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The Development of Physics Props Made from Second-Hand Materials as a form of Care for the Environment

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Abstract: Physical teaching aids made of used material as learning media is still very rarely used. The researcher took the title "The Development Of Physics Props Made From Second-Hand materials materials As A Form Of Care For The Environment". This study aims to produce Physical Teaching Aids made of used material as a manifestation of Environmental Concern On Junior High School/Islamic Junior High School Student of West Coastal District and find out the student's response to the attractiveness of the Physical Teaching Aids product made of used material as a manifestation of Environmental Concern On Junior High School/Islamic Junior High School Students of West Coastal District. This study uses the Research and Development (R&D) method conducted in six Junior High School/Islamic Junior High School. The development procedure follows the Borg and Gall procedure which can be done more simply, namely the 10 main steps, but the researchers only limited the procedure to 7 steps in this study. Data collection techniques in this study used questionnaires, interviews, and documentation. Based on the results of validation by media and material expert validators, the final product produced has met the eligibility criteria, the media experts by 90%, the material experts by 95% and in the field trials 91%. So that it can be concluded that the product is feasible to be used as a physics learning media.

1. Introduction

Changes the paradigm of College in order to answer the needs of the professional workforce which are based on academic ability and experience in the field of specific skills and positive attitudes towards the profession in responsibility is a necessity all parties [1]. The efforts of Learn IPA concepts to students in order to be active, and strive to do inventions in the concept of the IPA is to give teachers initial stages that motivate students in learning [2]. As there are props made from second-hand as a form of care for the environment is intended so that learners can be more active in learning and more attentive to the environment.

Human activities that affect the environment much at all without concern for the consequences [3]. Environmental damage, natural disasters, and the current air temperature changes have occurred in the world and human life. The case of environmental damage and the number of disasters that occur due to no other human activity that does not care about the preservation of the environment. The inability of human beings in developing social value system and lifestyle that is aligned and balanced will cause damage to the environment. Education is one of the containers to be able to cope with various environmental problems because it can improve the quality of human resources. Attitude and behavior of humans on the environment can be formed through a process of positive education. Education will also provide knowledge, awareness, and love for a person to preserve the environment [4].

The difficulty in studying Physics in learners, one contributing factor posed by educators because the physics lessons are usually presented to learners in concepts that are so abstract and complex, giving rise to difficulties serious. Therefore it needs media which can facilitate learning, learners understand learning as props [5, 6]. Props are one of the success factors in the process of teaching and learning. The benefits of the other props is one method that can be markedly Stimulate interest students so can still
concentrate on the lesson. "science lesson requires the combination in the teaching and learning process by using a very simple props that correspond to the child's intellect, then any lessons with easy to understand" [7].

The use of appropriate learning media being able to attract the attention of students as well as make it easier for students to understand the material. In General, physical science discusses the symptoms of dust on everyday life as well as the phenomena that occur in the universe [8]. Character education efforts is designed and carried out systematically to instil the values of learner behaviour associated with God, ourselves, our fellow man, environment, and nationality that is embodied in the minds, attitudes, feelings, words, and deeds based on religious norms, law, manners, culture, and customs [9].

The distinction makes learning as a process of education requires strategy, methods, models, and props that are diverse so that learners can master the material well and deep [10]. In this research, the props that are used will be modified by giving background on the design of the sticker contains the verses of the Qur'an that are present in the materials used. The making of the props is very easy and also the researchers here to provide assistance with a User manual in order to make the students more easily at the time of making the props.

Learning to use the module implementing the learning strategies of students active [1]. Because in the process of the lesson, students no longer act as a listener and noted teacher lectures, but they are active learners, although in principle modules are individual yet at any given moment or the tasks the students are required to working together in groups [11]. User manual or modules are expected to make the learners will understand more tools and materials used in the manufacture of props.

Sometimes as a physical educator you plan and select activities for your students that you think will motivate them to try again, or to make them laugh, or to make them feel good about participating, and then in your lesson, you realize that your exciting new activity is a "big yawn" [12]. A youth's social growth could and should compare favorably with the progress which he makes intellectually and physically [13]. Input from teachers is a necessity for language learning. More specifically, however, learners need input that has been modified to make it comprehensible to them. This does not mean that each word must be understood by the learner. Rather, the changes in the input should demonstrate the linguistic options that are available to the learner and should also highlight differences between the learner's way of expressing a message and the way that the message can conventionally be expressed in the second language [14].

As for simple props made, namely in the form of LCD, Virtual Reality, HK, Paskal, thermometer, studied the effect of the temperature [15] and a simple magnifying glass. The props made with environmentally friendly materials or materials originating from the second-hand, such as cardboard, styrofoam, bottles and more. With the use of these materials is intended so that learners can better safeguard the environment by making use of the environment. General environmental action to meet the goals at the global and local level such as on climate change [16].

Around them in order to minimize damage to the environment, as well as on the creation of props these learners do not need to need a lot of funds and friendly environment. Foster a sense of environmental concern is indeed required a long process and it is not easy to do, simply because the matter in the absence of actions have no effect. With the props as it expected the learners can develop the pedagogical aspects, namely to develop attitudes and skills by interacting with the surrounding natural environment, can be used for students of all levels of development intellectual property, and can be a source of motivation in learning of the child [17].

Therefore, the presence of products made from second-hand props as a form of care for the environment is expected students can more easily understand the instruction. With the presence of some of the advantages of this product. As for an advantage of Physics Props products made from Second-hand as a form of care for the environment are: 1) props are easily made with environmentally friendly materials; 2) props can be made by learners as attractive as possible to the design of each learner; 3) the existence of user manual that can help learners to better understand more ways of making the props; 4) Learning Media Development props made from second-hand it can minimize the limited infrastructure in the learning process; 5) this product can be used as an additional learning resources for learners; 6) products able to experience directly to learners; 7) products can maximize learners based on learning styles. The excellence of the obtained results is 1 product) generated the development Of Physics Props
Made From Second-Hand materials materials as a form of care for the environment; 2 learning media Products) in the form of the development Of Physics Props Made From Second-Hand materials as a form of care for the environment has 90% of the media quality (very decent) according to experts the media and 95% (very decent) according to expert mater; 3) learner Response toward the attractiveness media learning in the form of the development Of Physics Props Made From Second-Hand materials as a form of care for the environment has revealed a very interesting interpretation of the criteria with a score of 91% in field trials.

2. Methods
Research and development are done in six school level of SMP/MTsN at Krui region, district of Pesisir Barat i.e SMPN 1 Pesisir Tengah, SMPN 2 Pesisir Tengah, SMPN 3 Pesisir Tengah, SMPN 1 Way Krui, MTs. NU Krui, dan MTs Muhammadiyah Krui.

The research was implemented starting preparation phase the preparation phase to the implementation on the development in the form Of Physics Props Made From Second-Hand materials as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat, class VIII semester II (two) started the semester academic year numbered 2018/2019.

The approach and method of research-based development of instructional media development research design by Borg and Gall. The resulting product is in the form Of Physics Props Made From Second-Hand materials as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat. As for product development carried out in this study only to produce the product revision level, namely in the form Of Physics Props Made From Second-Hand materials as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat. So it does not come to the trial phase and the production of mass consumption products. To arrive at the stage of trial usage and mass-production products can be done on the research next.

The first step before doing the development of physics props products made from second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat is a preliminary study. Preliminary research in the form of observation early in the learning activities conducted with allot of question form to learners as well as to interview and question form for educators in January 2018. Researchers use model development, Borg and Gall. Borg and Gall suggested there were 10 steps of research and development to do but in this study, the researchers limited the stride up the steps to the seven course due to limitations of time, effort and cost required. As the following chart:

![Diagram](image)

**Figure 1** Measures of research and development

The potential in research and development is at the six schools rank 228/MTsN at Krui region, district of Pesisir Barat i.e. SMPN 1 Pesisir Tengah, SMPN 2 Pesisir Tengah, SMPN 3 Pesisir Tengah, SMPN 1 Way Krui, MTs. NU Krui, dan MTs Muhammadiyah Krui laboratory facilities.
Figure 2 The potential and problems

Once you’ve found a potential problem and a complete and clear then the next stage namely collecting reference sources which support the "The Development Of Physics Props Made From Second-Hand materials To Infuse The Characters Care For The Environment On The Learners". The source stemming from journals, books, and the internet. Then the needs analysis from the data we’ve collected i.e. schools already have potentially underused in both as well as by analyzing the material to be delivered to learners with imparting caring environment exist i.e. as follows:

Figure 3 Chart Analysis Needs

After the requirements analysis, then do the draft media, namely:

Figure 4 Chart Design Media
After the initial product design, then the product should be referred to a team of experts consisting of expert material, media expert and science of teaching. Experts examine the material aspects of the presence of the material in the form of the suitability of the material to the curriculum (content standards), truth, adequacy, and accuracy of the content of the product. Media experts examine a rule accuracy animation and display module with the characteristics of the material as well as the suitability of the design with a level of age learners. After the initial product is already validated by experts, then it can be known to lack of props and then do the initial revisions.

The initial revision was done then validated again by the team of experts to find out the feasibility of props and give you the question form on the learners about the response to the attractiveness props. After product design validated by expert content, media expert and teacher of SMP/MTsN then known the advantages and disadvantages of the props. The shortage is then improved to produce better products and effective. Product trials with trials of products is an important part in the development of research conducted after the design of the finished product. Product trials are meant to gather data that can be used as a basis to set the degree of effectiveness, efficiency, and appeal of products produced. To test your product done by small groups, test and field trials. Later revisions of the product in accordance with the advice of the experts. Data collection instruments use the question form were analyzed using Likert scale 1-5.

3. Results
This research was conducted in six school-level 228/MTsN at Krui region, district of Pesisir Barat i.e. SMPN 1 Pesisir Tengah, SMPN 2 Pesisir Tengah, SMPN 3 Pesisir Tengah, SMPN 1 Way Krui, MTs. NU Krui, dan MTs Muhammadiyah Krui. The school's sixth has good potential with the availability of the lab, the students are already using props, but still, lack of media of instruction, especially in the fewer props vary.

The results of this research is on the development of products in the form Of Physics Props Made From Second-Hand materials as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat, as well as knowing the judgment of experts (material and media), and knowing the response attractiveness on learners of product produced. In this study researchers use research and development model by adapting the method R&D Borg and Gall that have been modified by Sugiyono from stage 1 to stage 7. In research and development conducted resulting in a product of physics learning media props made from second-hand materials as a form of care for the environment on learners of SMP/MTsN District on the Pesisir Barat.

The initial stages in initial product planning are observing schools. The result of the observation that it is known that he hasn't done media learning in the form Of Physics Props Made From Second-Hand materials as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat in the learning process. The first step in the manufacture of products made of physics props second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat with finding material and props as appropriate for use by learners. The product is expected to be the basis in developing physics-based props products second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat. Physics props made from second-hand as a form of care for the environment on learner SMP/MTsN District is one of the Pesisir Barat media learning educators that can be used in carrying out the activity of learning and learners can more easily understand the concept of learning well.

a. The results of product design
Based on the data and the results of pra research or observation field. Then the product specifications that were developed in the form of physics props products made from second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat that can help educators and learners in the learning process.

The making of the props using tools and materials that are simple, inexpensive, and easily obtained in the surrounding environment as a medium of learning physics in the form of props made from second-hand to infuse the characters care about environment against learners.
b. Feasibility Models

After successfully developed products is the validation of the product. Validation of product development Of Physics Props Made From Second-Hand materials as a form of care for the environment On Learner SMP/MTsN District on the Pesisir Barat it's validated by several professors who are in Lampung and Raden Intan UIN several teachers at the school SMP/MTsN District on the Pesisir Barat by using reference test eligibility. In the early stages of product design validation in advance to the team of experts comprising 4 material expert and two media experts.

1) validation of Expert Material

Expert validation material done by the now fill the assessment on each aspect of the assessment consisted of 4 aspects; (1) the appropriateness of the content, (2) the suitability of the material, (3) implementation, (4) linguistics. The now filled by 3 expert material. Here are presented the results of the validation of the product by experts of material phase 1 and 2.

![Figure 5](image1)

**Figure 5** The graph of the results of the Expert Assessment material

Based on the above chart, the highest to lowest feasibility aspects derived from the linguistic aspect of the start with a score of 90%, implementation with a score of 90%, the suitability of the material with a score of 86%, and the appropriateness of the content with a score of 84%. However, all these aspects are already entered into the range value is well worth it so that it is no longer needs to be fixed and ready to be tested at school. The difference in percentage of the results of stage 1 and 2 because the validator assumes that the product development Of Physics Props Made From Second-Hand materials as a form of care for the environment On Learner SMP/MTsN District on the Pesisir Barat, there are still shortcomings and needs to be Plus so that product development Of Physics Props Made From Second-Hand materials as a form of care for the environment On Learner SMP/MTsN District on the Pesisir Barat will look more attractive.

2) validation of Media experts

Products are made and then validated by the validator media expert. As for the aspects that are validated by the media is the physical aspect of the display props, the safety of use, creativity, understanding of concepts, efficient design, props, props, and function attractive props. Here are presented the results of the validation of the product by experts of material phase 1 and 2.

![Figure 6](image2)

**Figure 6** The graph of the results of the assessment of the media expert

Based on the above chart, the highest to lowest feasibility aspects derived from the physical aspect of the Display starts with a score of 90%, efficiency with a score of 90%, safety props with a score of
85%, Creativity with a score of 80%, the understanding of the concept with a score of 80% Design props, with a score of 80%, Function props with a score of 80%, and Attractiveness with a score of 80%. However, all these aspects are already entered into the range value is well worth it so that it is no longer needs to be fixed and ready to be tested at school.

c. Design Revision
Products that have already been given the assessment by experts further revised. The revision is carried out based on the suggestions and comments provided expert during the validation process. Some points from revised aspects are as follows:

a. Repair material on the user manual
b. Improvement design on the user manual

Both points are then relied upon to be repaired. However, in spite of these improvements, in general, the experts had agreed that the product development is stated already deserves to be used with little improvement.

d. Trial products
Presented the following results of the response field trials-related products made of physics props second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat. Based on 2 aspects of the assessment be aspects towards achieving 90% props and aspects to the materials reached 95%. As in the graph below:

![Figure 7 The Graph Of The Results Of The Assessment Field Trials](image)

Based on the above chart, the highest to lowest feasibility aspects derived from the start aspect of the response to the material after that, the aspect of the props. After a to be tested, see that product's physical props made from second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat according to learners is entered in the category of very interesting. With the props as it expected the learners can develop the pedagogical aspects, namely to develop attitudes and skills by interacting with the surrounding natural environment, can be used for students of all levels of development intellectual property, and can be a source of motivation in learning of the child [17-18].

4. Conclusion
This product is produces in the form development physics props made from second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat, as well as based on the results of the validation in the form of Product development Of Physics Props Made From Second-Hand materials as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat, has 90% of the media quality (very decent) according to experts the media and 95% (very decent) according to the material. In addition to this product response given the learners towards attractive media learning in the form of the development Of Physics Props Made From Second-Hand materials as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat, stated criteria of interpretation has very interesting with a score of 91% in field trials. As a whole indicates that the products are made of physics props second-hand as a form of care for the environment on learner SMP/MTsN District on the Pesisir Barat has a good quality, very practical and can be used to be the media learning physics.
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