to learn Malay language through Cued Speech and Malay Sign Language. The target group is hard hearing kids children; hard hearing kids is referred to individual who face difficulties to hear certain frequencies of sound either fully or partially impairment [1].

MYKIU developed as complement for current educational system used to teach hard hearing kids. MYKIU provide mobile education to hard hearing kids and give full control to them to choose their module based on their level. MYKIU developed using Adobe Flash CS5.5 and tested in android tablet. Meanwhile Adobe Photoshop are use to edit picture that use in development of MYKIU.

This scope of study of the project is targeting the hard hearing kids' age from 6 to 9 years old. Application is developed as complement for current educational system. MYKIU developed based on Malay based language, using Malaysia Sign Language and Cued Speech as learning approach.

First objective in this project is to identify learning approach use by hard hearing kid to learn Malay Language. Throughout the paper, the author found out that hard hearing usually use sign language and cued speech learning approach in Malaysia. Second objective is to identify hard hearing kids acceptance on android game based to learn Malay Language. This tested by survey that distribute to hard hearing kids in selected center in Malaysia. Thirdly is to developed android game based application to learn Malay Language based on the user requirement.

II. LITERATURE REVIEW

II.1 Hard Hearing communities

Deaf or hard hearing can occur at any time in a person's life and impact of hard hearing kid can vary considerably depending whether hard hearing kids was acquired before or after speech development. People are therefore defined as being either pre or post-lingual hard hearing kids [2].

“Pre-lingual hard hearing kids” is a term for hard hearing kid's individuals who become hard hearing kids before learning language. Pre-lingual hard hearing kids often it more difficult to learn language, as it is an auditory vocal language, which they can learn only from lip-reading and written word. Individual affected by pre-lingual hard hearing often acquire specialist tuition to develop certain language

skill and completely have a lower than average reading ability. Meanwhile “post-lingually hard hearing kids” is a person who gets hearing loss because of natural result of aging. “Post-lingually hard hearing kids” be able to use spoken word and relying on lip-reading. Therefore, hard hearing kids kid who falls under category “pre-lingual hard hearing kids” having difficulty in learning language compare to “post-lingually hard hearing kids”. However, hard hearing does not affect the capability of the student to learn and does not affect the person’s intellectual behaviour. But, these kids need some special education service in order to receive an adequate education [2].

II.II Communication between Hard hearing kids Communities

II.II.I Communicate Through Sign Language

Hard hearing children communicate with each other through sign language. Children who exposed to sign language late in childhood turn out to be less proficient and may never catch up in adulthood than those in early childhood. Findings suggest that hard hearing children read by using a code that is not based on sound and those hard hearing kids’ parents are better reader than hard hearing kid’s children of hearing parents [1].

Why they use sign language in communicating? Hard hearing kids learned communicate each other through the map between the sign and the print. This technique used by the hard hearing kids called as “chaining” [4]. They learn this sign language either through their parents or they go to school. Only small percentages of hard hearing kids in Malaysia attend school. From the statistics show that average of 0.3% of a given population being born hard hearing kid’s approximately 66,000 congenitally hard hearing kids’ people in Malaysia.

There are three signal language uses in Malaysia which are Kuala Lumpur Sign Language (KLSL) that based on American Sign Language (ASL), Malaysia Sign Language, (MSL) and Bahasa Malaysia Kod Tangan(KTBM) that develop by Malaysia government, and Penang Sign Language (PSL) that develop by hard hearing kids outside the classroom. We can see there are no universal languages that are use by hard hearing kid’s communities even in Malaysia itself. Many hard hearing kids that know signal language are not able to read or write. This cause many problems for them, for example when they visit ministry website and want to filled form. All the information in written language and the hard hearing kids unable to read because the website not provides any sign language translation for them.



Figure 1.0 Example of Sign Language

Figure 1.0 show example on how the hard hearing kids communicates with each other using the signal language they learned. It show how a person to say “thank for being my friend” in signal language.

II.II.II Communicate Through Sign Language

Cued Speech is phonemic-based system which makes traditionally spoken language accessible by using small number of hand shapes that represent the consonant and in different location near mouth to represent the vowel [31]. Cued Speech is the communication use to overcome the hard hearing communication abilities. Through Cued Speech, hard hearing people be able to spoke like normal person with the help of hearing aids. Cued speech is different from sign language. It is Manually Coded Sign System for a spoken language. It uses to represent the lip movement on the letter and syllables. On 2005, cued speech is adapted into 6 languages and dialects. Hard hearing kids be able to learn Cued Speech through lip reading.

Cued Speech is invented in 1966 by Dr. R.Orin Cornett at Gallaudet College Washington D.C. Cued speech is invented after they discover that children with prelingual and profound hearing impairment have poor reading comprehension. Through cued speech, it would help them to break the barrier [6]. In Malaysia, Cued Speech is rarely used by the school. Most of government school in Malaysia used Malay sign language as a medium of communication and learning. In Malaysia, the author identified one hard hearing centre that use cued speech as the medium of communication and learning. This centre called as Pusat Pertuturan Kiu in Kampung Pandan. Hard hearing kids from this centre are able to communicate verbally and be able to read. Besides that, these hard hearing kids not only are able to read in Malay Language but also in English and also be able to read Quran and learn Arabic letter.

II.III Learning reading method among hard hearing kids Communities

Idea of the individual letters with individual sounds blend to make words is known as alphabetic principles [6]. From the principle, we can see that relationship between letter and sounds is the most efficient way to read printed text. The process is when we recode each word from letter into movement is a significant way to learn language. There is many ways how hard hearing kids to learn how to read:

- **Finger Spell using Signal Language**
Description : Usually inside the classroom the teacher will fingerspell a word, then points to the word written on the blackboard an finally the teacher uses an initialized sign for the word.
Advantages: For hard hearing kids who learn signal language since born is able to catch up the lesson syllabus better.
Disadvantages: The problem with this method, there is not enough teachers who have skill to teach sign language and some of student has different level in order to understand the language some student might take longer time to understand the sign language.

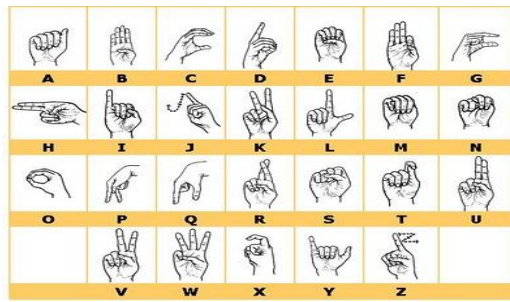


Figure 2.0 Malaysia Signal Languages

Figure 2.0 shows Malaysia Signal Language uses finger spell to recognize the alphabet from A to Z. They use different hand sign represent different alphabet. Malaysian Signal Language has different vocabulary and sentence structure compare to the America Signal Language.

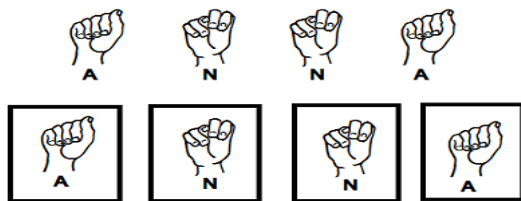


Figure 3.0 Word in Malaysia Sign Language

Figure 3.0 show how they use the finger spell to pronounce words to pronounce her name. Hard hearing kids use finger spell in order to read words and identified them meaning of the words in order to learn how to read.

- **Phonic**
Description: Phonic method us reading as method of reading. Hard hearing kids see the word written and how the word spells through lips movement. Then they are “sound out” the letter of words and learn what it means. Then they write the language into the written languages. Through this method hard hearing kids student be able to read and write at the same time.
Advantages: Most help for hard hearing kids who do not know signal language since born.
Disadvantages: Dull class environment and rigid syllabus period.
- **Whole language**
Descriptions: Hard hearing kids learn reading by focuses on seeing. Children learn to read first and they learn the meaning. Then they learn about the letter that makes how the word to build and they “sound out” the word. The different between phonic is this technique the way hard hearing kids spell the words might be wrong but it meets the meaning of the words.
Advantages: Most help for hard hearing kids who do not know signal language since born.
Disadvantages: Dull class environment and rigid syllabus period.
- **Guided Reading**

Descriptions: Guided reading uses different activities to increase child’s reading ability. There are different approaches to guided reading. But most of them use three activities:

- Pre-reading activities: Hard hearing kids are shown words and ideas that will be used in the reading.
- Silent and oral reading: Inside a group, the children read the story.
- Post-reading activities: The children do activities to understand the word given.

Advantages: Most help for hard hearing kids who do not know signal language since born.

Disadvantages: Dull class environment and fixed syllabus period.

II.IV Technology as Hard hearing kids Education Tool

II.IV.I Hard hearing kids Accessibility to Multimedia

There are two approaches to hard hearing kid’s access: ‘assistive’ and ‘direct’. Assistive access uses technology to help individual use previously develop systems. Direct access provide access as part of develop system [7]. Until recently, text and GUI interfaces allowed similar ‘direct’ access to computer systems for hard hearing kid’s users [7].

Caption system designed to help the hard hearing kids to read article in website and to watch news in television. We can use caption system to attract the hard hearing kids to understand how to read and communicate because they cannot hear but their sight become more sensitive, caption system is the best way to help hard hearing kids learn how to read.

II.IV.II Game-based Learning approach for hard hearing kids

Game based Learning (GBL) is a branch of games that deals with applications that defined learning outcomes. Through game based learning, it designs to balance subject matter with game play and ability of the player to retain on the game. When designing game based learning, there are few criteria need to be consider during the designing functionality. The trainee needs to identify the user interest. The material provided in the game based learning should be not tough for the targeted user.

In the future, game base learning is expected to be able to stimulate the real life scenario who will give the opportunity for user to use as an alternative of learning. For example, game based learning may be beneficial in future such as in the airline sector where game based learning be able to give environment for the pilot training.

The old fashioned game are using concept of enhance the intellectual skill of the player by playing game based learning. For example, monopoly games are design to help the player to play with family by using intellectual skill in winning the game.

II.IV.III Mobile Learning as Education Learning Tool

Mobile learning is a digital learning approach which use constructivist learning theory, draws on integrates other learning theories and uses equipment and the environment of information and communication technology, combining virtual learning with practical learning, self learning with collaborative learning, and formal learning with informal

learning [8]. Mobile learning is a flexible approach use to help student and help provide them with flexible learning environment. Mobile learning is to meet learners to learn anything at anytime and anywhere [1]. Its knowledge points is relatively independent and short, the learning content uses graphics, animation and sound to describe easily to built mobile learning [9]. Large text and video capabilities fully develop their creativity and imagination and give student better learning space so that they can understand the teaching content vivid and deeply to promote theirs coordinated development of all aspects.

II.V Current Application for Hard hearing kids

Since the initial of sign language introduced by Juan Pablo De Bonet, but organize educational system are introduced by 1750[3]. However in Malaysia, Malaysian Sign Language are introduce on 1998 and strong influence by the America Signal Language [3]. From time to time, there is more and more educational institution to help hard hearing kids to get proper education. Many companies have slowly realized the potential of building application and devices to help the hard hearing kids to learn signal language based on the word. The applications are listed below with its country and product in the following table:

Country	Product	Type
United State	The Ultimate Sign Language Dictionary	Computer Based
United State	ASL Ultimate	Android based application
British	British Sign Language	Web Based
United State	Dawn Sign Press	Web Based
United State	University of South Florida	Web Based/Online Class

Table 1.0: Current Product Available

As seen from the table, most of the company is located in United States and the application is designed based America Sign Language and English vocabulary. Besides that, the application design using Cued Speech is design for the English vocabulary. There is limited application even in web based using Cued Speech approach as learning approach for hard hearing kids

II.VI Comparison between Proposed Application (MYKIU) and Existing Products

This section would review on the functions, features, system strength and limitation between the above four existing application and proposed application (MYKIU). Summary of the function and features are tabulated in Table 2.0.

Based on **Table 2.0**, MYKIU are considering the features and strength of the four existing application in the market. The key different of MYKIU is this application is developed to focus for hard hearing kids from 6 to 9 years old. This application is having very high mobility and availability because MYKIU was design for android tablet games application.

Type/Features	The Ultimate Sign Language Dictionary	ASL Ultimate	British Sign Language	University of South Florida Website	Dawn Sign Press	Proposed Solution (MYKIU)
Sign Language	American Sign Language	American Sign Language	British Sign Language	Cued Speech	American Sign Language	Malay Sign Language and Cued Speech
Medium of instruction	English	English	British	English	English	Malay
Alphabet	No	No	No	Yes	No	Yes
Number	No	No	No	No	No	No
Word	No	Yes	Yes	Yes	Yes	Yes
Amount of words, letter and alphabet	15,000	1,400	More than 1,000	More than 1000	More than 1,000	50
Exercise	No	No	No	Yes	No	Yes
Audio	No	No	No	No	No	No
Picture	Yes	Yes	Yes	Yes	Yes	Yes
Operating Platforms	Computer-based	Android Application	Web-based	Web-based	Web-based	Android application
Mobility	High	Very High	High	High	High	Very High
Availability	High	Very High	Medium	Medium	Medium	Very High

Table 2.0: Application Comparison

III. METHODOLOGY

III.I Project Methodology

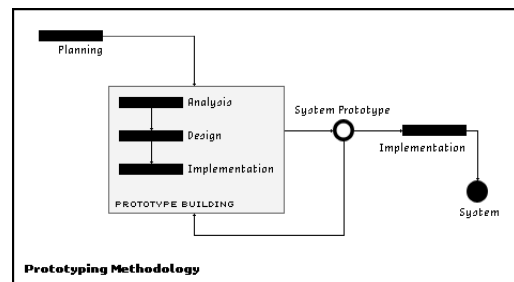


Figure 4.0: Prototyping Development Methodology

This project adopt prototyping development system life cycle. It segmented into planning, analysis, design and implementation. **Figure 4.0** show the prototyping development lifecycle where the author needs to plan and build the prototype. This prototype would be needed to be tested until it meets the user satisfaction and implemented the application at the end.

In the development of MYKIU, the author plan to come out with prototype and would be tested by hard hearing kids on the usability of the application. The author would gather all the feedback and analyse the data to come out with final application of MYKIU.

The elaboration for each phased are mention as follows:

- **Initial Planning**
In planning phase, the author needs to identify below items:
 - Identify the problem statement, objective, feasibility studies, project relevancy and scope of work.
 - Build Gant Chart to plan and schedule the project.
 - Search for hard hearing kids centre contact details around Perak and Kuala Lumpur.

MYKIU prototype development

- Analysis
In analysis phase, the author needed to gather information on the hard hearing kid's behaviour in learning and components needed in development of the **MYKIU**.
The below item needed to be identified by the author:
 - i. Conduct literature review on the learning behaviour of hard hearing kids, definition of hard hearing kids and previous application that uses by hard hearing kids to learn words, alphabet and letter through sign language.
 - ii. Identify the suitable operating platform for **MYKIU**.
 - iii. Identified the suitable programming tools to developed **MYKIU**.
 - iv. Study and learning the programming language (Adobe Flash CS5.5).
- Design and Development
In this phase, the author needs to design the interface of **MYKIU**.
 - i. Design user interface GUI. Below showed the propose design of **MYKIU** by using Microsoft Power Point for FYP 1.
 - ii. Develop flow chart for the **MYKIU**.
 - iii. Developed **MYKIU** application prototype.
- Implementation
In this phase, the author needed to test and implemented the application to get the hard hearing kids feedback on the **MYKIU**. Below items needed to be identified by the author:
 - i. **MYKIU** application conduct bug-fixing.
 - ii. Prepare set of questionnaire to test **MYKIU** application.

III.II Required Tools

Below is the required hardware and programming tools needed in the development of **MYKIU**:

Software Development Tools

- c) Adobe Photoshop CS5 Portable
Adobe Photoshop CS5 Portable is use to edit the picture to remove white background of images.
- d) Adobe Flash CS5.5
Adobe Flash CS5.5 is used in overall development of **MYKIU** application. It developed the game and all the content inside the game. It use ACS Script 3.0 as the programming language.

Hardware:

- c) Android Tab 7.0 Plus
MYKIU are test and implement by using Android Tab 7.0 Plus with 3.2 version. This device also use for testing with hard hearing kids to identify the hard hearing kids interactivity to the application.
- d) HP Compaq Presario V3000

HP Compaq Presario V3000 is use to do coding and develop the **MYKIU** application.

IV RESULTS & DISCUSSION

IV.I Prototype Progress

Figure 5.0 show the homepage of **MYKIU**. The background contain of school bus represent that this design for kids.



Figure 5.0: Home page of MYKIU

There were 4 categories in this application consist of sign language ("bahasa isyarat"), cued speech ("bahasa kiu"), comprehension 1 ("pemahaman 1") and comprehension 2 ("pemahaman 2").

Cued Speech Category

This category consists of two sections where it consists of introduction ("pengenalan") and 1 game. Introduction ("pengenalan") would teach hard hearing kids to learn cued speech. This menu would be consisting of cued speech of letters and syllables. Meanwhile game would help the hard hearing kids to learn cued speech through question and answer.

Sign Language Category

Sign Language Category which is consists of letter introduction ("pengenalan huruf") and word introduction ("pengenalan perkataan"). Introduction ("pengenalan huruf") which teach hard hearing kids are teach where learn through flash card concept where it show the respective letter using Malay sign language.

Comprehension 1 Category

Comprehension 1 category consists of introduction ("pengenalan") and three games. First game would help hard hearing kid to learn word by combine with syllables. Second game would help hard hearing kid to learn words and the object. Meanwhile, third game would help the hard hearing kids to learn how to get build correct sentences. Through this category it would help hard hearing kids to learn and identify words.

Comprehension 2 Category

This category would help hard hearing kids to learn how to built sentences. There would two games in this category. First game would help hard hearing kids to choose the correct sentences according to the animation. Meanwhile second game would help hard hearing kids to build sentences based on the images.

IV.II Testing Result

Post testing is conducted in Pusat Pertuturan Kiu on 6th August 2012. Set of questionnaire are distributed to the hard

hearing kids age 6 to 9 years old. The author successfully gathers information from 6 hard hearing students.

Below show the result from the post testing:

1. What age you are able to start to read?

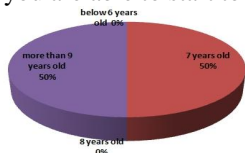


Figure 6.0: Age be able to start to read

Figure 6.0 shows age when the hard hearing kids start to read letters, words and sentences. Even though, there were quite number of hard hearing kids be able at early age of 7 years old, however quite of number (50%) of them be able to read late.

2.How long your parents spent time at home to teach you to read?



Figure 7.0: Time spend to teach hard hearing kid to read

Figure 7.0 shows how long their parents spend time at home to teach their kids. From the survey, parents are not be able to spend a lot of time to teach them at home.

3.Did you use computer and mobile phone at home?

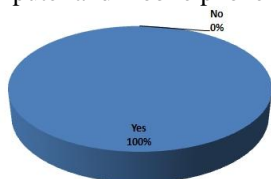


Figure 8.0: Time spend to teach hard hearing kid to read

Figure 8.0 shows that 100% of the hard hearing kids are expose to mobile technology and computer at home.

4.Did you how to use computer and mobile phone at home?

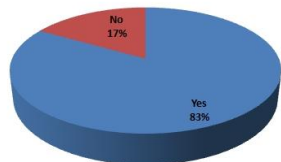


Figure 9.0: Usage of computer and mobile phone

Figure 9.0 show that 83% of hard hearing kids know how to use mobile technology and computer at home.

5. Did you agree that mobile learning help you to learn better?

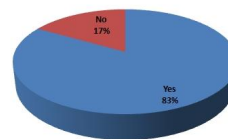


Figure 10.0: Mobile learning help learning better

Figure 10.0 shows that 83% of hard hearing kids are agree to use mobile technology as medium of learning.

6. Below criteria meet your requirement after using MYKIU.

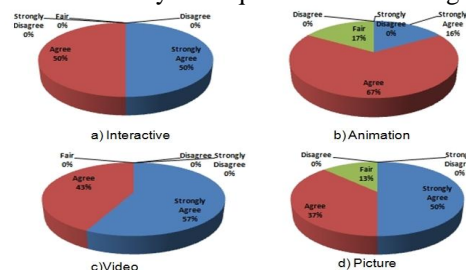


Figure 11.0: MYKIU criteria

Figure 11.0 shows that 83% of hard hearing kids are agree to use mobile technology as medium of learning.

V. CONCLUSIONS & RECOMMENDATION

Through the research, it can be concluded that few technology is developed in order to hard hearing kids in learning especially in for Malaysia hard hearing kids students. Thus, it is important to keep developing new technology to help these hard hearing kids' students. This application is a android mobile game based which can be installed in tablet computer to provide education anywhere and anytime. There are few recommendations are needed to improve the **MYKIU** which includes improve the human interaction interface, sign language and lips movement recognition and add on the more animation and animation video. These recommendations would help improve MYKIU application to help the hard hearing learning environment.

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