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**ANALYSIS AND DESIGN OF DIGITAL COMIC BASED ON EDUCATION
IN OVERCOMING GLOBAL WARMING IN INDONESIA**

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ABSTRACT

At present, information regarding global warming is usually offered in the form of written information or posters that can be read at a glance, with the hope that people will be interested in exploring the issue further. The importance of global warming can be conveyed effectively and interestingly through the digital comic. On the topic of global warming, digital comic can be a great way to communicate the subject. A comic can trigger certain affective processes and responses to readers. This makes it suitable for telling complex and emotionally rich stories without requiring one to read long or complicated texts. The availability of modern and digital information media makes it possible for humans to access and know about information more readily and more effectively. This research uses the ADDIE method in designing digital comic about global warming. The result of this research is an educational-based digital comic that provides material about global warming in Indonesia.

Keywords: Global Warming, Digital Comic, Indonesia

INTRODUCTION

The existence of modern and digital information media, certainly makes it easier for humans to know and access information quickly and actually. Information media such as the internet, television, and social media are very helpful for humans in obtaining information. Today's society, especially the younger generation, is more interested in modern information media. They also participate in providing development and change through digital media. The use of digital media plays a major role in providing information and entertainment, including information in the form of the digital comic (Swandi et al., 2020).

Digital comic is a comic made in digital form, in which they contain illustrated stories that present certain information or messages. In general, comic is narrative media that integrate text and visual images. Comic can trigger certain affective processes and responses to readers. This makes it suitable for telling complex and

emotionally rich stories without requiring one to read long or complicated texts (Terlouw et al., 2019).

Regarding the role of comic media, comic has an important role in providing information. Comic can be used as a medium to present stories, explain events, teach theories, present hypotheses, and hone ignorance. Comic can also increase motivation and give an affective impression in reading. The affective impression is a state when the information received by a person, makes him emotionally as if he was feeling it. This is because comic contain strong visual elements and stories

Currently, information about the impact of global warming is usually presented in the form of written information and posters at a glance, with the aim that those who see it will be interested in exploring global warming. Global warming is the process of increasing the average surface temperature of the earth, mostly due to increased levels of CO₂ (carbon dioxide) emissions in the

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atmosphere. Another source of global warming is the greenhouse effect (Mulyani, 2021). The phenomenon of global warming is not something that will happen far in the future, but it is with us now and must be addressed before it is too late

Therefore, an effective and interesting approach is needed in conveying awareness of the importance of the influence of global warming. Information about global warming can be expressed in the form of digital comic. Where access to media such as digital comic is currently quite broad and can be reached by anyone (Devi & Tanjung, 2020).

Research conducted by Ratnasari & Ginanjar, (2020) with a discussion about the use of digital comic as an educational medium. This study aims to optimize the quality of student learning regarding natural disaster management. Learning media such as comic is expected to help students avoid abstract thinking that can create a negative impression in their learning experience. The method used in this research is the Research and Development method. This study shows the results that learning media using digital comic is able to convey information effectively and educatively. As well as helping students to develop a mindset in understanding the learning material.

Research conducted by Suryani, (2020) on the introduction of stories that raise Javanese classical culture. This study aims to bring and reintroduce the cultural stories of the Indonesian people through a digital platform. The design of comic in this study uses a three-dimensional model. The results showed that the design of this comic had met the criteria and showed positive results from the readers. This indicator of success in designing comic is supported by several positive comments and is in accordance with the initial planning concept.

Research conducted by Riady et al., (2018) about the introduction of traditional snacks to teenagers through digital comic. This study aims to add new perspectives and

understanding of traditional market snacks. The comic designed is a type of comic that tells about everyday life, or commonly known as slice of life. This research uses Medibang Paint software in designing the comic. The results of the study indicate that the distribution of information through comic media such as Webtoon is very helpful in reaching readers.

Based on the described background and study literature above, this prompted us to conduct a research entitled "Analysis and Design of Digital Comic Based on Education in Overcoming Global Warming in Indonesia."

PROPOSED INNOVATION

Based on what has been described previously, the creation of a digital education-based comic design. The comic contains educational material on how to overcome global warming in Indonesia. The design of this comic is summarized in a study entitled "Analysis and Design of Education-Based Digital Comic in Overcoming Global Warming in Indonesia". The design of this comic is expected to reach various levels of society, especially users of the Webtoon platform which is quite popular in Indonesia.

METHODS

The application method used in developing this research uses the ADDIE (Analyze, Design, Development, Implementation, and Evaluate) method.

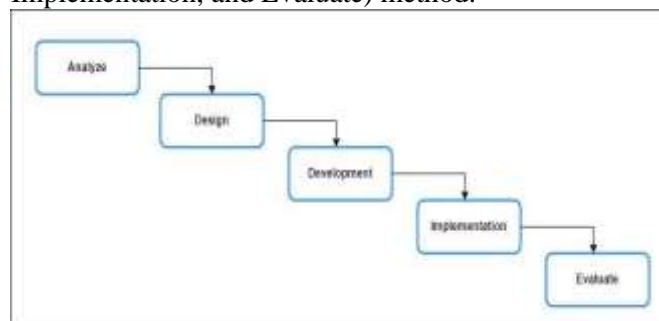


Image 1. ADDIE Method

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1. Analyze

The analysis phase is carried out to identify problems, opportunities, obstacles, as well as the required objectives and results. Some of these analyzes include:

a. **Problem analysis**
This problem analysis phase is carried out to identify problems that form the basis of research and studies to find solutions to problem-solving.

b. **Comic analysis**
In comic analysis, the identification and analysis of comic concepts are carried out based on current developments and knowledge. The results of the comic analysis are used as an illustration for writers in developing comic.

c. **Fact analysis**
This analysis was conducted to identify material relevant to the making of comic. The purpose of this analysis is that the materials used can support and comply with existing developments.

d. **Goal analysis**
Objective analysis is carried out to determine the abilities or competencies that need to be present in making comic.

2. Design

At this stage, the information from the analysis stage will be a guide in designing comic. Activities at the design stage include:

a. **Determination of comic material and concept**
Determine global warming material that will be used in making comic. Then the concept of the story will be adjusted based on educational goals. The Global Warming comic entitled "The Countdown" uses color on every page. The color combination used starts from brownish, yellowish, greenish, and bluish



Image 2. Color palette

The type of font used in making the comic title, is Hobo Std Medium with Medium style format and size 48 pt. Then the type of font used in the comic dialogue text, is Komika Hand with Regular style format and size 23 pt.



Image 3.Hobo Std Medium



Image 4. Komika Hand

b. Character creation

Design and manufacture of character sketches that will be used in the delivery of stories in comic.



Image 5. Character Sketches

c. Storyboarding

The making of this storyboard consists of panels and scenes that describe the comic story such as plot, characterization, and comic dialogue.

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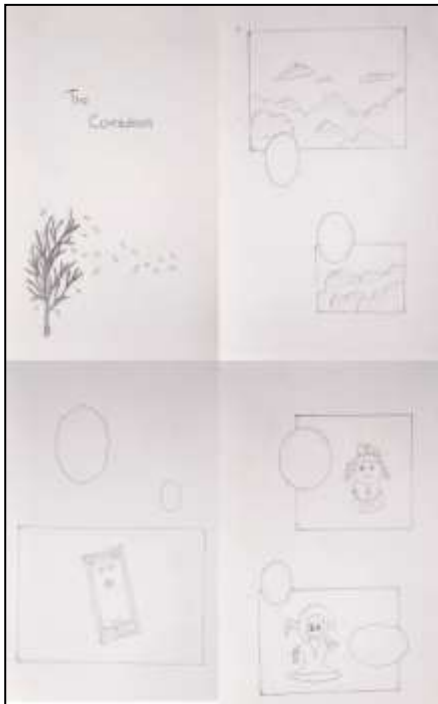


Image 6. Storyboard

At this stage, the coloring process is carried out on each panel. The coloring process uses Adobe Illustrator software.



Image 8. Coloring

3. Development

At this development stage, the designs that have been created will be developed using the help of Medibang Paint and Adobe Illustrator software. At this stage, several activities were carried out, namely realizing the storyboard to the digital stage, arranging the layout, adding dialogue text, and final improvements in terms of images, lining, and coloring. After making the storyboard, the next step is to do the lining or the process of smoothing the outline of the sketch that has been made.

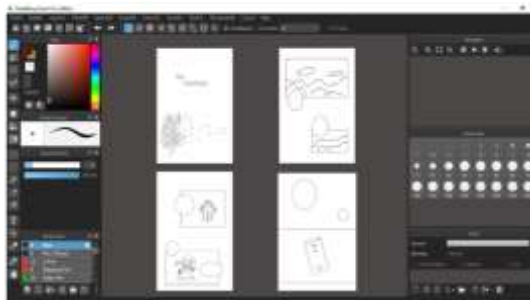


Image 7. Lining

After the coloring stage is complete, the next step is to fill in the dialogue. Filling in the dialogue is done on each panel of each episode.



Image 6. Dialog Ballons

4. Implementation

The implementation stage is the stage where the comic that has been developed will be implemented into supporting media. The media that will be used to implement comic is Webtoon. The following are the stages of implementing the global warming comic that carried out on Webtoon, as follows:

a. Filling Comic Publishing Form

At the initial stage, the required requirements from the Webtoon are

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filled out, such as cover, genre, series title, and story summary.



Image 7. Publishing Form

b. Releasing of Comic Episodes

At this stage, comic episodes are released. The comic episodes that have been made consist of a prologue, episode 1, and episode 2.



Image 9. Prolog



Image 8 Episode 1



Image 13. Episode 2

5. Evaluate

At this stage, an evaluation of the comic that has been published is carried out. This aims to determine the effectiveness of the comic made, so that the evaluation results can be used in developing better comic. Based on picture 4.13, the global warming comic entitled “The Countdown” has 351 page views or has been viewed 351 times. Then, this comic has also been added as a favorite comic by 17 people and for the comic rating, a total of 8.86 is obtained on a scale of 1 – 10.



Image 14. Main View of Comic Page

LIMITATIONS

The limitations of this research are:

- The contents of the comic story discuss issues related to global warming that occur in everyday life.
- Comic is made using the Medibang Paint and Adobe Illustrator software.
- The target audience for this comic reader is internet users aged 17 years and over.

FUTURE WORK

The design of comic in the future will consider the formation of content, the use of supporting software, and different methods. The comic design will also be adjusted to the needs and the required criteria.

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