BASIC SIGN LANGUAGE FOR KIDS (INTERACTIVE VIDEO)

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This report is submitted in partial fulfillment of the requirements for the
Bachelor of [Computer Science (Interactive Media)] with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
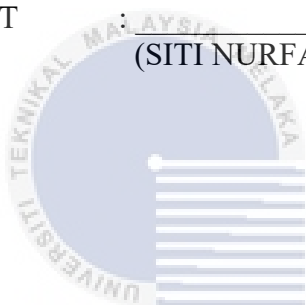UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

DECLARATION

I hereby declare that this project report entitled

BASIC SIGN LANGUAGE FOR KIDS (INTERACTIVE VIDEO)

is written by me and is my own effort and that no part has been plagiarized

without citations.

STUDENT   : _____   Date : 21/6/2021

             (SITI NURFARAHIN BINTI MOHAMED YAZID)

I hereby declare that I have read this project report and found

this project report is sufficient in term of the scope and quality for the award of

Bachelor of [Computer Science (Software Development)] with Honours.

SUPERVISOR   : _____   Date : 1/7/2021

           (PROF. TS. DR. FAAIZAH SHAHBODIN)

DEDICATION

This final project is dedicated to my parents, family, and friends who have supported me with inspiration and support to finish the final project.

Many gratitude to my supervisor, Prof. Dr. Faaizah binti Shahbodin, for her assistance me in finishing this final project.

Most importantly, I'd like to thank Allah SWT for providing me with the wellbeing and motivation to finish this final project.

ACKNOWLEDGEMENTS

In the name of Allah the Most Merciful, Peace and blessings be upon Prophet Muhammad, and beloved companions. Thanks God, because with His kindness and mercy, I can complete this final project well.

Thank you as well to the lecturers of Universiti Teknikal Malaysia Melaka (UTeM), especially my project supervisor, Prof. Dr. Faaizah binti Shahbodin, who assisted me in successfully completing my final year project and conducting this lesson from the very first month of the whole semester until the end of semester.

Thank you very much to all of my family members and friends, particularly to my family, who has always been encouraging and motivating me to complete the project and this final report.

ABSTRACT

There are now a multiplicity of video channels available for children and adults of all ages to learn sign language. The goal of this project is to concentrate and highlight the main theme of the courses without taking up additional time. It will assist the user or student in participating in the class while also allowing for a more personalized learning experience. A video, for example, may contain a longer timeline and way too much irrelevant content for each lesson. The aim of this project is to create an interactive video for academic purposes. As a result, the student can shorten and accelerate up the current period for each session. For instance, a user or viewer can select and point to a specific exercise by clicking a clickable button. Previously, the user would have difficulty distinguishing the primary topic of the instruction during video sessions. Additionally, the lengthier period per video results in a lengthier time to complete a single session. The objectives of this work is to produce an interactive video that makes it easier for people to utilize the program by adding more practical and user-friendly elements. The project's plan also includes determining the interactive video component that will be used in the learning modules. For example, the user can choose to learn a specific topic in any chapter without having to spend a lot of time on it. As a result, this effort will be used to interact with a deaf person or a society that is hearing-impaired.

ABSTRAK

Kini terdapat banyak saluran video yang tersedia untuk kanak-kanak dan orang dewasa dari semua peringkat umur untuk belajar bahasa isyarat. Matlamat projek ini adalah untuk menumpukan perhatian dan menonjolkan tema utama kursus tanpa memerlukan masa tambahan. Ini akan membantu pengguna atau pelajar untuk mengambil bahagian dalam kelas sambil juga membolehkan pengalaman pembelajaran yang lebih diperibadikan. Sebagai contoh, video mungkin mengandungi garis masa yang lebih panjang dan terlalu banyak kandungan yang tidak relevan untuk setiap pelajaran. Tujuan projek ini adalah untuk membuat video interaktif untuk tujuan akademik. Hasilnya, pelajar dapat memendekkan dan mempercepat tempoh semasa untuk setiap sesi. Sebagai contoh, pengguna atau penonton dapat memilih dan menunjuk latihan tertentu dengan mengklik butang yang dapat diklik. Sebelum ini, pengguna akan mengalami kesukaran untuk membezakan topik utama arahan semasa sesi video. Selain itu, tempoh yang lebih panjang bagi setiap video menghasilkan masa yang lebih lama untuk menyelesaikan satu sesi. Objektif kerja ini adalah untuk menghasilkan video interaktif yang memudahkan orang menggunakan program dengan menambahkan elemen yang lebih praktikal dan mesra pengguna. Rancangan projek ini juga merangkumi penentuan komponen video interaktif yang akan digunakan dalam modul pembelajaran. Sebagai contoh, pengguna boleh memilih untuk mempelajari topik tertentu di mana-mana bab tanpa perlu menghabiskan banyak masa di dalamnya. Hasilnya, usaha ini akan digunakan untuk berinteraksi dengan orang pekak atau masyarakat yang cacat pendengaran.

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FYP - **Final Year Project**

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CHAPTER 1: INTRODUCTION

This chapter introduces the project by providing context details, project statements, project objectives, project duration, planned results, and a conclusion.

1.1   Background

In verbal word, words are created by using the voice and sound to create sounds. But for the people who are deaf especially those who are deeply deaf, these sounds of words are often not seen, and just the portion of speaking sounds will be seen on the lips. Sign languages are from the idea that experience is the most important way the deaf person has to convey and get knowledge. When deaf human beings have been first protected within side the instructional technique they have been concept to have cognitive improvement problems and as a result that their situation became related to a cognitive problem. But the reality became that this took place because of the few stimuli received, the issue of verbal exchange among deaf and hearing human beings, and as a result the issue in know-how transmission. There are numerous signal languages, local languages of the deaf network of every country. The proposed worldwide signal language consisted of a choice of easy-to-research gestures from diverse signal languages.

E-learning allows apprenticeship at the same time as the use of the Web as a dissemination channel. While it lowers many access barriers, especially geographical and time-related, in addition to extra foundation on written substances over spoken ones, by itself it does now no longer resolve the problem of improving inclusion of college students no matter their sensory, cognitive or practical abilities.

Currently, there are numerous video channels for learning sign language for children and other individuals of all ages. The aim of this project is to focusing and highlight the key topic of the lessons without consuming more time. It will helps user or learner to participate in the lesson along with enable a more personalized learning experience. Primarily, a video might have a longer timeframe and way too much unnecessary information for each lesson. The objective of this project is to develop an interactive video for learning content. Therefore, learner able to shorten and speed up the time period for each of the lessons. For example, user or viewer can click a clickable button to choose and point up the specific exercise.

Formerly during the sessions thru videos, the user will encounter difficulties in identifying the key topic of the tutorial. Together with the longer timeframe per a video, which result in a longer amount of time to finish a single lessons. The purpose of this project is to create an interactive video that makes it easier for users to use the program with more practical and user-friendly features for effective learning. In addition, the project's plan is to determine the interactive video feature required to be used in the learning lessons.For instance, the user can choose to learn a particular topic in any chapter without having much longer time to understand. As a result, this initiative will be used as an opportunity to interact with a deaf person or a hearing-impaired society.

1.2   Problem Statement

As we were aware, video offers a practical teaching environment that helps learners understand and recall knowledge more effectively than listening and reading practices. Nonetheless, a prolonged and unrelated video that appears may be of no interest to children, and users may become easily distracted. As a consequence of the shortage of interactive features to draw the learner's attention, this would take the learner hours to watch the entire video. As a result, through the use of a clickable feature in the video, students can easily customize their educational experiences. This study aims to increase users' awareness and make it even more friendly and accessible for people of all ages.

Furthermore, most of the children and learners struggle to identify the main point of the lesson in the video. Further to that, the duration of a video has often been long than intended, making it difficult to miss insignificant sections of a video lesson. Even the most important aspects of the videos can be missed by the learner. For a deeper understanding, learners must eventually devote more time to viewing and rewatch the video. This will render the lesson longer and more complicated than necessary. Furthermore, users will not be required to explain the key point of the lessons without going for a longer period of time in a single session. As a result of break down the focus into smaller pieces and emphasizing the main points of the subject, the learners' anxiety and strain will be reduced. Users, for example, can decide and instead choose to watch some content that they'd like to understand without wasting energy watching a longer video. This project would be able to involve the learner and keep them interested in learning while also shortening the learning lessons.

As a result, using an interactive video as a learning platform would have a significant influence on improving the audiences, especially young children. Allows users to interact with the video content itself through with a variety of interactive elements and responsive features. Furthermore, interactive video will have a more customized learning experience and more options for the learner, resulting in a more immersive conscious information than using a linear video. This could also have a huge effect on perceptions by transferring new knowledge to the student's long term memory and freeing up time for content that the learner can need to research more thoroughly.

1.3   Objectives

The objectives of this project are as below:

1. To identify the interactive video element needed for basic sign language for kids.

2. To develop an interactive video for basic sign language using element specify in objective one.

3. To measure the user satisfaction on the basic sign language for kid interactive video.

1.4   Project Scope

This project's target users are those who want to learn sign language as part of getting engaged with various individuals in the deaf community and building connections with new people. This project is mainly open to people aged 7 to 15 years old. Furthermore, this project will include some features that will enable users to practice their skills and interact with the project. Furthermore, this project will provide features that enable users to easily learn skills and interact with the disabled community. The software used for this project are adobe animate, adobe illustrator, adobe photoshop and google chrome. Moreover, the hardware used is a laptop.

1.5   Project Significant

This project gives significance to the targeted user by using the e-learning interactive video as a tool for teaching and learning sign language in order to have a better and more enjoyable learning process, as well as a way to customize the course of their desires. Owing to its ability to monitor and make choices about what happens on screen next, users can also strengthen their skills and techniques of communicating with the deaf culture with the summative assessment. This project would be able to develop successful methods for keeping learning meaningful and entertaining. Furthermore, it is undoubtedly a valuable method that capable of engaging learners with content in an interactive video, increasing a user's likelihood of learning.

1.6   Conclusion

Finally, people of all ages will be able to learn the skills and techniques needed to communicate using sign language as a medium of communication in the form of

this project. This project will result in an amusing interactive video that allows the learner to customize the course based on their interests. Furthermore, the critical information of sign language can also be emphasized using minimum interactions, highlighting its relevance and making people more aware of it.

The introduction, project background, problem statement, objectives, and project scope are all included in this chapter. Furthermore, this chapter discusses the significance of the project. To establish this interactive video, we would have to be aware of the current scope, the observable goal, how else to solve the specified issue, and perhaps the most important aspect of these interactive videos. Furthermore, in Chapter 2, we will explain the methodology to use for this project as well as a literature review on previous articles related to this project.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1   Introduction

This chapter discusses the literature review involved in conducting this project. To achieve the objectives on the project and let the process go smoothly, better understanding of concept and technique must be clear so it will be achieving easier.

Literature review is involved in collecting data from related published information and materials from anywhere example like books, internet, journals, published papers and so on. The result of finding will cover the objectives of this project. This chapter focus on finding the previous project, research and technique which related to the project, to prove that this project could really working and function well based on the previous evidence. Besides, this chapter also covers the project methodology to show the process and direction of the development and also the requirements such as software and hardware in order to develop the application.

2.1.1   Literature Review

Communication is the process of transmitting messages, thoughts, and ideas between two or more people, and language is a medium for that as well. Verbal/vocal communications and non-verbal/non-vocal communications are the two types of communication. Nonverbal communication consists primarily of hand movements to convey messages and is commonly utilized by people with disabilities. According to Amirita Dewani et al. (2018) sign language is a language that uses body movements, hand gestures, expressions and specific mouth actions instead of sound to communicate. On the other hand, Wendy Sandler (2017) stated that sign languages

arise spontaneously wherever there is a group of deaf people who have opportunities to communicate with one another. Some people believe that sign language is basically a collection of basic iconic motions that must be simple and universal to learn. Because sign language evolved naturally among deaf populations instead of being imposed onto them, several countries and even regions use their own individual sign languages. Similarly, in Malaysia Despite the fact that the Persons with Disabilities Act 2008 recognizes BIM as the official sign language of the deaf, most schools still use Manually Coded Bahasa Malaysia (Kod Tangan Bahasa Malaysia or KTBM) to teach. Allowing deaf persons to communicate in their native tongue allows them to express themselves more clearly and obtain higher academic performance.

E-learning is a formal learning method that enables use of electronic resources. E-learning is playing an increasingly important part in today's educational environment, as it is transforming the entire educational system and becoming one of the most popular topics among academics. A study conducted by Aboagye et al. (2020) stated teaching can be inside or outside the classrooms, the use of computer technology and the Internet is the main component of e-learning. However, another study by A. Pauline Chitra*& M. Antoney Raj (2018) proposed that the term e-learning comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning. When it comes to time, location, and health concerns, e-learning is a great option. On the other hand, may lead to excessive use of specific websites. Furthermore, it is unable to support domains that necessitate practical research. Nowadays, many colleges have now recognized the value of E-learning as a critical component of in the educational system. Many higher education institutions in Malaysia have engaged to e-learning due to its success as an alternate solution mode of learning to the classroom teaching technique. Because of its availability and convenience, e-learning may contribute greatly to education. E-learning has the possibility to be a better virtual learning tool in the future as it can enhance the teaching quality in Malaysia's formal education systems.

George Palaigeorgiou et al. (2019) indicated that interactive videos facilitate differentiated and personalized learning since they allow learners to act independently, follow their path and maintain their pace which increase learners' satisfaction over the educational process and transform passive watchers into active learners. In the same

way, Clément Benkada & Laurent Moccozet (2017) evaluated that it has been identified that interactive modules like annotated videos may increase students' engagement may improve the self-study context of students involved in a MOOC thanks to extended navigation options and reflection breaks may speed up the skills acquisition process and increase the level of retention compared to standard videos. Many institutes of higher learning have accepted the use of interactive videos as an instructional medium as an option or addition to traditional classrooms. However, in comparison to institutes of higher learning in other industrialized countries, this innovation is not being implemented as quickly as it is. While there is a greater awareness and availability of video content, its successful application is still debatable because videos have been associated with passive learning.

These interactive behaviors in interactive video seem to have significant learning results (Wouters et al., 2007). A crucial element of the interactive video is that it can become a platform for self-regulating learning environments (Chen, 2012; Delen, 2014; Hartsell& Yuen, 2006). The possibility of controlling the individual speed, the offering of links which help avoiding cognitive overload (Chen, 2012), the possibility to seek or overtake a specific portion of the video and the ability to watch a specific portion again if needed (Zhang et al., 2006) provides a useful self-regulated instructional context where reduced levels of embarrassment or anxiety allow learners to be comfortable enough to learn new content (Pendell et al. 2013).

All of the above research examined the literature on e-learning in the subject of language teaching. Each of them approached sign language, e-learning, and interactive video from a different perspective and viewpoint, whether to include a big picture of how it is used in a practical sense, or to create a greater framework to assess the use of interactive video in e-learning for academic purposes. However, in order to comprehend the use of e-learning in language education and what findings reveal about the positives and negatives of using e-learning in educational settings, a more extensive examination of past related studies over the years is required.

2.2 Domain

E-Learning is a comparatively recent term used to describe a type of learning that may be done through internet which is online education. Presently, the creation and implementation of e-learning has become critical stages in universities. E-learning, particularly for higher educational institutions, has various advantages and benefits, and because of these advantages and benefits, it is regarded as one of the best ways of education. This is due to the fact that e-learning improves the efficacy of knowledge and certifications by providing easy access to a vast amount of material.

In response to the pandemic's new normal, Malaysia's higher learning institutions have accelerated their efforts to incorporate e-learning methodologies, often known as Open and Distance Learning (ODL) practices. ODL is a growing trend for teenage university graduates and university communities to gain access to education, flexible modes of teaching techniques, and a conducive learning environment. It gives the flexibility in learning, regardless of location or time, boosts teaching effectiveness. The prior e-learning system was much more student-centered, with less need for teacher discourse. Despite the small teacher discourse, a few teachers, believe that e-learning can boost their involvement with students. To properly exploit these technological advances and cognitive concepts, higher education must design and implement an infrastructure of adequate education, people networks, and quality assurances.

Today's students prefer a minimal amount of information that would be very interesting. They'd prefer watch a clip or hear to a webinar rather go through a long chapter. Learning developers can make information more interactive with the use of e-learning tools. The more captivating the topic, the stronger the learners will memorize it. With online learning, the students can access materials from any location and at any time. They are not required to leave their works to attend classes. Sources of e-learning allow for the potential of applying the sources in a variety of ways that enable for adjustment based on the best technique for the learner. Moreover, e-learning able to save money because there is no need for students or learners to attend. This is also financially effective in a way that everything provides opportunities to learn to

the greatest number of learners while not necessitating the development of numerous facilities.

E-learning lessons can benefit in the administration of academic staff, particularly lecturers, in a lot of formats, include allowing student self-learning at various locations and hours. Also, transmission and updating of teaching materials is quicker, promoting interactive communication between teachers and learners. Awareness campaigns must be implemented to inform students, teachers, and parents about the e-learning efforts. More passionate engaging students and gentle peer support will ideally create more motivation and inspire teachers to keep e-learning continue.

2.3 Existing system

Based on my observations, here are several examples of e-learning sign language. The existing e-learning associated with this project is an online ASL course supplied by SignLanguage101.com, and it's one of the market's sign language courses. To begin, this sign language e-learning video is comparable to other YouTube videos. Each lesson on this website is jam-packed with vocabulary terms, numbers, sign language learning recommendations, and information about the deaf culture. This website offers over 40 activities and worksheets to significantly boost the educational processes; unfortunately, the user or learner must spend a significant amount of money for the sessions. The further topics covered, the more expensive the lessons. Figure 2.1 is a screenshot from the beginning of the lesson's video.

Figure 1: Screenshot of Online ASL course by SignLanguage101.com

The link for the figure 1 video: https://www.signlanguage101.com/free-lessons/asl-level-1/about-dr-bridges

This ASLCONNECT sign language video can be found on YouTube even on a website. The classes are free and accessible to all learners through their YouTube channel. As many or more lessons can be discovered upon on YouTube channel, which includes fundamental ASL vocabulary. The website provides free online ASL classes, however for further in-depth ASL instruction, learners must sign money and charge for courses. Figure 2.2 represents screenshots from this lesson's YouTube channel and figure 2.3 shows the screenshots from the website.
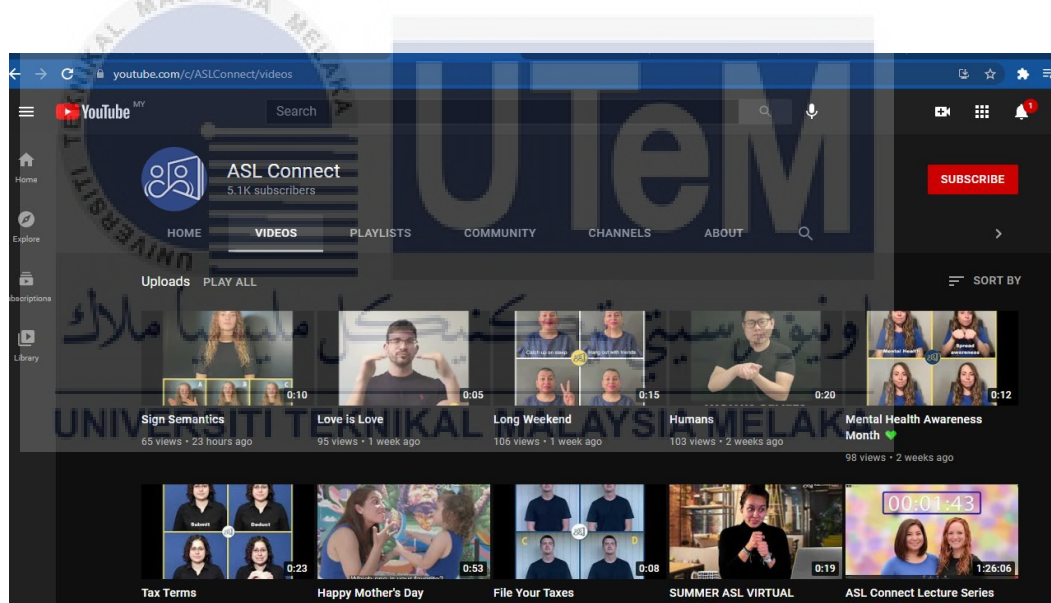
Figure 2: Screenshot of ASL Connect YouTube channel

The link for the figure 2 video: https://www.youtube.com/channel/UCyAsPO-R0bkIQT_QcKnHZ0g
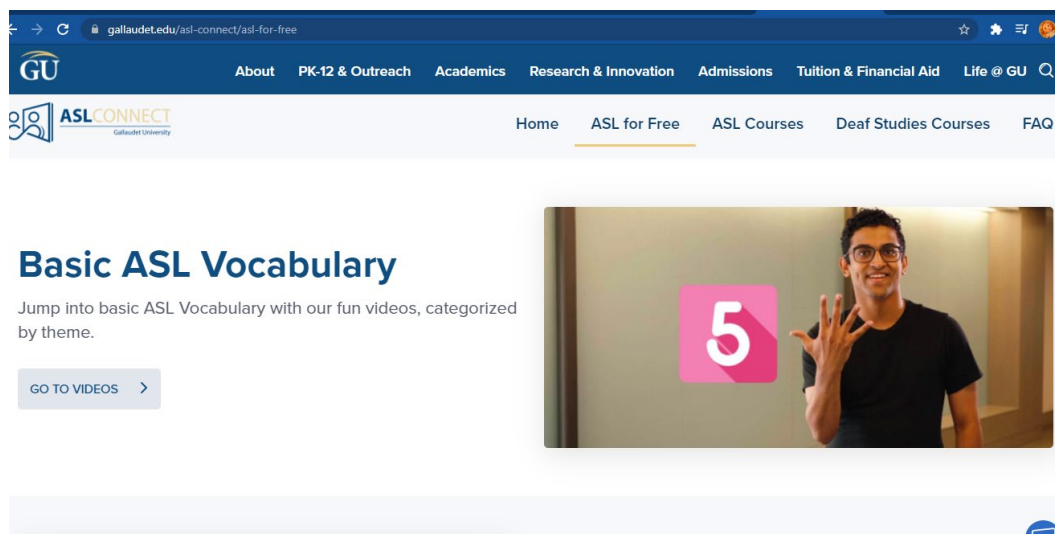
Figure 3: Screenshot of ASL Connect website

A mobile application is used for this sign language e-learning. The app is indeed free and easy to use. It includes a Sign Language dictionary for infants, children, and novices. It teaches the student basic ASL signs, such as ASL finger spelling and infant sign language, from an ASL dictionary. In addition, each hand gesture is paired with an image and sound button that stimulates speaking and hearing. This system also includes quiz games and an extra bundle of additional signs to assist learners improve their ASL knowledge. The application is kid-friendly and can also be used alone without assistance of an adult. Because there are no external links or advertisements, the program can be used without an internet connection. Additionally, there is no difficult language, so kids will have no trouble exploring, and there are clickable graphics.
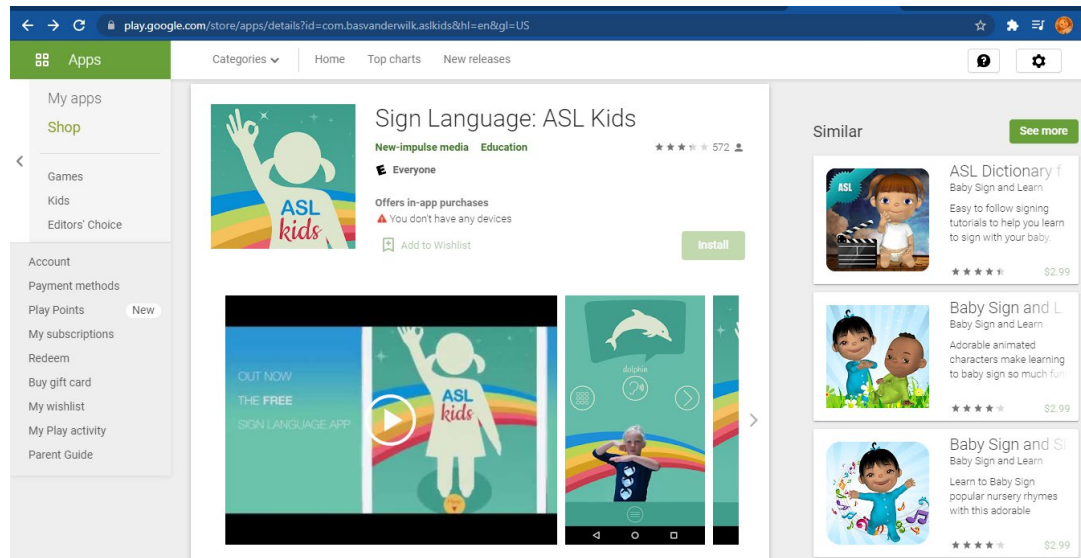
Figure 4: Screenshot of mobile application of Sign Language: ASL Kids

2.3.1 Comparison of Existing System

Table 2.1 displays a comparison of the current system. To create an interactive video for e-learning, a number of criteria must be met. Those existing system use different style and techniques to produce in such a high-quality product. One of the factors that persuades a user to use an application is its emphasis. Furthermore, the user's perspective and approach to learning tools are critical in attracting and motivating people to learn a new language.

Table 1: Comparison of Current Systems

Existing system	Online ASL course by SignLanguage101.com	ASL Connect	Sign Language: ASL Kids
Language	English	English	English
Medium	Computer	Computer	Mobile
Web-based system	Yes	Yes	No
Need internet access	Yes	Yes	No
Audio & video quality	Good	Good	Fair
Interactivity	Excellent	Fair	Good
Synchronization and delays	Good	Fair	Fair
Lesson's recorder	Yes	Yes	Yes

2.4 Project methodology

In creating the interactive video e-learning system, the process will be separated into five phases that will contain several steps in each part with the ADDIE methodology. The phases are:
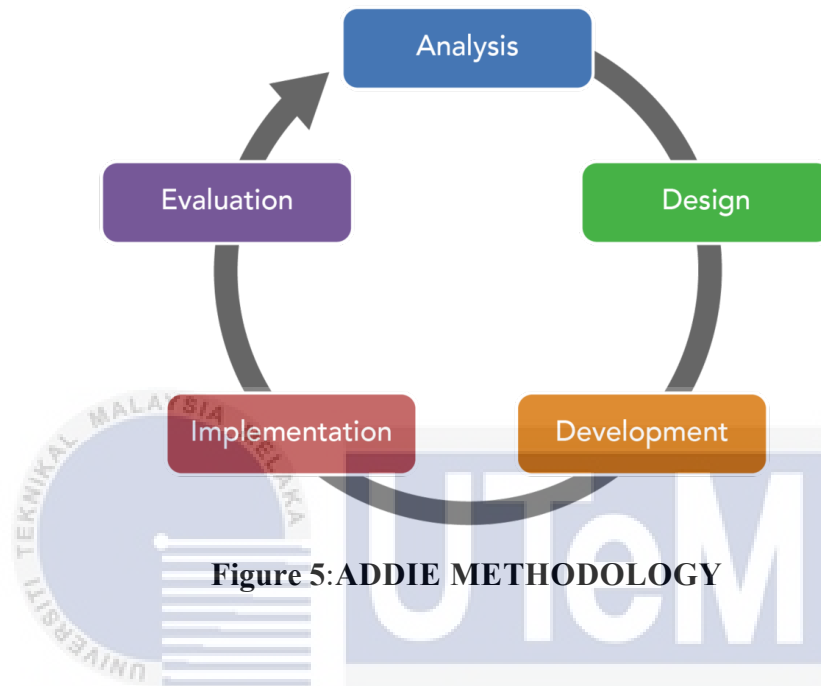
Figure 5:**ADDIE METHODOLOGY**

i. Analysis

- During the analysis phase, an analysis was performed to determine the need for developing the interactive video. The requirement analysis, task analysis, and instructional analysis are all central to the research process. Identifying the problem statement, the aims and objectives of the interactive video that will have to be created, the learners' requirement, current knowledge, as well as any other applicable specifications, as well as the content and functionality for the interactive video, are all part of the activities.

ii. Design

- A flowchart was created for the design phase. Identifying the interaction flow for video interactions, identifying the interface design for video, and content management in video are all part of the design phase.

iii.   Development

-   During the development phase, the process will continue on with the creation of the modeling design, the interface design, the music context, sound recording, and the implementation of interactive elements. For the development of a video interactive prototype, it is important to compile the graphic and search for defaults and failures.

iv.   Implementation

-   During this process, the project will conduct testing to determine the product's feasibility. A link was provided for users to be using the video to measure the project's functionality for the intended audience.

v.   Evaluate

-   Prior to the implementation, formative assessment will be performed throughout this phase to determine whether the quality of learning services satisfies the requirements described in the Design phase.

2.5   Project Requirements

2.5.1   Software Requirement

The software needed to develop this interactive video project are as follows:

i.   Adobe Animate CC

ii.   Adobe Illustrator

iii.   Adobe After Effect CC

iv.   Adobe Photoshop

v.   Adobe XD

vi.   Adobe Media Encoder CC

vii.   Adobe Premiere Pro Cc

viii.   Adobe Audition CS6

ix.   Microsoft Word

2.5.2   Hardware Requirement

i.   Personal Laptop
   a) **Processor**: Intel® Core™ i5-5200U CPU @ 2.20GHz 2.20 GHz
   b) **Installed RAM**: 12.0 GB
   c) **System type**: 64-bit operating system, x64-based processor
   d) **Pen and touch**: Pen support

ii.   Smartphone

iii.   Microphone

iv.   Hard disk: 1 TB

2.6   Conclusion

This chapter contains the literature reviews and project methodology for the final stages. The domain, the existing project, the methodology used, and even the project requirements are all discussed in this chapter. To carry out the project's progress, the required approaches and project specifications are specified. The ADDIE Process has been chosen for this project. Methodology is critical since it determines the project's progress flow. As a result, it is important to choose the right ones because then the project is delivered in accordance with the specifications laid out earlier. The current scenario and the need to create an interactive video project will be examined in the following chapter.

CHAPTER 3: ANALYSIS

3.1 Introduction

To carry out a project, we must first understand its scope and the issues that must be overcome. In this section, we will examine the issues, requirements, and thoroughly evaluate the specifications required to complete this project. This selection will also go over through the proposed approach in detail. This selection will also go over the proposed approach in depth. In order to accomplish this project, it is necessary to conduct an analysis in order to determine the appropriate elements to involve in this project; some of the essential requirements were taken from the current system and some adjustments were made to meet the project purpose and improve the existing system. This project's software and hardware requirements will be listed in order to provide excellent assistance in the development process.

3.2 Current Scenario Analysis

According to the literature review in Chapter 2, numerous research and initiatives have confirmed the usefulness of interactive video in e-learning language sessions. The majority of present e-learning languages emphasize mostly on delivering images and video rather than for the user-application interaction. The current systems to be examined are Online SignLanguage101.com, Online ASL Connect, and the Sign Language: ASL Kids application.

3.2.1   Online SignLanguage101.com

For these online sessions, the instructor will use video tutorials to highlight on the relevant information. According to the sub-topic of the seminars, every other topic is broken down into smaller segments. It also includes exercises and activities for additional practice. The contrast here between the system and this project is that the whole system doesn't somehow demand access to the internet to attend the sessions, while the Online SignLanguage101.com project required. Other differences between this project and Online SignLanguage101.com include there is a need to purchase for an entire course in addition to learning the material. Some screenshots from Online SignLanguage101.com's website can be seen in Figure 3.1 and Figure 3.2.
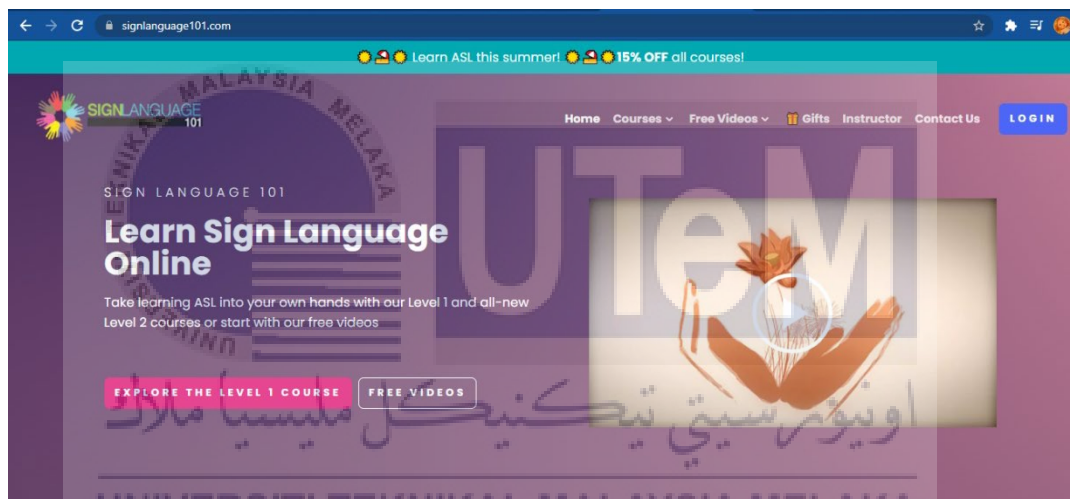
Figure 6: Screenshot of Online SignLanguage101.com

Figure 7: Screenshot of Online SignLanguage101.com

3.2.2 ASL Connect

For this online course, it distributes the courses for these online sessions via a website and a YouTube channel. On its YouTube channel, anyone can learn the sign language from the educator. Users could go to the webpage for more knowledge including exercises whether they want to acquire additional knowledge. The difference between this project and the online ASL Connect is that most of the videos are embedded in the platform, whereas the ASL Connect videos are linked to a YouTube channel. As an outcome, the user need delay for the networks to connect with their YouTube channel, usually requires a lot of time to load depends on the internet connection. This project will take significantly less time to load. It will keep the user's nerves less jangled. Some screenshots from the YouTube Channel and the website are shown in Figures 3.3 and 3.4.

Figure 8: Screenshot of Online ASL Connect
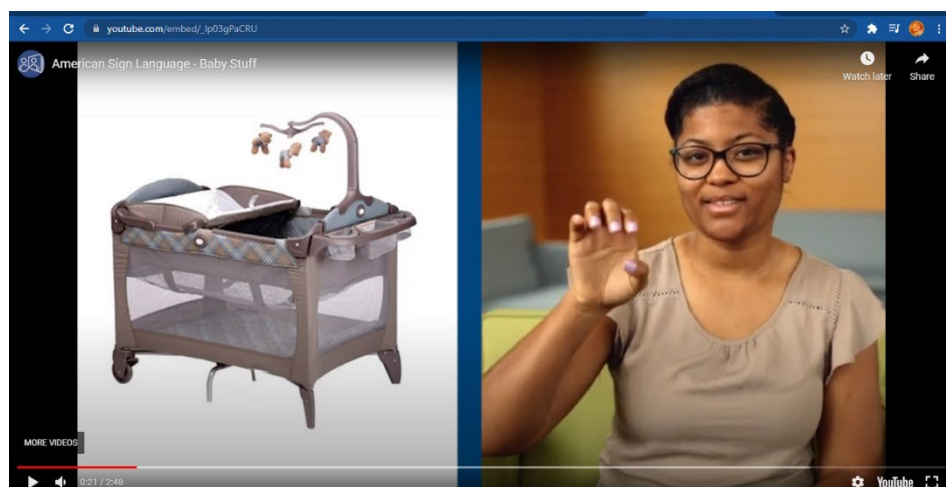
Figure 9: Screenshot of Online ASL Connect

The link for the figure 9 video: https://youtu.be/_lp03gPaCRU

3.2.3 Sign Language: ASL Kids

This mobile application follows the same application layout like any other educational smartphone application. That specific issue was disseminated and subdivided into a much more manageable selection. As an outcome, rather than just completing an entire learning lesson, the user can choose which sub-topic that would like to learn instantly. The distinction here between the project and the Sign Language: ASL Kids phone application seems to be that the user would not need to install the applications in order to obtain the lesson plan. Besides from all of that, the user should have a mobile device in order to fully utilize this application. However, there is no requirement to download this project in order to access the education programmes. Some screenshots of the mobile application from the website can be seen in Figures 3.5.
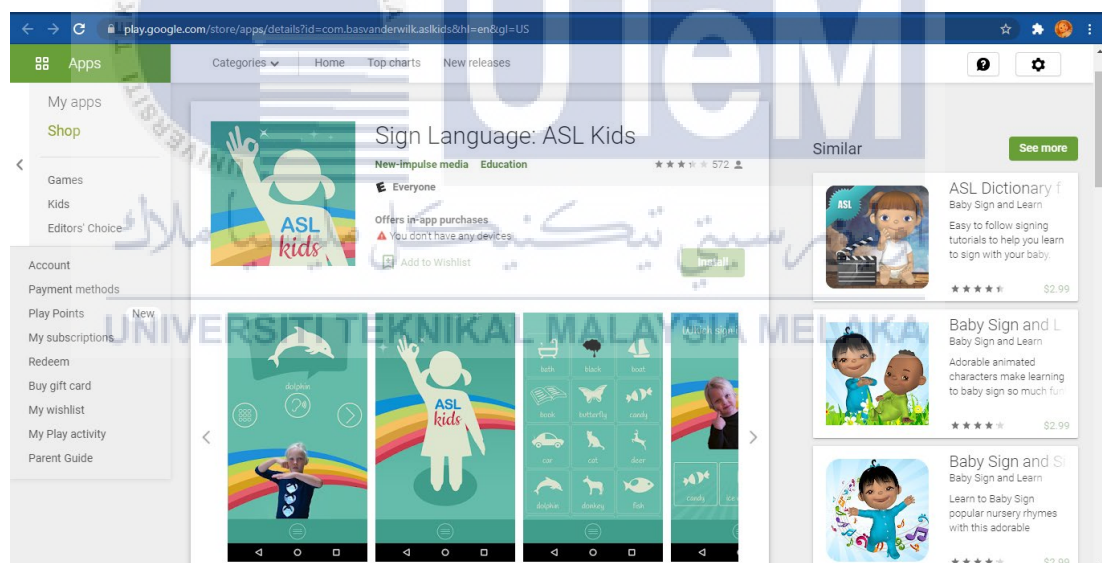
Figure 10: Screenshot of Sign Language: ASL Kids mobile application in website

3.3   Requirement Analysis

3.3.1   Project Requirement

3.3.1.1   **Need analysis**

According to the existing system's analysis, the current system educates sign language without providing for interactive engagement between both the user and the applications. Nevertheless, by integrating e-learning elements with sign language learning, the user can easily learn and develop understanding. Unfortunately, none of the previous systems considered have user involvement. Since there is no sufficient user interaction, the current methodology would not be positive and constructive. As a result, in attempt to optimize the educational experiences, this research will concentrate upon on interactive contact between the user and the program.

3.3.1.2   **User analysis**

As stated in Chapter 1, the primary target audience for this project is children aged 7 to 15 years old who wish to learn sign language as a means of engaging with members of the deaf community and making new connections. In this e-learning project, interactive video is employed as a learning tool. The user is more attracted to the e-learning learning method than the traditional approach, according to the literature review and actual initiatives. This is because e-learning is still a growing concept for users, and the merging of interactive video with e-learning provides a more interesting and pleasurable experience. Furthermore, e-learning allows for the transmission of teachings in a timely manner. This method of distribution has shorter delivery cycles than standard classroom education methods. The users can emphasis on select, important sections of the learning content rather than studying everything.

3.3.1.3   **Resource Analysis**

During the study for the development and design project, numerous sources and references were researched, including video and photographs from either the internet, websites, as well as other apps. This seems to be critical since all aspects of various learning sources must be examined in addition to developing a superior

product. The development of internet technology has made gaining sources for this research much easier.

3.3.2   Requirement Gathering

3.3.2.1   Analyzing existing documents

Examining an existing system's documentation might be a useful strategy for gathering requirements. Evaluating the existing sign language workflow and documentation can significantly improve the project's structure and layout. I was able to better understand and determine previous e-learning potential problems which not only operate inefficiently, and also have the potential to impact product performance and increases problems. "Intelligent Online e-Learning Systems: A Comparative Study," one of the documents examined, emphasized that an e-learning system should incorporate visual demonstrations of courses. It should also be able to cooperate and come up with creative key improvements.
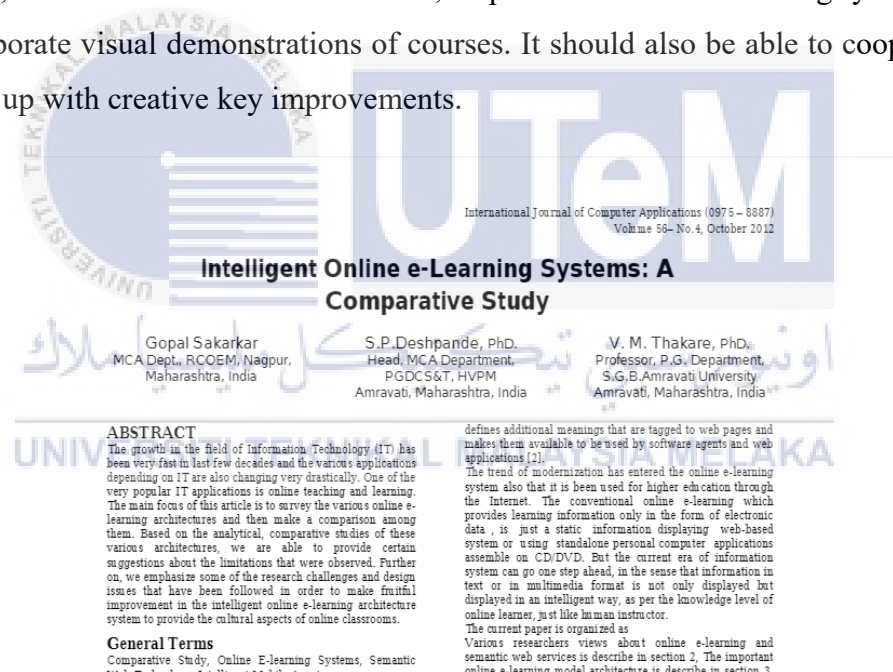
Figure 11: Screenshot of "Intelligent Online e-learning systems: A comparative study" article.

3.3.2.2   Questionnaires

The results of the questionnaire are based on a few questions asked of the general audience regarding their opinions on sign language e-learning tools. There are

7 questions to be answered in total. The questions are more focused on the participants' experiences with and opinions on sign language e-learning tools.

For starters, 92.6 % of those who responded to the first question expressed an interest in studying sign language. The remaining 7.4%, on the other hand, has no interest in learning sign language.

Do you interested in learning sign language?
27 responses
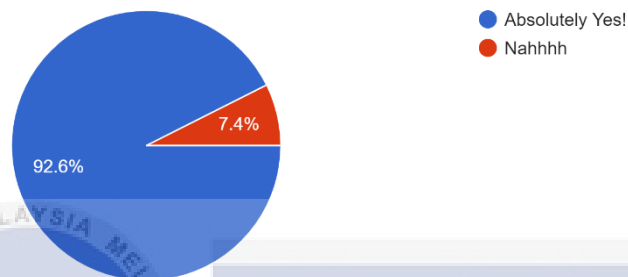
Figure 12: **Percentage of question 1**

The second question inquires on whether the respondents had ever encountered a deaf person. According to the data, 63% of respondents have encountered a deaf person, whereas 37% have never encountered a deaf person.

Have you ever had encounter with any deaf person before?
27 responses
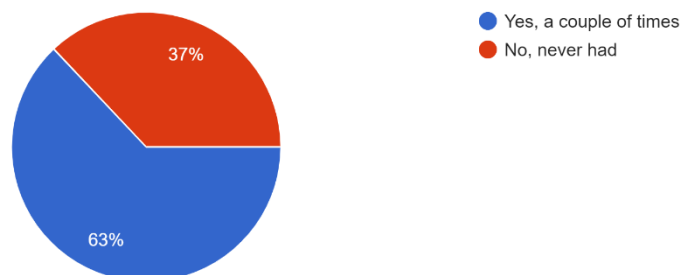
Figure 13: **Percentage of question 2**

The following question is whether the respondent has experienced any difficulties when engaging with deaf persons. According to the graph, 96.3% of respondents had encountered language barrier when interacting with deaf persons.

Is it a problem for you if a deaf person tries to speak with you?
27 responses

- Yes, It's a little difficult for me to communicate.
- No, cause I'm going to keep my mouth shut.

96.3%
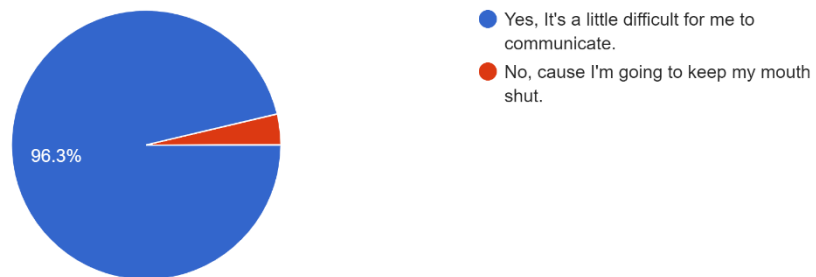
Figure 14: **Percentage of question 3**

The respondents were asked if they were interested in learning sign language through an interactive video platform. This graph illustrates that 92.6% of respondents are interested in learning sign language using interactive video, while only 7.4% are not.

Do you want to learn sign language with the help of an interactive video?
27 responses

- Count me in!!!
- sorry i'm not interested

7.4%

92.6%
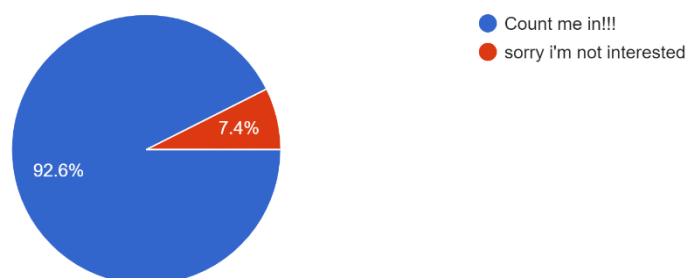
Figure 15: **Percentage of question 4**

In response to the fifth question, 44.4% of respondents said interactive video is the best way to learn sign language. The graph also shows that 33.3% of respondents prefer to learn it on YouTube, while only 14.8% prefer to study it on a website; nevertheless, deep learning comes at a price.

What kind of sign language learning platform do you prefer the most?
27 responses
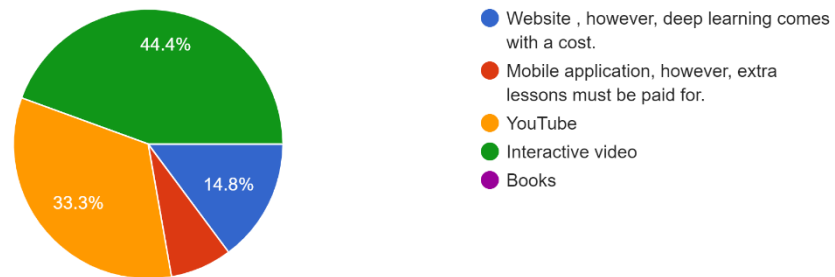
Figure 16: **Percentage of question 5**

The following question is whether the respondent believes that pictures, videos, or both are good learning materials for sign language. According to the graph, 85.2% of respondents think that both pictures and videos are the most beneficial learning materials, while 11.1% say merely video.

What are some useful tools for learning sign language?
27 responses
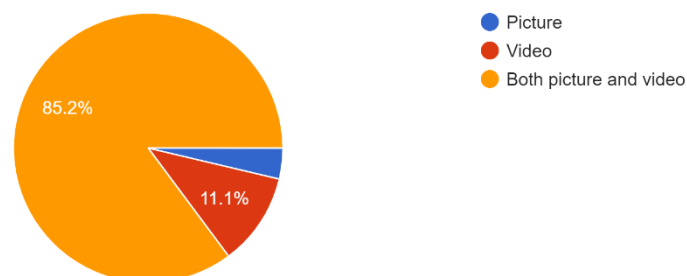
Figure 17: **Percentage of question 6**

This question inquires about the respondents' preferred techniques for learning sign language. The majority of respondents claimed that they would rather learn sign language through video. The majority of respondent favor engaging and fun websites as long since they are free, according to their comments.
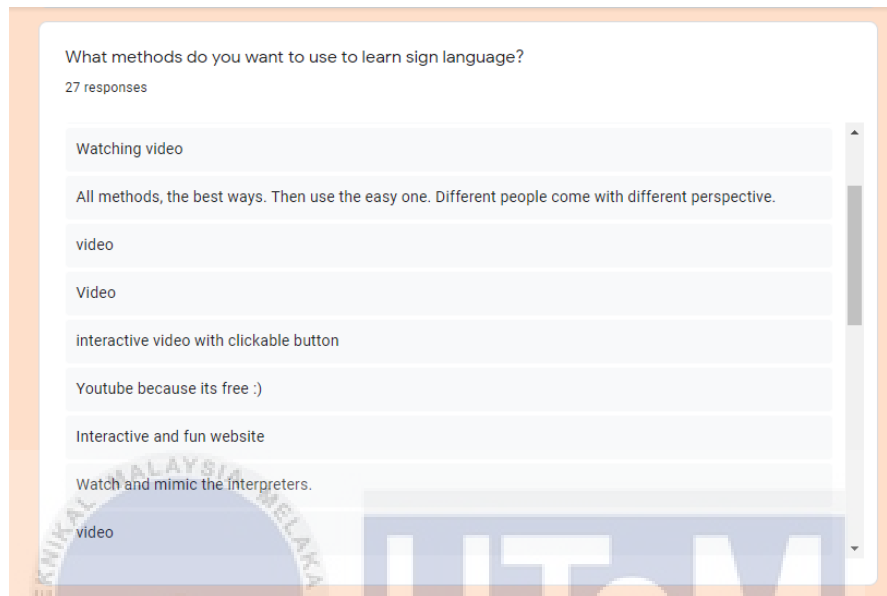
Figure 18: Percentage of question 7
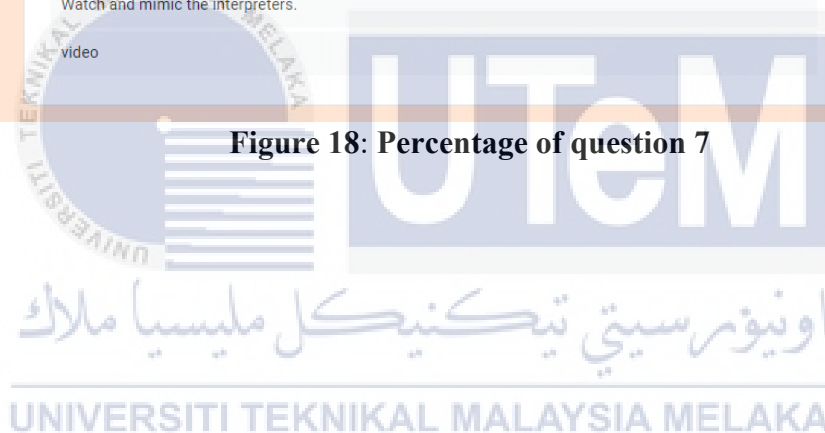
3.3.3   Software Requirements

1. Adobe Illustrator

    a. Adobe Illustrator is used to create a variety of digital and printed images, including cartoons, charts, diagrams, graphs, logos, and illustrations. It also can import a picture and use it as a guide to trace an object in the photograph. This can be used to re-color or create a sketch-like appearance of a photograph.

2. Adobe Animate

    a. Adobe Animate is an Adobe Systems multimedia authoring and computer animation software. Animate is a vector graphics and animation program that may be used to create vector graphics and animation for television shows, online video, websites, web apps, rich internet applications, and video games.

3. Adobe Photoshop

    a. Adobe Photoshop is a raster graphics editor to edit and compose raster images in multiple layers and supports masks, alpha compositing and several color models.

4. Adobe After Effect

    a. Adobe After Effects is a 2.5D animation software used for animation, visual effects, and motion picture compositing. After Effects is used in film, TV, and web video creation.

5. Adobe Premiere Pro

    a. Adobe Premiere Pro is a timeline-based video editing software application developed by Adobe Inc. and published as part of the Adobe Creative Cloud licensing program.

6. Adobe Audition CS6

    a. Adobe Audition CS6 is professional audio production software that facilitates a range of tasks, from editing audio for video to creating multitrack mixes, and from sweetening tracks to correcting pitch, removing noise, applying effects, and more.

3.3.4 Hardware Requirement

i. Laptop

    a. With all of the applications described above, a laptop was utilized to produce all of the project development process. It's also where the project's proposal and report are produced.

ii. Smartphone

    a. This project will require use of a smartphone to capture and video recording.

iii. Microphone

    a. In the practice phase of the application, a microphone was used for the dialogue and to record the audio of voiceover and characters voice.

iv. Mouse

    a. To ensure that the work is much easier than the personal computers with touchpads been used.

v. Headphone/Earphone

    a. To hear the audio or sound of the narration and the characters' voices clearly.

3.3.5 Others Requirement

i. Microsoft Word

    a. The paperwork for all of the project's proposals and reports is done in Microsoft Word.

ii. Microsoft PowerPoint

a. When presenting the final version of the product, Microsoft
    PowerPoint is applied as the presentation tool.

3.4   Project Schedule and Milestones

3.4.1   Project Schedule

Table 2: Project progress

No.	Task	Start date	End date	Duration (Days)
1.	**Proposal PSM: Discussion**	**8/3/2021**	**4/4/2021**	**27**
	1.1 Brainstorming the selected topic for the project	8/3/2021	12/3/2021	4
	1.2 Discuss with supervisor and proposal verification	12/3/2021	28/3/2021	16
	1.3 Submission of proposal to committee via email	28/3/2021	4/4/2021	7
2.	**Planning the system and Report progress**	**5/4/2021**	**25/4/2021**	**20**
	2.1 Do research	5/4/2021	10/4/2021	5
	2.2 Analysis the project	10/4/2021	15/4/2021	5
	2.3 Software installation	12/4/2021	20/4/2021	8
	2.4 Chapter 1 and 2 report progress	5/4/2021	25/4/2021	20
3.	**System development and Report progress**	**25/4/2021**	**6/6/2021**	**42**

	3.1 Modelling the system design	25/4/2021	2/5/2021	7
	3.2 Developed interface design	2/5/2021	25/5/2021	23
	3.3 Adding video related to the lessons	26/4/2021	5/6/2021	40
	3.4 Recording sounds for the project	30/4/2021	10/5/2021	10
	3.5 Adding music background	14/5/2021	20/5/2021	6
	3.6 Report progress for chapter 3 and 4	20/5/2021	6/6/2021	17
4.	**Deliver/Publish the project**	**7/6/2021**	**28/6/2021**	**21**
	4.1 Publishing fully functional project	7/6/2021	20/6/2021	13
	4.2 Presentation of the project	21/6/2021	27/6/2021	6
	4.3 Submission of PSM1 report	21/6/2021	28/6/2021	7

3.4.2   Milestones
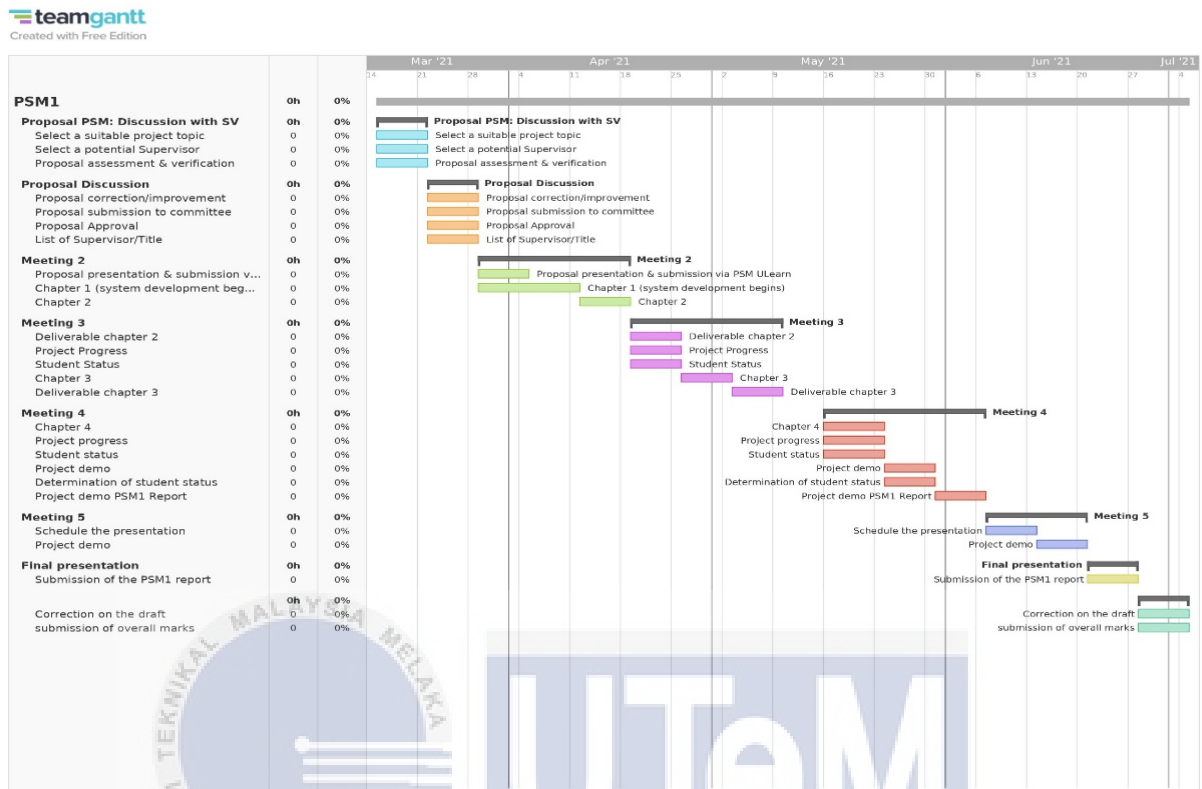
Figure 19: **Gantt chart for the milestone**

3.5   Conclusion

As a summary, the analysis phase is critical in evaluating the existing system and developing new projects. The problem analysis in the current system is discussed in this chapter. The project is developed using software, hardware, and user requirements. To keep up with technological advancements, the most up-to-date software and hardware are being used. The project schedule and milestones are critical in producing an e-learning operation that operates efficiently and reliably. The milestones are used to display the information about the project's progress. In addition, requirement analysis, which includes need analysis, user analysis, resource analysis, and requirement gathering, is crucial for identifying user's requirements. The project's design will be addressed in the following chapter.

CHAPTER 4: DESIGN

4.1 Introduction

This chapter will go over the project's design process in depth, including the storyboard, product output design, and other documents. The design phase is divided into three sections: system architecture, preliminary design, and product output design.

4.2 Sequence Diagram

The sequences of this e-learning are portrayed in Figure 4.1. This illustration depicts the whole situation that the user will encounter. For instance, a user's ability to select to choose any topic is dependent on the user's interest.
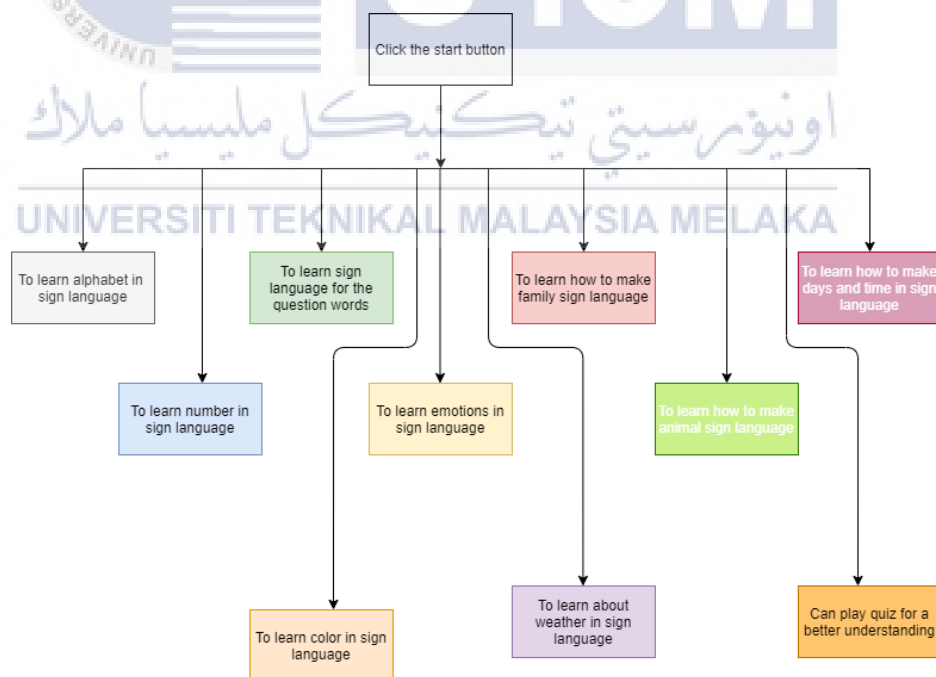
Figure 20: The flow of the application

4.3 Preliminary Design

The first section of the design phase, which includes storyboard design, is known as preliminary design. The storyboard depicts the application's visual interface

together with the user's linear progression. The storyboard explains the application's concept and purpose.

4.3.1 Interactive Storyboard

The storyboard is used to illustrate the application's flow in the correct order. This is also to present a high-level picture of the application flow to help developers understand the goals of various features. The project's storyboard is shown below.
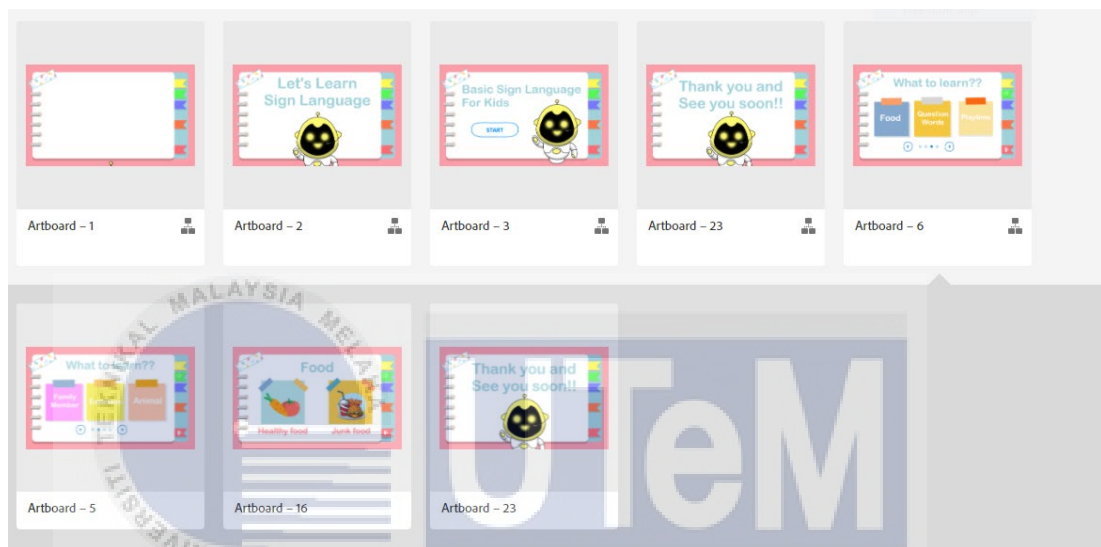
Figure 21: Storyboard of the application

Figure 22: Storyboard of the application content

4.4   Product Output Design

4.4.1   Navigation Design

The navigation design illustrates the application's navigation flow and multiple types of navigation buttons. The selection button that will display on the side interface menu will be included in the navigation design throughout this section. The tools and approaches for communicating with the application via clicking on clickable buttons. The application's prototype interface design is seen below.
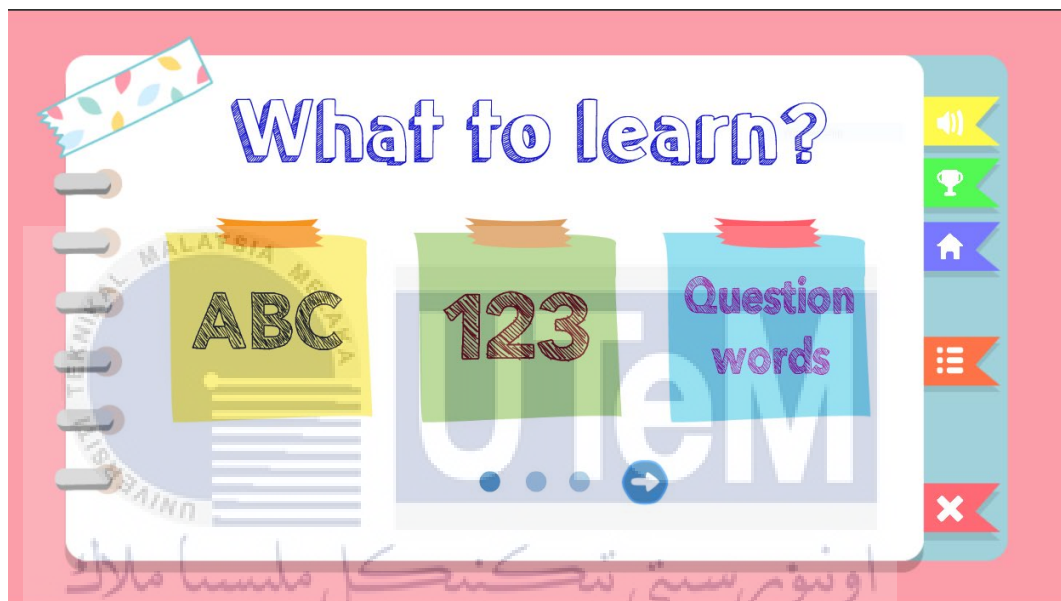
Figure 23: Button for the interface

Figure 24: Home button

Figure 25: Button for the quiz session

Figure 26: Button for the menu

4.4.2   The narrator/main character

This cartoon character will narrate the entire session in an effort to make learning more enjoyable. This cartoon will demonstrate the user how to use the program and what they need to learn. The journey through the class would be much less stressful and more pleasurable thanks to this cartoon.
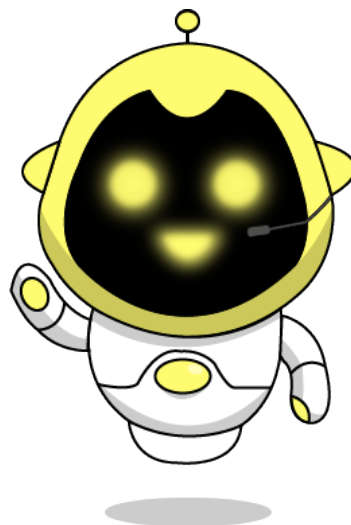
Figure 27: The narrator

4.4.3 Media control symbol

In this project, the media control is used to regulate how the video is played during in the sessions. For greater understanding, users can either choose to start, pause, or rewind the video. The color of the button has a significant impact on the clicking activity. It assists the user in determining whether or not button is being pressed.
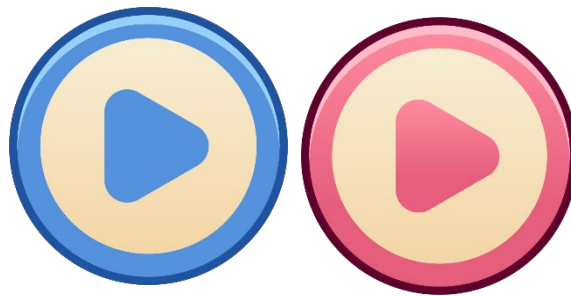
Figure 4.9 The narrator

4.5   Conclusion

In summary, the system architecture, preliminary design, and product output design are all discussed in this chapter. The interface design, audio design, and various buttons are all part of the product output design. This will make it easier for developers to incorporate the function into those designs in order to create a successful application. The application's implementation method will be discussed in the following chapter

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

This chapter describes the development of texts, graphics, and audio during the implementation phase. The procedure of combining the creation of components and elements in multimedia will be described in the media integration. Furthermore, product configuration management will define the developer design and setup process, the application implementation process, method, and control in version management. The purpose of this product implementation is to provide an overview of the strategies and elements utilized to create this interactive video. During this phase, the project will continue to progress without error and will achieve the project's goal.

5.2 Media Creation

This section of media creation will cover the entire process of creating and editing media components manually and individually before they could be integrated later in the media integration section. This process comprises the development of text, graphics, audio, and animation.

5.2.1   Production of Text

This section describes the application's text kinds, font management, and text format. Text is essential in interactive video because it provides information to audiences to enable viewers comprehend the content. To ensure that audiences can see and read well, the text color should match the background color. Font type, size, and color all have a role in generating a good text.

Table 3: Production of Texts

Scene	Example	Description	Font Style	Size
Opening		The interactive video title	Meatloaf	230pt
Start button		The interactive video subtitle	Meatloaf	100pt
		The text button to start the interactive video	Folktale	100pt
Home		The main menu button text	Folktale	500pt
ABC		The subtitle for the "ABC" menu	Meatloaf	600pt
		The text info for the alphabet	Folktale	120pt

123		The subtitle for the "Number" menu	Meatloaf	600pt
		The text info for the number	Folktale	50pt
Question Words		The subtitle for the "Question Words" menu	Meatloaf	600pt
		The text info for the question words	Folktale	50pt
Family Members		The subtitle for the "Family Members" menu	Meatloaf	600pt
		The text info for the family members	Folktale	50pt
Emotions		The subtitle for the "Emotions" menu	Meatloaf	600pt
		The text info for the emotions	Folktale	50pt
Animal		The subtitle for the "Animals" menu	Meatloaf	600pt

		Description	Font	Size
	Cat 🔊	The text info for the animals	Folktale	50pt
Color	🏆 Yellow 🏆	The subtitle for the "Color" menu	Meatloaf	600pt
	Yellow 🔊	The text info for the color	Folktale	50pt
Weather	☀ Summer ☀	The subtitle for the "Weather" menu	Meatloaf	600pt
	Summer 🔊	The text info for the weather	Folktale	50pt
Days and Time	Monday	The subtitle for the "Days and Time" menu	Meatloaf	600pt
	Monday 🔊	The text info for the days and time	Folktale	50pt
Quiz	Let's play	The title for the "Quiz" menu	Meatloaf	500pt
	Start	The text button to start the quiz	Folktale	100pt
Exit	Thank you	The title for the "exit" menu	Meatloaf	500pt

5.2.2 Production of Graphics

The design and editing process is an element of the graphic production for the 2D graphics where the image is being used. Character and surroundings are created. Adobe Illustrator is used to create the bitmap picture displayed in the 2D image. The bitmap image and surroundings were also created with Adobe Photoshop and Adobe After Effect. The steps for producing 2D are shown below.
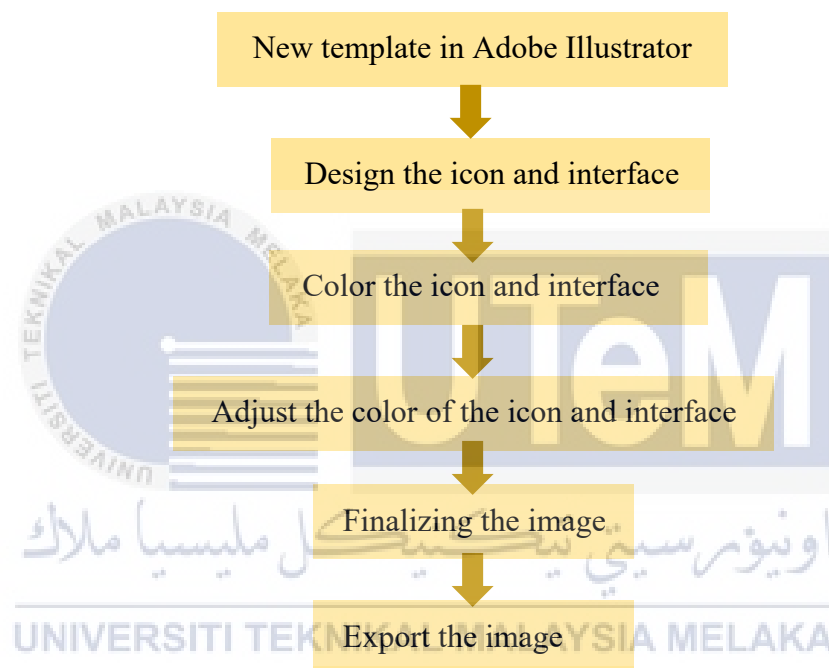
Figure 28: Graphic production process
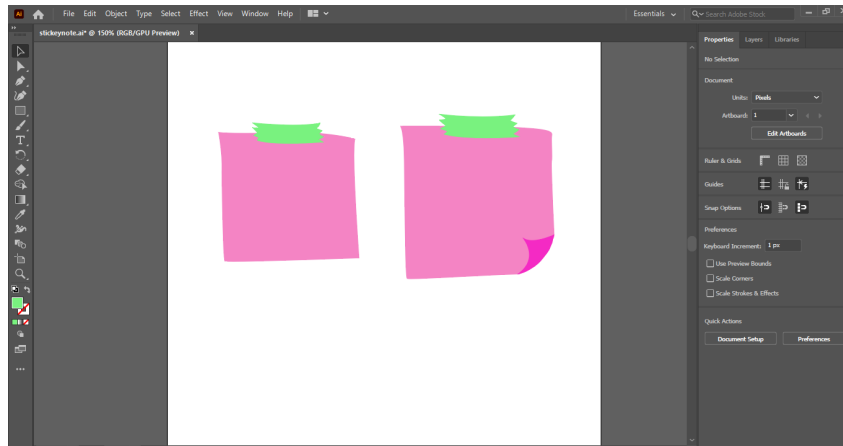
Figure 29: Example of the icon button for the menu

5.2.3 Production of Audio

To create a good and interesting interactive video, audio is a crucial element that can interest in an audience. This project's audio files are in MP3 format. Adobe Audition CS6 is the software used to edit and cut the audio file in order to compress it. To make the interactive video more alive, voice over is required in this interactive video. The voice over that I employed as a narrator for the interactive video is from a smartphone text-to-speech application. All of the voices were recorded with a smartphone voice recorder and will be converted to mp3 format. The sound is compressed and edited using Adobe Audition CS6 software. Below are the steps of audio production. Figure 30 shows chart production of Audio
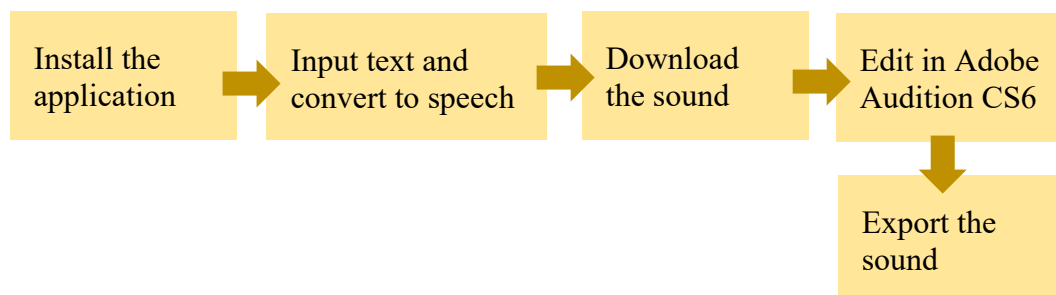
Figure 30: Production of Audio
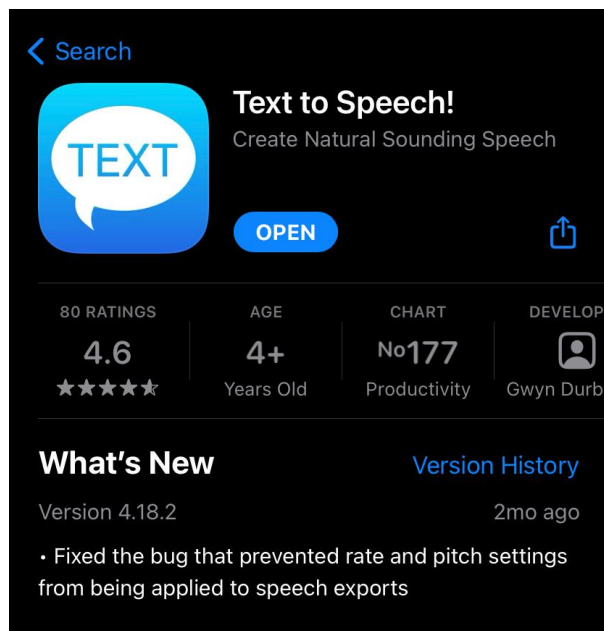
Figure 31: Screenshot of an application for the voice over

5.2.4 Production of Animation

The video is produced in this section based on the storyboard that was created during the pre-production process. Adobe Illustrator was used to design all of the buttons and graphics, as well as to color everything. Adobe Animate was used to create the animation for the interactive video. To make the animate process easier for the primary figure who operates as the narrator in this interactive video, the character's hand, head, eyes, and body parts are edited individually. All of the pieces which are already isolated in one piece are saved in Adobe Illustrator and then exported to Adobe Animate to construct an animation. All the combining file and movie clip is done in Adobe Animate. The final rendering and publishing are in swf file. The process of production in animation is shown in the Figure 32 below.

Open Adobe Illustrator

Edit and develop the robot character

Save the robot character

Open Adobe Animate

Import the robot character

Edit the robot character

Save all scene changes
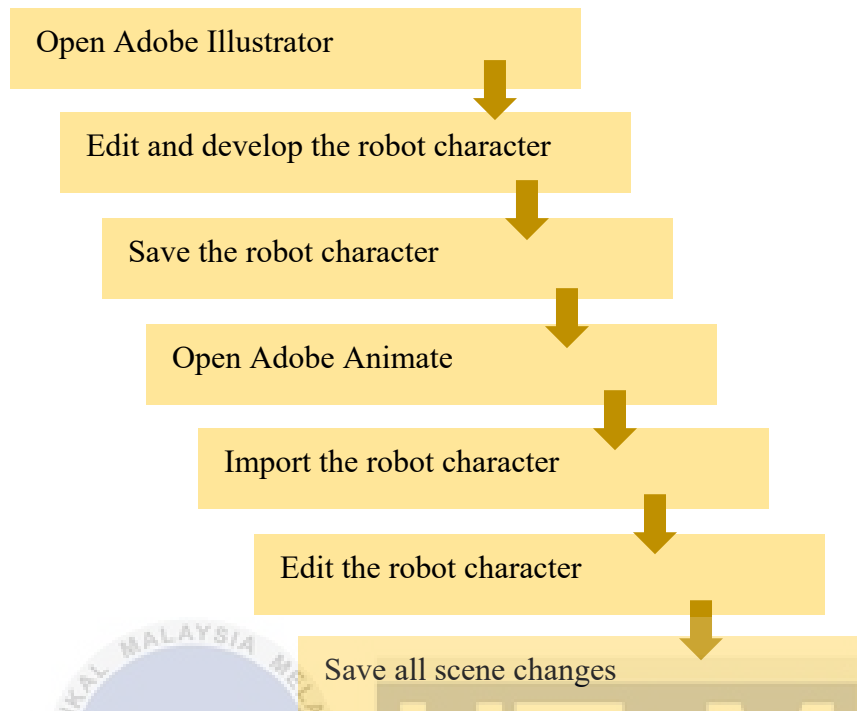
Figure 32: Production of robot character
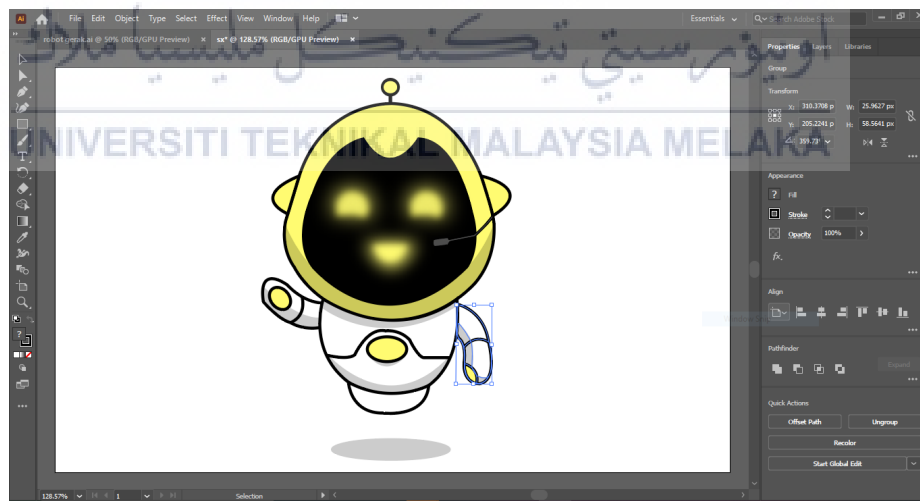
Figure 33: Screenshot of robot character in Adobe Illustrator
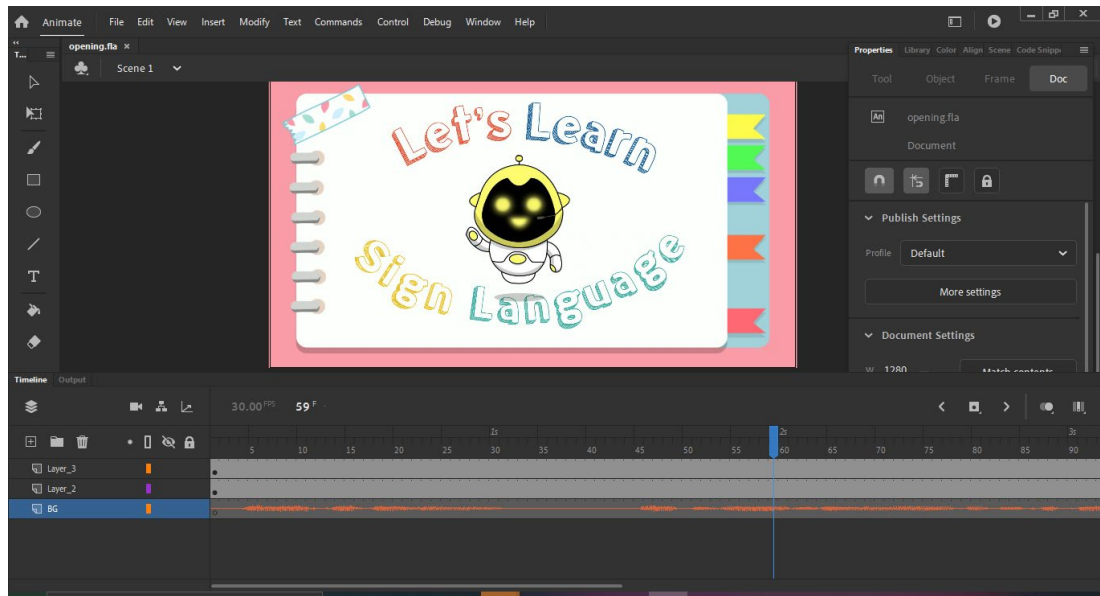
Figure 34: Screenshot of robot character in Adobe Animate

5.3   Media Integration

The media integration section explains that all of the media components were integrated to make this product useful and practical. This section will interact with the integration files for text, graphics, audio, and animation. This technique was carried out using tools found in Adobe After Effects, Adobe Premiere Pro, and Adobe Animate. The tools offered in Adobe Animate program are used to create animation. The animation was performed by applying a scene-by-scene process and motion tweening. The audio is gain from internet and edited with smartphone application before being imported into the Adobe Audition CS6 software. To maintain the high quality of mp3 audio, the audio and sound effects formats are supported in mp3 format. All graphics, audio, and video clips are put in the timeline and stage to make this entire component merge with one other. After all components have been integrated, the final adjustments will be performed to all components before they would be ready to be submitted in the specific format. The media integration method is demonstrated in Figure 36 below.
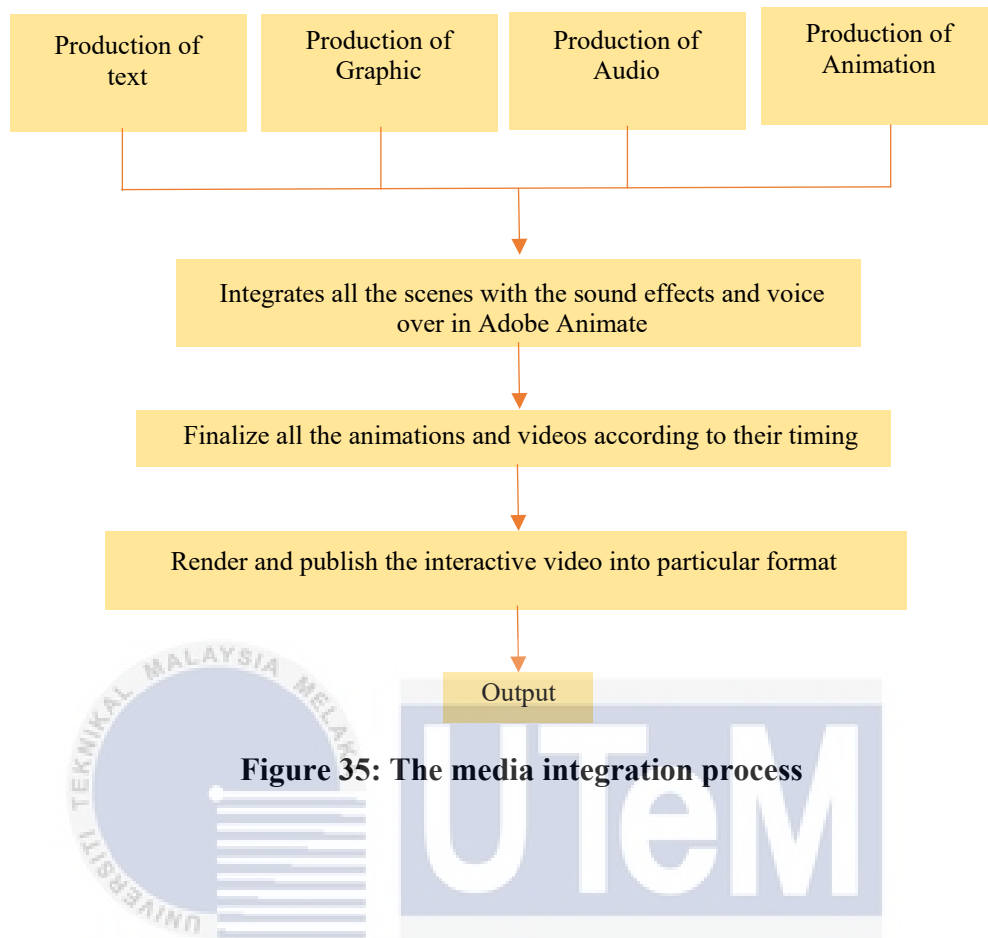
Figure 35: The media integration process

5.4 Product Configuration Management

This section discusses the approach to creating and implementing configuration management for system requirements. This section also describes the version control status, which explains the technique and control in application version management in a summary.

5.4.1 Product Configuration Management

Adobe Animate was used as the primary platform for creating this interactive video. Aside from that, Adobe Illustrator and Adobe Audition CS6 are expected to facilitate the production of high-quality audio video to be integrated in the animated. All graphics, audio, and animation must be adjusted before it could be used in the interactive video. Before beginning the task, the right software configuration must be completed. It is critical to ensure that the end product is excellent. Table 4 below show the configuration setup in details. Figure 36 Adobe Animate properties.

Table 4: Configuration environment setup

Software	Configuration
Adobe Animate	Stage configuration: • Width: 1280 pixels • Height: 720 pixels • Resolution: 1280 x 720 • Color Mode: RGB • Background: White

Figure 36: Adobe Animate properties

Adobe Audition CS6 was also performed to establish in first order to generate quality sound. The configuration setup is detailed in Table 5.3 and Figure 5.9.

Table 5: Configuration environment setup for Adobe Audition CS6

Software	Configuration
Adobe Audition CS6	Stage configuration: • Sample rate: Stereo • Channel: 44,100 Hz • Resolution: 32-bit
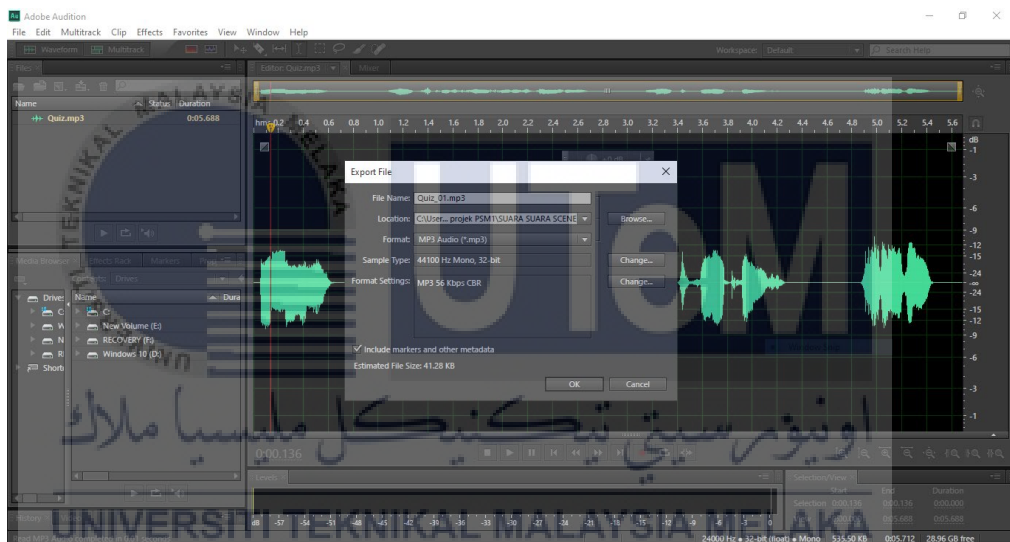
Figure 37: Adobe Audition CS6 properties

Furthermore, Adobe Illustrator must be configured in order to produce a high-quality image. Illustrator is used to modify and create some of the graphics. The configuration setup for Adobe Illustrator is shown in Table 6 below. Adobe Illustrator properties are illustrated in Figure 38.

Table 6: Configuration environment setup for Adobe Illustrator

Software	Configuration
Adobe Illustrator	Stage configuration: • Width:1280 pixels • Height: 720 pixels • Resolution: 1280 x 720 • Color Mode: RGB • Background: White
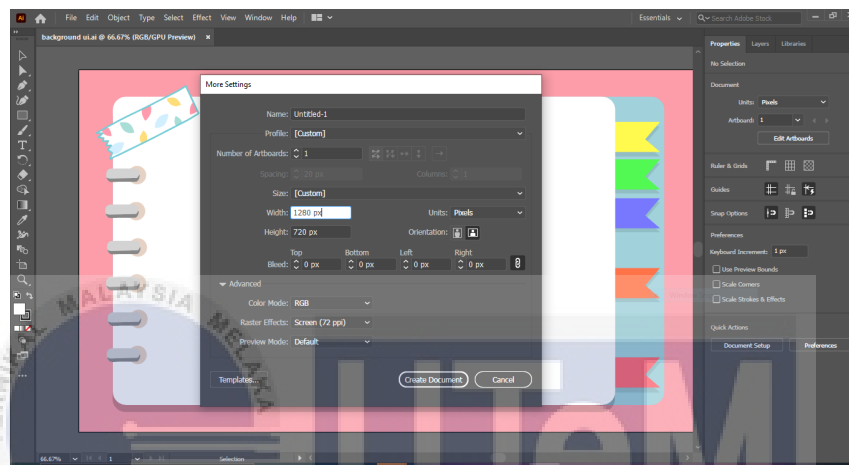
Figure 38: Adobe Illustrator properties

Adobe After Effect also need to setup to produce a good interactive menu as a front page interface. Table 7 below show the configuration setup in details. Figure 39 Adobe After Effect properties.

Table 7: Configuration environment setup

Software	Configuration
Adobe After Effects	Stage configuration: • Type: Composition • Size: 1920 x 1080 • Frame rate: 30 • Resolution: Full • Background Color: White
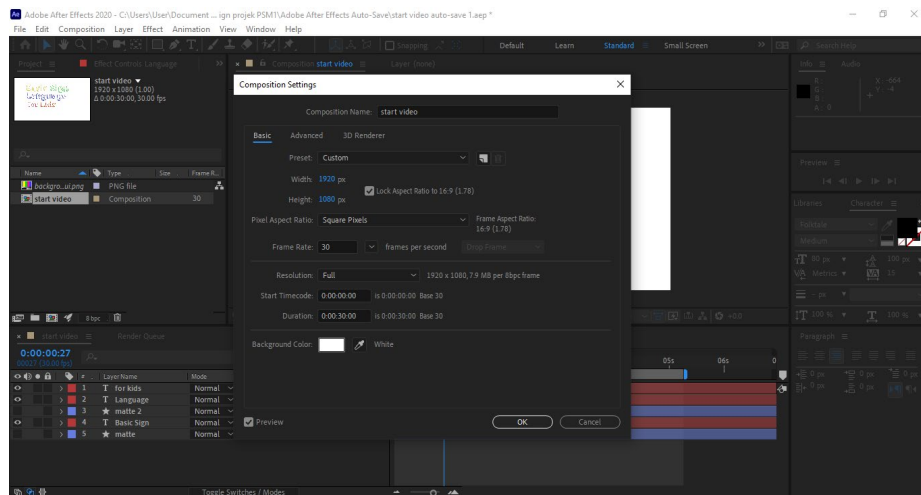
Figure 39: Composition setting in Adobe After Effects

5.4.2 Version Control Procedure

The process of maintaining product versions is known as version control. Versions are classified into two types: Alpha and Beta. The full version consists of certain testing methods in which the testers attempt to execute many activities in order to discover and analyze the test's reaction and outcome.

i. Alpha version

a. This alpha version is when the product is tested by a developer to guarantee the project is error-free. Before the product is released to end consumers, the developer is accountable for correcting the issue. This project has gone through five versions for Alpha version testing throughout its development. The alpha version is depicted and explained in Table 8 below.

Table 8: List of alpha version control

Version	Description
Version 1	Illustrate and create the main character, background and related graphics
Version 2	The development in coding for functioning buttons.
Version 3	Manage sound effect for each scenes and buttons
Version 4	Editing the product
Version 5	Finalize all the scenes and fixed bugs.

ii.   Beta version

a. Following the completion of alpha testing, the beta version is tested for end users. To ensure that the issue happened during the test, the user must be a target user. This beta version is distributed using a booth in a public place so that the developer can locate many people. The error that may occur then will be fixed and the release of the golden master.

iii.   Golden Master Release

a. This section will be the final and most important, in which the product will have been thoroughly tested and will be ready to be released or presented with its full functionality and potential. It is regarded to be quite stable and is expected to be bug-free.

5.5 Implementation Status

Implementation status is to track the progress of the activities to complete this interactive video project, BASIC SIGN LANGUAGE FOR KIDS (INTERACTIVE VIDEO). Table 8 below show the implementation status, which there is listed down in the general components task in the overall implementation phase of the project.

Table 9: Implementation status

Module name	Description	Duration	Date complete	Status
Planning and design	1. Storyboarding 2. Illustrator of characters 3. Develop background and related button and graphics 4. Create scenes 5. Record the voice over 6. Find the sound effects	6 weeks	27 Jan 2021 - 1 March 2021	Complete
Animated	1. Animated the character 2. Animated the character and the scenes 3. Putting texts and buttons	7 weeks	1 March 2021 - 3 Jun 2021	Complete
Editing	1. Edit all the interactive video audio 2. Put all the sound effects and voice over 3. Adding effects 4. Finalize all component	3 weeks	3 Jun 2021 - 20 Jun 2021	Complet

5.6 Conclusion

As a conclusion, this chapter has discussed and explained the project's implementation phase. This contains a detailed overview of the development process, media development, media integration, product configuration management, and the progress of implementation. The following chapter would go over the project's testing process in detail, including all the test design and test implementation.

CHAPTER 6: TESTING

6.1   Introduction

This chapter is about testing and outcomes, and it's the last portion of the 2D animation project that needs to be finished. The testing step for this animation was completed successfully, allowing developers to determine how well the end user accepts it. The test plan, which comprises the test user, test environment, test schedule, and test technique, is covered in this chapter. Also included is test implementation, which comprises test description, data, and results, as well as analytical testing.

The testing phase was carried out to see if the interactive video of basic sign language for kids met the project's goals and if the application served as an aid in learning basic sign language. Several test plans and test strategies were used to gather and analyze the testing results in order to determine the success of the e-learning. The important part of the research element of the testing is the strategy that will be adopted are the learnability, effectiveness and flexibility, functionality, satisfaction and design activities. The testing phase will be discussed in this chapter.

6.2   Test Plan

6.2.1   Test User

The test users for this testing are random users, special education student, and sign language expert, according to the tester's profile. The testers who participated in this testing are listed in Table 10.

Table 10: Test organization for testing

Testing	Questionnaire	Questionnaire	Questionnaire
Profession	Random User	Special Education student/ Hearing disabled person	Sign Language expert/ Malaysian Sign Language teacher
General Information	7-10 years old, 11-15 years old, 20-26 years old and Above 27 years old	A student from Sekolah Pendidikan Khas Penang	A Malaysian Sign Language organization
Description	The purpose of this testing is to determine the effectiveness of the interactive video of basic sign language for kids based on the user's response to the question.	The question to test on the multimedia and video part of this interactive video was supplied to the users	This testing is also being done to see if the content in the video is accurate and give all the necessary details about that particular sign language

6.2.2 Test Environment

The test environment specifies the place and conditions in which the research will be conducted. It also specifies the hardware that will be used throughout the test. The testing environment is beneficial in ensuring that the testing procedure is completed without difficulties. As stated in Table 6.2, the software and hardware configuration and preparation have been confirmed.

Table 11: Test environment

No.	Hardware and Software	Description
1	Laptop	To test the interactive video
2	Hard Disk	Minimum space 2GB
3	Operating System	Smartphone/Laptop

6.2.3   Test Schedule

The test schedule is an important part of the testing process since it ensures that the testing can be completed efficiently and within the time given. The test schedule is critical for ensuring that the plan is followed and the project is completed. The test schedule must include indicate the activities to be accomplished as well as the number of test participants. The consumer was given a demonstration on how to utilize the program before the study began. The duration of the testing was shown in Table 12 below. The duration of the testing is provided in Table 12 below.

Table 12: Test Schedule

Process	Description
User	Random users, Special education student and sign language expert
Number of user	63 users
Testing date	20-27th August 2021
Testing duration	Depends on the user
Testing venue	Online

6.3   Test Strategy

In this project, the test strategy is the element that must be planned in order to complete the research. This method is used as a research guide. The alpha and beta testing procedures are used in this strategy.

i.   Alpha Testing

     a. When the animation prototype is complete, alpha testing is conducted, and the animation will accept inputs and produce outputs. In this situation, industry professionals will be able to reflect on the interactive video requirement for this project and give appropriate recommendations for doing testing to determine whether or not the animation is fully functional. They will notice any flaws and provide feedback on how to repair them. The test will place a greater emphasis on activities such as efficacy, adaptability, usability, satisfaction, and design.

ii.   Beta Testing

     a. The interactive video is used by the end-user to analyze the situation. External testers would be able to concentrate on the final product at this point and provide relevant recommendations. This assignment requires a small group of students and parents to conduct the testing. These are the real-life viewers who were uninterested in the animation's creation process. Apart from multimedia aspects, this exam will assist developers in gaining a broader perspective and concepts of the overall animation section.

     b. A set of surveys is offered that includes certain parts that are learnable and effective. Each question is graded on a scale of 1 to 5, with 1 indicating significant disagreement and 5 indicating strong agreement. The question's details can be found in the Appendix: Questionnaire.

6.4   Test Implementation

6.4.1   Test Description

The testing objective and predicted test outcome would be explained in the test description. The questionnaire was delivered to the same target person for user acceptance testing during the evaluation session. After the developer provides them a brief project description of how the application will be used, both respondents will take the test separately. They must test all of the components that are currently available. The developer will next send out a questionnaire to 61 respondents. All questionnaires can be found in the Appendix section.

6.4.2   Test Data

After the testing session is completed, the data will be gathered. All of the test results are kept on file for later study. The goal of both usability testing and design activity testing is to see if the project meets the goal set forth in the first chapter. The results of both tests will be obtained and analyzed. All of the feedback and suggestions for improvement will be used to develop the interactive video.

6.5   Test Results and Analysis

The data will be analyzed for test results and test analysis in this part. The way of determining the conclusion and demonstrating that this test satisfies the project's goals is through test results and analyses. The results will be analyzed to see if the product is a success or not. It could also determine whether the product is appropriate for the intended user. This area will be analyzed when all of the testing methods have been finished, as well as the testing findings and interpretation.

The answer given to the tester in the questionnaire can be used to derive analysis and results. It's also for determining whether the user and the target user are compatible. The tester delivers a positive answer to the results obtained from the user, and all of them are delighted with the final product. A special education student and a sign language expert conducted the alpha test.

Table 13: Result Alpha Testing

No.		Result Alpha testing.	
1.	Mohd Armi Rusli	Position	Malaysian Sign Language Teacher
2.	Calment Isaac Sharvinathan	Name	Special Education student from Sekolah Pendidikan Khas Penang

Table 14: Result Alpha Testing Question 1

No.	Age	Result (frequency) sign language expert	Result (frequency) special education student
1.	7-10 years old	0	0
2.	11-15 years old	0	0
3.	20-26 years old	0	1
4.	Above 27 years old	1	0

Table 15: Result Alpha Testing Section 1 Learnability

No.	Test	Scale | Score	
		Learnability	
1.		Strongly Disagree	
		Disagree	
		Neutral	

	This interactive video able to attract your attention.	Agree	
		Strongly Agree	2
2.	The content of interactive video is easy to understand.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	1
		Strongly Agree	1
3.	Interactive video engages the user in the entire learning process.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	2
		Strongly Agree	
4.	Interactive video simple to use	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	

		Strongly Agree	2
5.	User able to gain knowledge about the basic sign language from the interactive video	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
6.	The content arrangement makes the delivery of information more effective.	Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
7.	Using this interactive video, it can help and enhance my knowledge of basic sign language.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	2
		Strongly Agree	
		Strongly Disagree	
		Disagree	

8.	This project is relevant and helpful for users to learn basic sign language	Neutral	
		Agree	
		Strongly Agree	2
9.	I plan to use the system for learning basic sign language	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
Effectiveness			
10.	This interactive video is more interactive compared to conventional poster.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
		Strongly Disagree	
		Disagree	
		Neutral	

11.	Integration of interactive video elements in the content help me to receive the information effectively.	Agree	1
		Strongly Agree	1

Usability			
12.	I found the various functions in this system were well integrated.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
13.	I would imagine that most people would learn to use this system very quickly.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
14.	The color used in the material are appropriate.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	

		Strongly Agree	2
15.	The graphics used in the material are appropriate.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
16.	The audio used in this application is clear to hear.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2
17.	The interface design of this application is satisfied	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	
		Strongly Agree	2

Table below shown the result of beta testing.

Table 16: Result Beta Testing Question 1

No.	Age	Result (frequency)
1.	7-10 years old	14
2.	11-15 years old	19
3.	20-26 years old	23
4.	Above 27 years old	5

Table 17: Result Beta Testing Section 2

No.	Test	Scale	Score
		Learnability	
1.	This interactive video able to attract your attention.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	12
		Strongly Agree	47
		Strongly Disagree	
		Disagree	

2.	The content of interactive video is easy to understand.	Neutral	2
		Agree	12
		Strongly Agree	45
3.	Interactive video engages the user in the entire learning process.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	16
		Strongly Agree	43
4.	Interactive video simple to use	Strongly Disagree	
		Disagree	
		Neutral	1
		Agree	15
		Strongly Agree	43
5.	User able to gain knowledge about the basic sign language from the interactive video	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	14

		Strongly Agree	45
6.	The content arrangement makes the delivery of information more effective.	Disagree	
		Neutral	
		Agree	18
		Strongly Agree	41
7.	Using this interactive video, it can help and enhance my knowledge of basic sign language.	Strongly Disagree	
		Disagree	
		Neutral	1
		Agree	15
		Strongly Agree	43
8.	This project is relevant and helpful for users to learn basic sign language	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	17
		Strongly Agree	42
		Strongly Disagree	
		Disagree	

9.	I plan to use the system for learning basic sign language	Neutral	2
		Agree	17
		Strongly Agree	40
Effectiveness			
10.	This interactive video is more interactive compared to conventional poster.	Strongly Disagree	
		Disagree	
		Neutral	1
		Agree	12
		Strongly Agree	46
11.	Integration of interactive video elements in the content help me to receive the information effectively.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	15
		Strongly Agree	44
Usability			
12.		Strongly Disagree	
		Disagree	

		Neutral	
	I found the various functions in this system were well integrated.	Agree	20
		Strongly Agree	39
13.	I would imagine that most people would learn to use this system very quickly.	Strongly Disagree	
		Disagree	
		Neutral	4
		Agree	21
		Strongly Agree	34
14.	The color used in the material are appropriate.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	17
		Strongly Agree	42
15.	The graphics used in the material are appropriate.	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	17

		Strongly Agree	42
16.	The audio used in this application is clear to hear.	Strongly Disagree	
		Disagree	
		Neutral	3
		Agree	21
		Strongly Agree	35
17.	The interface design of this application is satisfied	Strongly Disagree	
		Disagree	
		Neutral	
		Agree	18
		Strongly Agree	41

6.6 Analysis Testing

After all of the testing and evaluation with the tester, the statistical analysis of the findings shows that this 2D animation met the aim. The target user's acceptance is high, and the animation is appropriate for the target user. The data from the multimedia expert results are consolidated and presented visually in a chart.
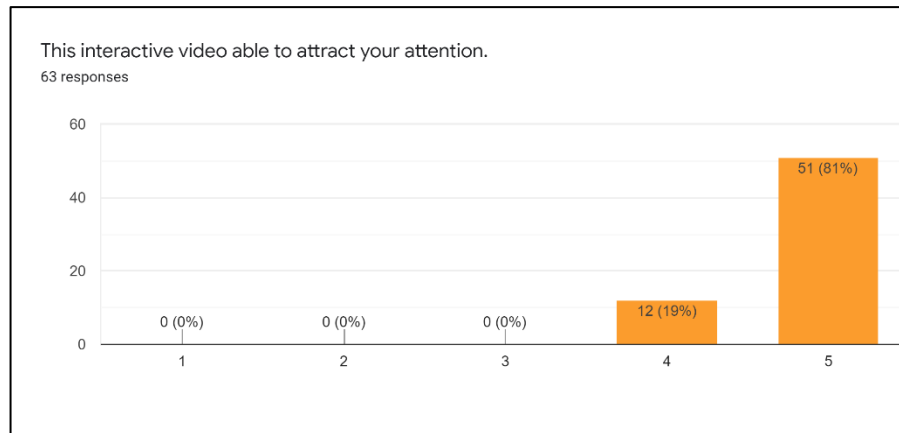
Section 1 Questionnaire: Learnability test

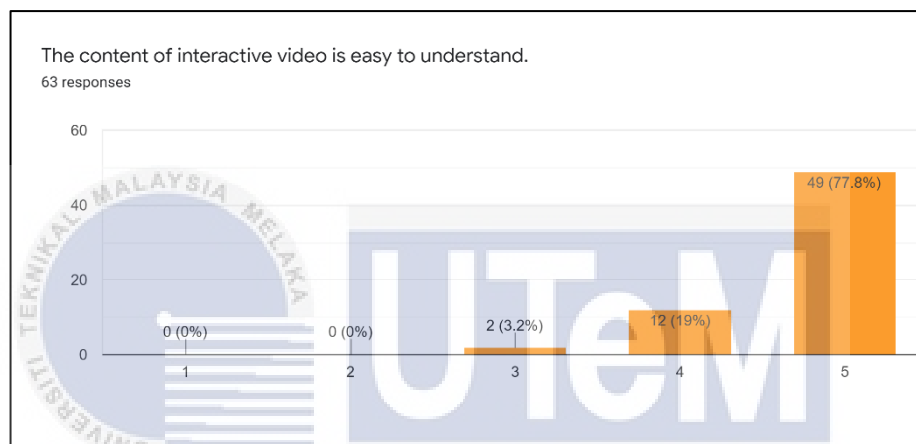**Figure 40: The results of the learnability Test 1**

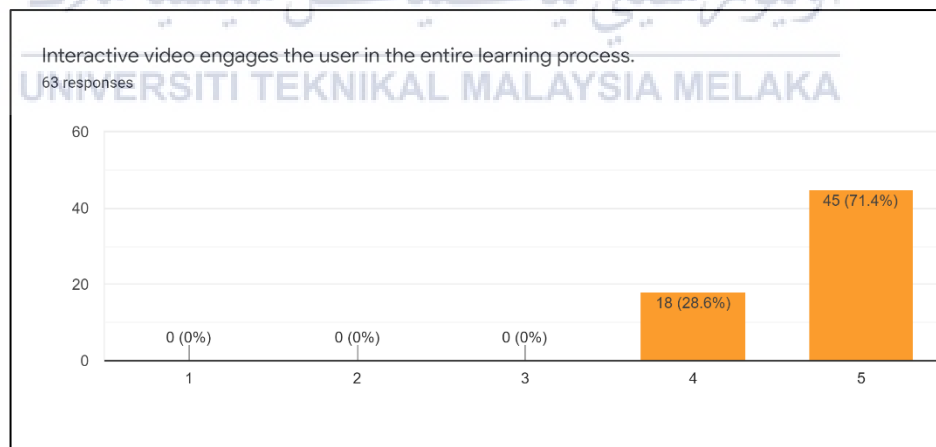**Figure 41: The results of the learnability Test 2**

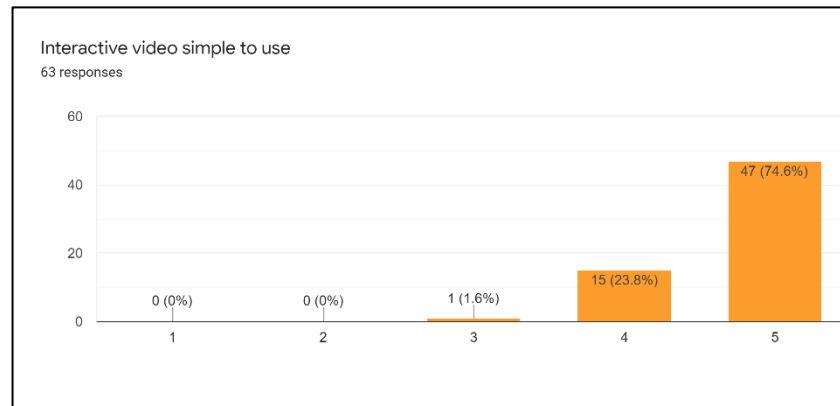**Figure 42: The results of the learnability Test 3**

Figure 43: The results of the learnability Test 4

From the figure 40 above, the result shows that 12 respondents (19.7%) agree that this interactive video able to attract the user attention. While, 49 other respondents (80.4%), sign language expert (1.64%) and special education student (1.64%) strongly agree that this interactive video will able to attract the user attention. Next, for the figure 41 above, the statement for the content of interactive video is easy to understand is strongly agree by 48 respondents (78.7%) and a special education student (1.64%), in the time 11 respondents (18.04%) and a sign language expert (1.64%) agree with the statement while the remaining 2 respondents (3.2%) states the statement is neutral. Then, for the figure 42, 16 respondents (26.2%), a sign language expert (1.64%) and a special education student (1.64%) agree that this interactive video engages the user in the entire learning process while the remaining 45 respondents (71.4%) strongly agree. Besides, for the figure 43, 15 respondents (23.8%) agree and for 45 respondents (73.8%), a sign language expert (1.64%) and a special education student (1.64%) strongly agree that interactive video is simple to use whilst the remaining 1 respondent (1.6%) choose neutral.
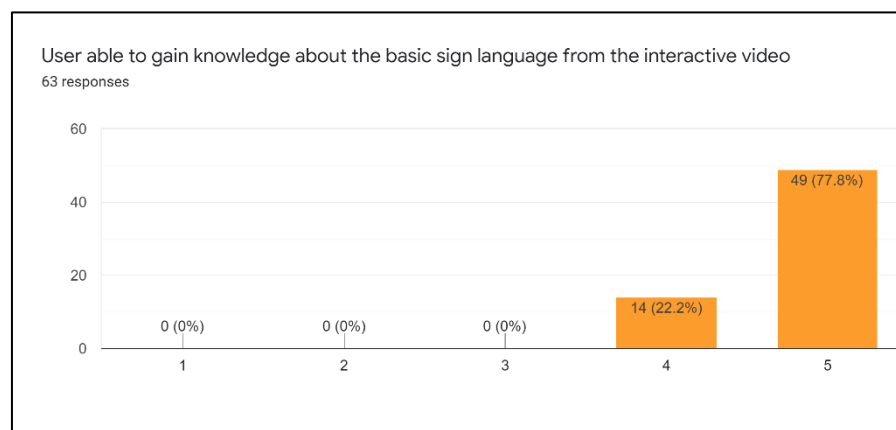
Figure 44: The results of the learnability Test 5

The content arrangement makes the delivery of information more effective.

63 responses
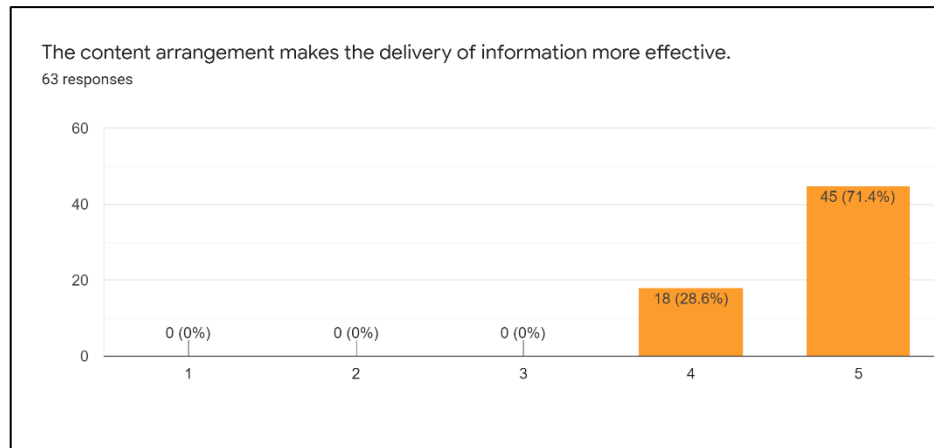
Figure 45: The results of the learnability Test 6

Using this interactive video, it can help and enhance my knowledge of basic sign language.

63 responses
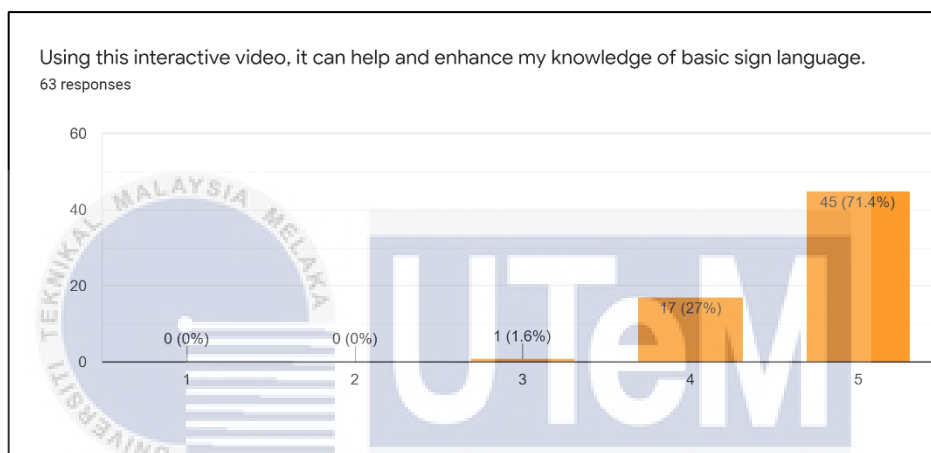
Figure 46: The results of the learnability Test 7

This project is relevant and helpful for users to learn basic sign language
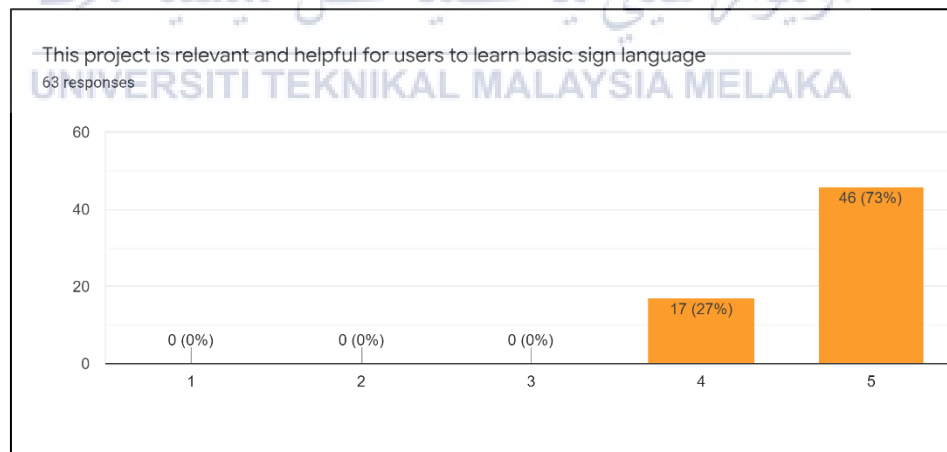
63 responses

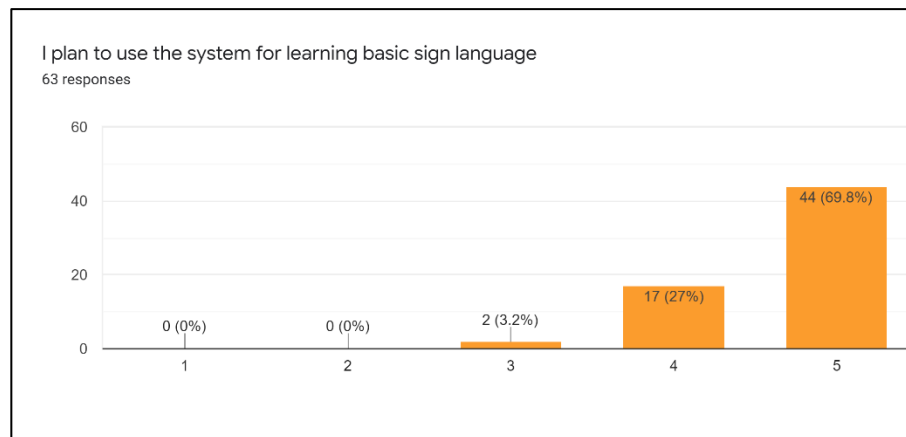**Figure 47: The results of the learnability Test 8**

Figure 48: The results of the learnability Test 9

The result for the figure 44 shows that 14 respondents (22.2%) agree with the question stated and the remaining 47 respondents (77.8%), a sign language expert (1.64%) and a special education student (1.64%) strongly agree. Next, for figure 45 stated that the content arrangement makes the delivery of information more effective thus, 18 respondents (28.6%) agree and 44 other respondents (72.16%), a sign language expert (1.64%) and a special education student (1.64%) choose strongly agree. For figure 46, a sign language expert (1.64%), a special education student (1.64%) and 15 respondents choose agree, at the same time 45 respondents (71.4%) strongly agree that this using this interactive video, it can help and enhance user knowledge of basic sign language. While the remaining 1 respondent choose neutral. Besides, for the figure 47, 44 respondents (72.2%), a sign language expert (1.64%) and a special education student (1.64%) chooses strongly agree that this project is relevant and helpful for users to learn basic sign language. Whilst, 17 respondents (27%) agree with the statement above. Then, for the figure 48, 2 respondents (3.2%) choose neutral and for 17 respondents (27%) agree whilst 42 respondents (68.9%), a sign language expert (1.64%) and a special education student (1.64%) strongly agree that they plan to use the system for learning basic sign language.

Section 2 Questionnaire: Effectiveness test
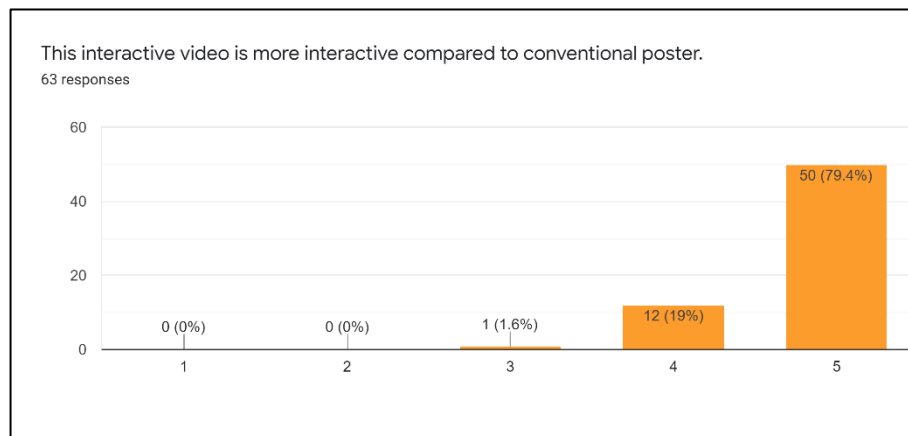
Figure 49: The results of the effectiveness Test 1
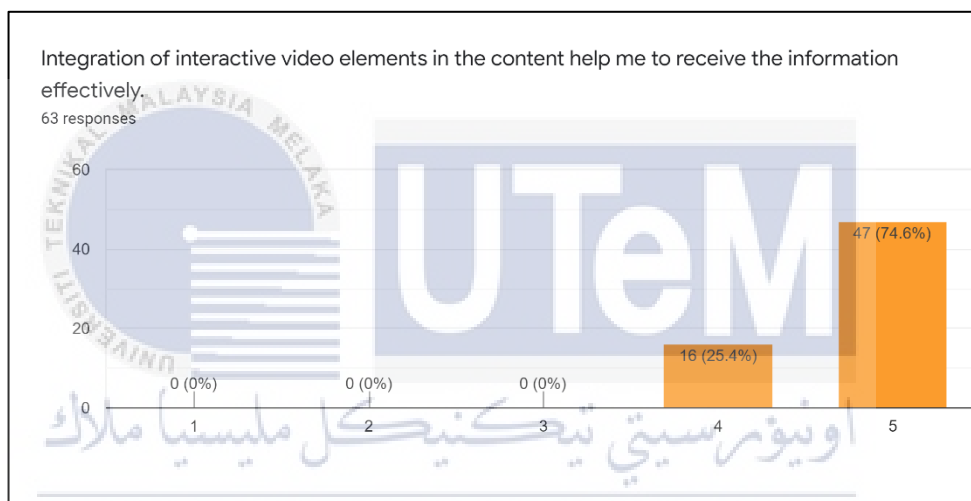
Figure 50: The results of the effectiveness Test 2

From the figure 49 above, the result shows that 12 respondents (19%) agree that this interactive video is more interactive compared to conventional poster. While, 48 other respondents (78.7%), a sign language expert (1.64%) and a special education student (1.64%) strongly agree with the statement and for the remaining 1 respondent (1.64%) choose neutral. Next, for the figure 50 above, the statement for the project integration of interactive video elements in the content help user to receive the information effectively strongly agree by 46 respondents (75.4%) and a special education student (1.64%), in the time 15 respondents (24.6%) and a sign language expert (1.64%) agree with the statement.

Section 3 Questionnaire: Usability test

Figure 51: The results of the usability Test 1
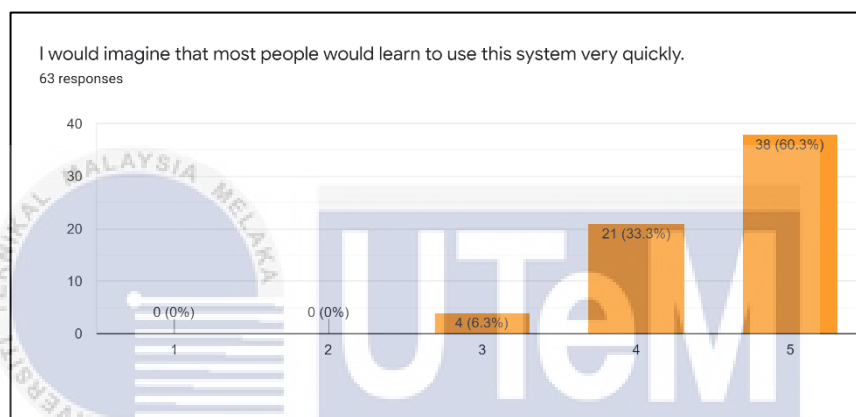
Figure 52: The results of the usability Test 2
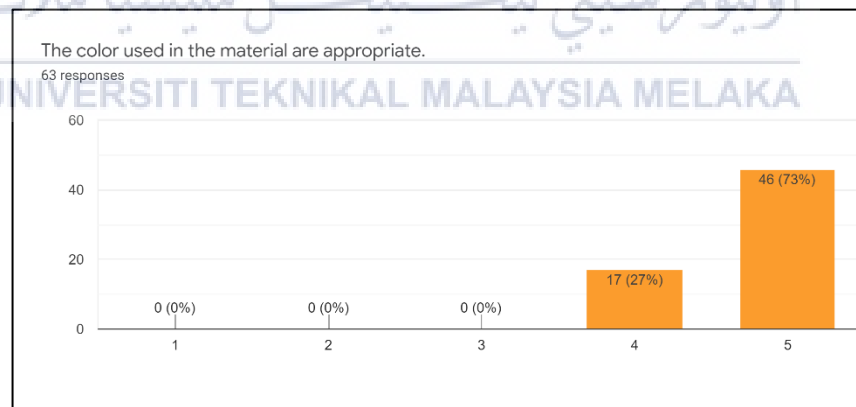
Figure 53: The results of the usability Test 3

Furthermore, for the figure 51, 20 respondents (31.7%) agree that the various functions in this system were well integrated while the remaining 42 respondents (68.9%), a special education student (1.64%) and a sign language expert strongly agree. Besides, for the figure 52, 36 respondents (59%), a sign language expert (1.64%) and a special education student (1.64%) strongly agree that would imagine that most people would learn to use this system very quickly. Plus, 21 respondents (33.3%) agree

with the statement while the remaining 4 respondents (6.3%) choose neutral. The result for the figure 53, shows that 17 respondents (27%) agree with the question stated and the remaining 44 students (72.2%), a sign language expert (6.7%) and a special education student (6.7%) strongly agree that the color used in the material are appropriate.

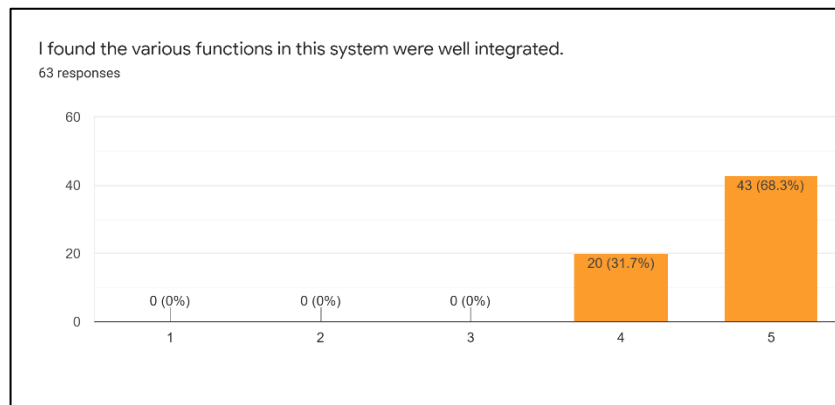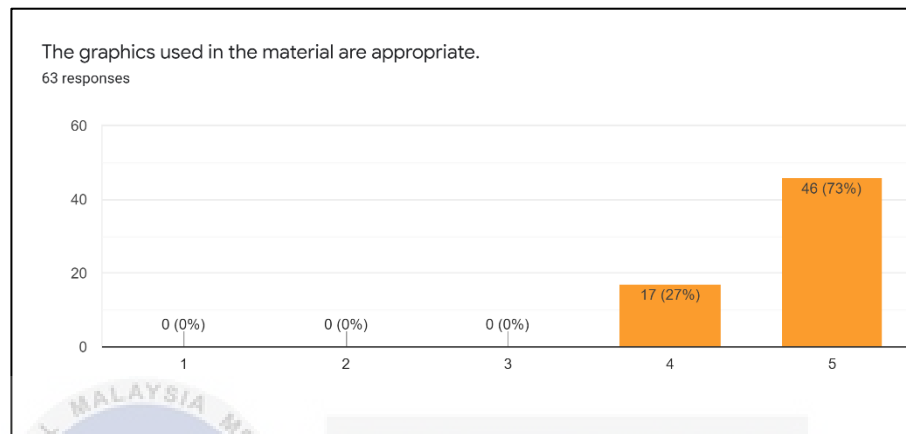**Figure 54: The results of the usability Test 4**
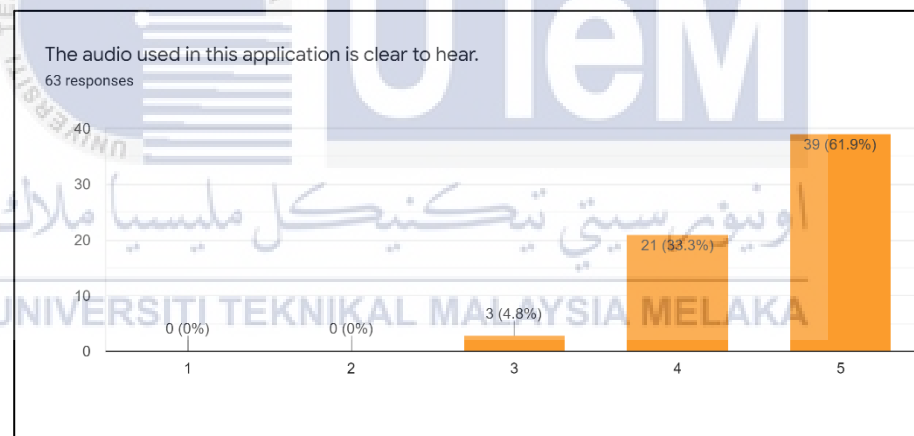
Figure 55: The results of the usability Test 5
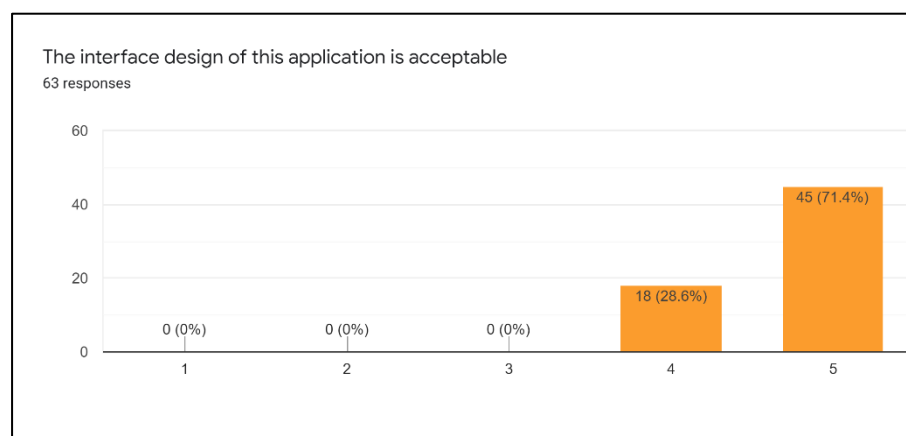
Figure 56: The results of the usability Test 6

Next, for the figure 54 above, the statement for the graphics used in the material are appropriate strongly agree by 44 respondents (72.2%), a special education student (1.64%) and a sign language expert (1.64%) in the time 17 respondents (27%) agree with the statement. Then, for the figure 55, 3 respondents (4.8%) choose neutral and 21 respondents (33.3%) agree that the audio used in this application is clear to hear while the remaining 37 respondents (60.7%), a sign language expert (1.64%) and a special education student (1.64%) strongly agree. Besides, for the figure 56, 18 respondents (28.6%) agree whilst 43 respondents (70.5%), a sign language expert (1.64%) and a special education student (1.64%) strongly agree that the interface design of this application is acceptable.

6.7   Conclusion

To summarize, the testing process is critical in the development of this animation. The testing is carried out, and the results are used for analysis. Based on the project's strengths and weaknesses, there are a few suggested enhancements that can be made in future development. The following chapter will go over the project's faults and strengths, as well as suggestions for development.

CHAPTER 7: PROJECT CONCLUSION

7.1 Observation on Weaknesses and Strengths

Several flaws and strengths in this 2D animation were uncovered during the testing and review process. This chapter will explain the weaknesses and strengths that must be maintained and improved.

7.1.1 Project Weaknesses

Even though it was constructed successfully, this interactive video project has significant flaws. These flaws emerge to ensure that the interactive video need will improve in the future to meet the requirement. The following are the flaws:

i. The content of the video

    a. The sign language video has only one viewpoint from a front. It minimizes the user's ability to see the entire hand gesture.

ii. The selected topic

    a. The user is given a limited number of topics to choose from. The user was just able to obtain a simple, basic, and insufficient sign language.

iii. The interactive video requires a certain format to be played.

    a. The interactive video requires a flash player format, which is a swf file that can be opened directly in the laptop.

7.1.2 Project Strength

Aside from its flaws, this interactive video product offers several advantages. The advantages of this animation are as follows:

i. Graphic and color

    a. This interactive film uses appropriate graphics and color to engage children in learning and watching the video. The color chosen is an important factor to learn since children are very drawn to learn the interactive video with the attractive color. This makes the youngsters more focused and absorbed in the learning session.

ii. Multimedia elements

    a. Multimedia elements were combined in this interactive video to create an effective interactive video. Text, graphics, video effects, and animation are examples of multimedia elements used in the media integration of this animation.

iii. Accessible Media control

    a. User can accommodate media accessibility features. The user can control the media with the offered buttons, such as stop, pause, and rewind.

iv. The video

    a. This video played without a problem and continued to play properly to the finish. The sounds and text are both clear and smooth.

7.2   Propositions for Improvement

Proposal for enhancement provide suggestions on how to improve the interactive video, there are a few techniques to increase the skills and upgrade the interactive video.

i.   Main character improvement

a.   To make this interactive video more fascinating, the main character's movement, which is the robot, needs to be smoother.

ii.   The content of the interactive video

a.   The contents of this interactive video can be extended to include more information and learning sessions to enable the user understand sign language more thoroughly.

7.3   Project Contribution

This interactive video's fundamental role is that it is the greatest medium for sharing simple sign language to children. This interactive video is really beneficial to the entire society. This project may have an indirect impact on the viewers who attempt to undertake this interactive video by offering them with useful information. The important aspect of interactive video is that the courses are delivered to the user in an interactive manner such that the user may interact with the product without becoming bored. Furthermore, this interactive video includes valuable content that children may understand easily. This can be a wonderful opportunity for children to learn basic sign language from the video. This project encourages children and new learners to understand and understand the courses.

7.4 Conclusion

To summarize, this interactive video was successfully generated and satisfies all of the criteria for developing an interactive video. The sign language video was created for anybody in society who wishes to understand the language. The advantages of this method include the capability to use this as a teaching medium for children or new learners to study from the lessons given. The interactive video able to support a new learner or user in learning fundamental sign language. However, improvements are still required to make it a more effective application. As a conclusion, the project has been successfully developed and completed on schedule, fulfilling all of the requirements.

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APPENDIX A

Interactive Video for Basic Sign Language

Assalamualaikum and hiii semua I'm farahin student of 3BITM from Faculty of Information and Communication Technology . This interactive video for sign language created as part of final year project. The objective of this questionnaire is to measure the usability of the interactive video created. I am grateful for the willingness of you to answer the questionnaire. Thank you.

This is the link to the video: https://youtu.be/3dA4Tg0rZiU

There will be 3 sections of evaluation which is learnability, effectiveness and usability.

* Required

1.   Age *

Mark only one oval.

⬭ 7-10 years old

⬭ 11-15 years old

⬭ 20-26 years old

⬭ Above 27 years old

Interactive Video for Basic Sign Language

2.   Age *

Mark only one oval.

⬭ 7-10 years old

⬭ 11-15 years old

⬭ 20-26 years old

⬭ Above 27 years old

Section 1: Learnability

3. This interactive video able to attract your attention. *

    Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

4. The content of interactive video is easy to understand. *

    Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

5. Interactive video engages the user in the entire learning process. *

    Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

6. Interactive video simple to use *

    Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

7.   User able to gain knowledge about the basic sign language from the interactive
       video *

      Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

8.   The content arrangement makes the delivery of information more effective. *

      Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

9.   Using this interactive video, it can help and enhance my knowledge of basic sign
       language. *

      Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

10.   This project is relevant and helpful for users to learn basic sign language *

      Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

11.   I plan to use the system for learning basic sign language *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

Section 2: Effectiveness

12.   This interactive video is more interactive compared to conventional poster. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

13.   Integration of interactive video elements in the content help me to receive the information effectively. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

Section 3: Usability

14. I found the various functions in this system were well integrated. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

15. I would imagine that most people would learn to use this system very quickly. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

16. The color used in the material are appropriate. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

17. The graphics used in the material are appropriate. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

18.   The audio used in this application is clear to hear. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

19.   The interface design of this application is acceptable *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

Skip to question 20

Section 1: Learnability

20.   This interactive video able to attract your attention. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

21.   The content of interactive video is easy to understand. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

22.   Interactive video engages the user in the entire learning process. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

23.   Interactive video simple to use *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

24.   User able to gain knowledge about the basic sign language from the interactive video *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

25.   The content arrangement makes the delivery of information more effective. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

26. Using this interactive video, it can help and enhance my knowledge of basic sign language. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

27. This project is relevant and helpful for users to learn basic sign language *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯		strongly agree

28. I plan to use the system for learning basic sign language *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

Skip to question 29

Section 2: Effectiveness

29. This interactive video is more interactive compared to conventional poster. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

30. Integration of interactive video elements in the content help me to receive the information effectively. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	⬭	⬭	⬭	⬭	⬭	strongly agree

Skip to question 31

Section 3: Usability

31. I found the various functions in this system were well integrated. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	⬭	⬭	⬭	⬭	⬭	strongly agree

32. I would imagine that most people would learn to use this system very quickly. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	⬭	⬭	⬭	⬭	⬭	strongly agree

33. The color used in the material are appropriate. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	⬭	⬭	⬭	⬭	⬭	strongly agree

34.   The graphics used in the material are appropriate. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

35.   The audio used in this application is clear to hear. *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree

36.   The interface design of this application is acceptable *

Mark only one oval.

	1	2	3	4	5	
strongly disagree	◯	◯	◯	◯	◯	strongly agree