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GRAPHIC USER INTERFACE ON VIRTUAL REALITY TOUR SCENE OF SIMIGAPI

Agatha Maisie Tjandra

Abstract: SIMIGAPI (Simulasi Mitigasi Gunung Berapi- mitigation simulator volcanic eruption) is an application of serious game with story line by using virtual reality using head mounted display. There are three parts of SIMIGAPI based on the process of mitigation. The main focus of this paper is on the evacuation parts. In this part, user are given a mission to escape from volcanic ashes by walking through the virtual world and passing the pin points. Briefing are given by using text, and graphic elements using 3D graphic user interface. On the other hand, bad user interface may decrease the immersive purposes and easily children as user can be bored. This automatically can affect failed the process transferring information evacuation mitigation to user. This paper aim to explain about creating 3D user interface and observing user experience for education purposes on evacuation part of SIMIGAPI. This project use production method and quantitative questionnaire test to know user perspective about SIMIGAPI information by using GUI.

Key words : 3D graphic user interface, virtual reality, children

Introduction

SIMIGAPI (Simulasi Mitigasi Gunung Berapi- mitigation simulator volcanic eruption) has concept to educate for children age 7-11 years old about eruption mitigation by using fun experience. Using VR technology by portable head mounted display has benefit to simplify the simulation or role playing and also can minimalized the risk to user and still have immersive emotion.

To gain more fun education, SIMIGAPI has a scenario supporting by visualization that compatible to user

and disaster concept. As an interactive application, user interface are need to delivering information.

This paper discussing about appropriate 3D graphic user interface and user experience on the 3rd scene of SIMIGAPI (Simulasi Mitigasi Gunung Berapi - Mitigation Simulator).

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table head mounted display has benefit to simplify the simulation or role playing and also can minimalized the risk to user and still have immersive emotion.

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This paper discussing about appropriate 3D graphic user interface and user experience on the 3rd scene of SIMIGAPI (Simulasi Mitigasi Gunung Berapi - Mitigation Simulator Volcanic Eruption) and using user research in order to show the effectiveness message using 3D GUI.

SIMIGAPI

SIMIGAPI is a digital application VR mitigation eruption with . User as themselves (1st person camera) was living on the village which affect the eruption disaster. User have to facing the preparation and evacuate before disaster happen (pre-eruption).

On its development, SIMIGAPI divided into three scenes. There are introduction, indoor mission, and evacuation. In the introduction stage, user are meet a character as a guide, user also watch the graphic information position playing area and volcanic mountain.

The second stage (indoor mission) give information about the things that should bring to evacuate from home. The third stage is evacuation stage using virtual environment. In this scene, the user is in a virtual environment with a mission to save themselves from the dangers of volcanic ash. In the third scene, users are also invited to take notice of evacuation signs are nearby. Before users can complete the third scene,

the user is assisted by tapping point.

Evacuation Stage of SIMIGAPI

The evacuation part of SIMIGAPI has the highest user interaction compared by the other part. This part takes a user interface as a communication media between user and computer. Joystick use as input device by user to the computer. Joystick was chosen because school age children are commonly used playing Playstation or PC game.

SIMIGAPI as a digital game-based education need educational information for user. This information using text and 3d object which is appropriate design for elementary school age children. This is very important because to keep user age 6-12 years old still motivated to finish and get full information.

On the 3rd scene, user start in front of user's home. User have to find every yellow diamonds which are direct them to finish line. Every diamond has its information or question. If user have lost or wrong way to go, 3D GUI will appear to warning the user.

Research Method

Graphic user interface on mitigation scene of SIMIGAPI are begin with the literature studies contains user interface, serious game and early school age children. This literatures are affecting the visual decision to the project.

SIMIGAPI's evacuation stage has simple scenario. User are given mission to escape from starting point to finish, guided by pin point by notice the evacuation sign. By using head mounted display, user can more achieve immersive feeling.

Based on the user interfaces for in-

creased player immersion in FPS Games, there are four type of interface depending on how linked to the narrative and game geometry. One of them is meta type of interface. Meta type is one kind of interface which is not fit with the geometry of the world but still maintain the game's narrative. Meta type usually applied on the 2D plane. Meta interface can be difficult to define in game without a strong narrative element.

3D Graphic user interface (GUI) common used in some of simulator, almost all the common 3D interaction techniques for tasks such as navigation, selection, and manipulation were designed and developed in the context of VR systems. 3D graphic interface appear on x, y and z. Three-dimensional user interfaces (3DUI) let user interact with virtual objects, environments, or information using direct 3D input in the physical and/or virtual space.

3D GUIs can take better advantage of the differences in visual appearances that attract human attention, such as color, shape, texture, shading, size, location, and the ability to register movement (Wiss and Carr 1998).

On the other hand, SIMIGAPI has a purposes to educating by using simulation for children age 6-12 years old. This application must have a fun learning and still motivate children to finish the mission.

A key challenge faced by serious game developers is efficient creation of expressive user interfaces that are highly dynamic and interactive, as well as effective and engaging. Creating user interfaces offering rich immersive experiences that simultaneously reduce cognitive load and increase emotional impact has the potential to significantly improve game adoption.

A research conducted by Dubit, School age children are able to play VR game up to one hour, they can quickly recognized the importance of control-

lers. All ages of kids were able to come up ideas for new styles of games and experiences in VR, without prompting, the all ages kids identified the value of using virtual reality in the classroom and exploration as a key theme. Children also want the games to feel like experience of different places and lives.

Visual Graphics Are Used for VR Interface

Visualization of 3D user interfaces were developed from adaptation of sci-fi animation movie. Some of the graphic elements are inspired from Iron-man movie, Guardian of galaxy, Avatar The Game and Boboiboy (favorite Malaysia animation movie in Indonesia).

Design Process Production

Evacuation part was build integrated with SIMIGAPI. This part pre-production process are begin with the landscape map.

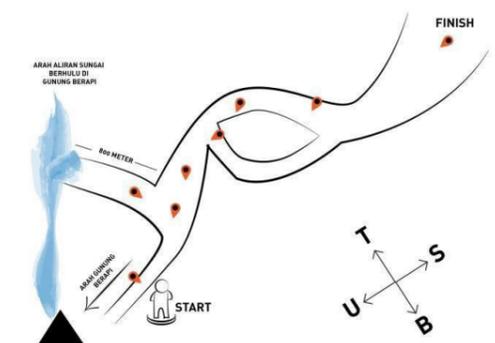


Figure 1. Map of SIMIGAPI escape stage

From the figure 1, some pin point are place on current place. Every pin point can triggering to display the 3D GUI (Graphic User Interface) windows when camera pass. Pin points are display as yellow rotating diamond. GUI on the evacuation stage are divided into

three kind of message. There are information message, warning message and choosing. From beginning, user are given information about diamond figure along the road. User have to passing this diamond to get another guidance to escaping. All of the GUI were using animation for come up and disappear. The GUI for information message are using blue light color. And red color for the warning message. GUI windows are design to presents augmented reality in virtual environment. On escape stage, user assumed wear a google glass so they can see GUI windows position following the head movement.

The environment was built by using low poly and flat shaded type rendering in order to reduce distraction and optimizing visualization. Evacuation part also use visual effect and

sound in purpose to gain the chaos mood in the middle of disaster.

Process of creating GUI windows begin with sketching, then using Adobe After Effect animating, adding visual effect and rendering video into *.ogv. The video



Figure 3. Some environments of SIMIGAPI escape stage

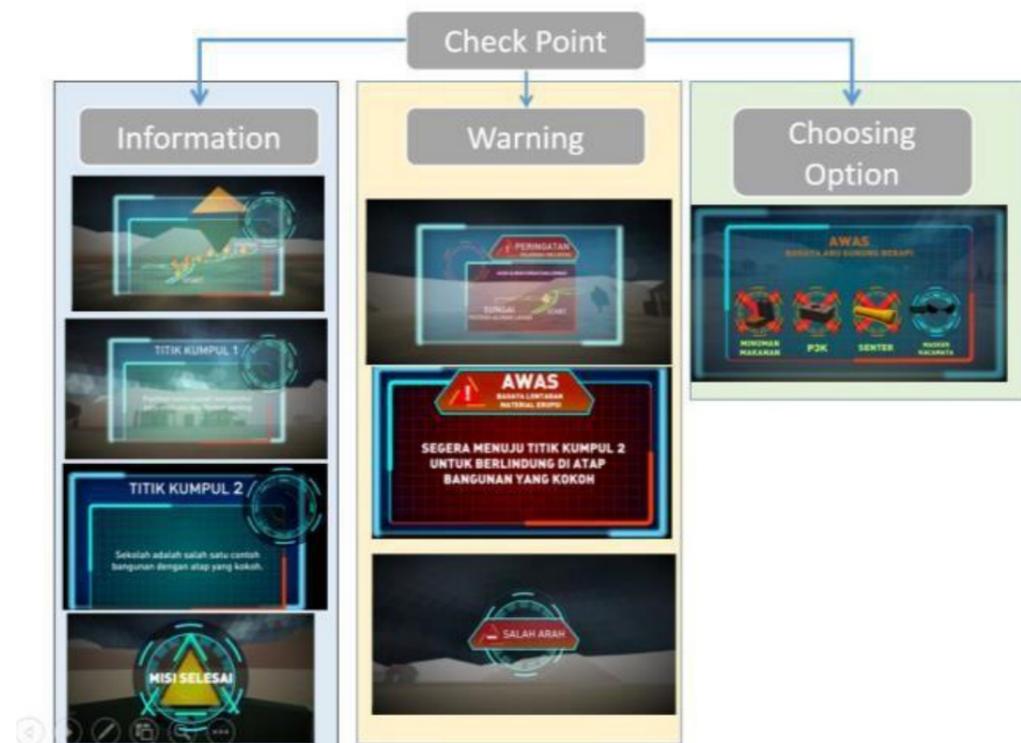


Figure 2. Schema of 3D GUI applied

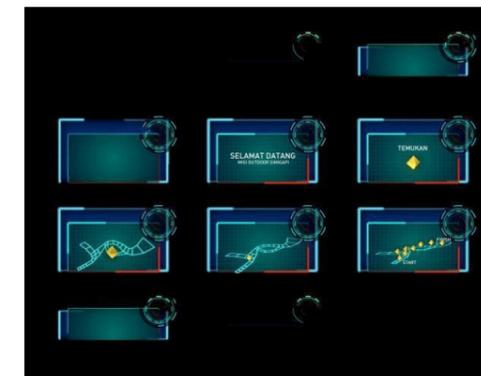


Figure 4. Animation scene one of 3D GUI for information

will using alpha layer and import as texture video at unity to apply on 2d Interface.

The technical problem that may be found with this kind of process on the applying part layer into virtual world. They may be not appropriate size, and overlapping one another. 3D layer also have to adjust the depth.

User Experience (Qualitative Research)

SIMIGAPI's users are elementary school student, age 7-11 years old in Bandung City. Most of the student are medium level user using technology use computer, smartphone, tablet and other digital gadget to play, or study but never use head mounted display as well. They already have an education about mitigation disaster.

There are 4 essay question with short answer for user they are:

1. Do you ever learn any simulation disaster? (This question purpose to ask about user background experience about educating mitigation)
2. Do you know the danger of eruption? Give 2 examples (This question test the information which al-

ready on SIMIGAPI Escape part)

3. After play SIMIGAPI, what do you know to facing the danger of eruption? (This question test the information whichal-readyonSIMIGAPIEscapepart)

4. What do you like or don't like from SIMIGAPI? Why? (This question to upgrade the possibilities development research).



Figure 5. Questionnaire were conducted after using SIMIGAPI

Analysis

This project will analyzing from 2 kind of perspective. Production process and testing process. Production The visual design and user experience. The developing process 3D GUI design are very influencing user experience. Because, 3D visualization GUI should be able to convey a message that can be received within a certain time. Thus, multiple font selection, color and graphic element should be considered so that messages can be delivered to the users.

The use of text on a 3D GUI that is generally used in other learning media, can help but be made shorter and use sans-serif font type with a level of legibility relatively easier on some of the objects move to the writings serif [citation]. So users can read

in a short time and easily understood.

Choosing the color can be associated with the types of information such as warning or indispensable. In addition to providing variety in order to look more attractive, it can also help the participants especially when the warning information.

Graphic elements used must not distract the user and an important part of information placed on part which naturally, is the focus of the user when using the VR.

Transparency of the background layer interface makes reading level could be disrupted. So the GUI using grid as a blue background with a thin layer as a base layer and the concept of an element of the nuances of sci-fi.

On the GUI with the selection of a user object, the incorporation of 3D objects with 2D it is possible to clear the selected objects. The response to whether or not the information is selected by the participants to provide clear information. We conducted participants who chose the object mask (to protect the breathing of volcanic ash) were very interested because, after choosing a mask, as if they were using it.

From the test questionnaire, some user already have mitigation background, usually age 8-11. Mitigation topic are new for children age 6 and 7 so take longer time to pass the part.

The questions about information from SIMIGAPI can answer by all of participant user. They answer directly and have some doodling about the answer on the questionnaire paper. For future development, character as a guide is no need to this virtual tour. User already know the information from GUI and feel bothered by the character who flying behind them like ghost.

Conclusion

During using SIMIGAPI, user feel enthusiastic about the material presented at the initial stage. So that, when user reached at evacuation part, they can do the mission properly follow the instructions of the user interface. User already know the information that are given and can choose the right object when they asked. User don't need any character to help, they only have to focus on the 3D GUI.

Head mounted display didn't make user have a dizziness during and after playing. They also comfortable using joystick as input device, because they already memorize the right button.

On the process, children are more regard SIMIGAPI as a game. However, when asked about some of the things SIMIGAPI learning materials, they can be answered properly.

Honorary

Emuloka Gagas Ceria Library, Bandung, **Mr. Muhammad Imron** as CEO Digital Happiness and team, **Mr. Gilang Rizwanda Esthian Guitarana** as Programming developer Digital Happiness

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