
Utilization Of Used Goods As A Biomath Learning Media

Yoel Octobe Purba¹, Julius Martunas Sihite², Hotmida Sinaga³, Kevin William Andri Siahaan⁴,
Widia Yunita⁵

^{1,2,3,4} Universitas HKBP Nommensen Pematangsiantar

⁵ Sekolah Tinggi Agama Islam Hubbulwathan Duri

Coressponding Author. E-mail:

yoeloctobe@gmail.com

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Abstract

Utilization of used goods in the environment can be used as a learning medium to trigger the creativity of students in learning and learning activities. Learning media is very influential in the implementation of the learning process, it is because students are more sensitive to see clearly than the learning material. This study aims to describe: 1) Biomath learning media obtained from used goods in the environment; 2) Simple learning media as a way to improve students' understanding of the lesson; 3) Utilization of used goods as a form of environmental care. This research was conducted in 2 cycles, each cycle consisting of four stages, namely: (1) planning, (2) implementing actions, (3) observation, and (4) reflection. The type of data collected is qualitative data in the form of observations of teacher and student activities during the teaching and learning process, and quantitative data in the form of student learning outcomes through the final evaluation test of the action. The results of this research are expected to be used by educators as a reference for obtaining learning media from used goods in the surrounding environment, so as to create varied learning with learning media that builds enthusiasm for learning and creates learning comfort to create those who can explore themselves with various things. new close to his world.

Keywords: *Used Goods; Learning Media; Biology; Mathematics*

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INTRODUCTION

The use of used goods and simple equipment as media is nothing new in the world of education. Before modern media came into existence, teachers had used various media and their own props to explain their subject matter. The previous teachers may have more creativity because they are forced by circumstances that are still completely limited. They have to work hard so that their students can learn and absorb the subject matter as much as possible. With the advent of modern technology media, various problems that have not been solved so far have been able to be solved and allow any subject to be taught and explained as well as possible.

However, many teachers in big cities have been complacent with advances in technology used in education. Modern media have made it easier for them to solve various problems in the teaching and learning process. When under certain circumstances they have to be away from the media they become confused because of dependence on the media. They have forgotten the media that can be developed from simple materials around them. As a result they become less sensitive to the potential around their environment. So that the teacher does not have many ideas about what media should be made to make it easier for students to learn, the teacher also does not understand what materials should be used to make the desired media so that the teacher does not have enough skills to make a media. Actually, a teacher's creativity can be seen when he tries to use simple materials that can be used as a medium in his subjects.

In essence, used goods are materials that are wasted from various sources resulting from human activities and natural processes that have no economic value, and can even have a negative value because handling them, either to dispose of them or to clean them requires considerable costs. (Hidayati, 2016). Many used goods are not handled further, as a result it affects the damaged or critical environmental conditions used as a dumping ground so that it does not function optimally (Laila & Sahari, 2016).

Whereas the management of used goods from the environment can be used as a very useful learning medium to trigger the creativity of students in learning and learning activities. Learning biometh (biology and mathematics) requires students to be creative and innovative in utilizing natural and human resources. This

creative and innovative concept should be seen in the activities carried out in the classroom and outside the classroom. Stimulating creativity from an early age is the key in getting innovative ideas later so that curiosity and enthusiasm in learning will emerge in the future Anggraeni, (2008); Flores et al., (2016).

In implementing the 2013 curriculum, the learning approach that is considered the most appropriate is the contextual approach (Pahrudin, 2019). Contextual approach is a concept that helps educators relate content / subject matter according to the world of education (Siahaan et al., 2021). With a contextual approach, it will motivate students in the relationship between knowledge and application in everyday life (Faishol et al., 2021). Therefore, in BIOMATH learning, the material will be more easily absorbed by students if the learning media uses concrete objects around them that they often see Wahyuni, (2010);Anas, (2014). For example in the concept of productivity, students can be invited to directly practice or make a product from used goods that is useful to help students understand the concept of learning materials and hone students in generating creative ideas from what they see Lestari, (2018); Desimarlina et al., (2021).

Harahap et al.,(2019); Al-Tabany, (2017); Ariyana et al., (2018) states that with the availability of media as teaching materials that attract the attention of students and are fun, it will be easier for students to understand the material presented by educators in class. The learning process in the classroom must be designed to be more attractive so that it can increase student interest in developing student skills (Al Masjid et al., 2019).

Therefore, the selection of an appropriate learning media according to the characteristics of learning, especially BIOMATH (Biology and Mathematics) is important so that the learning process runs smoothly and as expected.

METHOD

In accordance with the problem studied, this research is a classroom action research, the type of research is participatory action research where the researcher is directly involved in the research process from the beginning to the end of the research. The approach used is a qualitative approach, namely research procedures that produce written and oral data. from the activity or behavior of the subject observed during the learning process (Sugiyono,

2016). The plot refers to the Kemmis and Mc Taggart model which consists of planning, action, observation and reflection activities (Wekke, 2020). The implementation of the action is carried out in two cycles. Each cycle consists of four phases as follows: (1) Action planning, (2) Action implementation, (3) Observation, and (4) Analysis and Reflection.

In carrying out this research there are 5 stages of implementation. The implementation stages are: stage I (observation), stage II (socialization), stage III (tools and materials), stage IV (implementation/practice), stage IV (evaluation). The explanations for each stage are: Phase I contains observations made by researchers in observing school locations, school conditions, time allocation for Biology and Mathematics subjects. Phase II is about the introduction of materials used in the manufacture of viral structures in biology and mathematics subjects. Stage III is about the tools and materials used and their use. In biology learning media, the following tools and materials are needed:

- 1 Mizone used bottle fruit, as a tail sheath for bacteriophage virus with intact pattern.
- 2 2 bottles of narmada, as the capsid (head) of the bacteriophage virus is cut first, take the 2 upper sides of the two bottles about 10 cm and 1 the bottom side of the bottle as part of the structure of the bacteriophage virus needle prick. The two top sides of the bottle are held together and glued together. The bottom side of the bottle will be taped to the very bottom as an awl.
- 3 1 red ribbon, as a bacteriophage virus nucleic acid (DNA) structure.
- 4 1 sheet of cardboard, made 2 circle patterns. The first pattern is to form a complete circle that functions as the basic plate of the bacteriophage virus structure and the second pattern forms a circle pattern with holes as the neck structure of the bacteriophage virus.
- 5 4 pieces of wire with a length of 30 cm as the tail fibers of the bacteriophage virus. 1 piece of wax is used to heat the wire so that it is easy to form tail fibers by stabbed into the mizone bottle as a bacteriophage tail sheath
- 6 Matches to light candles.
- 7 Scissors, tools for cutting materials and patterns
- 8 Cutter, a tool for cutting materials and patterns
- 9 Fox glue, as an adhesive between patterns to form a bacteriophage virus structure. Pliers, a tool to cut and form a pattern of fibers.

2. In mathematics lessons, tools and materials are needed as well as the following manufacturing steps:

- a) Cardboard
- b) Cardboard box
- c) plywood
- d) Double Tip
- e) Origami Paper/Colored Fabric
- f) Calendar Paper

3. While the tools needed in making this media include:

- a Ruler
- b) Pencil
- c) Whiteboard marker
- d) Scissors
- e) Colored pencils

4. Manufacturing Procedure

The procedure for making learning media “The Rainbow Pascal’s Triangle” these are as follows:

- a) Prepare all needs including tools and materials.
- b) Measure the cardboard as needed while at the same time describing the pattern making it easier for the cutting process.

- c) Cut the cardboard to size with scissors.
- d) Then coat the cardboard with plywood according to its size
- e) Make a triangular design by measuring the parts of the triangle that are equal to each other with a side length of 6 cm.
- f) Cut/cut origami paper into small triangles, for cardboard measuring 0.3 mm.
- g) Then set aside the cut triangles.
- h) Glue the cut triangles using a double tip on the cardboard pieces.
- i) Putting together 2 sizes of cardboard by stacking them and then glueing them together.
- j) Numbering the numbers according to the concept of the Pascal Triangle (Pascal's triangle)).
- k) Props ready to use.

Phase IV on the demonstration method of implementation. Reviewing material on the structure of bacteriophage viruses in biology and Pascal's triangle in mathematics to students. Students are divided into three groups with 4 people each and accompanied by 1 tutor and given basic directions in making patterns. Stage V is about evaluation, a questionnaire sheet is given to students to find out the interest in developing creativity in the use of used goods as learning media.

DATA ANALYSIS

Data analysis was carried out to find out the extent to which students' interest in using used goods as learning media for Biology on virus material and Mathematics on Pascal's triangle material was shown through the results of questionnaires that had been filled out by students and calculated using the Linkert scale with intervals with scale categories according to Susilo et al., (2013); Retnawati, (2015); Widagdo et al., (2021) as follows:

Table 1. Data Analysis

Scale	Category
1,00-1,80	Not very good

1,81-2,60	Not good
2,61-3,40	Deficient
3,41-4,20	Good
4,21-5,00	Very Good

RESULTS AND DISCUSSION

The results of used goods that are used as learning media in biology with material on the structure of bacteriophage viruses are obtained as follows.



Figure 1. Bacteriophage virus biology learning media.

The results of used goods that are used as learning media in mathematics with Pascal's triangle structure material are obtained as follows.



Figure 2. Pascal . triangle mathematics learning media

The results of the learning media are directly used by students. Where with the use of bacteriophage virus learning media, students are easier to recognize the parts and shapes of the bacteriophage itself. Meanwhile, in Pascal's

triangle with the media that has been made by students, it is easier to understand in a simple way as follows in the explanation:

The way is that the first line onwards, starting and ending with a 1 sign, already has rules.

For the 3rd line, it is expressed as "1-2-1". How to get it by adding up $1 + 1 = 2$, because the number in row 2 is only two, then the number increases by only one, so a row also depends on the previous row.

The 4th line, denoted by "1-3-3-1". How to get it, at the beginning and at the end you have to use 1, Then where does "3-3-3" come from? It is obtained from "1 (the beginning) + 2 = 3" and "1 (the end) + 2 = 3", because the one in the middle is two, all are added by two, then the beginning & end must be 1, then insert the number one at the beginning and at the end, it produces the number "1-3-3-1".

The 5th row, the numbers are "1-4-6-4-1". How to get it is obtained from the addition of "1 + 3" and "3 + 3" and "3 + 1", put together to become "4-6-4" plus one at the beginning and end, so "1-4-6-4-1".

Row 6 and so on, the same as the previous rows. What's unique about Pascal's triangle is that if each row is added up, the result is a number 2 to the power of n with n consecutively from 0. The first row is 20. The second row is 21. The third row is 22. And so on.

- a) $1 = 20$
- b) $1 + 1 = 21$
- c) $1 + 2 + 1 = 22$
- d) $1 + 3 + 3 + 1 = 23$
- e) $1 + 4 + 6 + 4 + 1 = 24$
- f) $1 + 5 + 10 + 10 + 5 + 1 = 25$
- g) $1 + 6 + 15 + 20 + 15 + 6 + 1 = 26$

The relationship between Pascal's triangle and the exponent of two algebraic forms for addition is described as follows.

$$(a + b)^2 = 1a^2 + 2ab + b^2$$

$$(a + b)^3 = 1a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a + b)^4 = 1a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$$

$$(a + b)^5 = 1a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$$

After conducting an evaluation with the learning media that has been successfully created, Then the results of the post test were analyzed using the linkert scale and calculated using the help of Microsoft Office Excel to determine the extent of the interest of students in using used goods as learning media. showing the interest of students in using used goods as a medium for learning biology, especially on virus material, is shown through the results of a post test on a scale of 4.00 with the category "Good" which means that making learning media from used goods is good to do so that it can increase the interest and knowledge of participants educate. While the products produced in research activities are in the form of biology learning media, namely the structure of the "bacteriophage" virus as shown in Figure 1 and Figure 2, Pascal's triangle.

The research was conducted to educate students in recycling used goods that they often encounter in the surrounding environment in the form of plastic bottles that have no value into a learning media that has academic, practical and economic value. This research aims to foster interest so that students are able to develop creativity and participate in helping to reduce the amount of waste production in the environment and help preserve nature. (Raisah, 2018).

The willingness of educators to use used goods as BIOMATH learning media can improve the quality of learning so that students gain experience in learning BIOMATH (Desimarlina et al., 2021), because BIOMATH learning really needs media in the learning process. The creativity of educators in recycling used goods into a learning medium can not only be made on viral learning materials, Pascal's triangle, but can also be applied to other subject matter to help students understand the learning process.

Based on the data obtained from the observations of teacher and student activities, then an evaluation is carried out to determine

the impact of the actions given. The results of the second cycle of action evaluation are:

1. Students' motivation in learning activities is increasing, this can be seen when they do demonstrations with used goods and students are also more active in learning.

2. The material has been mastered by the teacher (researcher).

3. Students already understand / are able to conclude the material according to the learning objectives.

4. The teacher gives enough time for students to ask things that have not been understood so that students can create their own.

CONCLUSION

The conclusion obtained from the research on the use of used goods as a medium for learning biology and mathematics is that the use of used goods as a medium for learning biology, material on viruses and mathematics, is one of the additional alternative learning media to help students understand at the school level. Educate students in recycling used goods in the form of plastic waste to help reduce the amount of waste production and help preserve nature. The results showed that there was an interest from students in using used goods as science learning media, especially on virus material, which was shown through the results of a 4.00 scale post test with the "Good" category, which means that making learning media from used goods is good to do so that it can increase interest and student knowledge.

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