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Development of Experimental Bag Media in the Subject of Science and Technology in the Independent Curriculum to Increase Students Understanding

Maulia Zulfa Rahmaningrum[1], Giska Enny Fauziah[2]
Institut Agama Islam Badrus Sholeh Kediri, Indonesia
[1]*mauliazulfa873@gmail.com*, [2]*giskaenny@gmail.com*

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Abstract
The purpose of this research is to improve the quality of IPAS learning, which has been less interesting and difficult to understand because it only relies on LKS. The experimental bag was created by researcher as a learning tool that helps students, helps teachers, and improves learning outcomes. Analysis, design, development, implementation, and evaluation are all parts of the Research & Development (R&D) method with the ADDIE development model. Design experts, material experts, and learning experts validated 97%, 92%, and 98% respectively. N-Gain analysis in the medium category (0.5) showed the effectiveness of the media, and the pilot test showed an average result of 99% in the small group and 101% in the large group. The results showed that the experimental bag can help students understand IPAS lessons in grade V.

Introduction

The world of education is currently experiencing changes that lead to the advancement of education due to various innovations made to ensure that the quality of education continues to improve theoretically and pragmatically. Many changes are being made in the education sector to improve the quality and quantity of education around the world, including the development of innovations, provision of facilities and infrastructure, and curriculum development. These breakthroughs are needed to improve the quantity and quality of education.[1] One of the educational changes needed in the global era is the curriculum. The independent curriculum is a new curriculum defined as a way of learning that allows students to showcase their talents in a relaxed, casual, fun and pressure-free

[1] Kadi & Awaliyah, Education Innovation: Efforts to Solve Educational Problems in Indonesia, *Islam Nusantara Journal, No 1, Vol 2, 2017.* 03

*correspondence Author

way. Schools in Indonesia have been using it for a long time, especially at the MI / equivalent level.

Learning media are physical tools used to convey lessons through books, tapes, tape recordings, films, photographs, graphics, and computers. In the teaching and learning process, learning media can have a psychological impact on students in various ways, including increasing students' understanding, providing interesting and reliable information, and encouraging them to carry out learning activities. In addition, learning media can also help students understand the material, collect information, and explain data more easily.[2] The right learning media can help teachers and students interact better and prevent students from getting bored while learning.

Media includes all types of media used to transmit data and messages, according to a decision made by the Association of Education and Communication Technology (AECT) in 1997. Learning, according to Article 1 Paragraph 20 of Law No. 20 of 2003 concerning the national education system, is the process of student interaction with teachers and learning resources in an educational context.[3] The learning process consists of five parts: teachers (communicators), learning materials, learning media, students (communicants), and learning objectives.

Media should be present during the learning process because using learning media while teaching can change students' interests and desires, encourage them to do things, and even have a psychological effect on them. This is due to the fact that learning media can increase students' interest in all subject matter, including the IPAS course content. Educators should design IPAS media so that it allows students to learn in a more active and student-centered manner. To achieve this goal, learning methods, learning strategies, learning resources, learning models, and most importantly learning media must be considered. Teaching and learning is basically a process of communicating or conveying messages from sender to receiver. Students then interpret the communication symbols, which are represented by verbal and nonverbal communication. This successful interpretation depends on the situation. Inability in interpretation is the inability to understand what is heard, read, seen or observed. Since distractions that hinder communication lead to failure, the media should reduce distractions that hinder the delivery of the message in learning.

Researchers at Madrasah Ibtidaiyah Al-Huda Bogo found that IPAS subject teachers tell students that they really understand the subject matter. However, in reality grade V students, who prefer to play and explore, still do not fully understand the electrical circuit material during practice or evaluation. Therefore, the researcher decided to use the experiment bag as a learning medium. Because nothing has been developed at MI Al-Huda Bogo, Experiment Bag Media is not available for grade V students.

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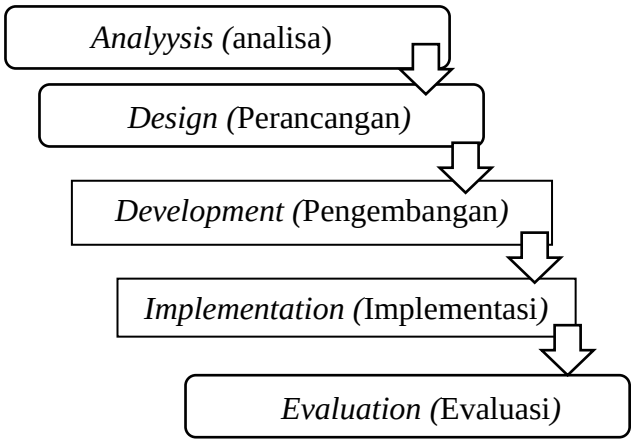
[2] Azhar Arsyad, *Learning Media*, (Jakarta: PT Raja Grafindo Persada, 2019). 03

[3] Department of National Education, *SISDIKNAS Law*

This is an easy-to-use game that can make learners more motivated to learn because there are games during the learning process that allow them to interact with their peers and learn more actively. Since IPAS material tends to be boring because it discusses natural and social aspects in depth, the relationship between the experimental bag and the material is to make it easier for students to understand the material being taught. However, sometimes there are practices that make students uninterested in the lesson. Many students are still confused about the main components of electrical circuits, tools, and the difference between series and parallel circuits. The researcher developed a little material to help students understand the electrical circuit material. This study aims to answer the questions: (1) How is the process of developing experimental bag media? (2) How is the design of experimental bag media? (3) how is the effectiveness of media in improving student understanding?

Methods

This research uses the development research method also known as research and development (R&D) in English which is widely used by the world. It is an academic method for designing and testing the effectiveness of products. This method is intended to produce a product through the process of discovering potential problems, designing, and developing the best product.[4] Research using the research and development method is conducted to create a product and test how effective the product is. This research analyzes the needs for a particular product using survey or qualitative methods, and tests how effective the product is so that it can be used by society as a whole. In this study, researchers used experimental methods. In this study, researchers used a descriptive research and development model, which describes the process that must be done to make a product by Reiser & Mollanda using the term ADDIE (*Analysis, Design, Development, Implementation, Evaluation*).[5]



[4] Marinu Warumu, Research and Development (R&D) Methods: Concepts, Types, Stages and Advantages, *Scientific Journal of Education Profession*, Vol. 09, No. 02, Year 2024. 02

[5] Sugiyono, *Research Model,*…….394.

This research uses the Research *& Development* (R&D) method with the ADDIE model approach. (*Analysis, Design, Development, Implementation, And Evaluation*) which has the following stages:[6]

1. Analysis: identifying students' needs through interviews and observations, with the discovery that conventional learning is less effective for improving understanding.
2. Design: designed an experiment bag with simple electrical components such as batteries, cables, lights, and switches. This media is equipped with question cards and material pocketbooks.
3. Development: the media was developed based on input from design, material and learning expert validators.
4. Implementation: The media was tested on a small group (4 students) and a large group (27 students) of class V MI Al-Huda Bogo.
5. Evaluation: The effectiveness of the media was analyzed using N-gain to measure the increase in student understanding.

Collecting information and data as material for media development developed by researchers. Information is obtained through observation, interviews, questionnaires and documentation at MI Al- Huda Bogo. The following data collection techniques are used by researchers:

1. Observation

   Observations were conducted in class V MI Al-Huda Bogo. This observation aims see how teaching and learning activities in the madrasah.
2. Interview

   The interview was conducted directly to the fifth grade teacher of MI Al-Huda Bogo. The interview material to the teacher is about how the method is carried out in teaching Natural Science subjects on Electrical Circuit material in class V MI Al- Huda Bogo and the obstacles that occur during teaching and learning activities.
3. Documentation

   Documentation is used to document the activities of the Fiqh learning process in the classroom. The data in this study are in the form of images and photos that record activities during the learning process.
4. Inquiry

Questionnaires are used to understand whether the development of this Experiment Bag game media is effective or not. Then this questionnaire is also used to find

[6] Sugiyono, *Quantitative, Qualitative, R&D Research Methods*, (Bandung: Alfabeta, 2017), 395

out whether the material in this Experiment Bag game media is effective for students as well as for validator assessments.

This research uses qualitative data and quantitative data. Qualitative data is processed from the results of the scoring in the form of presentasse which is used to determine the feasibility of using the software. The second data is in the form of qualitative data in the form of responses, criticisms, suggestions from validators and respondents. The second data is the form of qualitative data in the form of responses, criticisms, suggestions from validators and respondents. The instrument in this study is a cross-media quality research sheet which contains aspects of the quality of a good Experiment Bag game media. The instrument was given to one media expert lecturer, one material expert lecturer, and a Natural Science subject teacher in the form of a product quality rating scale using a *libert* scale with 5 alternative answers.[7]

Results and Discussion

The experimental bag learning media is a three-dimensional media that conveys material in learning activities that are packaged in games according to the rules of use. A game in which players are asked answer questions displayed on cards in a very short time. The goal is to understand the question or question as quickly as possible in a limited time. The game tests the speed of thinking and the ability to understand question as a group. Experiment Bags are a key element in social games and are popular with many people for their entertaining nature and ability to remember and understand questions. However, the game is made to help students understand the material. Therefore, the researcher relates the learning media to the Experiment Bag so that learning is more interesting and increases the enthusiasm of students' learning of Natural Science subjects. The specifications of the experimental bag media are as follows:

1. This experimental bag media is included in the 3-dimensional media made of lightweight wood.
2. This media also includes a material pocket book made of F4 paper and playing cards made of A3 paper.
3. This media has tools and materials such as lights, switches, cables and batteries.
4. The design of this media is very attractive because the outside is covered with full color.
5. This media is very interesting for students because of direct practice
6. This media also teaches learners about electricity in everyday life such as lights that turn on.
7. This media has also been equipped with game instructions whose language is easy for students to understand.

[7] Sugiyono, *Educational Research Methods*, (Bandung: Alfabeta, 2009), 93

8. This media is easy to carry around.
9. These tools and materials are very safe for students because they do not have high electrical voltage.
10. The design of the experimental media bag is as follows:
    a. Experiment Bag Media Cover

    b. Contents of the Experiment Bag Media (Tools and Materials)

    c. Problem Card Design in Experiment Bag Media

d. Material Pocket Guide

e. Game Instructions

The validation results show that the experimental bag is very feasible to use in IPAS learning. Based on the assessment that has been carried out, it shows that the media that has been validated by design experts scores 97% with positive comments regarding appearance and functionality. Material experts who have validated the material contained in the media reach 92%, which can be confirmed that the relevance of the content to the Merdeka curriculum. Meanwhile, learning experts have also validated with a score of 98% with a note that the media is able to increase student interaction. Active interaction is proven to strengthen student understanding in the learning process.

This research has been tested on a small group of 4 children with a 99% satisfaction rate, especially in the aspects of material clarity and fun while learning. The simplicity and interactivity of the media were the main factors supporting this result. The large group

test with 27 children showed a score of 101%, reflecting increased enthusiasm. The experimental bag media provides an in-depth active learning experience in accordance with the constructivist approach. The results of the N-Gain analysis of moderate effectiveness (0.5), which indicates an increase in student understanding of electrical circuit material. This media is also proven to encourage students to be more active in discussion and practice. Learning media that involves direct activity is more effective in strengthening students' long-term memory.

Conclusion

In this study, the development design was carried out in five stages. First, this research analyzes the needs at MI Al-Huda Bogo Nganjuk. Then, design is done to create learning media to be developed. Next, development is done by making learning media. Finally, implementation is done by applying learning media to students at MI Al-Huda Bogo Nganjuk.

The results of design experts averaged 97% with "very good" criteria, material experts averaged 92% with "very good" criteria, and learning experts averaged 98% with "very good" criteria. The results of student response questionnaires in small group trials averaged 99% with "very good" criteria, and large group trials averaged 101% with "very good" criteria. Based on the above findings, the results show that the product developed by the researcher is suitable for use as a learning tool. The results of the t-test data analysis show that the pre-test and post-test values are 0.000 <0.05, which indicates that there is a significant difference between the use of media before and after the experimental bag.

N-Gain analysis showed that the medium N-Gain index category with an effective description had a value of 0.5; the high N-Gain index category with a moderately effective description had a value of 0.7; and the low N-Gain index category with a description of less than 0.3. Thus, it can be concluded that the experimental bag media can be used well to teach electrical circuit material in IPAS in grade V Madrasah Ibtidaiyah.

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