THE MULTIMEDIA SIMULATION APPLICATION DEVELOPMENT K3 FOR EARLY CHILDHOOD WITH RGB WHEEL TRACKER AND AUGMENTED REALITY (CASE STUDIES: RA AL-KAUTSAR*)*

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ABSTRACT

Hygiene, health, and safety (K3) is sub-theme from theme of my needs in educational unit level curriculum for Raudhatul Athfal. Material that taught in K3 learning is personal and environmental hygiene, personal healthy (limb, how to self-caring, and care for environmental) and safety from dangerous things like knife, electricity, and poison.

K3 Multimedia Simulation Application is application that build with development application method according of Luther-Sutopo and be equipped by interactive learning method. The delivery of learning material in this application use interactive learning method wich consist of simulation and game. This application is build with purpose to give easiness for teacher when teaching K3. There is remote control features using RGB Wheel Tracker Algorithm and augmented reality features with FLARToolkit.

Based on result of search and testing that has been done, can be concluded hat K3 Multimedia Simulation Applicaion can give teacher easiness to simulate K3 to student and student get ease when learn about K3 with safe and attractive and this application can be implementation in RA Al-Kautsar.

Keywords: *K3, Hygiene, Healthy, Safety, Early Childhood, Multimedia, Simulation, RGB Wheel Tracker, Augmented Reality.*

1. INTRODUCTION

Hygiene, health and safety (K3) is a sub-theme of the theme of my need in the educational unit level curriculum for Raudhatul RA [1]. The material taught in the learning K3 is personal hygiene, and environmental, health themselves (members of the body, how to care for themselves, and protecting the environment) as well as the security of dangerous objects such as knives, electricity and poison).

Based on the interviews that have been conducted with Ms. Marneli S.Pd., as a teacher at RA Al-Kawthar, K3 learning methods conducted in RA Al-Kawthar is the method of demonstration and experimental methods. In the method of demonstration, the teacher only shows or demonstrates a method or a skill that aims to make children understand and can do it right seangkan the experimental method, is done by providing experience for children where children provide treatment against something and observe the consequences. The introduction of K3 in RA Al-Kawthar which still made directly have limitations will be the material presented. According to one of the other teachers, Mrs. Siti Sarah Juarsa, explanations material limited security would be a security problem itself, because the objects are introduced harmful to children, such as sharp objects, electrical, and objects other harmful, the material is introduced only by means explained without seeing it directly.

Based on observations made on the behavior of students in RA Al-Kawthar, found that students aged between 4-5 years have behaviors that tend to be active and curious objects. Pupils tend to hold objects directly in front of him. It can cause harm if not handled properly, especially on electronic items.

Augmented reality is a technology to combine the real world with the virtual world [2]. Security issues concerning objects berhaya the K3 can be solved with the introduction of augmented reality, by projecting the original objects into the virtual world. Students can experiment with dangerous objects without touching objects directly through augmented reality. In addition to security of dangerous objects, it is also necessary security for the device to be used from the liveliness of a child. RGB Wheel Tracker will be used as the technology that children can perform simulation without directly touching the device. RGB Wheel Tracker is an algorithm developed by Didier Burn, which serves to make the detection of markers using color RGB (Red, Green, Blue) [3].

So as to provide simulation K3 need a media that can simulate K3 are built in a safe and attractive. This media is intended for early childhood education students. Besides these media can be a learning tool for students to learn simulation K3.

1.1 Tutorial Model

Model tutorial is a model which made learning programs as a substitute for the human as an

instructor directly on reality. In which there are information such as text or graphics on the screen that has provided the points question atay problems.

1.2 Simulation Model

Model simulasipada essentially one learning strategy which aims to provide experience of concretely through the creation of imitations form of experience approaching atmosphere sebenarnyadan experience closer to the atmosphere takes place in an atmosphere without risk. The simulation model is divided into four categories, namely: physical, situations, procedures, and processes.

Generally phases of matter simulation model is as follows: introduction, presentation, information, (simulation 1 simulation 2, etc.), the question and answer response, response assessment, provision of feedback on the response, repetition, segment teaching arrangements, and cover.

2. RESEARCH

K3 simulation diabngun multimedia applications using multimedia development, the concept and design, material collecting, implementation and distribution.

2.1 Deskripsi Konsep dan Desain Pembangunan Aplikasi Multimedia Simulasi K3

K3 simulation multimedia applications are applications that are built with the aim to simulate K3 activities in environmental education for early childhood, precisely in RA Al-Kawthar.

K3 materials (Hygiene, Health and Safety) of the multimedia applications is a matter of K3 activities taken from the theme of my need. The material includes:

1. *Hygiene and Health*
    a. *Brushing teeth*
    b. *Shower*
    c. *Putting on clothes*
    d. *Littering*
2. *Safety*
    a. *a. The introduction of dangerous objects*

This application combines several elements such as text, images, animation, sound and video are packaged in a scene form. Here is a description of the concept of the multimedia applications of simulation K3.

Table 2.1 Description of Concept Applications

Building elements	***Description***
Title	*K3 Multimedia Application Simulation*
Audiens	*Early childhood (4-6 years)*
Image	*Images contained in this application are illustrations of the original image (real image).*
Audio	*Audio consists of vocal narration by the narrator and backsound instrument that has done the mixing process.*
Animation	*Animation in this application is a 2D animation.*

K3 simulation multimedia applications built for early childhood, so that the characters presented are style cartoon illustrations. There is a main character that serves as a conduit of messages (information and skills) in this application. This application is a character illustration of children.



Image 2.1 Character

2.2 Non-Fungsional Analysis

Non-functional requirements of multimedia applications K3 simulations include hardware requirements, software requirements and user analysis.

Table 2.2 Hardware Spesification

No.	***Hardware***	***Spesification***
1	*Processor*	*Processor with capacity 2.0 GHz*
2	*Monitor*	*Monitor with resolution 1024 x 768 pixel*
3	*Graphic Card*	*VGA 2GB*
4	*Harddisk*	*500 GB*
5	*Memory*	*RAM 2GB*
6	*Mouse*	*Standard*
7	*Speaker*	*Standard*
8	*Webcam*	*3 MP*

Table 2.3 Hardware Minimum Spesification

No.	Perangkat Keras	Spesifikasi
1	Processor	Processor with minimum capacity 1.8 GHz
2	Monitor	Monitor with minimum resolution 1024 x 768 pixel
3	Graphic Card	VGA with minimum capacity 64MB
4	Harddisk	Free space minimum 600 MB
5	Memory	minimum RAM 512 MB
6	Mouse	Standard
7	Speaker	Standard
8	Webcam	2 MP

Table 2.4 Software Specification

No.	Perangkat Lunak	Spesifikasi
1	Operation System	Minimum Microsoft Windows XP SP1
2	Tool Compiler	Minimum Adobe Flash Player 9

Table 2.5 User analysis

Users	Teacher	Student
Access rights	Use application	Use application
User Experiences	1. Can read 2. Can use a computer 3. Understand Indonesian	1. Can read 2. Can use a computer 3. Understand Indonesian
User Job and Task	1. Explain to the students how to use 2. Directing the students ssaat use application	1. Students can understand the instructions of the teacher 2. Students use application
Karakter fisik pengguna	1. It has no physical barriers	1. It has no physical barriers

2.3 Functional Analysis

On the development of multimedia applications K3 simulation modeled using object-based modeling that can diImagekan using diagrams UML (unified modeling language).

a. *Usecase*

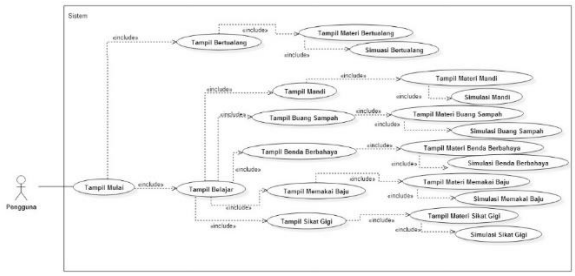


Image 2.2 Usecase Diagram

Table 2.6 Indentification Usecase Diagram

No.	Usecase	Description
01	Start	Contains the process for displaying Adventure and Learning.
02	Adventure	Contains the process for displaying material simulation adventure and adventure.
03	Adventure Material	Contains the process for display material and instructions adventurous adventure simulation.
04	Adventure Simulation	Contains process simulation adventure.
05	Learn	Contains the process to display the menu baths, trash, wear clothes, toothbrush, and dangerous objects.
06	Shower	Contains material process to display a bath and shower simulation.
07	Shower Material	Contains material process to display a bath and shower simulation instructions.
08	Shower Simulation	Bath containing the simulation process.
09	Throw garbage	Contains the process for display material and simulated trash trash.
10	Material Throw garbage	Contains the process for display material and instructions simulated trash trash.
11	Throw garbage Simulation	Contains process simulation trash

12	*Dangerous Objects*	*Contains the process for displaying material harmful objects and simulate dangerous objects.*
13	*Material Dangerous Objects*	*Contains the process for displaying material harmful objects and clues simulated hazardous objects.*
14	*Simulation Dangerous Objects*	*Contains simulation process dangerous objects.*
06	*Putting on clothes*	*Contains the process for displaying the material wear and simulated wear.*
07	*Material Putting on clothes*	*Contains the process for displaying the material wear and wear simulation instructions.*
08	*Simulation Putting on clothes*	*Contains wear simulation process.*
06	*Tooth brush*	*Contains the process for displaying material simulation toothbrush and toothbrush.*
07	*Material Tooth brush*	*Contains the process for displaying material toothbrush and manual toothbrushes simulation.*
08	*Simulation Tooth brush*	*Contains simulation process toothbrush.*

2.4 Multimedia Applications Design Materials Simulation Collecting K3

Collecting material simulation K3 multimedia applications is a step to collect all the material needed to build applications.

Table 2.7 Material Collecting

No.	***Name***	***Type***	***Description***
1	Pisau	*Image (.PNG)*	*Made with CorelDraw X7*
2	Tempat sampah	*Image (.PNG)*	*Made with CorelDraw X7*
3	Awan	*Image (.PNG)*	*Made with CorelDraw X7*
4	Background	*Image (.PNG)*	*Made with CorelDraw X7*
5	Tombol	*Image (.PNG)*	*Made with CorelDraw X7*
6	Karakter	*Image (.PNG)*	*Made with CorelDraw X7*
7	Logo	*Image (.PNG)*	*Made with CorelDraw X7*
8	Judul	*Image (.PNG)*	*Made with CorelDraw X7*
9	Sikat gigi	*Image (.PNG)*	*Made with CorelDraw X7*
10	Pasta gigi	*Image (.PNG)*	*Made with CorelDraw X7*
11	Cermin	*Image (.PNG)*	*Made with CorelDraw X7*
12	Air	*Image (.PNG)*	*Made with CorelDraw X7*
13	Keran	*Image (.PNG)*	*Made with CorelDraw X7*
14	Gelembung	*Image (.PNG)*	*Made with CorelDraw X7*
15	Saluran air	*Image (.PNG)*	*Made with CorelDraw X7*
16	Meja	*Image (.PNG)*	*Made with CorelDraw X7*
17	Pohon	*Image (.PNG)*	*Made with CorelDraw X7*
18	Sampah	*Image (.PNG)*	*Made with CorelDraw X7*

2.5 Menu Structure

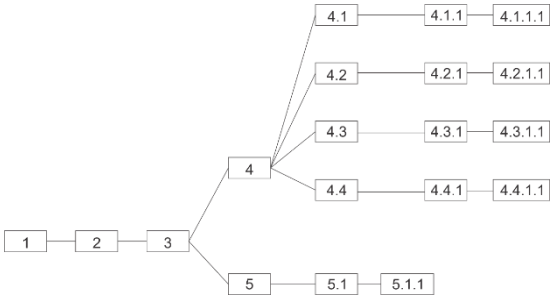


Image 2.3 Menu Structure

Description:

1. Home
2. Page Prologue
3. Home
4. Learning
4.1. display Shower
4.1.1. the material Bathing
4.1.1.1. simulation of Mandi
4.2. Discard display Trash
4.2.1. Dispose of waste material
4.2.1.1. simulation of Mandi
4.3. Views Harmful Objects
4.3.1. Matter Harmful Objects
4.3.1.1. Simulations Dangerous Objects
4.4. Display Wearing Clothes
4.4.1. Material Wearing Clothes
4.4.1.1. Simulation Wearing Clothes
4.5. Views Toothbrush
4.5.1. Material Toothbrush
4.5.2. Simulation Toothbrush
5. Display Adventure
5.1. matter Adventure
5.1.1. simulation Adventure

2.6 Interface Design
Interface design in this application:

1. *Interface start*



Image 2.4 Start

2. *Interface Choose Mode*



Image 2.5 Choose Mode

3. *Interface Learn*



Image 2.6 Learn

4. *Interface Shower*



Image 2.7 Shower

5. *Interface Cloth*



Image 2.8 Cloth

6. *Interface Dangerous Object*



Image 2.9 Dangerous Object

7. *Interface Tooth brush*



Image 2.10 Tooth brush

8. *Interface Throw garbage*



Image 2.11 Throw garbage

9. *Interface Adventure*



Image 2.12 Adventure

5. CONCLUSION

The conclusion of the interview the teacher and pupil RA Al-Kawthar multimedia application simulations showed that K3 has met the need to teach students about the simulation K3 (Hygiene, Health and Safety). Observations on 18 samples showed that with this app students can learn K3 dengna attractive and safe.

Useful advice in the development of further applications, namely: ditambahnya material contained in the program and more varied simulation.

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