Mobile Augmented Reality Application: Understanding Covid-19 Virus

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Abstract - Augmented Reality (AR) is a technology in which a computer-generated image is superimposed onto the user's vision of the real world, giving the user additional information generated from the computer model. AR can present information just in time, in situation when people need it. It is very clear, and it allows you to communicate sometimes, pretty technical and complicated things very effectively. As our society today is not fully aware on the dangerous of this virus, this system is a helpful platform. The aim of this research is to educate and spread awareness about the new diseases Covid-19 that has been rampages all around the world. In line with that, the objective of this application is to make it easier for people to understand precisely about Covid-19 on how it spreads and running through human's body. In this situation, the learning potential of AR is significantly amplified by the capability of the system to present 3D models in real-time at remote locations.

Keywords—component; Augmented Reality, Covid-19, Mobile Application, 3D Model

I. INTRODUCTION

The new virus called Corona is a kind of infection where it creates respiratory contaminations in people. It was found back in December 2019 in Wuhan,China. This virus will attack directly to respiratory malady and cause serious infection. The majority of people will experience mild to moderate symptoms and recover without the need for hospitalization. According to reports, older people and those with low health conditions such as cardiovascular disease, cancer and diabetes are more susceptible to this virus. This virus has killed over millions of people all around the world in just a blink of an eye

Plenty of research has been done to spread awareness in most countries but still lack among the society on how deadly this virus can be. Therefore, with the help of this AR technology, in hope it will provide information and give awareness to the community during this pandemic. With that, together we will fight through this worrying situation today, with the help of technology and also information that we learned since the first wave of this pandemic.

II. RELATED WORK

A. Coronavirus Infections

Referring to the CDC (CDC, 2020), this infection can spread within only 6 feet. It moves by contact and enters the body through the mouth, nose and eyes. Dr Martin S. Hirsch, senior physician in the Infectious Diseases Services at Massachusetts General Hospital, said "there is still a lot to learn but experts believe the virus can behave similarly to SARS-CoV from 13 years ago". In explaining more about the Coronavirus, Dr Martin shared about the spread of the virus starting when the virus gets into a human body. "Once inside the body, it starts tainting epithelial cells in the covering of the lung. A protein on the receptors of the disease can associate with a host cell's receptors and penetrate the cell. Inside the host cell, the disease begins to imitate until it butchers the cell." From here we can know that the virus usually attacks the internal organ which we can see is one of the reasons why this virus usually kills senior citizens. Besides that, there are symptoms that will appear to the patient's body when the virus has started to enter the cell. "The patient starts to encounter mellow forms of indications: dry hack, windedness, fever and migraine and muscle agony and tiredness, practically identical to seasonal influenza" (Javier Zarracina, 2020).

According to the WHO-China Joint Mission on Coronavirus Disease, which was reported in 2020, about 80% of patients have a mild to moderate disease from infection. "A case of "mild" Covid-19 includes a fever and cough more severe than the seasonal flu but does not require hospitalization" (Javier Zarracina, 2020). Milder cases are on the grounds that an unacceptable reaction by the body can contain an infection of the upper respiratory tract. Younger patients have a livelier safe reaction as compared to the older

patients. Hence, that is why older patients are more at risk when being infected with the virus.

B. Augmented Reality for Covid-19

Augmented Reality is one of the modern technologies that can be utilized as a strategy to attract people from all ages. It can avoid infections when being outside, where there are many people, or in open space especially for the older citizens and children. According to Leonardo Mataruna (Leonardo Mataruna, 2020), "Augmented Reality 'expeditions' which include the members looking for assets give a sheltered and comprehensive climate to keep up physical wellness levels while holding fast to social removing rules". One of the popular AR games that showed real potential is 'Pokemon Go' where it can be played by all ages.template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

With the current pandemic situation, this technology fits perfectly as people practice social distancing. Hence, the users are advised to use mobile applications to keep the social distance alive. This technology is capable of tracking the virus sources and notify users when the symptoms of coronavirus is detected. The mobile applications is now one of the most preferred mediums for people to search for information and learn new things every day, thus, the technology is serving it's roles well

C. Mobile Application on Covid-19

In parallel to the development of modern technology, mobile applications are one of the best mediums to spread information without the physical movement. "Mobile technology has been leveraged in a number of ways to control the spread of Covid-19, including to support knowledge translation", according to Noella Noronha (Noella Noronha, 2020). Mobile applications can be accessed anywhere, easy to be accepted and are capable of supporting social distancing efforts. Hence, it is suitable to be used as it follows the current pandemic standard operating procedure (SOP), which puts social distancing as the first most important step. "Mobile apps can support interactivity, visual and auditory content, real-time data collection, as well as links to social functionalities", (Muhammad Nazrul Islam, 2020). There is an exciting potential of using mobile application during covid-19 pandemic to the developed countries where it fastens the process of giving out information or allowing the community and the users to access information.

Today, more than 45% people in the world use smartphones (Muhammad Nazrul Islam, 2020). It is undeniable that the usage of smartphones along with the internet has been massively growing from time to time. Since the existence of these smartphones and the internet, they have benefited certain sectors in the developed countries. At the same time, recent studies show that the uses of smartphones and the internet have also been noticeably high in many developing countries (Muhammad Nazrul Islam, 2020).

D. Case Study Of Recent Work

Since Covid-19 is still new in these 2 years, people are still adjusting to its cause and effect. There are quite a few existing mobile applications which do not have many features which give the best service and also satisfy the users with much information regarding the coronavirus.

Diagnosis Medical App

It is a simulation type of game that combines both medicine and technology through artificial intelligence. This application was designed by professional doctors from several selected US American university hospitals that was developed by Progressive Programming. This application serves the purpose of identifying the potential diagnosis based on the symptoms which will provide details for future consultation. Thus, it would be easier for the patients to use the given information to have consultations with the doctors. Not only that, but it will also help us to understand better on how the doctors or medical people diagnose and treat a patient with coronavirus infections.

Table 1 shows the comparison between three different applications

TABLE I: COMPARISON

Title	***Functionality***	***Interactivity***	***3D/ 2D***	***AR***	***Animation***
Diagnosis Medical App	Can interact and have movement.	Yes	2D	No	Yes
Human Anatomy in AR	Can move the body in 3D and explore precisely	Yes	3D	Yes	Yes
Humano-id 4D+	Can move the body in 3D and explore precisely	Yes	3D	Yes	Yes

III. METHODOLOGY

Before the purpose of this research is to visualise coronavirus and how it is spreading using this new technology. Through this research, it will help people by raising their awareness about this deadly virus by using more advanced applications. The research methodology approached by the author will be developed primarily in this chapter. In this chapter, it has a tendency to cover the research design, demographics, population sample, sample process, data collection system, research model, analysis, design, growth, implementation, evaluation, and finally the conclusion. The selection of these elements are appropriate and suitable in order to meet the expected research objectives.

A. Analyse

Analysis phase is crucial in this research. Data analysis involves describing the data received from the targeted groups, describing trends, comparing the data and also relating the variables used. In this stage, the research will put the main attention on the effectiveness of mobile applications to society on giving out information. Besides that, this phase also will determine the subject field and the target group. It will also explain the educational issue, the goals are defined and will identify the learning environment.

B. Design

The Design phase is where it involves the implementation of the guidance. To gain a good first impression by the targeted audience, the animations used, interaction and 3d model are the main things to be focused on. During this phase, software such as Adobe Illustrator and Photoshop were used in the making of the design phase. It is important to make the designs fascinating in order to attract people. This is to ensure that researchers will get good feedback from the respondents by providing decent multimedia elements in this mobile application. Media content such as journals, articles, books, research publications, information available online are being used by the researcher to create a template which can attract the respondent besides obtaining comprehensive and rational instructional input that are relevant to the subject matter.

C. Development

In this stage, the product was produced using all the tools and materials that will lead to conducting the testing. The project was done using Unity Software and C# language for the script. This mobile application includes a main menu page and an AR scene. The animation was animated in Unity Software and using 3D models that were developed in 3ds Max software. After the test has been conducted, then it will proceed to the next stage.

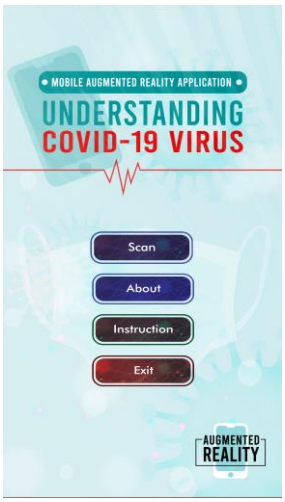

Fig. 1. Main Menu

Fig. 1. shows the picture of main menu page which consists of multiple buttons.

Fig. 2. AR Scene

Fig. 2. shows the process of Coronavirus entering a human's body through the nose.

Fig. 3. AR Scene

Fig. 3. visualizes how the animation transitions happen from opaque to less visible visual anatomy.

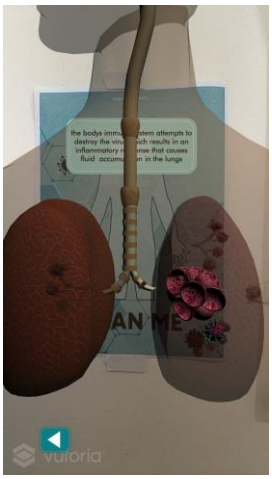

Fig. 4. AR Scene

Fig. 4. above shows the Coronavirus has entered one side of the lung and spread the infection throughout the space.

D. Implementaion

The mobile application was executed in this phase to check the functionality and errors that may occur. It was then exported as an Android Package Kit (APK) to be installed on the smartphone that uses the Android operating system. The product was assessed and tested by the developer first, before distributed to people. However, a back-up plan was already prepared by the researcher if there were any errors or technical issues regarding the application.

E. Evaluation

The last important step in this process is the evaluation phase. This is to ensure that the project has met the goals of spreading information and education. Also, it is to gather feedback from this project in order to make improvements in the future. The type of questionnaire used for this research was an electronic questionnaire. The questionnaire was prepared using Google Form as it was compatible to be used during this pandemic. It was easy to be distributed to the respondents and also fast feedback was received in return. Through this questionnaire, researchers have collected the reviews from the respondents based on the questionnaire earlier.

IV. RESULTS AND DISCUSSION

The data for this research was collected through a questionnaire. Google Form was used to create the questionnaire and then the link was distributed to the respondents through WhatsApp. The questionnaire was passed to 18 respondents which were also the users of this application. The motive of this testing is to evaluate the accomplishment of this research objective and how it delivers the information. In addition, it is also to get feedback on this application functionality. The results are as presented below.

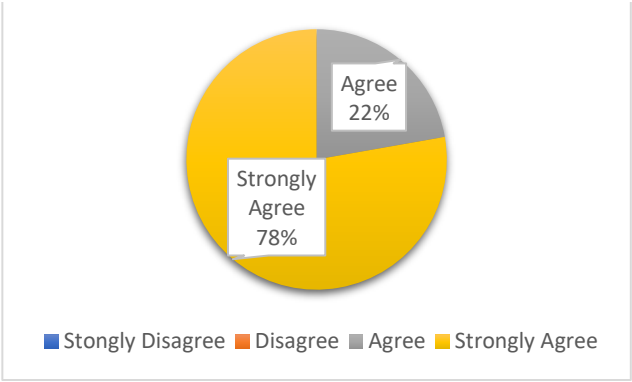

Fig. 5. Interesting Platform

Fig. 5. shows that 78% of the respondents strongly agree that mobile application augmented reality is an interesting platform while 22% voted agree. This shows that AR technology can contribute whole new ways of learning rather than conventional ways.

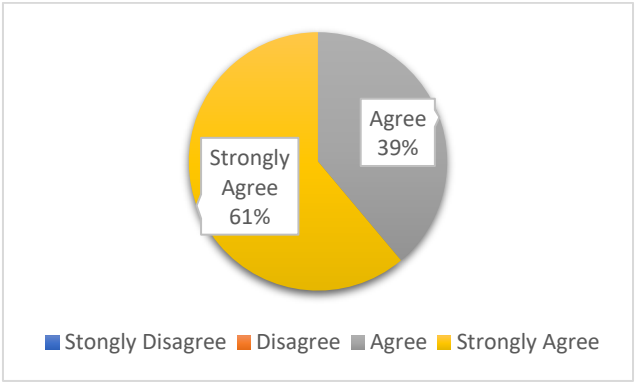

Fig. 6. Useful Tools

As shown in Fig. 6. 61% of the respondents strongly agree that mobile applications can be useful tools to spread awareness of covid-19 while 39% agreed to the statement.

This can conclude that nowadays most people enjoy mobile applications and find it easier to give out information.

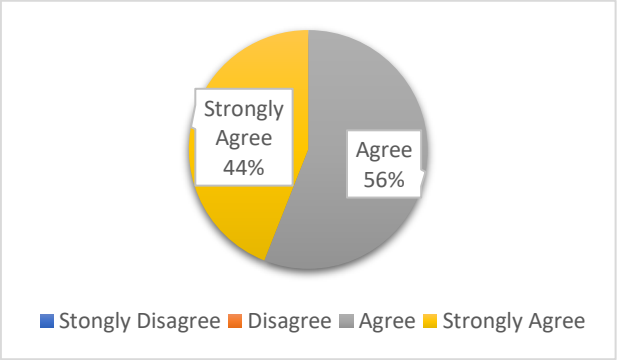

Fig. 7. Motivation

According to Fig. 7. 56% of the respondents strongly agree that this application motivates them to learn more about Coronavirus while 44% agree with this statement. This shows that applications with good animation and graphics can encourage people to learn.

By looking at the feedback, the majority of the respondents showed positive results toward this project. Hence it served the purpose of this research to deliver knowledge using mobile applications. This also concludes the effectiveness of using mobile applications as a medium to spread information rather than the ordinary or the old ways.

V. CONCLUSION

A rapid increase of growth in the development of technology today causes many developers to become creative and innovative inventors in designing, creating and promoting their products. Today's pandemic situation causes everything to be carried out via online, in which bridging the gap from all over the world through technologies. Therefore, to create such good products, the developers use advanced technologies to attract users and also to invent applications that may help everyone by giving information and spreading awareness during this pandemic.

Following the results of the survey, mobile applications could lead to new mediums in spreading information. With new technology like Augmented Reality, it could enhance the use of mobile applications and attract more people learning about the dangers of Coronavirus.

REFERENCES

[1] CDC. (2020). Person-to-person spread. *How It Spreads*.

[2] Javier Zarracina, A. R. (2020, March 17). *www.usatoday.com*. Retrieved from USATODAY: https://www.usatoday.com/in-depth/news/2020/03/13/what-coronavirus-does-body-covid-19-infection-process-symptoms/5009057002/

[3] Leonardo Mataruna, M. A. (2020). A gaming approach to curb COVID-19. *Augmented reality at Dubai parks*.

[4] Muhammad Nazrul Islam, I. I. (2020). A review on the mobile applications developed for COVID-19: An exploratory analysis. *A review on the mobile applications developed for COVID-19: An exploratory analysis*.

[5] Noella Noronha, A. D. (2020). Mobile Applications for Covid-19: A Scoping Review. *Mobile Applications for Covid-19: A Scoping Review*.