Analysis of the Effectiveness of LKPD Based on Project Based Learning (PJBL) to Stimulate Students' Critical Thinking

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ABSTRACT

Critical thinking skills master the material where students know, know, master, and are able to express concepts in a form that is more accessible. However, critical thinking skills still tend to be low. So it takes teaching materials that integrate these abilities. For this reason, this study aims to develop Student Worksheets (LKPD) based on Project Based Learning (PjBL) in the context of critical thinking for class VII students on quality triangles and quadrilaterals seen from aspects of validity, practicality and effectiveness. This type of research is descriptive qualitative. This research was conducted in one of the junior high schools in Yogyakarta. The subjects in this study were 32 students of class VIIC. Data collection techniques used interviews, concept understanding ability tests, and preliminary questionnaire studies. While the data analysis technique uses the Miles and Huberman model which consists of data collection, data reduction, data presentation, and drawing conclusions. The results of the study indicate that the teacher has carried out learning assisted by LKPD teaching materials. Based on the results of the assessment of material experts and media experts, the learning media is feasible to use with improvements. The assessment by the material expert obtained a score of 161 and converted into the "Good (B)" category and the results of the assessment from the media expert obtained a total score of 59 with the "Good (B)" category so that the learning has met the validity aspect, (4) Trial limited research involving 6 students, (5) Extensive Product Test was carried out on 32 grade VII students of SMP Negeri 12 Yogyakarta and the results of the student response questionnaire obtained a total score of 1504 with the category "Very Good (SB)" and has fulfilled the practicality aspect, (7) Revised Wider Field Test Results. From the results of the pre-test and post-test the average pre-test score was 24.38 and the post-test average score was 82.25 and the calculation results were in the "High" category and had fulfilled the effectiveness aspect.

Keywords: *Critical Thinking, Stimulate Students, Student Work*

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INTRODUCTION

The implementation of the 2013 curriculum (K13) is one of the improvements in formal education in Indonesia. The implementation of 2013 (K13) is the development of the learning process. One of which is a passive learning pattern to be active. Active student learning is seeking, encouraging learning models with a scientific approach, and individual learning patterns into group learning (team-based). National Education System Law No. 1 of 2003 Article 1 Paragraph 1 states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual strength, self-control, intelligence, intelligence, noble character. According to Slameto psychologically learning is, "A process of change, namely a change in behavior as a result of interaction with the environment in meeting the needs of life or learning is a business process carried out by a person to obtain a new change in behavior as a whole, as a result of his own experience in learning. interaction with the environment". Azhar Arsyad suggests that learning is a complex process that occurs in everyone throughout his life. The learning process occurs because of a person's interaction with his environment. Lefudin suggests that learning can be interpreted as a process of changing behavior, due to individual interactions with the environment [23]. Based on some of these things it can be said that learning is a process of changing an individual both from the resulting behavior and the definition of the interaction between the individual and the environment.

The ability to understand mathematical concepts in Indonesia is still not optimal. This can be seen from the results of the Program of International Student Assessment (PISA) study presented by the OECD in 2017 which showed that Indonesia was ranked 63 and 69 countries in mathematics. Muslimin et al, say that mathematics is a subject that is considered unpleasant for students. This displeasure in mathematics can affect students' understanding of concepts in the teaching and learning process and affect student learning outcomes. Gazali says that teachers must change, no longer as the holder of the highest authority but scientific and indoctrination, also become facilitators who guide students towards the formation of knowledge by themselves. This statement is reinforced by the opinion of Adha, N.W., Situmorang, M., and Muchtar, Z., stating that the learning difficulties experienced by students are caused because students do not fully understand the concept. In this problem the teacher as one of the people who pursue a field of science that has a role in improving the quality of students. According to Fathurrohman project-based learning or project-based learning is a learning model that uses projects, activities as a means of learning to achieve attitude, knowledge and skill competencies. Meanwhile, according to Saefudin argues that projectbased learning is a learning method that uses problems as the first step in collecting and integrating new knowledge based on his experience in real activities. Meanwhile, according to Isriani and Puspitasari project-based learning is a learning model that provides opportunities for teachers to manage learning in the classroom by involving project work. Seels and Richey say that the definition of development research is defined as a systematic analysis of the design, development and

evaluation of learning processes and products that must meet the criteria of effectiveness, validity, and practicality.

The quality of learning development products must meet the criteria of being valid, practical and effective. Student worksheets (LKPD), which used to be called Student Worksheets (LKS) are a means to help facilitate teacher educators in teaching and learning activities so that effective interactions are formed between students and educators, and can also increase student learning activities and achievements. LKPD is defined as a printed teaching material in the form of sheets of paper containing materials, summaries, and instructions for implementing learning tasks that must be carried out by students with reference to Competence. This is in accordance with the definition of LKPD according to Trianto Participant Worksheet of student (LKPD) is a student guide that is used to develop cognitive aspects as well as a guide to the development of all aspects of learning in the form of a guide to inquiry or problem-solving activities according to indicators of achievement of learning outcomes to be achieved. Ratna Willis Dahar reveals that student worksheets are worksheets that contain information and instructions from the teacher to students so that students can work on a learning activity themselves, through practice or the application of learning outcomes to achieve learning objectives. According to Endang Widjajanti, LKPD is one of the learning resources that can be developed by teachers as facilitators in learning activities. Meanwhile, according to the Ministry of National Education, LKPD (student worksheet) is a sheet containing tasks that must be done by students, usually in the form of instructions, steps to complete a task by referring to the Basic Competencies (KD) to be achieved.

RESEARCH METHODOLOGY

This type of research is a qualitative desk. This research was conducted in one of the public junior high schools in Yogyakarta. According to Borg and Gall, educational research and development is a process used to develop and validate educational products. Or it can also be interpreted that educational development research is a process used to develop and validate educational products, Seels and Richey state that the notion of development is defined as a systematic analysis of planning, development and evaluation, processes and learning products that must meet the criteria for effectiveness, validity and practicality. The subjects in this study were 32 students of class VIIC. Data collection techniques used interviews, tests, and preliminary study questionnaires. Interviews were conducted with mathematics subject teachers to analyze the teacher's response to students' critical thinking skills and the need for open materials. The test technique used to determine the ability to understand students' initial concepts in solving mathematics. the form of the test used in this study was a description consisting of 10 questions. The student response questionnaire technique aims to analyze student responses to pjbl-based LKPD teaching materials for learning mathematics. The data analysis technique uses the Miles and Huberman model which consists of data collection, data reduction, data presentation, and drawing conclusions.

RESULT AND DISCUSSION

This section will explain the research results obtained from interviews, observations, critical thinking tests, and preliminary study questionnaires. Based on the results of interviews with mathematics teachers at SMP Negeri 12 Yogyakarta, it is known that the LKPD teaching materials used are not based on project based learning as a reference for learning mathematics. Furthermore, the results of observations show that students tend to be passive, feel bored quickly and most students still think of mathematics as a difficult and boring subject. This is supported by the results of the questionnaire distribution of the preliminary study which showed that there were 8 students who liked mathematics and as many as 24 students considered learning mathematics difficult and boring. Other things were also obtained based on the distribution of students' critical thinking ability tests presented in Table 1.

TABLE 1.
TEST RESULTS

No	Value Interval	Percentase
1	15-22	37%
2	23-30	22%
3	31-38	22%
4	39-46	10%
5	47-54	9%

Table 1 shows that the students' critical thinking ability test results are below the KKM (Minimum Completeness Criteria) set by the school for mathematics subjects, which is 70, while it is known that the maximum score obtained by students is only 54. For this reason, Table 1 concludes that the value of students' conceptual understanding abilities under the KKM. Thus, to find out the categories of students' critical thinking skills, the researchers conducted a categorization analysis based on the empirical statistics presented in Table 2.

TABLE 2.
CATEGORIZATION OF DATA

Category	Score Interval	Precentase
Very low	$x \leq 13$	37%
Low	$13 < x \leq 21$	22%
Currently	$21 < x \leq 28$	22%
Tall	$28 < x \leq 35$	10%
Very high	$35 < x$	9%

Table 2 shows that as many as 19% of students show high critical thinking skills, while others are in the low category. For this reason, it can be concluded that students' critical thinking skills still tend to be low. This is supported by the results of interviews

conducted with mathematics teachers that students' critical thinking skills still tend to be low. According to him, when learning takes place, students tend to be less active so that students' critical thinking skills are still lacking. Critical thinking means that students will continue to understand the material and analyze what has been learned. Therefore, students are said to think critically about learning mathematics when they are able to study and analyze a problem in mathematical material and also work on non-routine questions given by the teacher. The low critical thinking ability of students requires teachers to develop a pjbl-based LKPD development to facilitate it. However, the teacher has not yet developed LKPD in the class. Thus, based on the results of the preliminary study questionnaire distribution, it is known that all students have used the PJBL-based LKPD and 82% of students are very interested if learning uses the PJBL-based LKPD that has been developed. The pjbl-based LKPD is a teaching material that contains interesting material so that students can think critically about a math problem, and can analyze systematically about the problems in the pjbl-based LKPD that the author has developed. The description of the pjbl-based LKPD that researchers made presented in Figure 1.
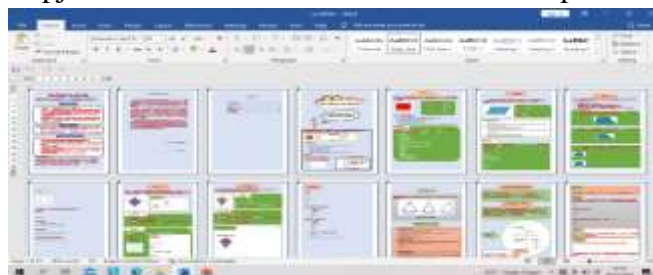

Fig. 1 Contents of PJBL-Based LKPD

Figure 1 is an example of PjBL-based worksheets made by researchers as an illustration to students regarding teaching materials that will be applied by researchers. From the results of the preliminary study questionnaire, it is known that almost all students are interested in learning using these teaching materials. In addition, according to students, learning using Pjbl-based LKPD will be able to make it easier for students to understand the concepts of the existing material because they can apply and take examples in everyday life.

Based on this information, the researcher concluded that the PjBL-based LKPD was able to increase students' critical thinking levels. From the results of the analysis of student needs obtained from the distribution of questionnaires to each class VIIC student, it shows that students are interested in learning to use PjBL-based LKPD because students can develop their way of thinking about mathematics by analyzing and relating to objects that are around them in everyday life.

Several studies have also shown that the development of PJBL-based LKPD is able to stimulate students' critical thinking. Development of the Discussion and Determination LKPD based on the Curious Note Program (CNP) Learning Model to Facilitate the Ability to Design Experiments for High School Students Materials Newton's Law of Gravity By Purwoko Haryadi Santoso who conducted research in July - September 2014 at SMA N 6 Yogyakarta and Development of Paper-Based Biology Learning LKPD on Environmental

Pollution Material and Its Effectiveness on Creative and Reflective Thinking Skills of High School Students by Annisa Firanti who conducted research in 2013 at SMAN 4 Magelang.

CONCLUSION

This study concludes that teachers have used LKPD to be used as teaching materials to students, but PJBL-based LKPD and useful for stimulating students' critical thinking have never been used as a reference for student teaching materials when learning mathematics takes place, students' critical thinking skills tend to be low, students are interested if learning uses LKPD teaching materials developed by researchers because they can analyze and imagine things around in everyday life to be used as examples in learning mathematics during learning.

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