Learning Covid-19 restaurant standard operating procedures (SOPs) through virtual reality (VR) game

Norazlin Binti Mohammed[1], Soh Yi Jin[1], Khor Zhen Di[1]

[1)] Centre for Advanced Computing Technology (C-ACT), Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Corresponding e-mail: norazlin@utem.edu.my

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ABSTRACT – COVID-19 SOPs keep on changing according to the pandemic situation which confuses people. This project is to applicate VR games to the understanding and learning of COVID-19 restaurant SOPs. The implementation of the gaze interaction will increase the excitement of the VR game. The game is based on a simple puzzle-solving game with three different stages. In the first two stages, the player plays as the restaurant worker to make sure the customers follow the SOPs, whereas in the last stage, the player will play the role of customer, which requires following all the previous SOPs. The expected outcome for the VR game in practicing COVID-19 restaurant SOPs is to allow the player to become familiar with the COVID-19 restaurant SOPs in the sense of protecting self-individuals from COVID-19 and stopping the spread of COVID-19.

1. INTRODUCTION

Standard Operating Procedures (SOPs) is a document or written instructions which describes the regularly recurring operations or a routine to ensure the operations are carried out correctly (quality) in the same manner (consistency) [1]. In the year of 2020, SOPs were introduced by the Malaysia government in the response towards COVID-19 pandemic which known as the Movement Control Order (MCO) and Conditional Movement Control Order (CMCO) etc. However due to uncontrollable circumstances, the fight against COVID-19 has been prolonged till today and the SOPs are constantly changing based on the situation of the pandemic. Then Malaysian Prime Minister, Tan Sri Muhyiddin Yassin conceded that he is well-aware of the constant changes of the SOPs causing it to be convoluted [2].

Throughout the pandemic, numerous news were reported on behalf of teenagers defied the COVID-19 SOPs [3,4]. Thus, teenagers are to be said as to be lack of understanding of the COVID-19 SOPs and also underestimated the consequence of getting COVID-19. Furthermore, with the advancement of technology, citizen tend to be tricked and misled by fake news and information across the internet causing them to have different understanding towards SOPs and even misfollowed the incorrect SOPs [5]. Hence, this project is to aid the spread of the correct restaurant SOPs with the implementation of VR game which is expected to increase the efficiency of spreading COVID-19 restaurant SOPs.

From the preliminary analysis, data was collected from 30 respondents on what type of game genre which they have played before. The majority (86.7%) stated that Puzzle game genre is the most preferable learning method.

Figure 1 Preliminary Analysis Result

Restaurant was chosen as the environment within the VR game as based on the preliminary analysis, surprisingly that only 13 of the respondents (43.3%) are well-aware of the SOPs in restaurants they need to be followed other than the general SOPs. Only 3 out of the 13 respondents (23.1%) understand and follow the SOPs which only allow 2 people to dine with a distance of 2 meter apart and limited dining time. 12 out of 13 respondents (92.3%) were aware of the recommendation of the Pre-order or reservation for dine-in or take away stated in the SOPs of COVID-19.

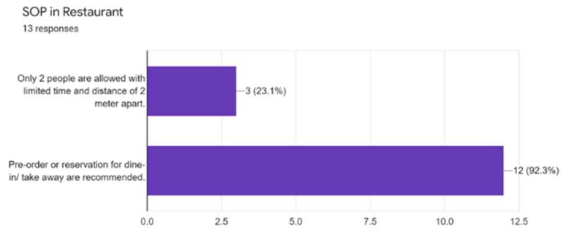

Figure 2 Preliminary Analysis Result

1.1 Problem statement

COVID-19 SOPs changes based on the situation of the pandemic such as MCO, RMCO, FMCO and EMCO which is differ from one another [6]. Such difference causing the citizen of Malaysia to be confused which to be followed and moreover there will be a total fine of ten thousand Malaysia Ringgit (MYR) if they violated

the SOPs which is not meant to severely punish violator but to act as a reminder [7]. The dullness and ineffective ways of information deliver to citizens. Malaysia Government has tried many ways such as video and infographic to raise the awareness towards COVID-19 [6]. However, such methods are not as effective as expected as the daily new cases keep increasing [8]. Thus, new ways of delivering COVID-19 SOPs should be introduced which is the usage of VR game [9]. The lack of awareness and understanding towards COVID-19 SOPs is in critic level causing the daily cases keep on increasing. Yet, government tried their best to fight against COVID-19 [6].

1.2 Objective

The objectives of this project are as below:

- To study the VR application requirements for development of COVID-19 restaurant SOPs.
- To develop a VR game application in practicing the COVID-19 restaurant SOPs.
- To evaluate the effectiveness of VR in learning the COVID-19 SOPs.

2. METHODOLOGY

The methodology used for this project is the Multimedia Development Life Cycle (MDLC). The MDLC consist of a total of five stages which includes definition, planning, implementation, construction, and evaluation & documentation.

Table 1 MDLC methodology

Stage	Activity
Definition	Brainstorming for idea and research on the selected topic. Define the problem for the existing system and determine the function needed to be better and upstanding from the existing system.
Planning	Analyse the requirement to develop VR application. Determine the method to be used in producing a VR game.
Implementation	Implement of VR software such as Unity and Blender to produce the VR game and implementing the VR box which is affordable and easily accessible by most of the user.
Construction	The 3D models are created in this stage by using Blender. With the usage of Unity to combine the 3D models into a VR game. Test run is done at the end of this stage to ensure the quality of the VR game.
Evaluation & Documentation	The product is evaluated by the target user which provides their opinion and feedback for improvement through User Acceptance Test (UAT). Documenting the project development is also done.

3. RESULTS AND DISCUSSSION

Android is the main platform for this project. In the production of the VR application, an asset, Google VR, is imported into this project. Google VR is an SDK that provides data of the user to the system [10]. With that, the application will be able to support with VR headset to enable user to immerse in and experience the environment that was created. The game engine to be used to completely build this project is Unity.

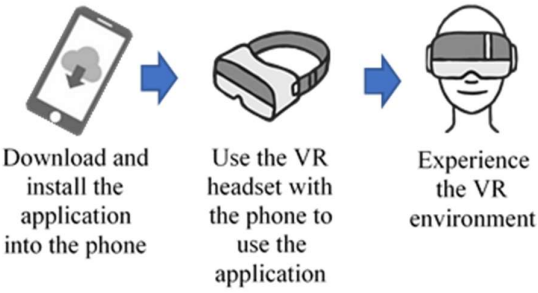

Figure 3 System Architecture

In the VR game, it consists of three stages. The game component in the stage 1 and stage 2 includes NPC which is the customers, button which permit customer enter the door, table number and reject button which reject customer to dine-in if they violated the SOPs, timer and score indicator. The game mechanic which implemented in this VR game is gazing sensor. In the First and second stage, the player will be play as the role of the restaurant worker which in charge of securing the customer follows the COVID-19 restaurant SOPs before entering the restaurant and after entering the restaurant. While in stage 3, the player will be as the customer in whom he/she is required to follow the COVID-19 restaurant SOPs learned from stage 1 and 2.

In stage 1 the player needs to ensure the customer follow the COVID-19 restaurant SOPs such as wearing mask, scan QR code using *MySejahtera* application and scan temperature. Customer who completes all the correct SOPs will be permitted to enter the restaurant by the player, whereas for the customer who disobeys the SOPs will be rejected to enter the restaurant. The action can be taken by the user as mentioned is through gazing. User are required to gaze at the door to admit the customer entering the restaurant whereas gaze at the reject button to reject the customer from entering.

The scenario for the second stage is continuous from the first stage, as customer enter the restaurant and will be sit randomly. User as the waiter need to ensure the customer follows the SOPs such as social distancing and mask off only when food arrives. If there is

customer who disobey the SOPs, user need to reject the customer from the restaurant by gazing at them. The user is also required to determine which SOPs to the customer disobeyed in such if customer disobey social distancing, user need to gaze at the table number whereas for the customer which take off their mask before food is serve, user need to gaze on that particular customer in order to rejected them from continue dine-in. In additional, the user be able to move around by gazing slightly tilt to the floor.

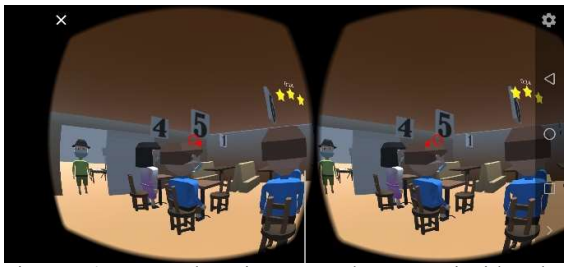

Figure 4 Gameplay in Second Stage inside the Restaurant

The game components in third stage are the score indicator and intractable objects such as button, thermometer and QR code. The user will be put in other's shoes in which to understand other situation and feelings as they will be in the role of customer in third stage. The game mechanic for the third stage is the player needs to practice and follow the COVID-19 restaurant SOPs as learned from the previous stages. Score will be gained when the user follows the correct SOPs, by gazing the intractable objects. For example, the user gazes at the thermometer to scan the temperature and gaze at the QR code which indicates scanning the QR code using *MySejahtera*. Upon completing all three stages, the COVID-19 restaurant SOPs will be listed out for the player to revise.

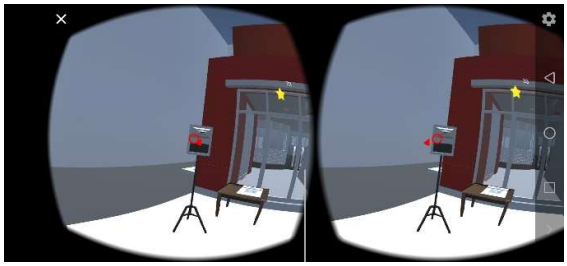

Figure 5 Gameplay in Third Stage as the customer

User Acceptance Test (UAT) is conducted by the target test user after they experience the VR application. The UAT is to aid and prove the functionality and effectiveness of the VR application in the aim of learn and practice the correct restaurant SOPs. Overall, almost all of the test users are satisfied with the performance of the application in term of usability, ease of use, interface design and effectiveness of the Restaurant SOPs application. User also suggests having some adjustment and improvement on certain criteria such as the tutorial and 3D model texture to have better immersive experience to the application.

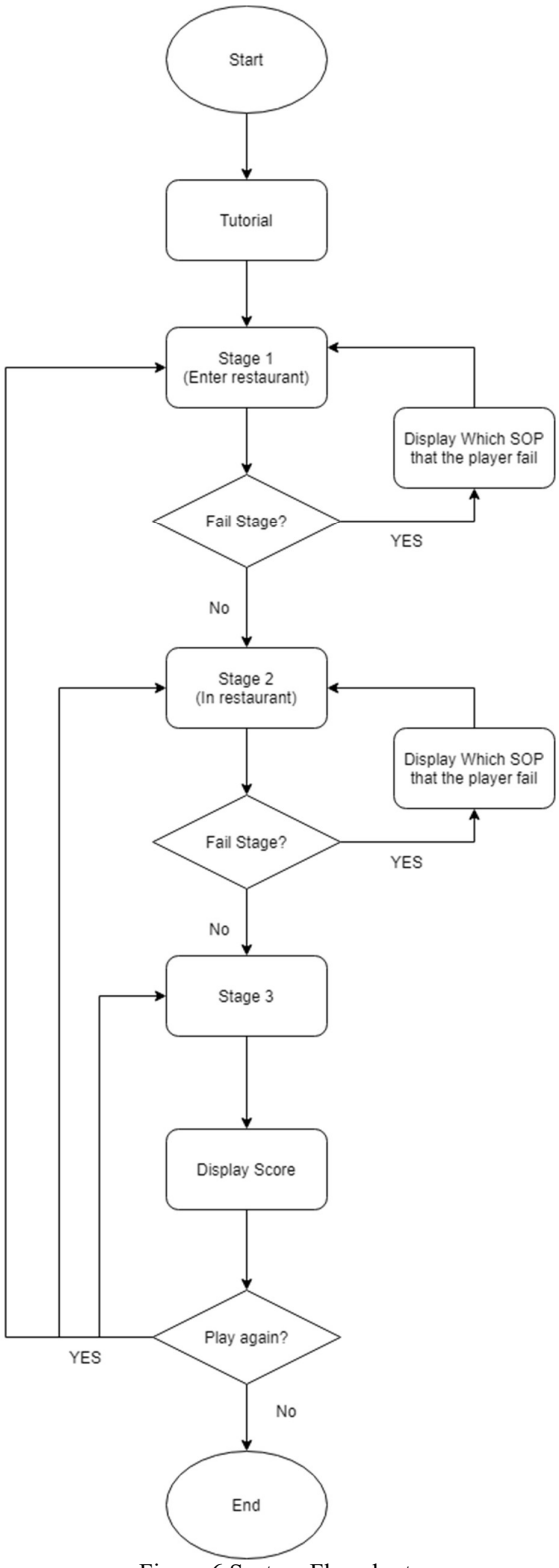

Figure 6 System Flowchart

4. CONCLUSION

In conclusion, this project has been successfully developed to achieve the objective and over the problem stated above. This project is to help the spread of correct COVID-19 restaurant SOPs to the citizens to reduce confusion. Users are immersed in virtual environment to be able to learn, understand and practice the correct COVID-19 restaurant SOPs. In such, users able to apply what they have learnt in the VR game in the reality to avoid being one of the COVID-19 victims.

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