

## **The Development of a Multimedia Learning and Its Effectiveness in Improving Student Environmental Awareness**

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Date of Submission: 26-04-2018

Date of acceptance: 14-05-2018

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### **I. Introduction**

Neoloka [2008:29] provides an explanation of the environment, which is all the things, strength, conditions, circumstances and influences contained in the space we occupy, all living beings, including genes, living and nonliving objects, including humans and their behaviour. From the above understanding of the environment, we can conclude that the living environment consists of living beings and inanimate objects, called components of the environment. There are four main issues that can be affected by the countries of the world. These problems include climate change, biodiversity loss, health problems caused by the environment and waste of natural resources. The problem is caused by environmental damage [Kingstone, 2010:1129].

People are very dependent on the environment; people will be destroyed if the environment is damaged. A damaged environment is an environment that can no longer perform its function in maintaining life. At school, the learning process leads to the desire to shape the behaviour of students who care about the environment, using appropriate teaching aids and affecting daily life. Meanwhile, the school environment is used as a means of habit to everyday environmental behaviour.

Daniel Chiras [1991:445] argues that environmental ethics is the main reason for environmental awareness. If such an environmental ethic is owned by everyone, then awareness will be raised about environmental awareness regarding the preservation of the environment. Care of the environment in accordance with the Ministry of National Research Center of Education of the Curriculum Center [2010: 10] "Attitudes and actions that always try to prevent damage to the natural environment and develop efforts to correct existing natural damage. Based on the above understanding, as a person, each person must maintain the environment and try to eliminate the environmental damage that has occurred. With a community that is concerned with the environment, then the environmental problems that have now occurred will be small, environmental care can be achieved based on you with the advent of environmental awareness.

The use of the media has many advantages, Kemp & Dayton [1985:3-4] offers some research results that show the positive impact of using the media as an integral part of classroom learning or as the main direct learning method, such as delivering lessons, becomes more standardized, training can be more interesting and interactive, have motivational aspects and increase interest, and the quality of learning outcomes can increase. From the background of problem above, the researcher formulates the research questions, as follow:

1. How is the appropriateness of learning multimedia development results?
2. How is the effectiveness of learning multimedia development results to improve students' awareness toward the environment?

### **II. Research Methodology**

This research is a type of research and development or research and development (R & D), a process used to develop and validate products used in education [Borg & Gall, 2003: 569]. The model of the curriculum used refers to the training model developed by Dick & Carey Borg & Gall, [2005:6-8]. The development procedure includes the defining phase of the field/ area, design and development. During the development phase, the testing by media experts and material experts, then the original product is reviewed. The possibility of using the media is known from the audit of media experts and material experts. The multimedia learning experiment was carried out in 3 stages one by one for 3 respondents, small group assessment was 8 respondents, and in the group assessment 32 respondents.

The evaluations resulting from the development of the multimedia learning are then converted into five-digit qualitative data with reference formulas from Sukarjo [2006: 53-54], as shown in Table 1 below:

**Table 1.** Conversion of Quantitative Data Into Qualitative Data With A Scale of 5

Value	Interval Score	Criteria
A	$X\bar{i} + 1,8 \text{ SBi} < X$	Very Good
B	$X\bar{i} + 0,6 \text{ SBi} < X \leq X\bar{i} + 1,8 \text{ SBi}$	Good
C	$X\bar{i} - 0,6 \text{ SBi} < X \leq X\bar{i} + 0,6 \text{ SBi}$	Enough
D	$X\bar{i} - 1,8 \text{ SBi} < X \leq X\bar{i} - 0,6 \text{ SBi}$	Less
E	$X\bar{i} \leq X\bar{i} - 1,8 \text{ SBi}$	Very Less

Source: Sukarjo, 2006: 53-54

Notes:

$X\bar{i}$  = Ideal score for evaluation =  $\frac{1}{2}$  (maximum score + minimum score)

SBi = perfect ideal deviation =  $\frac{1}{6}$  (maximum score - minimum score)

X = Actual score

The level of awareness-raising was made using the initial questionnaire, and the final questionnaire was conducted in the XI Social Science 1 SMA N 1 Pangkalpinang multimedia classroom experiment. The environmental awareness measuring tool used in this study is an overview of a new environmental paradigm designed to understand the worldview of the environment in order to assess changes in the environmental conditions of participants. NEP as a new ecological paradigm developed by Dunlap and Van Lier (1978) specifically to measure whether the population departs from the dominant (anthropocentric) social paradigm against a more ecological (bio centric) or environmental perspective of the environment.

The NEP survey is reliable, because it is internally consistent and has a scale of one size. As a result, the NEP survey can now be the most popular and acceptable indicator of environmental values, attitudes or worldviews (Anderson, 2014). The NEP survey has 15 units, each of which offers a statement of the concept of the environment.

Students evaluate each Likert statement with five values from one to five, where one strongly disagrees, two agree, disagree, three unsure /neutral, four agree and five agree. Using a tool scale with an odd number of values is useful because it allows participants to neutralize the position. It is clear that seven even statements are classified as a reflection of the "dominant social paradigm", and eight strange sound statements reflect the approval of the "new ecological paradigm" (Dunlap & Van Liere, 2008).

The researchers calculated the number of responses from each student for odd applications and even applications to obtain an NEP survey score. Students who agree with seven odd statements (evaluate the statement as four or five) show a pro-ecological outlook, while participants who agree with eight statements show the world view of the pro-government social paradigm. The result of the student's environmental assessment tool varies from quantitative data to qualitative data by category. The level of environmental awareness of students is divided into 3 categories, including high, medium and low. For more details, see Table 2 below:

**Table 2.** Levels of Environmental Concern

Value	Interval Score	Criteria
A	$X \geq M + SD$	High
B	$M - SD \leq X < M + SD$	Medium
C	$X < M - SD$	Low

Source: Azwar, Syaifuddin. (2015:145-161)

Notes:

X : Total score of respondents

M : Average or average score

SD : Standard deviation

The effectiveness of multimedia learning to increase students' awareness of the environment using the N-gain assessment. According to Hake (2002: 1), the gain or normalized gain is the actual average gain with the maximum average gain.

**Table 3.** N-gain Category

N-Gain	Category
$g < 0,3$	Low
$0,3 \leq g \leq 0,7$	Medium
$> 0,7$	High

Source: Hake, Richard R. (2002).

### III. Result and Discussion

#### 3.1 The Results of Multimedia Learning Processes

The evaluation of material experts on the content aspect received a total score of 32 and an average score of 4.57, including the category "very good". The educational aspect of multimedia learning received a total score of 28, and the average score of 4.67 in the category "very good." Multimedia learning in terms of material: content aspects and learning aspects in the "very good" category, so from the point of view of materials, the multimedia learning is very useful.

The evaluation of media experts on the content aspect displays a score of 43 and an average score of 4.3, including the category "very good". The program aspect of multimedia training in the field of the environment is 36 points, and the average score of 4.5 is included in the category "very good". The study of the multimedia environment from the media aspect: the aspect of the display and the program aspect belong to the category "very good", so from the multimedia point of view the multimedia learning is very useful.

Assessment of students in court over one group of 3 people (100%) was noted in the category very well. A small group study for 7 people (87.5%) was noted in a very good category, and 1 person (12.5%) declared a good category. A field group of 32 people (87.5%) said that in a very good category 4 people out of 12.5% said in good category. The results of testing indicate that the results of training in the field of multimedia development deserve attention.

#### 3.2 Result of Environmental Awareness

Before the data was used to compare the means of initial questionnaire and final questionnaire, Kolmogorov Smirnov test was utilized to find out the normality distribution of initial questionnaire. The calculation using Kolmogorov Smirnov test was as follow:.

**Table 4.** One-Sample Kolmogorov-Sminov Test

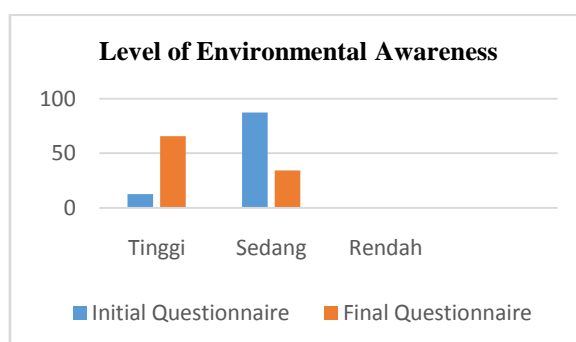
	Parameters		Extreme Differences		Kolmogorof-Smirnov	Sig	
	Mean	SD	Absolute	Positive			Negative
<b>Initial Questionnaire</b>	47.0000	5.01610	.125	.125	-.100	.707	.699
<b>Final Questionnaire</b>	56.0000	3.37925	.148	.087	-.148	.835	.488

When significant (Sig.) is higher than 0.05, the distribution of initial questionnaire is normal. In contrast, when significant (Sig.) is less than 0.05, the distribution of initial questionnaire is not normal. The data showed that the significant (Sig.) of initial questionnaire was 0.699 which was higher than 0.05. It meant that the distribution scores of initial questionnaire were normal. Then, to know the homogeneity of variance, the researcher administered Levene Test.

**Table 5.** Test of Homogeneity of Variances

	Levene Statistic	Df1	Df2	Sig
<b>Initial Questionnaire</b>	.000	1	60	.990
<b>Final Questionnaire</b>	2.618	1	60	.111

Initial results of the survey show that 12.5% have a high level of environmental awareness, 87.5% have a moderate level of environmental awareness, no one has a low attitude towards environmental management. The final questionnaire for students who have a high level of concern is 65.6%, 34.4% of students have a moderate level of environmental awareness, and no one has a low level of care.



**Figure 1.** Level of Environmental Awareness

The results of the initial questionnaire and the final questionnaire were evaluated at 0.30, which means that after the training it is possible to raise the level of environmental awareness using a multimedia learning with moderate effectiveness.

The results of this study are similar to the results of a study published by Computer Technology Research that a person will receive only 20% of what they see and 30% of what they hear. While multimedia will receive 50% of what they see and hear, up to 80% of what they see, hear and interact at the same time. [Winarno, 2009: 10].

#### **IV. Conclusion**

The development of a multimedia learning environment based on the validation of experts in the field of the media, the confirmation of the reliability of the materials expressed by the experts is very good, therefore they are worthy of testing. In the experimental phase from one to one, the evaluation of small groups, the evaluation of the group, gives a very good opinion, so that students of class use environmentally acceptable learning multimedia. The effectiveness of a multimedia learning environment based on an N gain of 0.30, thus, the multimedia ambition for the environment has an effectiveness aimed at increasing environmental awareness.

#### **References**

- [1]. Anderson, M., New Ecological Paradigm Scale. *Berkshire Publishing group, all rights reserved*, 2014, 160-262.
- [2]. Azwar, Saifuddin., "Skala Psikologi," Pustaka Pelajar, 2015.
- [3]. Borg, W. R., Gall, M. D., and Gall, J. P., " *Educational Research (8th ed.)*," Longman, 2007.
- [4]. Chiras, D. D., " *Environmental Science Action for A Sustainable Future*," The Benyamin/Cumming Publ.Company Inc.Third Ed, 1991.
- [5]. Dick, W., Carey, L., and Carey, J.O., " *The Systematic Design of Instruction(6th Ed.)* " Scott Pearson A.B, 2009.
- [6]. Dunlap, R. E., & Van Liere, K. D.). The "New Environmental Paradigm". *Journal of Environmental Education*, (2008, 40(1), 19-28
- [7]. Hake, Richard R., " *Analyzing Change/Gain Scores* " Dept. of Physics, Indiana University, 2002.
- [8]. Kemp, J.E., and Dayton, D.K., " *Planning And Producing Instructional Media*," Harper & Row Publishers Cambridge, 1985.
- [9]. Kingston, Suzanne., "Environment," *The International and Comparative Law Quarterly* 59 (4) 2010, pp. 1129-1141.
- [10]. Neolaka, Amos., " *Kesadaran lingkungan.*," Rineka Cipta, 2008.
- [11]. Tim Penyusun Kamus Pusat Pembinaan dan Pengembangan Bahasa., " *Kamus Besar Bahasa Indonesia*," Balai Pustaka, 1990.
- [12]. Winarno, dkk., " *Teknik Evaluasi Multimedia Pembelajaran* " Genius Prima Media, 2009.

Reni "The Development of a Multimedia Learning and Its Effectiveness in Improving Student Environmental Awareness ."IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) 12.4 (2018): 59-62.