User Experience Analysis On Application Simulation "Healthy Lifestyle At Home" Based On Virtual Reality

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Abstract. A healthy lifestyle at home is very important to implement; some families do not apply health or clean living rules at home. Nowadays, there are problems that can be explained with technology; one of them is by providing content with a realistic visual concept called Virtual Reality (VR). VR technology is also used in several fields, such as in the field of gaming, health simulation, simulation in the field of education and others. For this reason, the author decided to analyze applications that aim to educate based on virtual reality about the rules of healthy lifestyle at home. The author wants to know the level of user experience of healthy living applications at home. For method of user experience or the experience of this user itself the author decides to use the TCSD (Task Centered System) method. TCSD is a method that is included in Human Computer Interaction (HCI). This method has four stages, namely Identification, User Centered Requirements Analysis, Design through Scenario and System Evaluation. System. And at the final stage of the TCSD method is the walktrough evaluate stage. Evaluate which will be done to evaluate user usability. Evaluation is done with one of the usability methods, namely heuristic evaluation. From the results obtained from research analysis and testing about the healthy living simulation application at home as an application that educates about the importance of healthy living at home. With the method of heuristic calculation method, an average value of 0.81 has been obtained with a severy rating "Cosmetic" which means there are problems but the problem is not too important to fix. And it can be concluded that healthy living simulation application at home can be accepted with low usability problems. usability problems are low.

Keywords: Simulation, Virtual Reality, TCSD method, Heuristic testing

1 Introduction

Home is a place to rest and a place for us to live, but some families don't practice healthy living at home. The family is used as a unit of service because health problems interrelated and influence each other among families. Implementing healthy living at home is very important. If the family practices clean and healthy living at home, the family will have better health One form of behavior is knowledge, knowledge can be obtained from anywhere.Technology at this time has developed a lot and has a high influence on the field of information technology and

education. At this time, there are problems that can be solved with technology, one of which is by providing content with a realistic visual concept that can be used as a visual aid. Technology, one of which is by providing content with a realistic visual concept that is also called Virtual Reality (VR). The main function of this technology is that users can feel better and real experience [1]. The use of VR technology itself can provide an experience to its users, where it feels as if the user is in a realistic environment. As if the user is in an artificial environment that has been developed. VR technology is also used in several fields such as in the field of gaming, health simulation, simulation in the field of education, and others [2]. Therefore, the author decided to analyze applications that aim to educate people about the rules of healthy living based on virtual reality about healthy living rules at home. The author wants to know the level of user experience application of healthy living at home. User Experience or commonly referred to as UX is a response or response from users of a product, system or service. product, system or service. Or it can be concluded that User Experience is how users feel towards every product interaction when the user uses the product [2]. This will be a parameter for determining valuable or valuable products. User experience is not only used to measure applications only, user experience can also be used for any products and services as long as they follow the applicable provisions and procedures. following the applicable provisions and procedures.For the method of this user experience itself, the author decides to use the TCSD method. (Task Centered System Design) . TCSD is a method that is included in Human Computer Interaction (HCI). This method has four stages, namely Identification, User-Centered Requirements Analysis, Design through Scenario and Evaluation System [3]. And at the final stage of the TCSD method is the walktrough evaluate stage which will be carried out to evaluate user usability. Evaluation is done with one of the usability methods, namely heuristic evaluation. Heuristic evaluation is a user usability method with the aim of finding problems in [4]. This method is used to find structural problems heuristic of the interface review, taking into account aspects of user experience. To order the usability of the heuristic, it is necessary to understand usability which refers to the ability of a product to be used by users who have minimal skills. to be used by users who have minimal skills and can be projected within the scope of creation of a product and evaluated through inspections or tests [5]. The author hopes that this VR-based home healthy living simulation application product can provide insight to its users.And user experience measurement is carried out to determine the level of experience gained by users of this product, where the experience will be a reference for applying the insights gained to be done in the home. To apply the insights gained to be done in the real world. Therefore the author raises research on "Simulation of Healthy Living at Home Based on VR".

2 MANUSCRIPT PREPARATION

2.1 Definition of User Experience

UX (User Experience) is a concept related to HCI (Human Computer Interaction) that is broadly applied in development broadly and not only in software and hardware development, but also in services, then products, as well as a process, society and culture. UX is connected to all experiences related to emotions and thoughts, as well as reactions, and behaviors by users in feeling and thinking both directly and indirectly from a system, product, and culture. Indirectly from a system, product, content, or service [7]. The basic principle in designing a UX is that the user has an experience that the user determines to have, up to the level of experience. Determine

to have an experience, to the level of satisfaction based on experience and comfort in interacting with the product, system, or service [7]. If the UX features are well developed but there are no end users are satisfied and comfortable, the value of UX will be low [8]. To create a system that can be well received, one of the important things is good usability. Based on the results of usability can affect user experience [9].

2.2 Virtual reality (VR)

The term VR is a three-dimensional computer-generated world that can be explored interactively through various computer devices. VR can be any system that aims to allow the users experience through the use of specialized perception-altering tools. The illusion of reality, which exists within the virtual environment so that the image changes continuously depending on the orientation and gaze of the of the user. As such, users are able to navigate through the virtual world as if they were part of it and will have a high level of interactivity experiencing it first-hand revealing what is known as "immersion" or "presence" [10]. VR technology is divided into non-immersive desktop VR systems, semi-immersive VR systems, and immersive systems. Non-immersive systems are the simplest type of VR with a lower level of immersion. This system does not need any special devices, only a computer screen. On the other hand, semi-immersive VR systems are an enhanced version of desktop VR. These systems can provide, for example, head and motion tracking. head and movement. Because of this, the system can enhance the user's 'sense of being there' and provide better immersion. Finally, the most immersive systems allow users to be completely immersed in a 3D world with a head-mounted display (HMD). This experience may be fully immersive by using auditory, haptic and other non-visual technologies [10].

2.3 Healthy Living at Home Application

Healthy living simulation application is an application made for learning media about the importance of healthy living at home. This application is made to facilitate understanding health rules at home and to make it easier to implement this understanding, this application is made using VR. This application is in the form of a simulation where it is as if users are in a real house that will be directed by instructions to carry out activities for healthy living at home. The making of the application begins with researching some of the needs that will be used in the making of the project, prepare some will be used in making the project, preparing some of the assets needed in making the project. This healthy living simulation application is designed in 3D as an object that looks real, and 2D images as UI to make it easier for users to understand the contents of the application. The following appearance application can be seen in Figure 2.1 and Figure 2.2 below.

Fig 2.1. VR home simulation

Fig 2.2. VR home view

This application also added NPC (non playing character) this is a character that cannot be played.The purpose of this character is as a family. For health information using 2D UI,as in Figure 2.3 and Figure 2.4 which can be seen below.


Fig 2.3. NPC on VR house

Fig 2.4. Information UI

3 RESEARCH METHOD

The method used in this research, is a method that focuses on the needs of the tasks or tasks of the users. Task-Centered System Design is a method for user-centered design based on specific tasks and carried out by the user using the system that has been provided. In this method there are four stages, namely identification, requirements, design through scenarios and walkthrough evaluate [11]. The research process can be seen in Figure 3.1.
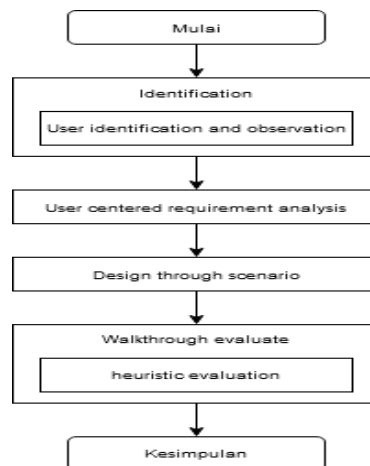
Fig 3.1. Research Process

3.1 Identification

At this stage, user identification and observation is carried out, which is a stage that can be used to identify application users. Information can be obtained by conducting observation interviews with students who will use the healthy living simulation application as who will get education about the importance of healthy living at home. Observation interviews are conducted directly to get information about habits at home. It can be concluded that application users is more intended for students who need more education about healthy lifestyles at home. And The results of the observations obtained will be implemented into the design through scenario stage.

3.2 User-Centered Requirements Analyisis

At this stage, user identification and observation is carried out, which is the stage used to identify application users. Information is obtained by conducting observation interviews with students who will use the healthy living simulation application at home. As those who will get education about the importance of healthy living at home. It can be concluded that users of this application are more intended for students who need more education about healthy living patterns at home.

3.3 Design through Scenario

At this stage what will be done is to determine the design of the process system and what is needed by the system and develop the system according to the experience that users have felt. After being obtained from user analysis. And the design results obtained are: 1. The design is made as if the user is in the house to get a more real experience, as in Figure 3.2.

Fig 3.2. Home design

2. Provide an NPC Non-Playingg Character) as a family at home as shown in Figure 3.3.

Fig 3.3. NPC Design

3. Provide experience on hygiene at home with a hygiene simulation, as shown in figure 3.4.

Fig 3.4. Cleaning Simulation

4. Provide information on healthy lifestyle at home through UI, as shown in Figure 3.5.

Fig 3.5. Information UI

5. Provide a challenge in the form of a quiz so that users can get better understand the education that has been provided, as shown in Figure 3.6.

Fig 3.6. Quiz

4 ANALISYS RESULT

The final step is to conduct a walkthrough evaluation. This is an evaluation of experience or can be called User Experience (UX). This stage of evaluation is focused on on user usability. The evaluation is carried out with a method, which is heuristic evaluation. Heuristic evaluation itself is a user usability method aimed at finding problems in usability [4]. This heuristic evaluation is carried out to find problems contained in the application and for the question, 10 usability principles are used

4.1 Evaluators

The ideal number of evaluators of this method is 5, because it has been declared sufficient, with 5 people test testing has reached more than 75% [10]. The evaluator of this research is someone who has criteria with experience or educational background regarding usability, UI/UX or in the field of game development. game developer, this was chosen because it is not a layperson or ordinary user and can be said to be an expert.

4.2 Assessment Aspect

The factors described can be assessed on a scale of 0-4 to provide a severity rating in theproblems found [11], namely:

Scale 0: Disagree, is a usability problem

Scale 1: only Cosmetic problems (problems that do not need to be fixed).

Scale 2: Minor usability problem (low priority problem).

Scale 3: Major usability problem (important to fix, high priority problem).

Scale 4: Usability catastrophe (a serious problem and must be fixed immediately).

In this study there are also evaluation instruments, each instrument has a 0-4 severy rating scale which can be seen in table 4.1.

Table 4.1. Usability Principles

No	Variables	Instrumen
1.	Visibility of system status.	Are selected buttons clearly labeled and different from unselected buttons? Does the main title clearly describe the content? When the user moves the controller over the teleport, is there any visual feedback given? Is there any feedback given when the user presses a function key?
2	Match between system and the real world.	When the UI implies a required action, are the words in the message consistent with that action? Is each explanation clearly explained to convey information? Is the language used in pop-up windows that display confirmation or error messages clear and simple?

		Are the meanings of the boxes and icons understandable for both advanced and novice users?
3	User control and freedom.	Can operations that are already in progress be canceled by the user?
		Can users easily move forward and backward between screens?
		Does the user have the option to click on menu items with the controller?
4	Consistency and standards.	Are all the icons labeled correctly and of the same length?
		Does each UI have a different title?
		Is the title of each question correct?
		Does the "cross icon" always appear if you answer a question incorrectly?
5	Error prevention.	Is the cross icon used to notify the user when answering a question incorrectly?
		Is the user informed of the severity of the error in the error message?
		Was any advice given on the possibility of mistakes being made?
		Does the error suggest that the user fix the error?
6	Recognition rather than recall.	Does the app convey information well?
		Is color highlighting used to attract users' attention?
		Are the buttons separated by at least one space?
7	Flexibility and efficiency of use.	Are there options for each question in the challenges?
		Are the button actions on the main menu in the right order?
		Is each button the right size?
		Does each button work properly?
8	Aesthetic and minimalist design.	Does the system provide a laser to indicate the direction of the crosshairs on the controller?
		Does the system consider the differences between novice and expert users, and support them appropriately through the provision of different levels of detailed error messages?
		Does the system allow users to switch scenes via buttons?

		Does the system offer the user the option to click on the answer to the challenge question?
9	Help users recognize, diagnose, and recover from errors.	Does the system clearly distinguish between text, line drawings, and background? use of color and brightness?
		Are icons and boxes clearly separated by spaces?
		Is there a proportion between the icon and the background, which means the icon stands out more clearly?
		Is it possible to recognize the function of the icon from the title, image, or shape of the icon?
10	Help and documentation.	Does the "Simulation of Healthy Living at Home" app provide clear enough education to its users?
		Does the pop up message appear at the right time after clicking the button?
		Is the wording of the message clear and understandable to the user?
		Can the message conveyed in each UI educate about the importance of health?

4.3 Score calculation on the heuristic

The statistical formula for the calculation of the average is as follows:

$$(\bar{x} = x1 + x2 + \cdots + xn)/n$$

Description:

$\bar{x}$: calculated average : sample value : number of samples

This process aims to find out how many scores are obtained from evaluators on the use of healthy living simulation applications. The data that has been successfully collected is calculated to be given a weighted score on the severy rating based on the calculation rules on the heuristic. Data processing can be seen in table 4.2

Table 4.2. Heuristic calculation results

No	Factor	Severy rating					achievements
		0	**1**	**2**	**3**	**4**	
1.	Visibility of system status.	11	7	2	0	0	0,55
2.	Match between system and the real world.	7	10	0	3	0	0,95
3.	User control and freedom.	6	7	0	1	0	0,8
4.	Consistency and standards.	9	8	1	2	0	0,8
5.	Error prevention.	5	11	3	1	0	1,0
6.	Recognition rather than recall.	7	5	0	1	2	1,06
7.	Flexibility and efficiency of use.	10	6	0	3	1	0,95
8.	Aesthetic and minimalist design.	11	5	0	4	0	0,85
9.	Help users recognize, diagnose, and recover from errors.	13	4	1	2	0	0,6
10.	Help and documentation.	14	1	3	0	2	0,7.5
total average							0,81

If any, should be placed before the references section without numbering. After getting the average value of a variable, next categorize the average value and round it into a 0-4 scale as in table 4.3.

Table 4.3. Average score category

Average Value	Scale	Description
0 – 0,4	0	Not a problem
0,5 – 1,4	1	Cosmetic
1,5 - 2,4	2	Minor usability
2,5 – 3,4	3	Major usability
3,5 – 4,0	4	Usability catastrophe

Based on the research method, the results of the usability evaluation research of healthy living simulation applications at home got the final result of 0.81 in the following category:

 - With an average result of 0.81, the usability problem falls into the "Cosmetic" scale.

- The usability factor with the highest score is Recognition rather than recall with a score of 1.06.

- The usability factor with the lowest score is Visibility of system status with a score of 0.55.

5. CONCLUTION

Based on the results of research analysis and testing conducted on the healthy living simulation application at home as an application that educates about the importance of healthy living at home. This application uses the TCSD (Task Centered System Design) Method with the evaluation stage using usability evaluation with the heuristic calculation method, and get results, namely:

1. At the evaluation stage using the heuristic calculation method, an average value of 0.81 has been obtained with a rating of "Cosmetic" which means that there are problems but these problems are not too important to fix. And it can be concluded that the healthy living simulation application at home can be accepted with low usability problems.

2. As for the responses from evaluators regarding this simulation application, this application is considered innovative, so that if applied in learning it will be more exciting and students will not be bored to try.

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