

Light Experiment Media Kit Development For Elementary School Students

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Abstract. This research aims to develop learning media that will aid in scientific learning. We determined that the light trial series is essential based on our needs analysis. The primary goal of this research is to create a media kit for elementary school students to conduct light science experiments. The experimental tool kit and the experiment guide module are included in the media kit. To achieve this goal, we use a 4-D model. The results of the questionnaire from this study showed a 3.86 with an excellent category. The developed light media kit has advantages, including complete, multifunctional, and more practical to use, easy to imitate, and his teachers' and student handbooks.

Keywords: science experiment; light; elementary school; media.

1 Introduction

Science education in elementary schools is critical. Students can learn about natural phenomena by studying science [1]. It is not enough to lecture about science; it must also be taught through direct experiences, such as simple experimental activities [2]. Direct learning experiences in science can provide students with meaningful understanding, skills, and positive attitudes [3].

All parties hope to achieve good learning outcomes. Unfortunately, this expectation is not met in science education [4]. Several studies mention the following causes of students having difficulty learning science: far too many foreign words [5], material that is overly dense [6], students impressed to memorize the material [7], and limited learning media [8]. Without media, teachers will tend to dominate learning, causing it to become monotonous [9].

Experimental kits are one way for educators to support the development of knowledge, skills, and fundamental requirements for delivering science materials, concepts, and information. The experimental kit can clarify the teacher's teaching materials, making it easier for students to understand the teacher's material [10]. Experiment kits also catch students' attention and can pique their interest in science learning [11]. By using the experimental kit, students' ability to understand the concept of the material will be expected to improve because they will be able to directly observe the processes that occur in it [12].

Hands-on practice is emphasized in primary school science education to help students improve their practical skills [13]. Unfortunately, according to our survey, most schools do not have media kits for conducting experiments. This research was conducted to investigate the gap

between expectations and reality. The primary goal of this study is to create a scientific media kit on a light topic for elementary school students.

2 Literature Review

Science is connected to everyday phenomena. Students will benefit from having science introduced to them as early as possible. Science experiments incorporating best practices are among the best options for assisting students in developing knowledge and skills through practical experience.

2.1. Media for Learning

The term media is derived from the Latin medium, which means intermediary. All physical equipment designed to convey information and foster interaction is referred to as learning media [14]. Media use can pique people's interest or action, present information, and provide hints [15].

Although the media can be a valuable tool and information source, it cannot entirely replace the teacher's role. Without the use of media, it is impossible to improve teaching quality. The teacher can advise students on what they should learn, how they should know, and the outcomes of the media used. Media is a tool for achieving teaching goals; it is not a learning goal.

2.2. Science experiment

Science is essentially a method of thinking, researching, and gathering information. There are two significant components in progress and development in science: science as a process and science as a complementary product [16]. Science is a collection of scientific activities or observations of natural occurrences that result in scientific developments and knowledge. Scientific outputs can be expressed in various ways, including facts, concepts, principles, generalizations, theories, laws, and models.

2.3. Elementary School Science Education

Elementary schools are an important part of the national education system in Indonesia, so elementary school is a low-level formal education that shapes students' personalities in the future. It lasts 6 (six) years. Elementary school science education is not only based on the depth of knowledge being taught, but students can meaningfully receive the extent to which the knowledge is being taught. Science learning allows students to understand various events and solve various problems encountered in everyday life. Science education in elementary schools focuses on enhancing the learning process. In this case, students are expected to learn for themselves rather than being told. Science learning stages must be seriously considered and emphasized to students. The predicted learning stages implement an integrative scientific approach in science learning that is consistent with the scientific method [17]. Elementary school science education must be planned because it tends to begin with concrete things, learning as a unified whole, integrated, and manipulative process. Science knowledge is formed in students' minds through observation, collecting data, and reaching conclusions.

3 Method

This study uses an R&D approach to create science experimental media kits. We employ a 4-D model [18] with four phases: define, design, develop, and disseminate. The define phase begins with a need assessment, followed by a review of the elementary science curriculum and determining the media kit's coverage. During the design phase, we propose the layout of the media kit and accompanying modules and validate the expert judgment of the media kit and its modules. Based on expert advice, the media kit and modules were revised and finalized during the development phase. During the dissemination phase, we will test the media kit and its modules on target users in several schools.

3.1. Define phase

We evaluated the requirements of four elementary schools in East and Central Java. We discovered that these schools required a light media kit due to these activities. The school is the subject of our media kit development. We looked over the science curriculum for elementary school to determine the media kit's main features and modules.

3.2. Design phase

Using the data from the previous phase, we created the media kit design and modules. We propose a small light experiment media kit that can hold many simple experiments. Following the applicable curriculum, the developed module emphasizes developing students' scientific skills. The module is designed using an inquiry approach. Figures 1 and 2 show an example of a media kit and its modules. Expert judgment was used to evaluate the initial draft of the media kit and its ancillary modules. To expedite the evaluation process, we used the previous project's evaluation rubric with some adjustments and modifications [19], which essentially uses a 5-Likert scale.



Figure 1. Light experiment media kits

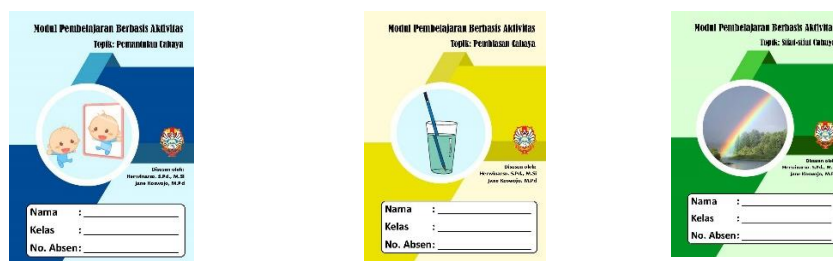


Figure 2. Modules for light experiment kits

3.3. Develop phase

We are revising the media kit and accompanying modules in response to the expert review's recommendations. The appearance of the media kit and the accompanying modules must be changed to reflect the STEM (science, technology, engineering, and math) integration and scientific approach. The developed experimental kit was then put through its paces using the one-shot case study method.

3.4. Disseminate phase

In the dissemination phase, we will register the Intellectual Property Rights of the experimental media kit. Then we also disseminate the results through seminars and socialization of the results to several schools in East Java

4 Result and Discussion

The average student questionnaire results are 3.86 and are included in the excellent category (see table 1). In more detail, 4.35% gave a good response, and 95.65% gave a fantastic response. Table 2 shows the average student questionnaire results for each aspect.

Table 1. descriptive analysis of questionnaire results

N	Mean (Out of 4.00)	Standard deviation	Lowest Score	Highest score
23	3.86	0.35	3.00	4.00

Table 2. the questionnaire analysis of student responses to the created worksheet

Aspect	Student's response	
	Average	Category
All the tools needed to conduct experiments are listed in the student worksheets.	3.87	Strongly agree
The procedure for experimenting is sequential, correct, and precise.	3.74	Strongly agree
The writings and pictures in the student worksheets are well organized.	3.83	Strongly agree
Student worksheets are written in easy-to-understand language.	3.83	Strongly agree
The pictures in the student worksheets follow the written instructions.	3.91	Strongly agree
Student worksheets help me in conducting experiments.	3.91	Strongly agree
Student worksheets help me understand the subject matter	3.83	Strongly agree
The design of the student worksheet display is appealing.	3.91	Strongly agree
Student worksheets are written using language that is difficult to understand	1.09	Disagree

The average result of student responses to the developed media kits and worksheets is 3.86, indicating that the media kits and worksheets can be used in learning. This good response can also be observed using media kits and worksheets during the learning process. Students seemed enthusiastic about doing each experiment. Students are also interested in using the experimental

tools available in the media kit. Learning science using media kits and worksheets can help students in conducting investigations.

The development of this light media kit is an innovative step taken to complement the media kits available in schools. In the development process, the resulting media is expected to have advantages compared to similar existing media. According to the validation and testing results, the benefits of the light kit media over other media kits include a fully developed media kit, multifunction and more practical use, easy to copy, and a teacher and student handbook.

5 Conclusion

The light-topic media kit can be used for educational purposes. The students' questionnaire responses show this, with an average of 3.86 in the excellent category. The developed light topic media kit has the advantages of being complete, multifunctional, and more practical to use, as well as being easy to duplicate and including a teacher and student handbook.

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