MARI

3D Sign Language: The Development of Mobile Learning Application

Juliana Mohamed[1]*, Khairul Haziq Haizal[1], Nurul Irdina Jamaluddin[1], Nuraliah Mohd Amin[1]

[1]Department of Information Technology, Centre for Diploma Studies,
Universiti Tun Hussein Onn Malaysia, Pagoh Education Hub, 84600 Pagoh, Johor,
MALAYSIA

*Corresponding Author Designation

Abstract: A sign language is no longer foreign nowadays. Especially for an impaired person that wants to communicate. It becomes a need for them to know about the basics of sign language. A platform is needed to learn about sign language, especially in the pandemic phase of Covid-19 which makes it tough for all communities to learn face to face. Thus, there is a lack of the right resources and platforms to learn basic sign language demanding normal people to know and learn. 3D Sign Language application has been developed to help the community in learning a basic sign language with the issue enabling users to learn basic sign languages and basic conversation. ADDIE model used to implement the project. It's combination of process to get a good product of the application. As a result, an impaired person such as students at school can use this application as well as parents and the community who wants to learn about basic sign language, can learn easily, quickly and fun because this application is built in an attractive interface with 3D animation that makes the application it is more helpful to users.

Keywords: Sign language, Application, ADDIE Model, 3D animation

1. Introduction

In today's era of technology, communication is very important to connect with each other. Every normal human being or not does not run away from communication. Communication plays an important role. To plan and develop sustainability and sustainable strategies are essential for people to express themselves internally and externally using appropriate modes communication [1]. In addition, we get ideas from the surrounding monitoring and a desire to help the community and individuals with hearing problems and dumb especially children in recognizing and learning about a basic sign language. Furthermore, this application also wants to help families such as parents to learn a basic sign language in an easier way.

This application is named 3D Sign Language in accordance with its internal context that we use 3 Dimension as a model for users to learn this basic sign language [2]. This is because it will make it easier for users to better understand when learning and practicing the sign language so they can also learn with effective learning that is more interesting and fun when use it. Besides, we hope that the development of this 3D Sign Language application will help every section of the community by benefiting from its development.

1.1 Education application

In this era of technology, various learning facilities have been made to attract students to learn a subject. Especially during this covid-19 pandemic season, there have been many facilities to study online to provide convenience to instructors and students. Most of the current generation has also spent their time with smartphones because of the variety of amenities that can be created with smartphones. Due to the smartphone is small in size and easy to hold, it makes it easy for users to carry the smartphone anywhere. Therefore, learning in the form of applications is the best method for students to take advantage of their smartphone usage and time [3]. Educational applications have been proven to attract students because learning in the form of games makes them not easily bored to learn a subject [4]. Therefore, the idea arose to create a learning application about sign language to make it easier for people to learn sign language easily and interestingly.

1.2 Sign language

As we all know, sign language is the language of body movements to communicate with the hearing problem. The use of sign language among the people is increasingly marginalized and makes the hearing problems excluded from community activities in Malaysia. Amir Hamidi Abdul Manan, the Deputy President of the Malaysian Association for Sign Language and Deaf Studies, also suggested that Malaysian's citizen must learn and master sign language to facilitate communication with the hearing problem [5]. Sign language needs to be developed and its use exposed to those who are normal because it is a spoken language. Now, people can learn sign language easily.

Sign language is a solution for these special children that they can learn in early age. The language is difficult to learn especially for their parents. An application called 3D Sign Language has been developed specifically for children with hearing problems. The unique about our application is that we use 3D animations for movements. The application also helps their parents to learn and teach their children to build their communication skills with the community.

2. Materials and Methods

This project uses ADDIE model as a methodology in developing this 3D sign language application. ADDIE also means Analysis, Design, Develop, Implement and Evaluate which are the five phases in the ADDIE model [6], [7]. Each phase in this ADDIE model is very important and interconnected with each other to produce the best application. **Figure 1** shows ADDIE model.
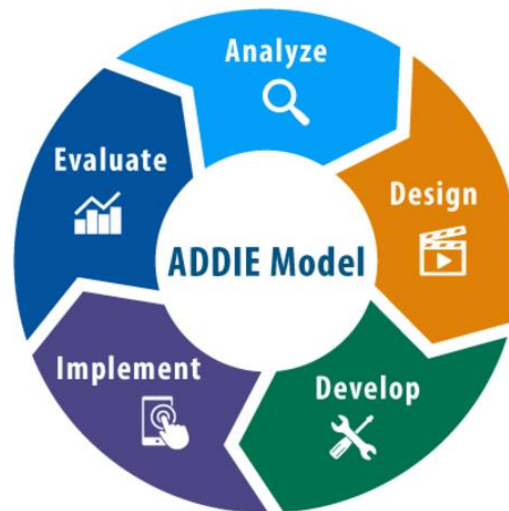
Figure 1: ADDIE Model

2.1 Analysis

During this phase, several problems need to be identified to analyzed the data before the project is carried out. Analysis needs to be done so that the solution to the problem can be solved. This research uses google form as a medium to collect data from the community in Malaysia. Through the data collected, we found that many of the people in Malaysia do not know sign language and do not feel it is important. This problem gives the idea to build an application about sign language so that this problem can be solved. This 3D sign language targets users from children and the general public.

2.2 Develop

At this phase, the software to be used should be in accordance with the suitability of the application to be built. Application content should also be listed in this phase to find out the appropriate software to develop this project. Therefore, a blender software is used to create an animated 3D model that will create sign language movements. In addition, unity software is also used to develop the application based on the storyboard created. In unity software, the programming language used is C# as the development of this application. Multimedia elements are also used such as graphics, text and audio as backgrounds, icons and menus to make the application look more attractive and cheerful.

2.3 Design

In the design phase, the application design must be planned according to the suitability of the application to be built. Storyboards have also been created in this phase to show an overview of the application to facilitate the development process of this application. Hand model and girl model are downloaded via google chrome to create sign language animations in blender software. Next, the model is transferred into unity software for further application development prior to the next phase. **Figure 2**, **3** and **4** shows the development of application.

Figure 2: Main menu

Figure 3: Learn alphabets and numbers

Figure 4: Learn basic and quiz

2.4 Implement

The implementing phase needs to be carried out to find out if this application is successful or not, before moving on to the next phase. The testing process needs to be done on a mobile phone to see the success of the development of this application. If all works well as desired, it can go to the next phase to see whether the objectives have been achieved or not. Throughout this implementation process, this application has been tested from stage to stage to see continuity of success at a level that has been altered and improved.

2.5 Evaluate

At this phase, the evaluation is made through close contacts which is family and close friends. Respondents are required to use the application that has been built to see the effectiveness of the facility to learn sign language easily to users. Some questions will also be asked to find out whether it achieves the objective or not. With this, we can know its effectiveness to help people learn sign language.

3. Results and Discussion

Through the development of this application, a survey has been made using Google Forms. This survey form intended for the general public in society. This is to get consensus information through the general public about the importance of sign language.

The survey found that the number of respondents are 34 people, consisting of general public in society of male and female. The group that responded consisted of the range of 17-25 years old which majority responded are 17-20 years old. Besides, this online survey includes 3 general questions about personal information which are gender, age, and nation. In addition, the other 6 questions related to sign language that they need to answer as to complete this survey process.

3.1 Results

Table 1: Public opinion about the importance of sign language

Scale frequency	Respondent	Percentage (%)
Important	28	82.4
Maybe	6	17.6
Not important	0	0

Based on the **Table 1**, the question asked is the opinion about the importance of sign language majority respondents are agreed that sign language is important to everyone. This shows that they have realized the importance of sign language to communicate especially to people with deaf and dumb.

Table 2: Public opinion about Sign Language application will make learning a sign language easier

Scale frequency	Respondent	Percentage (%)
Important	29	85.3
Maybe	5	14.7
Not important	0	0

Based on **Table 2**, the question asked is the opinion about Sign Language Application will make learning a sign language easier. 85.3% of respondents which the majority of overall respondents said Sign Language Application will make learning a sign language easier. It can be concluded that the respondents are aware that the sign language application that has been developed will make it easier for everyone to learn about sign language which 3D Sign Language will fulfill the needs of society, especially for the needy such as children and impaired persons.

Table 3: Public opinion about 3D animation can help and make Sign Language application more helpful and interesting

Scale frequency	Respondent	Percentage (%)
Important	32	94.1
Maybe	2	5.9
Not important	0	0

Based on **Table 3**, the question asked is the opinion about 3D animation can help and make Sign Language Application more helpful and interesting it shows that almost 100% agreed that with 3D animation, it can make the sign language application more helpful and interesting. This means that people really like the application that will make them enjoy when using it because it is more interesting and easier for them when learning about sign language.

4. Conclusion

In conclusion, this 3D Sign Language mobile learning can help children born deaf or dumb learn sign language easily and can use it anytime and anywhere. The mobile learning also can help the parent to teach their children to learn the sign language. Mobile learning is a very popular device but to interest children to learn and use this mobile learning, we add 3D animation and also can interact with 3D model in the mobile learning. This mobile learning can also become either one helps the deaf and dumb to communication with the people out there. In addition, the community can also learn the sign language using this mobile learning. Therefore, the community also can use it with the deaf and dumb people. Finally, we hoped that the development of 3D sign language will give a positive impact to all levels of society in helping them learn a basic sign language easily. Thus, it can improve wellbeing in communication and strengthen friendships regardless of an individual's situation.

Acknowledgement

References

[1]   R. Genç, "The Importance of Communication in Sustainability & Sustainable Strategies", *Procedia Manufacturing*, vol. 8, pp. 511-516, 2017. Available: 10.1016/j.promfg.2017.02.065.

[2]   M. Ramlie, H. Tahir and A. Mohd Shuib, "Kepentingan imaginasi dan persepsi dalam merekabentuk imej 3D", *Idealogy*, vol. 3, no. 2, pp. 110-120, 2018. [Accessed 14 July 2021].

[3]   R. Makhija, "Top Advantages, Ideas and Features of Education Apps", *Guru TechnoLabs*, 2021. [Online]. Available: https://www.gurutechnolabs.com/advantages-ideas-and-features-of-education-apps/. [Accessed: 14- Jul- 2021].

[4]   "16 Aplikasi Interaktif Dalam PAK21", *Cikgu Press*, 2019. [Online]. Available: https://www.cikgupress.com/2019/10/16-aplikasi-interaktif-dalam-pak21.html?m=1. [Accessed: 14- Jul- 2021].

[5]   "Masyarakat disaran belajar, kuasai bahasa isyarat", *Astro Awani*, 2021. [Online]. Available: https://www.astroawani.com/berita-malaysia/masyarakat-disaran-belajar-kuasai-bahasa-isyarat-225999. [Accessed: 14- Jul- 2021].

[6]   T. Bates, "Is the ADDIE model appropriate for teaching in a digital age?", *Online Learning and Distance Education Resources*, 2014.

[7]   S. Kurt, "ADDIE Model: Instructional Design", *Educational Technology*, 2018. [Online]. Available: https://educationaltechnology.net/the-addie-model-instructional-design/. [Accessed: 14- Jul- 2021].