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## Developing of Hologram Multimedia for Speed Learning Through Bio-Communication

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**Abstract:** The development of holograms carried out in environmental learning is needed to affect the level of responsibility of students. Research conducted by a collaborative team between lecturers, teachers, and experts in hologram development is urgently needed. As has been done in the Indonesian Education University laboratory environment, currently multimedia holograms are being developed. Learning with the support of multimedia holograms has become a new trend that changes the speed of students' bio-communication. This speed occurs because the effect of the hologram turns out to be able to strengthen the workings of the frontal lobe, which go directly to the occipital, where the information transformation of learning can reach 12 milliseconds per second. This finding has been the newest in learning in primary schools, especially in environmental education.

**Keywords:** hologram, multimedia, speed learning, bio-communication.

## 开发全息多媒体以通过生物通信快速学习

**摘要：**在环境学习中进行全息图的开发需要影响学生的责任水平。迫切需要由讲师、教师 and 全息图开发专家之间的协作团队进行的研究。正如在印度尼西亚教育大学实验室环境中所做的那样，目前正在开发多媒体全息图。借助多媒体全息图学习已成为改变学生生物交流速度的新趋势。之所以出现这种速度，是因为全息图的效果证明能够加强额叶的运作，额叶直接进入枕骨，学习的信息转换可以达到每秒12毫秒。这一发现是小学学习的最新发现，尤其是在环境教育方面。

**关键词：**全息图、多媒体、快速学习、生物通信。

### 1. Introduction

In learning about the environment, or better known as environmental engineering, it is very important to be

taught early. Of course, the level of basic education is very important to be touched through this learning. However, there is a challenge regarding how these students have a learning speed according to their

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respective abilities. Students' ability is often determined by readiness or intrapersonal communication, including in other fields as done by [1], as described is known as the power of Bio-communication [2]. In this research, a multimedia learning that utilizes the Hologram effect, otherwise known as Instructional Hologram Multimedia (IHM), is developed to provide the best service according to these learning strengths. Multimedia technology in the era has now been utilized across scientists, as researched by [3].

Through this IHM, children learn by witnessing the effects of objects in the surrounding environment and the wider environment on how waste from rivers should be managed; this environmental education review continues to be reviewed as published by [4], who compared their analyzes. For example, holograms must illustrate the effect of holograms from plastic bottles, wood, food scraps, and bones to students. From the simple research that has been done, including focusing on research on (1) How has the learning process changed before and after the teacher teaches using IHM in Environmental Education Lessons ?; (2) What is the picture of increasing the motivation of students before and after learning using IHM in Environmental Education lessons ?; and (3) How is the description of the quality of the teaching and learning content of PLH before and after a teacher teaches with IHM?

The research hypothesis tested in this study include:

(1) Ho: There is no change in the learning process before and after the teacher teaches using IHM in Environment Learning.

Hi: There is a change in the learning process before and after the teacher teaches using IHM in Environmental Learning.

(2) Ho: There is no increase in student motivation before and after learning using IHM in Environmental Education subjects

Hi: There is an increase in students' motivation before and after learning to use IHM in Environmental Education subjects.

(3) Ho: There is no quality improvement of the learning content of Environmental Education. before and after teachers teach with IHM.

Hi: There is have quality improvement of the learning content of Environmental Education before and after the teacher teaches with IHM.

## 2. Literature Review

### 2.1. Hologram for Educational Multimedia

Environmental Education Learning has been tested using various innovative learning models, one of which is using Hologram Technology as developed by [5]. At the Junior High Schools level, student understanding has begun to be controlled as an actor in keeping the environment healthy and clean. Thus, learning in

schools requires a flexible learning model that can present content that is not easily damaged and can present 3-dimensional visuals. One of the developments of this Hologram Model has been developed by [6], which illustrates 3D-dimensional objects [7]. The multimedia aspect in environmental education is very important, as emphasized by [8], especially when the teacher stops and continues learning what is being presented in 3D.

### 2.2. Environmental Education in Indonesia

Environmental Education serves for instilling an attitude of environmental care. In UU No. 32 Year 2009, Republik Indonesia [9] concerning environmental protection and management, it has been stated that the environment is defined as a unitary space that includes all objects, power, and living conditions, including humans and their behavior that affect the environment, the sustainability of life, and the welfare of humans and other creatures. Environmental education certainly has a unique vision, namely the realization of Indonesian people who have the knowledge, awareness, and skills to play an active role in preserving and improving the quality of the environment. Based on this vision, environmental education is taught as early as possible to children, including children aged 12-15 years in Junior High school.

According to the development and basic concepts of environmental education, the implementation of environmental education learning in schools has several obstacles, including the methods and materials used, which are not yet sufficient so that students' understanding is incomplete. Therefore, in the delivery and learning process, there need to be interesting innovations. Of course, it is connected with daily life to make the learning process more meaningful while answering existing environmental problems. At the Junior High School level of education, the environmental education material already in the Environmental Education subject has been integrated with other subjects such as Indonesian Language and Natural Sciences. That is done because integrated learning can foster students' thinking skills. Following the child's needs, learning becomes more meaningful so that learning outcomes will last longer than learning separately. One of the environmental education materials in grade VII Junior High School in theme 2, Clean Air for Health in sub-theme 3, is the discussion about maintaining human respiratory organs. This material was chosen because from 2018 to the present, upper respiratory tract disease occupies the first position in the disease most experienced by residents of the city of Bandung. The material teaches children how to prevent respiratory disease through clean and healthy living habits and maintain human respiratory organs.

### 3. Research Methodology

The research method is an experimental research method on Education Environmental, and hologram usage will take place in Junior High schools in Garut. The research instrument in the form of questionnaires and tests is used in this study. The study was conducted with research subjects divided into groups, namely true experiments. The subjects of the study are Junior High Schools students. For sample selection done randomly or by random area sampling [10] suggests that in quasi-experimental research. The selection of regions for the sample of one and 1 class schools through Micro-Learning Models with 10 students. This research was being done with the procedure of Research Method steps bellow.

#### 3.1. Analysis and Data Collection as Evidence

The research started by study Indonesian's curriculum on environmental education. The context is enlisted and explored. The most suitable topic will be selected as the example for the content of *Instructional Hologram Multimedia*.

#### 3.2. Development Content of Environmental Education

The *content of environmental education* should have meaning for a student that is explained through some illustrations. Based on the analysis and data collection from the previous step, the content and storyboard are designed. Finally, the result of this step should be validated by the expert.

#### 3.3. Initial Experiment

First, teaching practice does not use the Instructional Hologram Multimedia; run is done at microlearning sample of research. After this step run, the result of the student's score will be done according to the found and collected data and to be analyzed.

#### 3.4. True Experiment

The final experiment run is taken place at the Junior High school. The real sample is observed, and the research data is also collected in this step on Teaching Quality of Environmental Education, Motivation, and Result of Environment Education competencies on students.

#### 3.5. Data Analysis for Hypothesis Test

The last step of this research is hypothesis test with following the T-test based on SPSS Version.12.

## 4. Result and Discussion

From the research results on the description of the quality of learning about environmental education by elementary school teachers in their students using the Multimedia Hologram learning model, it can be seen in the learning quality indicator data as follows.

#### 4.1. Learning Process

From the results of experiments conducted on a microlearning class consisting of 10 students during environmental education learning using IHM to the Bio-communication aspect, the results can be seen in Fig. 1 below.

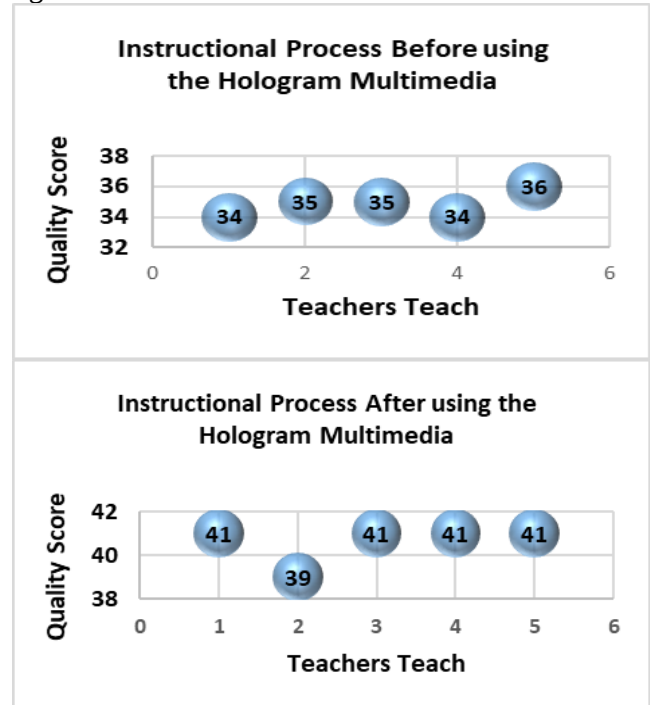


Fig. 1 Learning process on instructional hologram multimedia

Based on data before and after learning using IHM, it can be seen that the difference in the achievement of the Learning Quality Score by students. There have been differences in learning outcomes from the two assessments, with initial differences between 34 to 36 (before IHM) and after using IHM starting from 39 to 41. These results show the advantages of E-learning, which are in line with the opinions of the findings [7], likewise with aspects of the quality of learning which are determined by the repetition of philosophical use of learning following the research findings of [11]. Of the five times the teacher taught after using IHM, the average of strengthening the workings of the frontal lobe goes directly to the occipital, where the information transformation of learning can reach 12 milliseconds per second. It's pretty stable.

Table 1 Independent samples test in learning process

|                              |                             | Independent Samples Test                |      |                              |      |                 |                 |                       |                                           |
|------------------------------|-----------------------------|-----------------------------------------|------|------------------------------|------|-----------------|-----------------|-----------------------|-------------------------------------------|
|                              |                             | Levene's Test for Equality of Variances |      | t-test for Equality of Means |      |                 |                 |                       |                                           |
|                              |                             | F                                       | Sig. | t                            | df   | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |
| Learning Process Through IHM | Equal variances assumed     | 4.99                                    | .034 | 6.33                         | 28   | .000            | .26733          | .04218                | .354 .181                                 |
|                              | Equal variances not assumed |                                         |      | 6.33                         | 21.8 | .000            | .26733          | .04218                | .355 .180                                 |

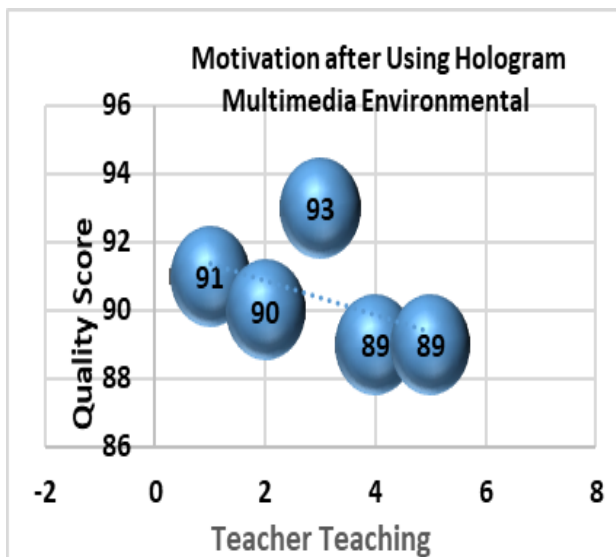


Fig. 2 Student motivation on instructional hologram multimedia through instructional hologram multimedia

From a table of Independent Samples Test above, the value of sig. (2-tailed) of  $0.0000 < 0.05$  then  $H_0$  is accepted. There is a change in the learning process before and after the teacher uses IHM in Environmental Learning.

#### 4.2. Student Motivation

The findings regarding the increase in student motivation during learning about Environmental Education by using IHM learning by paying attention to the Bio-communication aspect can be seen in Fig. 3 below.

The experimental results regarding increased student learning motivation before and after participating in learning using IHM are quite different. The experimental results showed a significant increase in the condition of student motivation, which initially, after a simple calculation, showed an average achievement height of 83. Meanwhile, after participating in learning with IHM, it increased to an average of 90. This increase can be explained by the role of learning IHM by paying attention to learning speed based on Bio-communication [12], which must be considered. Given that internally, the learning outcomes and learning motivation must be under consideration.

From the hypothesis proposed for this finding, the results can be seen in the table below.

Table 2 Independent samples test in student motivation

| Independent Samples Test |                             |                                         |      |       |       |                 |                 |                                           |               |
|--------------------------|-----------------------------|-----------------------------------------|------|-------|-------|-----------------|-----------------|-------------------------------------------|---------------|
|                          |                             | t-test for Equality of Means            |      |       |       |                 |                 |                                           |               |
|                          |                             | Levene's Test for Equality of Variances |      |       |       |                 |                 | 95% Confidence Interval of the Difference |               |
|                          |                             | F                                       | Sig. | t     | df    | Sig. (2-tailed) | Mean Difference | Std. Error Difference                     | Lower Upper   |
| Student Motivation       | Equal variances assumed     | 13.83                                   | .001 | 14.86 | 28    | .000            | .3480           | .02341                                    | .39596 .30004 |
|                          | Equal variances not assumed |                                         |      | 14.86 | 17.62 | .000            | .3480           | .02341                                    | .39726 .29874 |

#### Motivation Before Using Hologram Multimedia Environmental

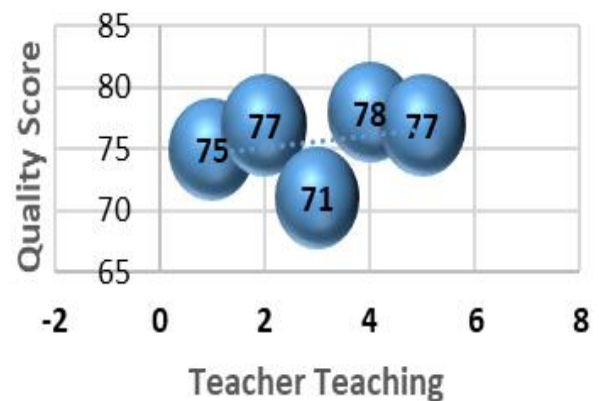


Fig. 3 Student motivation before using Environmental Hologram Multimedia

From a table of Independent Samples Test above, the value of sig. (2-tailed) of  $0.0000 < 0.05$  then  $H_0$  is accepted. There is an increase in students' motivation before and after learning to use IHM in Environmental Education subjects.

#### 4.3. Quality of Learning Content for Environmental Education

The findings regarding the increase of Quality of Learning Content during learning about Environmental Education by using IHM learning by paying attention to the Bio-communication aspect can be seen in Fig. 4 below.

Learning Content before and after Using Hologram Multimedia Environmental

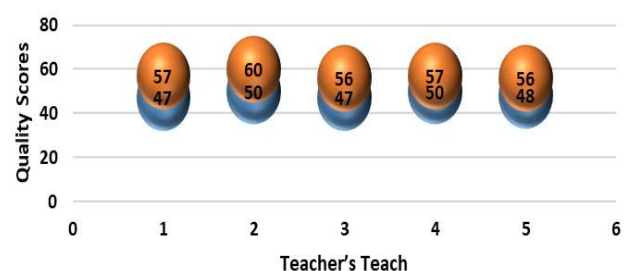


Fig. 4 Quality of learning content of environmental education through instructional hologram multimedia

The quality of learning content for the environmental education subject turned out to be an average of 50 before being processed. It taught using IHM, while the teacher taught using IHM, the average quality of learning rose to 56. From these findings, the aspects that support improving the quality of environmental learning [13], especially those that are difficult to understand in real terms. Other evidence findings are also influenced by bio-communication skills [14]. The teachers and students interacted while trying to do functional magnetic resonance imaging of environmental education materials presented in holograms. As for the speed of information processing regarding environmental education material, the students experienced stability, 12 milliseconds per second.

Based on the proposed hypothesis about Quality of Learning Content, the results can be seen in the following SPSS output Table 3.

Table 3 Independent samples test in quality of learning content through IHM

| Independent Samples Test                |                             |      |      |                                           |      |                 |                 |                       |       |       |
|-----------------------------------------|-----------------------------|------|------|-------------------------------------------|------|-----------------|-----------------|-----------------------|-------|-------|
| Levene's Test for Equality of Variances |                             |      |      | t-test for Equality of Means              |      |                 |                 |                       |       |       |
|                                         |                             |      |      | 95% Confidence Interval of the Difference |      |                 |                 |                       |       |       |
|                                         |                             | F    | Sig. | t                                         | df   | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| Quality of Learning Content Through IHM | Equal variances assumed     | 5.59 | .032 | 7.13                                      | 28   | .000            | .24811          | .04132                | .361  | .168  |
|                                         | Equal variances not assumed |      |      | 6.84                                      | 21.8 | .000            | .24633          | .04114                | .364  | .172  |

From a table of Independent Samples Test above, the value of sig. (2-tailed) of  $0.000 < 0.05$  then  $H_0$  is accepted. There are have quality improvements in the learning content of Environmental Education before and after the teachers with IHM.

From the results of this study, a new novelty that researchers can convey is students regarding the Findings of Instructional Hologram Multimedia (IHM), which is designed for students' Bio-communication strength-based learning. This IHM was developed based on special students' needs and visual speed in learning about Environmental Education. The basic ingredients of IHM objects are taken from the environment around students and schools regarding food waste, plastic drinks, fruit, and fish that people in Indonesia and Japan often consume. Through the speed of Bio-communication owned by students, this hologram content becomes the essence of findings of the success of environmental learning taught by teachers from an early age, especially in Indonesia.

## 5. Conclusions

Changes in the learning process before and after the teacher taught using IHM in Environmental Education

Lessons reached a score of 41, which was supported by the achievement of mastery of environmental education material with a speed of 12 milliseconds per second. Obtained an overview of the increased motivation of students before and after learning using IHM in Environmental Education lessons that reached 90. This finding was indicated by the support for the achievement of information processing of environmental education material by students with a speed of 12 milliseconds per second. Obtained an overview that shows that the quality of the learning content of PLH before and after the teacher taught with IHM reached a score of 50. The support marked that for the achievement of information processing of environmental education material by students with a speed of 12 milliseconds per second.

## 6. Limitations

From the three conclusions, it can be recommended that environmental learning be able to take advantage of engineering multimedia holograms adapted to teachers and students during their use; as for the limitations of the findings, learning other subjects cannot apply to IHM. It could be the reason to go through another experiment.

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