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Development of Student Worksheets-PBL

Improve Students Critical Thinking Ability

Rizki Aulia Elissa
College Student in Postgraduate
Universitas Negeri Medan
Medan, Indonesia
rizkiauliaelissa3@gmail.com

Reh Bungana Perangin-angin
Lecture of Postgraduate
Universitas Negeri Medan
Medan, Indonesia

Dede Ruslan
Lecture of Postgraduate
Universitas Negeri Medan
Medan, Indonesia

***Abstract*—This study aims to: (1) produce a problem based learning based worksheet that is suitable for thematic learning in grade 5 of elementary school; (2) knowing the students critical thinking skills by applying the participants worksheets in the class. his student worksheet is compiled using the 4D model of Research & Development. Data retrieval research was conducted at SDN 101877 Tanjung Morawa. The research phase is define, design, develop, and Disseminate. The level of feasibility of student worksheets is obtained from expert validators and practitioner validators analyzed. After being validated and revised, the product is tested on a limited basis on students. The results of the trials were then analyzed to determine the feasibility of the worksheet of students from the perspective of students. Extensive tests are conducted after making improvements from the results of limited trials. The final results of the extensive test in the form of pretest and posttest values were then analyzed and obtained a standard gain value of 0.87 in the high category.**

Keywords: (Development, Problem Based Learning, Critical Thinking Ability)

I. INTRODUCTION

The 2013 curriculum requires students to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative and able to contribute to the life of society, nation, state and world civilization [8]. This is also reinforced by the goal of national education, namely education based on the life line of the nation (cultureel-nationaal) and aimed at the needs of life that can lift the ranks of the state and its people, so that they can work together with other nations for the glory of all people throughout the world [2]. The learning process in the classroom is a system that includes many components, including: teacher, students, objectives, subject matter, learning strategies, learning media and evaluation. Teachers are the key and also the spearhead of achieving the mission of education renewal. They are at the central point to regulate, direct, and create an atmosphere of learning activities to achieve the intended national education goals and missions. Therefore, the teacher is indirectly required to be more professional, innovative, perspective, and proactive in doing the learning task. In this case the teacher must be able to develop their abilities, in developing their abilities in managing learning is one of the factors supporting success in learning.

However, in reality the expectations that are desired in education have not all been realized properly, so that changes are still needed more in terms of the curriculum and the ability of the teacher itself. Based on observations obtained from the test site, it was found that there were discrepancies between teaching materials and curriculum in the learning process. Teachers and students only use teaching material that is ready to use as a reference, namely a textbook. In fact, textbooks facilitated by schools are very limited. Every week students must take turns carrying books or one textbook for two students. The textbook has not facilitated students to achieve the expected competence because it does not fit the needs and characteristics of students at SD Negeri 101877 Tanjung Morawa. Student questions or worksheets are still very limited, so students do not practice much. More writing from the blackboard. While 5th grade students should do more exercise, develop creativity and do various things in problem solving so that students' critical thinking patterns can be formed properly. Therefore, in this study the authors conducted a development worksheet based on problem based learning.

II. THEORETICAL

According to Siddiq [12] states that LKPD is packaged with only an emphasis on training, assignments or questions only. Although it only emphasizes this matter, LKPD still presents a description of the material but is presented briefly. The questions presented in LKPD must really be developed based on an analysis of learning objectives / competencies that have been translated into achievement indicators. According to the Ministry of National Education [8] Student Worksheets (LKPD) are sheets containing assignments that must be done by students. Activity sheet in the form of instructions or steps to complete a task. The task must be clear the basic competencies to be achieved. Trianto [16] argues that LKPD is a student guide that is used to carry out investigation or problem solving activities. This activity sheet can be a guide for developing cognitive aspects of the exercise and a guide for developing aspects of learning in the form of experiments or demonstrations. LKPD contains a set of fundamental activities that must be done by students to maximize understanding in an effort to form basic abilities in accordance with the learning indicators that must be taken. Meanwhile, according to Prastowo [9] LKPD is not an abbreviation of

Student Activity Sheet but a Student Worksheet, which is teaching material that has been packaged in such a way, so that students are expected to be able to study the teaching material independently.

According to [15] states that LKPD is a teaching material that is prepared to support individual activities that will be done while learning and will also allow students to have an interest in learning by themselves given the steps associated with these activities. LKPD is used by teachers and students will increase student interest in learning and influence learning in a positive direction. According to Hamdani [4] the student activity sheet is one type of learning aid. Based on the description from the experts above, it can be concluded that LKPD is a printed teaching material in the form of a sheet of paper containing material, summaries, and instructions / guidelines for the implementation of tasks that must be done by students to understand the material being studied and solve the problem with those refers to the competencies that must be achieved.

Prastowo [9] LKPD functions: (a) as teaching material that can minimize the role of educators, but more activates students; (b) as teaching materials that make it easier for students to understand the material presented; (c) as a concise and rich teaching material for training; and (d) facilitate the implementation of teaching to students. According to [9] due to differences in the purpose and purpose of packaging material in LKPD, there are five types of LKPD, namely: (a) LKPD that helps students find a concept; (b) LKPD which helps students to apply and integrate various concepts that have been discovered; (c) LKPD which functions as a guide to LKPD learning contains questions or answers whose answers are in books and students are required to read books to find the answers; (d) LKPD which functions as a strengthening of LKPD is more directed to the deepening and application of LKPD learning materials suitable for enrichment; (e) LKPD which functions as a guideline for LKPD, the practice manual is one of the contents of LKPD. According to the Ministry of National Education in [9] the steps in preparing LKPD are as follows: (1) Conducting curriculum analysis, before making LKPD the first step is to analyze the curriculum; (2) Prepare a map of LKPD needs; (3) Determining LKPD titles; 4) Writing LKPD. Write a LKPD there are a number of steps that must be carried out; (1) formulating basic Competencies; (2) determining appraisal tools; (3) compiling material.

Borg and Gall [13] educational research and development (R&D) is the process used to develop and validate educational products. The steps of this process are commonly referred to as the R&D cycle, which consists of studying the research findings related to the product to be developed, developing the product based on these findings, the field of testing in the setting where it will be used finally, and revising it to correct deficiencies found in the test submission stage. In a program that is more rigorous than R&D, this cycle is repeated until the test-field data shows that the product meets the defined behavioral goals.

Problem-based learning (PBL) is an influential way for inquiry-based learning in which students use an authentic problem as the context for an in-depth investigation of what they need and what to know. Problem-based learning differs from didactic teaching in that students, faced with a description of new situation or event, are required to define their learning needs and questions in order to achieve understanding of the situation or event. Problem-based learning is an educational approach that challenges students to work cooperatively in groups to seek solutions to real-world problems and to develop skills to become self-directed learners [1]. PBL model, there are several theories that form the basis of the learning model, they are: (1) Meaningful learning theory, David Ausebel distinguishes the characteristics of learning, between meaningful learning and rote laerning. Meaningful learning is the process of learning information that has been obtained is connected or associated with new knowledge and experience that someone found in the learning process. The relationship with PBL in terms of linking new information with the cognitive structure students [5]; (2) Vigotsky theory, intellectual development occurs when individuals face new and challenging experiences and when they try to solve problems that arise. Efforts to gain understanding, individuals try to associate new knowledge with the initial knowledge they already have and then build new understanding. The connection with PBL in this case relates new information to the cognitive structure that has been owned by students through learning activities in social interaction with other friends [11]; (3) Jerome S. Brunner's Learning Theory , the discovery method is a method by which students rediscover, not find a completely new one. Learning discovery in accordance with active knowledge seeking by humans, by itself provides better results, trying alone to find solutions to problems and supported by the accompanying knowledge, and produce truly meaningful knowledge. The connection with the PBL model is the ability of students to find and solve problems or solve problems document. Please do not revise any of the current designations.

Critical thinking is a systematic mental activity carried out by people who are tolerant with an open mind to broaden their understanding [6] Critical thinking means carefully examining their thought processes and the thought processes of others to get the most complete understanding. They try to think sequentially and objectively and suspend personal prejudices and emotions in seeking faith. If students make good use of their extraordinary thinking capacity, they will most likely be able to use their critical thinking skills. According to Scriven and Paul [14] critical thinking is defined as a disciplined process that is intellectually active and skillfully conceptualizes, implements, analyzes, synthesizes, and evaluates information collected.

Begg and Donald state that critical thinking has been accepted as one of the oldest and most well-known approaches to intelligence skills. According to Gehard and Beyer critical thinking is learning that emphasizes aspects of evaluation and synthesis to understand meaning, so as to produce knowledge about causes and evidence and theories. According to Kurniasari [18] there are 6 basic elements in critical thinking, namely; (1) Focus, becomes the main thing needed in thinking to find out information; (2) Reasons, namely being able to find the truth of the statement to be stated with the right reason and the truth of the statement depends on the situation that

occurred; (3) Conclusions, namely ensuring the truth of a statement of the situation that occurs; (4) Situation, namely knowing the condition of the problem to be solved; (5) Clarity, which is the ability to know clearly the problem to be solved; and (6) thorough examination.

In the field of education, critical thinking can help students improve understanding of the material being studied by critically evaluating arguments in textbooks, journals, discussion partners, including teacher's arguments in learning activities. So critical thinking in education is the competency to be achieved as well as the tools needed to construct knowledge. Thinking displayed in critical thinking is very orderly and systematic. Critical thinking is one of the high-level thought processes that can be used in the formation of students' conceptual systems. Besides that students' critical thinking can be developed through providing meaningful experiences. The meaningful experience in question can be in the form of verbal or written opinions as a scientist. These meaningful opportunities can be in the form of discussions that arise from divergent questions or ill-structured problems, as well as practical activities that require observation of symptoms or phenomena that will challenge students' thinking abilities.

III. RESEARCH OF METHOD

This research is an educational development research (R & D). This study aims to develop a Problem Based Learning Worksheet based on Class V of SDN 101877 Tanjung Morawa. Subjects in the study were 20 students in class V. The device development model as suggested by Thiagarajan, [17] is a 4-D model, which consists of 4 stages of development namely, defining, designing, developing and disseminating. The trial design in this study used the One Group Pretest-Posttest Design design. The first step is to take measurements as an initial test (pretest), then subject to treatment within a certain period, then a final trial (posttest). The pretest and posttest design research design is with the following table pattern:

TABLE 1 DESIGN OF ANALYSIS

Pretest	Treatment	Postest
T_1	X	T_2

Information:

TI= Test before treatment
T2= Test after treatment
X= Treatment

The following data collection instruments will be used in this study; (1) questionnaire; and (2) test. Analysis of the results of expert validation using the formula:

$$X = \frac{\sum x}{n} \quad [13]$$

Information:
$\bar{X}$ = mean
Σx = total score
n = Many question.

Data analysis of student effectiveness is done by analyzing student learning completeness, achievement indicators, student responses and learning representations.

IV. RESULT AND DISCUSSION

Data validation results by expert lecturers on content material content / material eligibility, language eligibility and graphic worthiness. Validation from expert lecturers is done twice, the first is done by giving every aspect, while the second can only be seen on all products after revision. Following are the validation results in each aspect.

TABLE 2 VALIDITION EXPERT CONTENT CONTENT PHASE I AND 2

Stape Validation	Number	Assesment Aspect	Mean	%	Category
1	1.	Content / material eligibility	3,67	73,40	good
	2.	Language Egibility	3,80	76,00	good
	3.	Design Egibility	3,59	89,75	good
Mean			**3,68**	**79,71**	**Good**
2	1.	Content / material eligibility	4,50	90,00	Best
	2.	Language Egibility	4,50	90,00	Best
	3.	Design Egibility	3,94	98,50	Good
Score Mean			**4,31**	**92,83**	**Best**

In this table, it can be seen a significant increase between stage 1 validation and stage 2 validation. The average score at stage 1 is 3.68 with the category of "good" and the average score at stage 2 is 4.31 with the category "very well". The following is a graph of the results of the validation of the material and graphic experts.

Figure 1. Validation Diagram of Expert Content / Material Phase 1 and Phase 2

Next the tests provided in this student worksheet are performed to further see where critical thinking students need to go through the student worksheets. For the results of the average critical thinking skills test, see Table 3

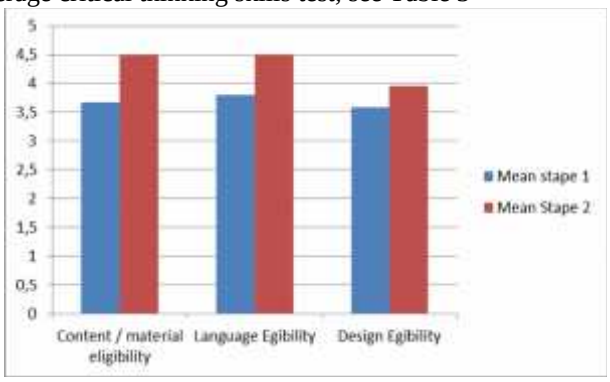

Fig.1. Validation Diagram of Expert Content / Material Phase 1 and Phase 2

TABLE 3. MEAN OF PRETES AND POSTEST

Total of Student	Mean Pretes	Mean Postes
20	45,10	82,95

This means that students' critical thinking skills through the use of PBL-based students worksheets are much better, because in the learning process with this model students are directed to conduct several experiments repeatedly. Experiments carried out repeatedly and independently aims to formulate and test hypotheses (PBL syntax), so as to foster student activeness in asking questions and communicating knowledge possessed to his peers. Teachers who act as facilitators in learning problem-based learning make students learn independently so as to foster student activity to dig deeper knowledge possessed. In addition, the problem based learning model which is a learning model that trains students to find their own concepts based on real problems from life with inquiry skills (science process skills) forms better and longer lasting concepts of student knowledge.

The data of this research are in line with the results of the research by [10] with the title research Development of Student Worksheet on Materials Economy Based Problem Solving said that Based on the results of this research, it concludes that the student developed worksheet with problem-based instruction is valid, practical, and effective, so it is very well used by the teacher as a supplement in teaching to complement the teaching materials in the learning process. Then [7] with the research Development of Problem Solving-Oriented Worksheet of Physics Learning In Senior High School said that The results showed that the average increase in the learning outcomes of the learners was equal to 79.44 with a difference in the scores of learning outcomes where tcount = 32.806 > ttable = 1.734, with a significance level of 0.000. Also, the improvement of learning outcomes on the response of learners gives significant influence with a score of 0.338 with a significance level of 0.085. Based on these results the development, the problem-solving oriented students' worksheet is declared valid and effective based on the results of validation tests by experts and the results of the implementation of classroom learning. These results impact the students' learning outcomes. Next reaseach by [3] based on the results of the research, it can be concluded that (1) a student worksheet based on Problem Based Learning has the potency to improve the 7th grade student's creative thinking skill based on assessment of expert lecturers and science teachers on the content business feasibility component, language and image component, component, and presentation graphics component get score 105.75 of a maximum score of 120 with a value of "A" is categorized as "Very Good", (2) a student worksheet categorized as "Good" with a value of ' B "based on student response with score 66.09 of maximum score of 88, (3) the student's creative thinking skill improves after using a student worksheet based on Problem Based Learning with N-gain score 0.72 categorized as "High".

V. CONCLUSION

From the results of this study it can be stated that the development of PBL-based learners worksheets influences students' critical thinking skills. This can be seen from the results of the average pretest score of students who only 45.10 to 82.95 after learning with the PBL-based LKPD.

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