

Validity and Practicality Test of Science Comic learning media for Class VI on Waste Processing Material at SDN 8 Pule Trenggalek

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ABSTRACT

This study aims to measure the validity, practicality and effectiveness of science comic media with the material Processing Waste in class IV students at SDN 8 Pule, Pule District, Trenggalek Regency. This research is Development Research by adopting the ADDIE development model which has 5 stages, namely: Analysis, Design, Develop, Implement, and Evaluate. There are 4 validators, 2 from material experts and 2 from media experts. Practicality is measured by analyzing the results of respondents' (students') responses. The respondents in this study were 15 students consisting of 6 female students and 9 male students in class IV of SDN 8 Pule, Pule District, Trenggalek Regency. The effectiveness of learning with science media was analyzed using the N-gain formula. The results of the research show that the science comic media has an average validation value of 76 (Valid), which means it is suitable for use with revisions. The practicality percentage of the science comic media is 97% in preliminary activities, 100% in core activities, 97.2% in closing activities. The N-Gain value is 0.7 (high: 0.07-100) which means that the effectiveness of learning using science comic media is high or very effective, student response is very good (90%). Student learning outcomes in the critical thinking aspect increased from an average score of 30 to an average score of 80. Students looked active, enthusiastic and enthusiastic in answering every question asked by the teacher, and students looked enthusiastic in participating in every learning process.

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1. INTRODUCTION

Waste is leftover material that is unwanted or unused after the end of a process. Waste is defined by humans according to the degree of its use or useful function. In natural processes there is actually no concept of waste, there are only products produced after and during the natural process, for example used goods in the form of drink bottles, pans, pans, glasses, gallons of drinking water, and plastic buckets. Not only from household equipment, but also from building materials such

as used house paint cans, paralon or used road drums. For most people, waste is items that can no longer be used. They think that rubbish is something that must be thrown away, so they often ignore and leave the rubbish behind, without needing to know the other benefits of rubbish. However, for some people, waste is goods that can be used and reused according to their needs[1][2].

They realized that, in fact, waste has other benefits which are certainly very useful. One method of utilization used is by recycling waste. Recycling is the reprocessing of used goods that are no longer useful into goods that can be reused. In general, every item produced from the recycling process has a different function from the original item, before it became waste, in other words there is a change in function. The recycling process carried out, to produce new goods (recycled results), is tailored to needs, the recycling process must also require high creativity, both in terms of art and benefits[3][4].

Science learning at SDN 8 Pule, Pule District, especially material on processing waste, has not shown maximum results. This is due to various things, one of which is that students' motivation to learn to process waste into usable goods is still lacking. This is because the way teachers deliver material tends to be monotonous, less interesting, and teachers still apply a teacher-centered learning model, namely teachers only rely on the lecture method in delivering lesson material. Therefore, a learning model is needed that understands and understands the student's condition.

Referring to the existing problems, efforts are needed to change this less interesting learning. Efforts that can be made to increase the learning motivation of class IV students at SDN 8 Pule, Pule sub-district, Trenggalek district well. One of the efforts used to improve student learning achievement is in learning to process waste into usable goods, with the aim of improving student learning achievement. Students will feel that they have a new, more enjoyable atmosphere in participating in learning, so it is hoped that this can improve student achievement in learning.

Natural science (IPA) is concerned with finding out about nature. Natural science is a translation of the words in English, namely natural science, which means natural science (IPA). Because it is related to nature and science, it means science, so natural science (IPA) or science can be called natural science, science that studies events that occur in nature [5].

In accordance with the learning objectives and nature of science, which can be seen as a product, process and attitude, learning in elementary school must contain these 3 dimensions of science. Learning not only teaches mastery of facts, concepts and principles about nature but also teaches methods of solving problems, trains critical thinking skills and draws conclusions, trains being objective, working together and respecting other people's opinions. A learning model that is suitable for elementary school age children is a learning model that adapts students' learning situations to real life situations in society. Students are given the opportunity to use learning tools and media that exist in their environment and apply them in everyday life. Learning should be carried out through inquiry and action to gain a deep understanding of nature and improve the ability to think, work and behave scientifically [6].

Science learning in schools, especially elementary schools, is expected to be a vehicle for students to learn about themselves and the natural world around them, as well as prospects for further development in applying it in everyday life. This is related to the meaning of Natural Science (IPA) which is related to how to find out about nature systematically. So that science is not only mastery of a collection of knowledge in the form of facts, concepts or principles, but also a process of discovery [7][8].

An important aspect that teachers must pay attention to in implementing science learning in elementary schools is actively involving students in learning to develop their thinking abilities. Science learning begins by paying attention to students' initial conceptions/knowledge that are relevant to what will be studied. Furthermore, learning activities are designed through various real activities with nature. This real experience activity with nature can be carried out in the classroom or laboratory with learning aids or carried out directly in the open air. Through real activities with nature, students can develop process skills and scientific attitudes such as observing, trying, concluding the results of activities and communicating the conclusions of their activities. Science learning activities are also designed to provide as many opportunities for students as possible to ask questions.

Learning media is anything that can be used to convey learning information to students and can stimulate the students' thoughts, feelings, attention and will so that it can encourage the learning process. Learning media is also anything that can be used to convey information in the teaching and learning process so that it can stimulate students' attention and interest in learning. Media has a very important role in education as a means or device that functions as an intermediary or channel in a communication process between the communicator and the communicant. Media is any tool that can be used as a message channel to achieve teaching goals where media can display information

through sound, images, movement and color, both naturally and manipulated, thus helping teachers to create a learning atmosphere that is more lively, not monotonous. and not boring.

2. METHOD

The type of research used is development research. Development research is the process of developing or perfecting new products. Media development uses R & D (Research and development) by adopting the ADDIE development model which has 5 development stages, namely: Analysis, Design, Develop, Implement, and Evaluate[9],[10],[11].

Research data collection uses four techniques, namely observation, tests, documentation and validation questionnaires. Observations are carried out to observe the condition of the school, classes, students and teaching materials to see the school's needs for learning media. Validation questionnaires are used by expert validators to measure the validity of this science comic media using percentage techniques. The practicality of comic media was measured using a student response questionnaire. The test technique uses pre-test and post-test results to measure student learning completeness and the effectiveness of science comic media. The formula below is used to analyze the validity of IPA comic media [12][13]:

$$\text{Validity Value} = \frac{\text{Score obtained}}{\text{maximum score}} \times 100\%$$

The combined validity formula of 4 validators is as follows:

$$V = \frac{V_1 + V_2 + V_3 + V_4}{4} \dots\dots [14] [15]$$

- V = combined validity
- V_1 = validity value from validator 1
- V_2 = validity value from validator 2
- V_3 = validity value from validator 3
- V_4 = validity value from validator 4

Angka	Kategori Kevalidan
85,1% - 100%	Very valid or used without revision.
70,1% - 85%	Fairly valid or usable with minor revisions.
50,1% - 70%	Not valid or recommended not to be used because it needs major revision.
0,1% - 50%	Invalid or may not be used.

Tabel 1. Validity Range.

Media Practicality

The practicality of Comic media is analyzed using the following formula [16][17][18]:

$$P = \frac{\text{Score obtained}}{\text{maximum score}} \times 100\%$$

Practical Criteria are analyzed based on the criteria in table 2 as follows:

Table 2. Category of practicality of IPA Comic Media.

Number	Categori of practicality
85,1% - 100%	Very practical or used without revision
70,1% - 85%	Quite practical or usable with minor revisions
50,1% - 70%	It is not practical or is recommended not to be used because it requires major revisions
0,1% - 50%	Impractical or should not be used

3. RESULTS AND DISCUSSION

This development research is to test the validity, practicality and effectiveness of a learning media created by researchers. This research produces the final product in the form of science comic media, waste processing material. Utilization of used goods in learning to improve the critical thinking

skills of Class IV elementary school students. Media development uses the ADDIE R&D (Research and development) development model which has 5 development stages, namely: Analysis, Design, Develop, Implement, and Evaluate.

Before carrying out development research, researchers first carry out an initial test (Pre test) on students. The pre-test is carried out by giving 15 questions. The test results showed that only 4 students were able to get a score above the Minimum Completion Qualification (KKM). In this initial test the average score obtained was 55. The results of the initial test are as follows:

Table 3. Analysis of Pre Test Results.

No	Description	Total
1	Total students(Respondents)	15
2	Number of students who have completed their studies.	4
3	Number of students who have not yet completed.	11
4	Average student score	55
5	Completion percentage	30%

Media validation consists of several aspects, including: (1) material, (2) language and (3) graphics. These 3 aspects of discussion are then summarized into several statements that will be observed by validators when testing the media. The statement consists of 10 questions namely; (1) the material used is in accordance with the learning objectives, (2) the material presented is complete, (3) the material presented is systematic, (4) the material is easy to understand, (5) the material is in accordance with user needs, (6) the use of language is appropriate ; (7) The language used is effective, (8) the language used does not create double meanings, (9) the language used is effective, (10) the design and appearance of the comic is attractive to students, (11) the suitability of the type and size of the letters to the characteristics of the participants students, (12) the arrangement of text in comics is easy to understand, (13) the spacing and punctuation used are correct, (14) the illustrations used in the media are clear, (15) the placement of word balloons is correct, (16) the media is easy to apply, (17) illustrations used in accordance with material, (18) the color contrast of the letters with the background of the word balloons is appropriate, (19) the media can be used in online, hybrid and offline classes, and lastly, (20) the colors used are harmonious.

The results of the IPA Comic Media validation are as follows: a score of 76% in the material aspect, 80% in the linguistic aspect and 72.1% in the graphic aspect. These three aspects produce an average validation percentage of 76%. [19] wrote that media validation criteria have 4 levels of validity where a value of 0-39% falls into the invalid category, a value of 40%-55% falls into the less valid category, a value of 65%-75% falls into the quite valid category and the value 76%-100% is a valid criterion in a medium. So that the comic media developed by researchers after going through validation got a score of 76% into the valid category and can be used in teaching and learning activities in the classroom.

Table 5. Media Validation.

No	Aspects	Average Validation Aspects (%)	Avg Validation	Validity Level
1	Material Aspects	76	76	Valid
2	Linguistic Aspects	80		
3	Graphic Aspects	72,1		

Based on the table, it shows that the results of media validation by validators on the material aspect show an average of 76%. The linguistic aspect of comic media shows an average of 80%. The graphic aspect of the media shows an average of 72.1%, where from the three aspects, a validation average of 76% is obtained, which is within the valid level of validity.

Tabel 6. Aspek keefektifan media

Indicator	Activity	Mean	N-gain	Categori N-gain
Interpretasi (<i>Interpretation</i>)	Pre-Test	80	4,4	High category
	Post-Test	88		
Analisis (<i>analyses</i>)	Pre-Test	40	1,3	Higt Categori
	Post-Test	78		
Evaluasi	Pre-Test	20	1,05	Hight categori

Indicator	Activity	Mean	N-gain	Categori N-gain
(<i>evaluation</i>)	Post-Test	84		
Inferensi	Pre-Test	20	0,85	High category
(<i>inference</i>)	Post-Test	68		
Eksplanasi	Pre-Test	20	1,05	High category
(<i>explanation</i>)	Post-Test	84		
Regulasi Diri	Pre-Test	20	1,1	
(<i>self-Regulation</i>)	Post-Test	88		

Data on media practicality results were obtained from observations made by observers during the teaching and learning process. The results of the observations are described in table 7 below:

Table 7. Practicality of science comic media.

No	Learning Activities	Th meeting (%)			Presentase %	Categori
		1	2	3		
1	Introduction	100	91	100	97	Very Practical
2	Main Activities	100	100	100	100	Very Practical
3	Conclusion	100	98,3	93	97,2	Very Practical

Based on the table above, it shows that the practicality of the media that was observed by the observer in the preliminary activities at meetings 1, 2 and 3 resulted in a percentage in the preliminary activities of 97%, 100% in the core activities and in the closing activities it resulted in a score of 97.2%, where It can be concluded that the observation results show that practical media can be used.

Students take tests at the beginning and at the end of the teaching and learning process where the tests have been adjusted to indicators of critical thinking abilities. From the pretest and posttest score data that has been obtained, the N-gain value is calculated to determine the effectiveness of using comic media in learning. N-gain is calculated using the formula below [20][21].

$$N \text{ Gain} = \frac{\text{Posttest score} - \text{Pretest score}}{\text{Ideal score} - \text{Pretest score}}$$

Table 8. Pre-test scores, Post-test scores, and N Gain.

Komponen	Pre-test scores	Post-test scores	N-Gain	Categori
the highest score	55	100		
lowest value	0	20	0,7	high
Average	29,6	82,88		

Table 8 shows that in the pre-test, students got the lowest score of 0 and the highest score obtained by students was 57. Post-test scores show that the lowest score obtained in class was 20 and the highest score obtained by students was 100. Data What was obtained was then processed using the N-gain formula, which then from the calculations carried out, resulted in an N-gain of 0.7 which is included in the high N-gain category.

Following are the Average Critical Thinking Ability Test Scores.

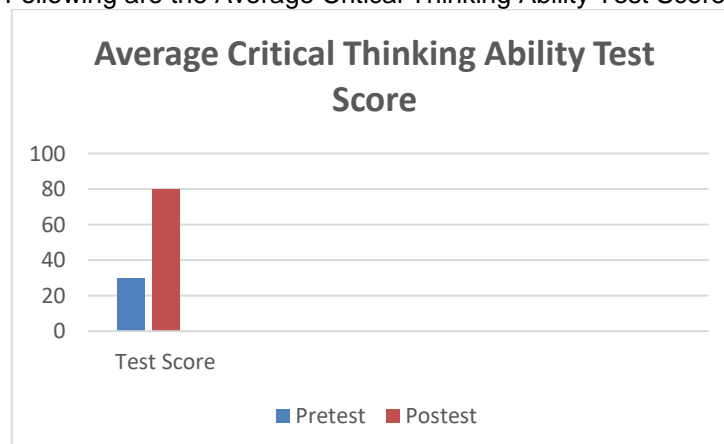


Figure 1. Increase in average pre-test and post-test scores on the critical thinking ability aspect for class IV science subjects, waste processing material.

In the bar diagram image above, the average critical thinking ability test scores of students after being given media in the form of Video Comics in the science subject material on processing waste experienced a good impact, with an average percentage of student scores of 90%. This means that waste management comic media plays a good role in improving students' critical thinking skills.

At the end of the lesson, students are then given a student response questionnaire at the end of the science learning hour to process waste into finished or used goods to find out how students respond to video media in learning to process waste into finished goods as an additional learning aid used by the teacher. The questionnaire that was given produced the following data:

Table 9. Percentage of student responses.

No	Aspect	Response Percentage(%)	Category
1	Students' interest in media	92,9	Very Good
2	Material	90,6	Very Good
3	Graphics and Display	91,67	Very Good
4	Implementability	87,5	Very Good
	The average student response	90	Very Good

The table above describes the average percentage of students' responses to aspects of the media where students' interest in the media shows a response of 92.9% which falls into the very good category. In the material aspect, a percentage of 90.6% is included in the very good category, then in the graphic and display aspects it shows a percentage of 91.6% which is included in the very good category, and implementation shows a percentage of 87.5%, which is included in the category indication. Very good. All aspects included show that the average student response to the media produces a score of 90%, which is a very good response category.

4. CONCLUSION

Based on the data obtained from the research results and discussions described in the previous chapter, the following conclusions can be drawn:

- (1). The results of the research show that the science comic media has an average validation value of 76 (Valid), which means it is suitable for use with revisions. The practicality percentage of the science comic media is 97% in preliminary activities, 100% in core activities, 97.2% in closing activities. The N-Gain value is 0.7 (high: 0.07-100) which means that the effectiveness of learning using science comic media is high or very effective, student response is very good (90%). Student learning outcomes in the critical thinking aspect increased from an average score of 30 to an average score of 80.
- (2). Students appear active, enthusiastic and enthusiastic in answering every question asked by the teacher, and students appear enthusiastic in participating in every learning process.

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