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## THE ANIMATION OF ANTICIPATION SIMULATION OF FLOOD DISASTER BASED ON INFOGRAPHIC (CASE STUDY OF WATERSHED IN MEDAN JOHOR REGION, MEDAN CITY)

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### Abstract

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Flood disaster is a natural phenomenon caused by the natural process and uncontrolled human activities in exploiting nature. The natural process depends on rainfall conditions, groundwater systems (geohydrology), geological structure, rock types, geomorphology, and topography. Meanwhile, human activities mean behaviors in exploiting nature for human welfare, that tend to damage the environment, particularly at a watershed, with high intensity, less control, and oversteps of the spatial planning rules. It has been known that flood disaster brings a big loss, for example, the physical loss is estimated more than a billion rupiah and it has not included tangible losses (or invaluable losses), such as plague, the time loss of social activity, and so forth. It is expected to minimize the loss by flood anticipation from government and society who are prone to getting the flood impact, for example, the settlement at the watershed. This research aims to design and make an infographic of flood anticipation simulation based on animation and multimedia for giving education to the society who are often getting the flood impact, like the settlement at the watershed, so that the physical and intangible losses can be minimized.

Keywords: simulation, flood, infographic

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### 1. Introduction

Flood is rising water because of the abnormal rainfall intensity, extreme weather and temperature change, the broken water dam, and the clogged water flow in other areas[1]. Based on the data from Regional Disaster Management Agency (BPBD) of North Sumatera, flood is one of annual disaster occurred in North Sumatera area[2]. The society living at the watershed and the lack of awareness for the flooding risk and the cleanliness maintenance at the river surrounding are the factors why flooding occurs. It is written in the Circular Letter of North Sumatera Governor 360/12639/2019 dated November 26, 2019, about the anticipation preparation for the rainy season in 2019-2020 to all the governors of North Sumatera that all parties are involved to overcome one of the rainy season disasters, which is flood [3].

It has been known that flood causes a big loss, for example in Jeneponto district - South Sulawesi that flood has currently happened, the physical loss is estimated at 180 billion rupiahs, and the intangible loss (invaluable loss), such as plague, the loss of social activity, and so on. The loss can be minimized by the anticipation from the government and the society who are prone to getting the flood impact like the settlement at the watershed.[4][5].

In this era of industry revolution 4.0, all of the information media use digital-based. Multimedia has a role to give an easily understandable visual and content for the society. Multimedia

itself consist of audio, visual, graphic elements, and the interesting text combination[6]. It is easily shared through the content of social media, such as youtube, Facebook, Instagram, and so forth[7]. Infographic is a part of multimedia technology that has the advantage to give information interactively in the form of texts, visuals, pictures, illustration, and typography[8].

By participating and giving contributions to the government program, the writers educate the society with the infographic simulation for anticipating flood disasters at watersheds by using multimedia technology. It is due to the society living at watershed have minimum information about the anticipation towards flood disaster.

## 2. Method

### 2.1 Research and Development (R&D) method based on Computer Assisted Learning (CAL)

Analyzing potency and matters based on the observation where the implementation opportunity for this product of CAL-based improve the understanding and solution for the users towards the problems[9]. The data collection used is the literature review approach and information collection in the form of program, system, model, software, and other data that support the basics and concept of this research[10]. The design product produced is the learning of interactive multimedia based on Computer Assisted Learning (CAL). The validation of the research design is a series of activity process for giving an evaluation on the animation simulation design based on the infographic and the new product rationally whether it will be more effective. The users and experts will examine this product. The design of revision is done by writers based on the suggestions from the users and experts to get the product as the goal of this research. Then, the product is assessed and ready to use as a whole by the society living at the watershed of Medan Johor region, Medan city, and the parties involved. The analysis and report are written after the product is finished to use. The report is aimed at the writers' responsibility towards the product.

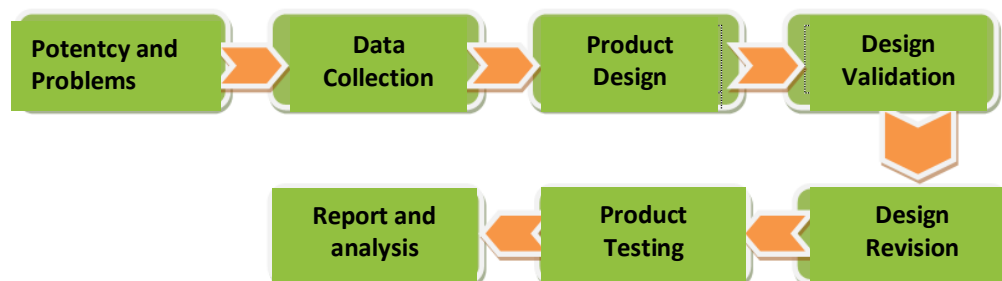


Figure 1. Research and Development (R&D) method based on Computer Assisted Learning (CAL)

### 2.2 Data Collection Method

Here is the method of collecting the data:

- Observation, which means observing the anticipation process of the flood.
- Interview, which means communication with the people who are experts in disaster studies.
- Literature review, which means searching information from paper, e-book, online tutorial, and scientific journals about flood and the simulation anticipation from government, infographic, and multimedia technology
- Survey method, which means filling out the questionnaire from the society.

## 3. Result and Discussion

### 3.1 Analyzing the Multimedia Needs

The following is the analysis of the multimedia needs in this research:

Table 1. The Analysis of Multimedia Needs

<i>No</i>	<i>The Analysis of Multimedia Needs</i>	<i>Explanation</i>
<b>1</b>	Idea and Research	<p><b>Pre-Production</b></p> <p>Designing a story, plot, and concept of the description from the animation of anticipation simulation of flood disaster based on the infographic (Case study of the watershed at Medan Johor region, Medan city). Drafting storyboard for the animation process.</p> <p>Make a visual design consisting of infographic needs that will be the main element of the animation process, such as character, background, text, and property.</p>
<b>2</b>		<p><b>Production</b></p>
a	Layout	Drawing a layout, determining the display of animation background, typography selection, coloring, and the character in the infographic.
b	Editing	The process of editing uses multimedia software of adobe after Effects and adobe illustrator. The picture processing is done at graphic software of adobe illustrator vector-based. The process of motion frame animation process uses After effect.
c	Rendering	Rendering proceeds after the animation frame is arranged based on the storyboard.
<b>3</b>		<p><b>Post-Production</b></p>
a	Animation Finishing	The animation of the infographic simulation will be in the form of an Mp4 video. The video consists of animation motion, voice, and text.
b	Animation Launch	The animation of the infographic simulation is ready to use by using a multimedia-based video player.

### 3.2 Design Model of Infographic Simulation Animation

The design of the simulation animation constructed in the form of circle idea design as follow:

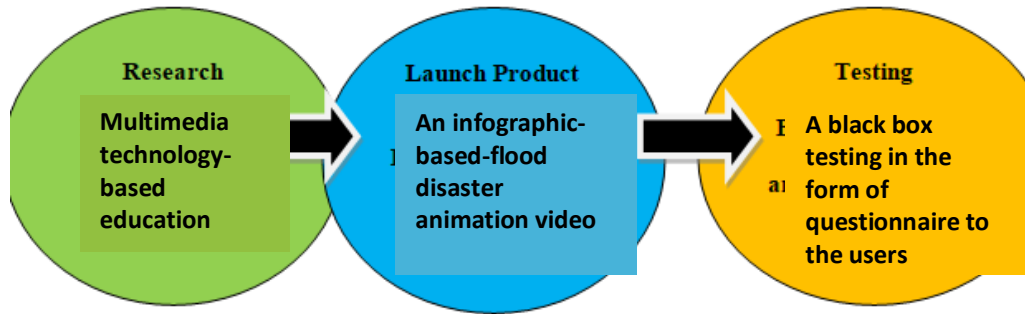


Figure 2. The Design Model of Infographic Simulation Animation

### 3.3 Display of the infographic-based flood anticipation animation simulation



Figure 3. The draft Scene of flood anticipation animation simulation

In the draft scene, the vector-based picture processing is aimed at drawing an illustration of object character and background. The property selection with bright colors has a purpose to be attractive and do not make the audience bored. The object character is drawn in a cartoon model.

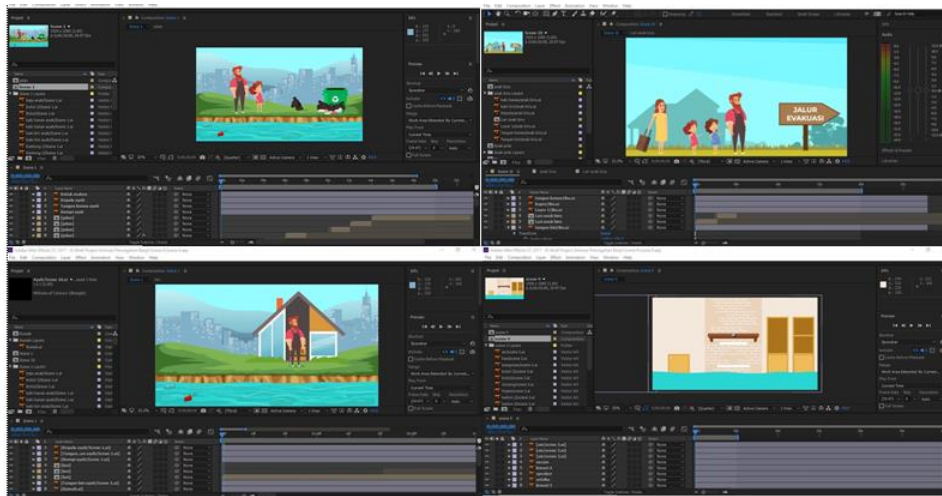


Figure 4. The processing of infographic simulation animation

The processing of infographic simulation animation of flood disaster anticipation at the watershed uses adobe after effect software. The frame animation, rigging, and motion used aim to manage the object motion simultaneously. The ringing animation sets the character's movement and the motion changes. The motion animation is used to arrange the text motion.

### 3.4 Animation Rendering

The process of rendering animation of infographic-based anticipation simulation reads frame by frame from the stages of the scene. The output from this process is an Mp4 video. Mp4 has a good quality of video and easily play in all devices, such as laptop and smartphone. It can also be accessed on social media. The capacity is small with the standard video quality.



Figure 5. The trial of video play in a computer

### 3.5 Questionnaire result of infographic animation simulation

The result of the graphic data is the questionnaire result of the people living at the watershed of the Medan Johor region. For the display of the simulation animation of infographic-based flood anticipation, 77% of the respondents strongly agree and 7% of the respondents agree. For the display of color adjustment and the background, 53% of the respondents choose strongly agree, 37% of the respondents choose to agree, and 10% of the respondents choose enough. For the readable text, 90% of the respondents say highly agree and 10% of them say agree. For the character, object, and

property selection, 37% very agree, 53% agree, and 10% are enough. For the voice clearance, 60% agree and 40% agree. For the information delivery, 70% select strongly agree and 30% agree. For ease, 50% state highly agree, 37% agree, and 13% are enough.

Table 2. The test questionnaire result of infographic simulation animation to the user

No	Question	Strongly agree	Strongly agree (%)	Agree	Agree (%)	Enough	Enough (%)	Disagree	Disagree (%)	Respondents	Total (%)
1	Is the display of infographic-based flood disaster anticipation simulation animation (Case study at Watershed of Medan Johor region, Medan city) attractive?	23	77%	7	23%	0	0%	0	0%	30	100%
2	Have the color display and background of infographic-based flood disaster anticipation simulation animation (Case study at Watershed of Medan Johor region, Medan city) been appropriate?	16	53%	11	37%	3	10%	0	0%	30	100%
3	Has the text of infographic-based flood disaster anticipation simulation	27	90%	3	10%	0	0%	0	0%	30	100%

4	animation (Case study at Watershed of Medan Johor region, Medan city) been appropriate? Have the character and object of infographic-based flood disaster anticipation simulation	11	37%	16	53%	3	10%	0	0%	30	100%
5	animation (Case study at Watershed of Medan Johor region, Medan city) been appropriate? Is the sound of infographic-based flood disaster anticipation simulation	18	60%	12	40%	0	0%	0	0%	30	100%
6	animation (Case study at Watershed of Medan Johor region, Medan city) clear to hear? Do you understand the message and information delivered through infographic-based flood disaster anticipation simulation	21	70%	9	30%	0	0%	0	0%	30	100%

7	region, Medan city)?	15	50%	11	37%	4	13%	0	0%	30	100%
	Is the animation video of infographic-based flood disaster anticipation simulation animation (Case study at Watershed of Medan Johor region, Medan city) easy to play?										

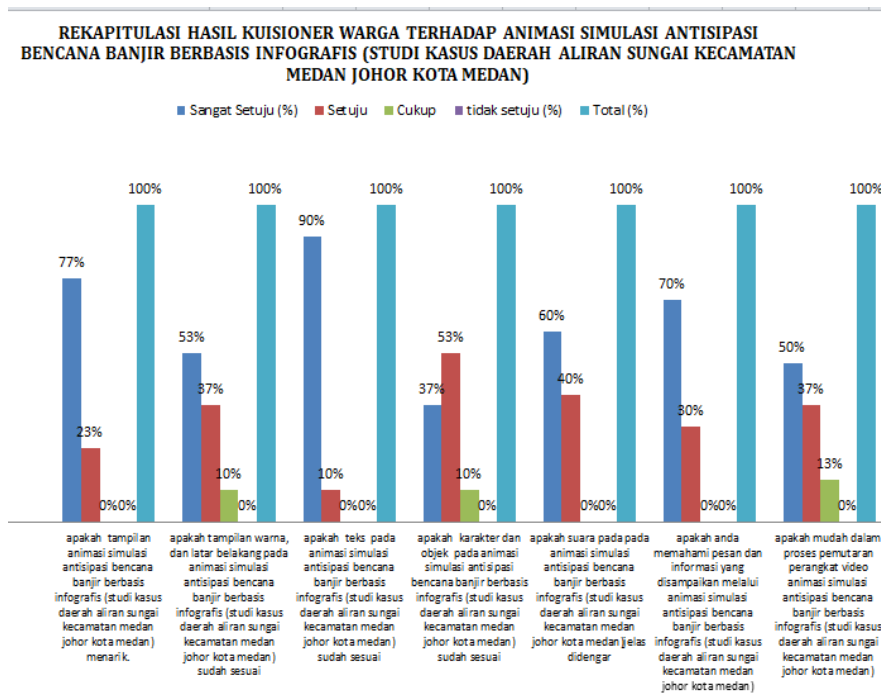


Figure 6. The questionnaire result of testing the infographic simulation animation to the society

#### 4. Conclusion

The infographic-based flood disaster anticipation animation simulation at the watershed of Medan Johor region gives an easily understandable education with a digital-based concept and an attractive display consisting of animation, object property, typography, and sound. This simulation animation can also be a teaching-aid specifically and to the point to help the village/region officials for doing socialization to the society in the surrounding environment.



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