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Development of Physics Learning Devices with Group Investigation Type Cooperative Model to Improve Students Logistics Thinking Ability in Senior High School

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ABSTRACT: This research is a development research that aims to develop Physics Learning Tool with Cooperative Model of Group Investigation Type to Improve Students' Logical Thinking Ability in High School. This research uses the ADDIE development model which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. Validation of Learning Devices was carried out by involving three validators who assessed the feasibility of media, material, and educator responses. The sample in this study was class XI consisting of 25 students who were given a pretest and post test. Data analysis techniques were carried out based on the stages of the ADDIE development model. The results showed that the learning tools developed have a high level of validity, practical, and effective in improving students' logical thinking skills. The use of this learning tool has a positive impact in improving students' understanding of physics learning on temperature and heat material as well as improving students' logical thinking skills in physics learning.

KEYWORDS: Cooperative Group Investigation Type, Logical Thinking, Learning Device Development.

INTRODUCTION

Physics is one of the branches of science that has a significant role in life, especially in the field of science and technology that has developed rapidly at this time. The concepts in physics itself are the result of observations and research on various phenomena of the universe studied through experiments in the laboratory. Because in essence physics is a collection of knowledge, ways of thinking, and investigation (experimentation), its application in effective and efficient learning and able to make students interested and motivated to study physics. One of the supporting facilities for learning physics is the laboratory. In the laboratory can be carried out activities to research and seek answers from the science studied including physics. Physics is built from careful observation, and the results of observations must be associated with a rational explanation of the theory. Conversely, a theory must be able to predict what will be observed due to the theory (Ariesta & Supartono, 2011).

The role of the teacher in learning, especially in the cooperative model of group investigation type, is as a counselor, consultant, and friendly critic (Joyce, et al 2009: 318). Group Investigation (GI) is one of the most complex types of cooperative learning. Learners are involved in planning both the topics studied and the course of their investigation. This model teaches students good group communication and group process (Wiratana, et al 2013).

In essence, physics is a collection of knowledge, ways of investigation, and ways of thinking seen as a product, process, and attitude. Physics learning should involve students in learning activities both physically and mentally on the problems of quantification, observation, and experimentation to the conclusion. Interaction in good learning between teachers and students will be able to encourage cognitive development and logical thinking skills of students in a better direction which in turn can display optimal cognitive learning outcomes (Rafafy, 2016). In order to form good interactions in a learning process, a model and learning tools are needed as a means of support so that they can improve the logical thinking skills of students.

Based on this statement, we can realize that currently education must be well directed and must be pursued by every learner with full responsibility and faced with enthusiasm. Currently, education in Indonesia is directed to improve the nation's competitiveness so that it can compete in the global market. The nation's goals can be achieved if education in Indonesia can run well. In addition, education in Indonesia also aims to be able to improve the ability and thinking skills of students, especially in improving logical thinking skills.

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From the explanation above and the findings in the field, the researcher tries to provide alternative solutions and is interested in developing learning tools by applying a cooperative learning model of group investigation type to improve logical thinking skills that have never been done at the school. The learning tools referred to in this study are part of the infrastructure. The appropriate physics learning tools are very important in an effort to achieve physics learning objectives. In addition, learning tools can make it easier for students to learn. Learning tools are a prerequisite for optimal teaching and learning interactions. So, the existence of learning tools will affect the success of the learning process in the classroom. Teachers will be easier to teach a material, while students will be easier to understand the material taught by the teacher. Therefore, learning tools are absolutely necessary for a teacher in managing learning.

In the cooperative learning model of group investigation type, the learning tools to be developed are Learning Implementation Plan (RPP), Learner Worksheet (LKPD), and Logical Thinking Ability Test (TKBL) The learning tools that were successfully developed were then tested on Class XI students of SMA YP. PGRI 3 Makassar. The trial is intended to determine whether the learning tools developed are effective in improving the logical thinking skills of students. Starting from the description above, the researcher will conduct research on the development of learning tools with the title "Development of Physics Learning Tools with Cooperative Group Investigation Type Models to Improve Students' Logical Thinking Skills in High School". Based on the background stated above, the problem formulation in this study is as follows. What is the validity and reliability of physics learning tools with the Cooperative Group Investigation Type model to improve students' logical thinking skills in high school.

METHOD

Based on the background and formulation of research problems that have been stated, this type of research is a development research (research and development). Development Research in question is research conducted to develop learning tools which include Learning Implementation Plans (RPP), Learner Activity Sheets (LKPD) and Logical Thinking Ability Tests (TKBL) which are implemented through a cooperative learning model of group investigation type. To determine the improvement of students' logical thinking skills, a single group experimental design with pretest-postest or one group pretest- postest design is used.

This research is planned to be carried out in the odd semester of the 2024/2025 school year. This research was conducted at SMA YP. PGRI 3 Makassar in the development process. The subjects in this study were students of class XI SMA YP. PGRI 3 Makassar consisting of 25 students in the odd semester of the 2024/2025 academic year. The procedure taken in this research is divided into two stages, namely: (1) the preparation stage, and (2) the implementation stage. The data analysis technique carried out in this research and development is carried out based on the ADDIE development stages, namely, at the analysis stage, the analysis for data collected from observations and interviews is analyzed descriptively qualitatively through a reduction process, the Design Stage, at this stage of development aims to produce a learning device that has been revised so that it is feasible to use in research or tested activities carried out at this stage are expert validation, simulation, and readability aspects, as well as limited trials, the Implementation stage At this stage, the learning device is tested on students at SMA YP. PGRI 3 Makassar, Assessment stage After the trial, then an assessment is carried out to improve the logical thinking skills of students.

The Data Analysis Techniques used in this study are Data Analysis of Validation Results of Learning Devices and Research Instrument Sheets, Analysis of Learning Device Implementation, Data Analysis of Student Responses to Learning Devices, Data Analysis of

Student Responses to the Learning Process and Data Analysis of Learning Device Effectiveness.

RESULT AND DISCUSSION

Based on the data from the assessment results by two validators, namely people who are considered experts in the field of physics, especially physics education, it shows that all components of the learning device have an average value of validators for lesson plans (RPP), student worksheets (LKPD), Media Expert Validation of Materials, Pre-Test and Post-Test Question Sheets, Teacher Response Sheets and Student Response Sheets are generally in the very valid category. This means that in terms of assessment aspects, the learning tools using the Group Investigation Type Cooperative Model developed have met the validity criteria.

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The results of expert assessments in the field of education show that learning devices using the Cooperative Group Investigation Type Model in terms of all aspects can be declared valid, but there are still suggestions for improvement that need to be considered for the perfection of the devices developed.

The results of instrument validation also show that all instruments that have been validated are in the very valid category to be used as assessment instruments or observations in the implementation of learning device trials. Although for some instruments revisions are still made to perfect the initial draft of the instrument.

CONCLUSION

Based on the results of validation by experts, this physics learning tool with the Cooperative Group Investigation Type model is declared very valid with a high validity score. The validation includes aspects of content, language, and presentation. This device has met the validity criteria because it is able to present accurate and relevant material, uses language that is easy to understand, and has an attractive appearance and supports the teaching and learning process. Based on the results of the lesson plan analysis, it shows that all aspects of the lesson plan are considered very valid with a total average of 3.60 ( ) and reliable 95% in the reliable category; all aspects of the LKPD are considered very valid with a total average of 3.52 assessment aspects and classified as reliable because the reliability value is 92% (above 75%); all aspects of the pre-test and post-test test questions are considered very valid with a total average of 3.57 ( ) assessment aspects and classified as reliable because the reliability value is 94% (above 75%) thus the learning device meets the validity criteria.

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