Improving Science Learning Outcomes of Elementary Students by Using Interactive Multimedia on Human Order Materials

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Abstract. This study aims to improve the learning outcomes of elementary school science students by using interactive multimedia on human skeleton material. This interactive multimedia is a learning media product in the form of an interactive CD. Based on information obtained by researchers that the lack of enthusiasm of students in science subjects, because students do not have a real picture of how the material process is explained. Therefore, this media is very important to support the learning process of science. The method used in this study uses the Research and Development (R&D) method with the 4D model which has 4 stages of development namely define, design, development, and disseminate. The results of the use of interactive multimedia on students showed that the average pretest score was 57.33 while the average posttest score was 84.17. Based on N-Gain of 0.60 in the medium category and it can be said that the effectiveness of interactive multimedia as a learning medium is classified as effective. Based on these results, it can be concluded that there is an increase in science learning outcomes for students of SDN 034 Tarabangun class IV using interactive multimedia on human skeleton material.

Keywords: Interactive Multimedia, Improving Science Learning Outcomes

1. Introduction

Education is an important thing in human life. Education in question is getting formal education one of the subject matter is natural science subject matter. Natural Sciences is concerned with finding out about natural phenomena systematically, so that science is not only mastering a collection of knowledge in the form of facts, concepts, or principles, but also a process of discovery \[1\]. Therefore, it is very important for students to master the material on Natural Sciences themselves. Thus, the success of students studying science is inseparable from the learning process of science in elementary schools. Amid the importance of mastering science learning materials, it is found that the ability of students to master science learning materials is still relatively low. This is indicated by the low student test scores on the Natural Sciences material. Also based on observations found that students tend to be passive and less enthusiastic in learning. When teaching, the teacher dominates learning by using the lecture method, then students are asked to record the material as a summary, and at the end of the learning the students work on the questions in the Student Worksheet individually. Therefore, the
A researcher wants to improve the science learning outcomes by using an interactive multimedia especially on human skeleton material.

Interactive Multimedia is a multimedia that is equipped with a controller (link) that can be operated by the user, so users can choose what they want for the next process [2]. Interactive multimedia is appropriate to be used as a learning medium and can attract students' attention, so students focus more on learning material because students can learn in fun learning situations. Besides that by utilizing interactive multimedia as a supplement in learning can improve student learning activities and outcomes [3].

The urgency of the research conducted by researchers is to facilitate students understanding human skeletal material with a pleasant learning atmosphere through interactive multimedia. In addition, this product is expected to help teachers overcome the limitations of the media used in science learning.

2. Methodology

This type of research is Research and Development (R&D). The development model used is the development model according to Thiagarajan, the 4D model which consists of 4 stages of development, namely define, design, develop, and disseminate [4].

The research design used was pre-experimental which meant that the researcher observed a main group and intervened therein throughout the study. First measured before the experiment (O1), then given a treatment (X) for a certain period of time, then measured the second time (O2) This design can be described as follows Figure 1 [5]:

![Figure 1](image)

**Figure 1. Design one group pretest-postest**

Information:
- $O_1 =$ pretest value
- $X =$ Treatment
- $O_2 =$ postest value

To calculate the coefficient of validity based on expert judgment as many people as to an item using the formula average score. The data source of this research was obtained from research conducted at SDN 034 Taraibangun. Observation activities carried out were combined with teacher interviews. Furthermore, the study continued the use of interactive multimedia on subjects that demanded to improve student learning outcomes.

In analyzing the data, it is used descriptive analysis of the test items per number and the writer identified each test item related to the indicator of reading and writing. The writer used those comparative results as the source of quantitative approach.

| Category | Combination of answer |
|----------|-----------------------|
| 4        | VA : Very Agree       |
| 3        | A : Agree             |
| 2        | NA : Not Agree        |
| 1        | D : Disagree          |

Modification Category of Agreement Rubric [6]
Average Score = \frac{\text{value score}}{\text{number of statement score}}

The writer category z the finding of valid confirmity test into the level criteria than revealed the criteria. There are four level criteria based on [7]:

| No | Achievement | Criteria |
|----|-------------|----------|
| 1  | 3,5 – 4     | Good     |
| 2  | 3 – 3,4     | Sufficient |
| 3  | 2,5 – 2,9   | Less bad |
| 4  | Less than 2,5 | Bad     |

### 3. Results and Discussion

This development research produced a product in the form of interactive multimedia on CD as a science learning medium in class IVC Elementary School that is suitable for use. The results of this study can be seen from the results of the validation of the feasibility provided by the validator as well as the results of limited trials to see students' responses to the products developed. Presentation of research results is developed based on the stages of research development with the 4D model, namely the defining stage, the design phase, the development stage, and the deployment stage, as follows.

#### 3.1 Define Phase

This stage aims to bring up and determine the basic problems faced in learning so we need a product to improve learning outcomes. From the results of this analysis obtained a description of facts, expectations and alternative solutions to basic problems that facilitate the determination of learning resources in order to facilitate students in understanding learning and be able to motivate to learn. Therefore it is expected to improve learning outcomes in the form of Interactive Multimedia more effectively going forward.

At this stage the researchers conducted an analysis of learning resources to improve learning outcomes. Learning resources are analyzed, namely by looking at the Competency Standards and basic Competencies of class IV. In this study to determine the characteristics of students from the intellectual aspects, language of students, motivation to learn and age of students. Analyzing the intellectual development of students to consider in the preparation of the level of difficulty of the problem in teaching material to be taught.

The concept developed in grade IV in elementary school based on Competency Standards understands the relationship between the structure of human organs and their functions, as well as their preservation and basic competence describing the relationship between the structure of the human body's framework and its functions. Task analysis is developed so that students are able to understand the conceptual about the human skeleton which is later expected by students to be able to mention what constitutes the skeleton. Student activities are by observing images that relate to the concept material of teaching materials that are developed, after observing the pictures students are asked to conduct joint discussions to provide responses based on teaching material. After the analysis has been conducted, then learning indicators are produced which form the basis for compiling questions and designing instructional media.

#### 3.2 Design Stage

Making the initial interactive multimedia design that refers to the concepts that have been made. Making the media using Adobe Flash CS Software 4. The display presented in the interactive multimedia learning media consists of: (1) Opening intro scenes (2) Scene main menu (3) Scene function key instructions (4) Scene menu material (5) Scene learning objectives (6) Scene content
content (7) Scene evaluation menu (8) Closing scene. Finishing Phase Namely the finishing stage is done changing the media format into SWF and EXE, then storing it in a Compact Disk (CD).

3.3 Development Phase
This research produces a product that aims to improve learning outcomes in the form of interactive multimedia on CD as a science learning media in class IVC elementary school which is suitable for use. The following results of interactive multimedia design using Adobe Flash program in natural science subjects can be seen in Figure 2.

![Figure 2. (a) Display of one material on the media and](image)

3.4 Disseminate
In the following Table 3 is the implementation of activities at the stage of the dissemination of interactive multimedia teaching materials in SDN 134 Taraibangun.

| Student Code | Category |
|--------------|----------|
| S1, S2, S3, S4, S5, S7, S9, S10, S11, S13, S15, S16, S18, S20, S23, S24, S26, S28, S29, S30 | Medium |
| S6, S8, S11, S12, S14, S17, S21, S22, S25, S27 | High |

Information:
Medium Category: 0.00 - 0.74
High Category: 0.75 - 1.00

The results of calculations using the normalized gain formula can be seen in table 3 below:
4. Conclusion

Based on the results of the study, it can be concluded that interactive multimedia is one product that can improve student learning outcomes of science learning in SDN 034 Taraibangun seen from the pretest results of 57.33 and the posttest results of 84.17. From the two tests seen a significant increase in learning outcomes by using interactive multimedia, especially on human skeleton material.

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| Pretest | Postest | N-gain | Category |
|---------|---------|--------|----------|
| 57,33   | 84,17   | 0,60   | Medium   |

Table 4. Pretest and posttest results in the trial

Based on table 4 it can be seen that the average pretest value is 57.33 while the average posttest value is 84.17. Increased N-gain by 0.60 with the moderate category and it can be said that interactive CD as a learning medium can improve learning outcomes in science learning.