Environmental science model based on 2-dimension animation

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Abstract. The aim of this research is to develop environmental science model on the basis of 2-dimension animation for junior high school students in Jakarta in Indonesia. This research and development were conducted in Jakarta, the capital city of Indonesia. This research built four products with 2-dimension animation related to global warming, recycling, ozone layer, biodiversity, and mangrove forest. These products were developed using animation technique involving manipulating physical objects in creating the illusion of motion with 2-dimension animation software. Validation of experts attained 3.72 from scores ranging 1 to 4 pointing out that this model is already valid as environmental science model. These products had been revised based on recommendation from expert connected with the content and presentation technique. It can be stated that this model is valid as environmental science model on the basis of 2-dimension animation in Jakarta in Indonesia.

1. Introduction

Environmental science is applied with caring and cultured environment at school [1]. Environmental science done at school is to be expected to develop action about environmental problems in order to have sustainable development. The environmental care and cultured movement are a collective action being conscious, voluntary, networking, and sustainable to implement environmentally friendly behavior. Formation of ecology is a formation of technologies nature protection behaviour, ecological protection and safety, and ecological consciousness [2]. It is very important to staticize ecological problems in methodological, psychological, and methodical plan. Individual environmental science is indicated by his satisfying natural curiousity, environmental awareness, and strengthening pro-conservation values [3-5]. Parents must have knowledge about making association between ecological knowledge and action [6]. Community members including parents are the source of important means of encouraging ecological sensibility, knowledge, and finally individual and social action. Designed and creative task about environmental issues influence change of student ecological culture [7]. Natural
basis, conservation, sustainability, benefits to local, and awareness affect individual environmental
education [8]. Lack of Pedagogical Content Knowledge among teachers can determine ineffective
implementation of environmental education [9]. Children is accepted as an essential component of
ecological culture [8]. Ecological competency is related to cognitive, operational, demand-motivational,
and value-meaningful components [10]. A social learning having multidimensional environmental
character allows to develop a holistic picture of the problems associated to the environmental
and educational action knowledge [11]. Animation presents an interactive movie through visualizing
dynamically evolving graphs [12,13]. Computer generated animation providing visually intuitive sound
medium with colorful visualizations and animation without requiring an extensive background in
computer programming [14]. Human computer interaction perspective on computer animation connects
the state-of-the-art in motion design interfaces with the concepts and terminology of a field [15].
However, most of previous studies haven’t combined environmental science with Information and
Communication Technology (ICT) specifically with 2-dimension animation.

2. Methods
The aim of this research is to develop environmental science model based on 2-dimension animation.
This research method used Research and Development consisting of needs analyzing to collect some
information related to environmental science model based on 2-dimension animation. Data collected
includes validation instrument for environmental science model based on 2-dimension animation.
Descriptive quantitative technique was applied to analyze data.

3. Results and discussion
In this research, environmental science was combined with 2-dimension animation-based environmental
education for Junior high school students for information transmission, internalization, and
understanding of environmental material integrated in learning with 2-dimension animation. This
product of research was made to attract student attention and strengthen motivation and stimulate student
interest and provide student understanding about environmental material. Application of 2-dimension
for environmental material integrated in learning makes students independent, creative, interested, and
motivated. Making 2D animation videos in this research used several software having different
functions, namely Adobe Illustrator, Adobe After Effect, and Adobe Premiere. Adobe Illustrator is a
software used to create a graphic design to make this animated video used for making characters.
Adobe After Effect is a software to create animations. Making this animated video was used to make animated
writing and characters. Adobe Premiere is a software to edit videos. Making this animated video was
used to mix between animations made and audio needed.

The initial step of making 2-dimension animation was making a story script determined so that
making the animated video more directed and the story made more appropriate. There were five
animated video theme script pieces consisting of climate change, mangrove forest, waste recycling,
biodiversity, and ozon depletion. The next step was that the required assets involving supporting
characters, audio, and images was determined. Audio needed in this animated video was the voice
character and background music. The next step was character creation done using
Adobe Illustrator software being exported to a picture in png format. After this step done, recording the
voices was needed using handphone recording. The next step was to created animation using characters
having been made with Adobe After Effect software. Before starting the animation creation,
frame size and fps of the animated video learning on Composition > New Composition toolbar option or the use of Ctrl+N shortcut were done. The frame size in this animated
video was 1,280 x 720 px (pixels) with a total of 30 fps. The frame and the large number of fps was
intended in order that animated video created has good quality.

This video was divided into 2 parts, namely opening and content. Each part was animated using
Adobe After Effect Software. After animation finished, the project file was rendered to be a complete
video. Animated video rendered is a video with mp4 format. Video rendering was done by
After animation was finished rendering, combination between animation and audio was done. Audio included voice over and background music. Figure 1 and 2 shows animated film with theme 1 (life diversity) and theme 2 (ozone depletion).

Validation expert result reached 3.72 from maximum score 4 showing that this ecological pedagogy model on the basis of 2-dimension animation for junior high school students in Jakarta in Indonesia was already valid. These products had been revised based on recommendation from expert connected with the content and presentation technique.
4. Conclusion
The conclusion of this research is that develop environmental science model on the basis of 2-dimension animation for junior high school students in Jakarta in Indonesia is already valid to help improve environmental insight with attractive displays of various colors in environmental science.

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