



DEVELOPMENT OF LKPD BASED ON PROJECT BASED LEARNING MODEL TO IMPROVE MATHEMATICAL CREATIVE THINKING ABILITY OF GRADE V ELEMENTARY SCHOOL STUDENTS

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Abstract

This study aims to 1) analyze the validity of the LKPD based on the Project-Based Learning model on the flat side of cubes and blocks; 2) Analyzing the practicality of LKPD based on the Project Based Learning model; 3) Analyzing the effectiveness of LKPD based on Project Based Learning; 4) Analyzing the improvement of students' mathematical creative thinking skills through the development of LKPD based on the Project Based Learning model on the flat side of cubes and blocks. The subjects of this study were fifth-grade students of SD Negeri 101736 Medan Krio, while the object in this study was LKPD based on the Project Based Learning model. This type of research is development research with the Dick and Carey model. The results of this study indicate (1) Based on the results of the validity of material experts 89%, linguists 89.2%, and design experts 98.2%. From the results of the developed LKPD validation, the LKPD is included in the excellent criteria and is declared valid and feasible to use; (2) The project-based LKPD is categorized as practical because the results of the student's response to the LKPD obtained a value of 90.80%, namely if the student's response is greater than 80%, it is said that the student gave a positive response to the LKPD; (3) LKPD is effective because in the field trial the results of the percentage of classical completeness increased from 44.83% to 89.66%, positive student responses, and the percentage of effective learning time; (4) The students' mathematical creative thinking ability increased, the average score was

68.55 in the pretest, while the post-test average was 87.17.

Keywords: *Development, LKPD, Project Based Learning Model, Mathematical Creative Thinking Ability*

A. Introduction

Education is a sector that gets much influence from the development of science and technology. Education plays an essential role in efforts to improve the quality of human resources in the future, which ultimately aims to cultivate good values for each individual in a planned manner. Efforts in increasing the resources and potential of these students have been obtained starting from the elementary school education level.

Piaget's theory of learning (Susanto, 2019:73) says that the age of school children is 7-11 years, students have begun to understand the cumulative aspects of the material, such as volume and number, can understand how to combine several classes of objects of varying degrees, besides that students can think systematically about objects. Concrete objects and events. For this reason, especially in learning mathematics in elementary school, which is learning, emphasizes direct learning to develop competencies so that children can understand mathematical concepts through learning by doing.

The learning tools used by teachers also cause the lack of students' understanding of mathematics are not optimal, such as teaching materials and Student Worksheets (LKPD) used by teachers only in textbooks. Student textbooks are used as the dominant source that presents formulas without providing opportunities for students to build their understanding of the material because textbooks commonly used are structured to improve mathematical abilities in general, not specifically.

LKPD is a means to assist and facilitate teaching and learning activities to form effective interactions between students and educators, increasing student learning activities and achievements (Umbaryati, 2016: 218). However, the LKPD should help the learning process and see the complete achievement of the essential competencies. To achieve these competencies, LKPD is designed that invites children to be active in project activities.

The advantages of the Project Based Learning model are that it can grow student learning stimuli, can grow problem-solving skills, can make students more active and can solve complex problems, can create collaboration between students, can motivate students to be able to build and implement communication skills, can grow students' abilities in processing learning materials, can share knowledge with students in learning and implementation in constructing projects, and can make the learning environment fun, so that students or teachers can enjoy the learning process (Daryanto, 2014).

The same thing was stated by (Saputri, 2019) who said that the Project Based Learning model is a learning model that, in its implementation, uses a project as a first step in finding knowledge, gathering information, and integrating new knowledge based on activities that are following learning objectives.

According to Munandar (Titu, 2015) Project based learning models needed in improving creative thinking skills are those that have the following syntax: First, Planning (planning), Second, creating (creating or implementing), Third, processing (processing).

Creative thinking is seen as a change in perception or seeing a combination of new ideas, new relationships, new meanings, or new applications that are felt not previously owned (Tan, 2009). According to

Harris (Aminullah 2017:45), three aspects of creative thinking skills are a success, efficiency, and coherence. Success is related to the suitability of the solution to the problem being solved. Efficiency relates to the practicality of problem-solving strategies. In contrast, the coherence aspect is related to the unity or integrity of the idea or solution. A coherent idea is an idea that is well organized, holistic, synergistic, and aesthetically pleasing.

According to Elvi 2018, students' creative thinking ability cannot develop properly if the learning process, the teacher does not involve students directly in the formation of concepts, the learning methods used in schools are still conventional, namely teacher-centered learning. Such learning can hinder the development of creativity and student activities, such as communicating ideas, so this situation is no longer following the targets and objectives of learning.

Various studies, especially mathematics education, show that the Project Based Learning learning model can be a solution to overcome problems to improve students' mathematical creative thinking skills. Among them are based on research conducted by (Rahayu et al., 2019) based on evaluations that students have carried out after participating in learning activities total score is 1,713. The results obtained by students for the highest score are 100 and for the lowest score are 50. The average test evaluation results obtained a score of 81.5, which is greater than the KKM mathematics class V, which is 60; thus, project based learning can improve students' abilities. Students' creative thinking significantly.

B. Method

Based on the formulation of the problem and the research objectives that have been set, the research to be carried out is [722]

categorized into the type of Development Research. The Student Worksheet (LKPD) based on the Project Based Learning Model will be developed in this study. The final product will be evaluated based on the specified product quality aspects. Thus, the product of this research is a valid, practical, and effective LKPD.

This research was conducted at SD Negeri 101736 Medan Krio, which is located on Jalan Sei Mencharim Medan Krio, in the even semester of 2020/2021. The researchers chose this school because; 1) at SD Negeri 101736 Medan Krio, no research has been conducted on the development of Student Worksheets (LKPD) based on the Project Based Learning (PjBL) learning model, (2) the unavailability of mathematics LKPD with the Project Based Learning (PjBL) learning model, and (3) the importance of mathematical creative thinking skills of elementary school students to improve mathematical creative thinking skills of students at SDN 101736 Medan Krio.

The subjects in this study were fifth-grade students at SDN 101736 Medan Krio TP 2020/2021. In contrast, the object in this study is the Student Worksheet (LKPD) based on the Project Based Learning (PjBL) learning model on the flat side space building material.

To measure the validity and effectiveness of the developed LKPD, a research instrument was developed. The instruments developed in this trial are as follows:

Content validity is based on the results obtained by students after an evaluation in the form of giving a test or an assessment scale. Based on the student's answers, the level of validation of the test items and the rating scale will be found, which are analyzed using Product moment correlation.

C. Finding and Discussion

1. Result

a. LKPD Validation Data Analysis

The assessment results by material, language, and learning design experts on each aspect of the overall assessment are determined by the average score in each category. The results of the assessment are then analyzed to determine the LKPD is feasible and valid. The average percentage of material experts, linguists, and learning design experts is as follows.

- Material expert validation data

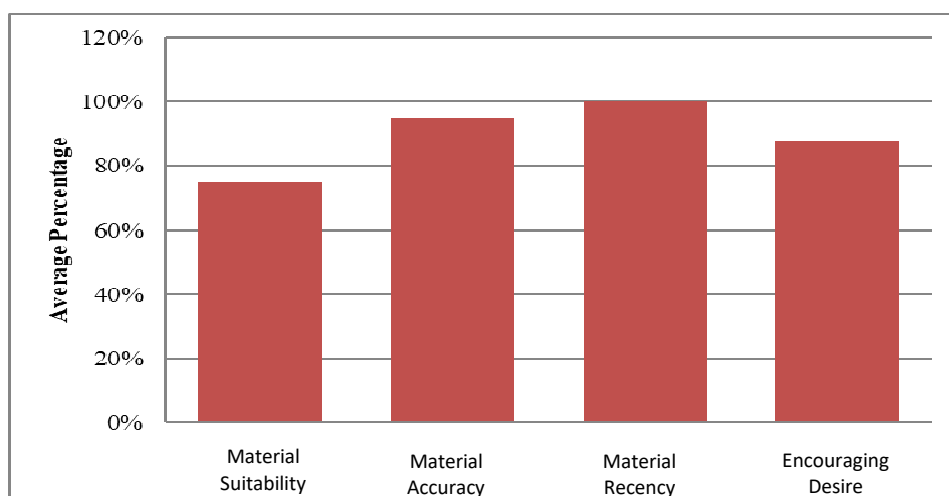


Figure 1. Diagram of the Average Percentage of Material Expert Assessment Results

Based on the assessment results of the material, there are several things that must be improved, including improving sentence editorial, expanding the material, and writing the correct material. After the revision, the material expert stated that the LKPD developed was suitable for use in the field and was declared very valid.

- **Linguistics expert validation data**

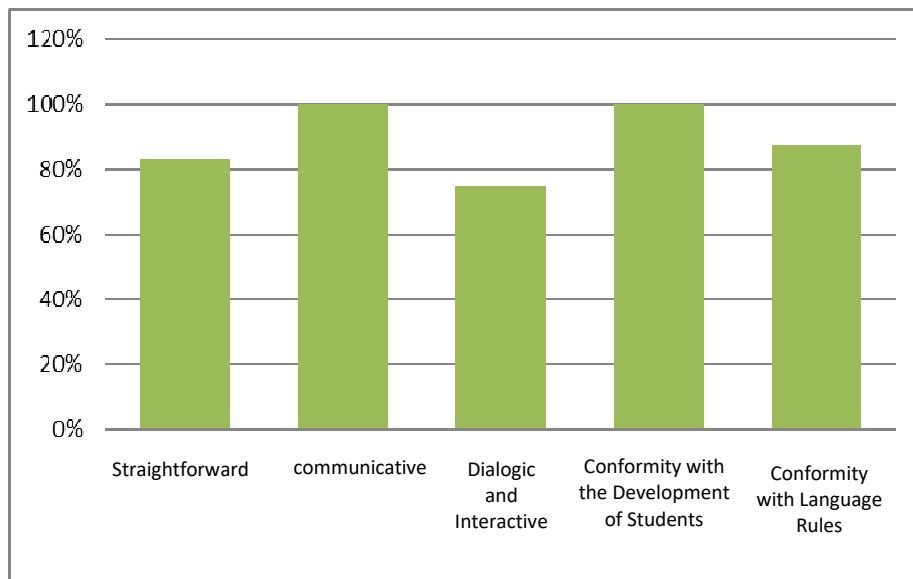


Figure 2. Diagram of the Average Percentage of Linguistics Assessment Results

Based on the language assessment results, several things must be improved, including improving the sentence redaction in the LKPD usage instructions and punctuation marks. After the revision, the linguist stated that the worksheets developed were suitable for use in the field with revisions and were declared very valid.

- **Data from the validation of learning design experts**

Based on the assessment results of the learning design, several things must be improved, including improving the indicators and learning objectives. After the revision, the learning design expert stated that the worksheets developed were suitable for use in the field with revisions and were declared very valid.

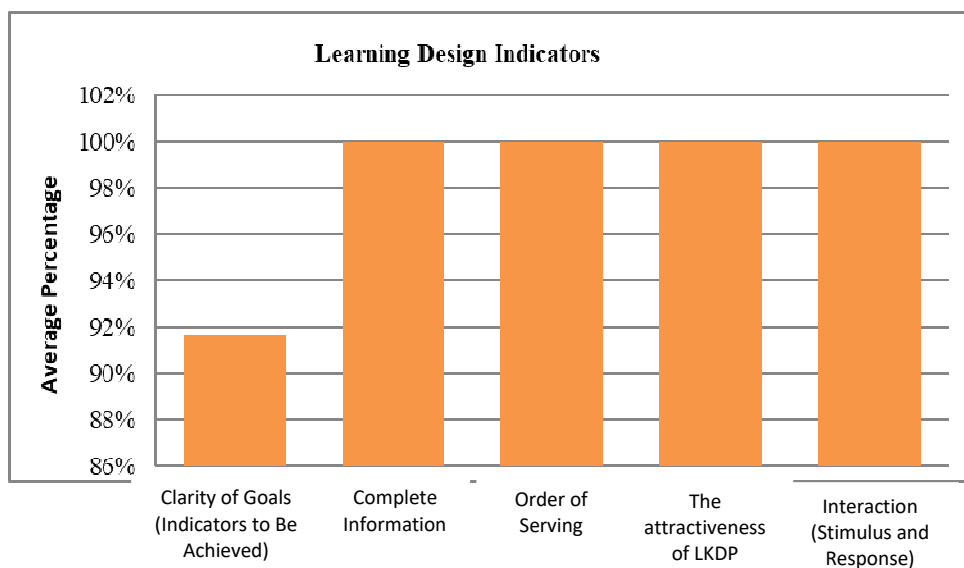


Figure 3. Diagram of the Average Percentage of Design Expert Assessment Results

Based on the assessment results of the learning design, several things must be improved, including improving the indicators and learning objectives. After the revision, the learning design expert stated that the worksheets developed were suitable for use in the field with revisions and were declared very valid.

b. LKPD Effectiveness Data Analysis

It can be seen that there is an increase in the percentage value of classical completeness obtained by students. Students' percentage value of classical completeness in the pretest was 44.83% and increased at the post-test to 89.66%. The diagram of increasing classical completeness of field trials can be seen in Figure 4 below:

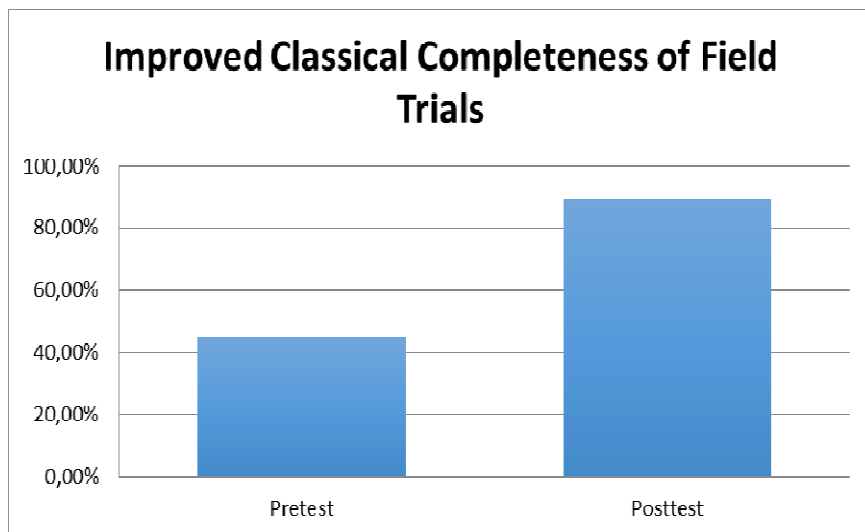


Figure 4. Diagram of Classical Completeness Improvement in Field Trials

Thus, based on the creative thinking ability test results in the post-test, it was found that the average class score reached 87.17 with a completeness level of 89.66%. These results have reached the predetermined level of learning completeness. Because mastery learning has been reached, the teacher does not continue the research to the subsequent trial.

2. Discussion

The final product of the development carried out in this research is the Student Worksheet (LKPD). At the LKPD development stage, validation was carried out by three experts, namely Dr. Mulyono, M.Sc., Dr. Rahmad Husein, M.Ed., and Dr. Samsidar Tanjung, M.Pd. The validation results by material, language, and learning design experts stated that the LKPD developed was suitable for use in the field with revisions and was valid.

Based on the research results that have been developed above, it shows an increase in the management of teacher learning taught using LKPD, which was developed based on project based learning on the flat side of cubes and blocks. The average value was 68.55, while in the post-test, the average value was 87.17. In terms of student learning completeness in the pretest, the number of students who completed learning was 13 students (44.83%), while the number of students who achieved learning completeness in the post-test was 26 students (89.66%). This proves that the use of project-based learning LKPD in mathematics can be applied to improve students' mathematical creative thinking skills, likewise with the teacher's management of learning.

The research results above confirm the project-based learning theory, which states that learning by applying project learning is one of the substantial efforts that teachers can implement to improve students' mathematical creative thinking skills. The project-based learning model emphasizes learning that uses projects/activities as media.

Students involved in the implementation of knowledge refer to the principles of cognitive learning theory by Jean Piaget. Students can build their knowledge by creating experiences from their activities in each project in LKPD. Learning objectives will be achieved by providing meaningful experiences to students. If the experience felt by students makes sense, it will trigger students to explore understanding the experience. Experience is provided through the division of tasks into groups (LKPD). Based on the results of the research analysis and theoretical studies above, it is true that the project-based worksheets developed are appropriate to be used to improve students' mathematical creative thinking skills.

This is supported by the results of Tuzzahra's research (2020); as a result of learning mathematics with project-based learning, the percentage acquisition of learning outcomes tests reaches 96.55%. Thus, the results of the research analysis and theoretical studies above show that the worksheets developed based on project-based learning are appropriate to be used to improve students' mathematical creative thinking skills.

D. Conclusion

The conclusions in this study are based on the research data findings, and the systematic presentation is carried out by taking into account the research objectives that have been formulated. The conclusions include:

1. Based on the results of the validity by material experts obtained a value of 89%, linguists obtained a value of 89.2%, and design experts obtained a value of 98.2%. So, the LKPD developed on a project basis is included in the excellent criteria and is declared valid and suitable for use.
2. LKPD based on project based learning is categorized as practical because the results of student responses to LKPD obtained a value of 90.80%. This shows that the use of LKPD positively responds to students if the score obtained is more than 80%. If the category is excellent, then the project-based learning LKPD is practically used in learning.
3. The effectiveness of the LKPD that was developed based on project based learning was obtained through one trial. In the field trial, the results showed that the percentage of classical completeness increased from 44.83% to 89.66%, positive student responses, and the

percentage of adequate learning time. Based on the gain score, the level of effectiveness of project-based learning-based worksheets in improving mathematical creative thinking skills is in the "medium" category with a score of 0.59. In the field trial, the effectiveness requirements are met, it can be concluded that the LKPD developed on a project-based basis has been effectively used.

4. Students' creative thinking ability increases; it can be seen from student learning outcomes before using the LKPD and after using the LKPD. In the pretest, the average value was 68.55. in contrast, the post-test obtained an average value of 87.17. In terms of student learning completeness in the pretest, the number of students who completed learning was 13 students (44.83%), while the number of students who achieved learning completeness in the post-test was 26 students (89.66%). This proves that project-based learning LKPD in learning mathematics can be applied to improve students' mathematical creative thinking skills.

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