

The Development of Student Worksheets Based On Problem Based Learning to Improve Collaboration Ability In Fifth Grade Elementary School

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Abstract:

The purpose of this research is to develop and describe the feasibility of developing student worksheets based on problem based learning for fifth grade elementary schools. This type of research is the research and development theory of Borg and Gall. The sample was determined by purposive sampling 12 students of fifth grade at the State Elementary School 1 Banding Agung, Lampung Province, Indonesia. The data collection tool used test and non-test instruments. Student worksheet products have been validated by material experts with a score of 85.5, media experts 89.0, linguists with a score of 83.3, and the practitioner test got an average score of 92.5 in the very good category. The data analysis technique used the n-Gain test to determine its effectiveness. The results showed that the resulting product was effectively used in the learning process. This is evidenced by the increase in student learning outcomes after using student worksheets based on problem based learning. Based on the results of these studies indicate that the product is feasible and effective for use of fifth grade elementary school.

Key Word: *Worksheets, Collaboration, problem based learning*

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I. Introduction

Education is the most important thing in developing abilities and increasing knowledge in preparing for a further life. Given the importance of education for human life, efforts to improve the quality of education must be made, educators are one of the factors that can affect the quality of education, educators with good quality will produce good quality education. Therefore, educators are expected to be able to make schools into quality by making the learning process varied and fun, educators must also be able to find deficiencies in the school environment or class in order to make improvements.

One of the goals of education provided at the primary level is to help learners understand how educators construct information, the processes followed in building this information and how it is used in new research efforts. Thematic learning that is currently being implemented changes a new understanding of the world of education in Indonesia in the 2013 curriculum which is expected to be implemented in 21st century learning (Barry, 2012). 21st century skills or termed 4C (Creativity and Innovation, Critical Thinking and Problem Solving, Communication, and, Collaboration). Frydenberg, (2011) also stated that to face learning in the 21st century, is the real ability to be aimed at with the 2013 Curriculum. The following is an explanation of 4C (1) Creativity and Innovation, the ability to develop, implement, and convey new ideas to others, being open and responsive to new and different perspectives. (2) Critical thinking and problem solving the ability to understand a complex problem, connecting one information to another. (3) Communication is an activity of transferring information either verbally or in writing. (4) Collaborative According to (Mukhlis, 2005) the ability to collaborate or work together, synergize with each other, adapt in various roles and responsibilities, work productively with those other.

One of the uniqueness of 21st century learning is collaboration. Collaborative learning is a situation where there are two or more people learning or trying to learn something together. Unlike learning alone, people involved in collaboration make use of each other's resources and skills. More specifically knowledge-based collaborations can be created in a population where members actively interact by sharing experiences and taking on different roles. In other words, collaboration refers to the environment and the activity methodology of students performing general tasks in which each individual depends and is responsible for one another.

But in reality in the field, the level of collaboration of students in learning is still relatively low, this is evidenced by data on pre-research at Banding Agung 1 State Elementary School. Based on these data, it is known that the overall level of collaboration of students is still quite low. Even though in learning students should be able to work together when faced with a problem or task, because after all, collaboration skills are

very useful later when the child is back in their community. These skills can be formed and familiarized by educators when learning in class. A fairly effective way is to design learning so that students can work together in completing the tasks that have been given. One of the teaching materials that is quite effective and efficient in cultivating these skills is a worksheet which contains materials or tasks that encourage children to cooperate.

Student worksheets used in the learning process in class. In the previous curriculum it was called LKS but in the 2013 curriculum this became a Student Worksheet. The worksheet itself is one of the teaching materials that can be done individually or in group work and allows conceptual development. In addition to requiring worksheets in the learning process in class, the learning process also requires an appropriate learning model so that it can achieve the expected goals and can improve student learning outcomes, one of which is using the Problem Based Learning model, PBL itself is a learning approach through efforts to confront students with real problems that provoke their learning process (Mukhlis, 2005). The PBL model was chosen because PBL is a learning model that can make students active in learning activities and have more meaningful experiences, this is in accordance with what Tan expressed in (Rusman, 2013) PBL is an innovation in learning because in PBL the ability Thinking of students is really optimized through a systematic group or team work process students can empower, hone, test and develop their thinking skills on an ongoing basis.

Lack of collaboration skills of students can be seen from poor cooperation between students. It was found during initial observations made by researchers at state elementary school 1 Banding Agung that female students were not willing to share tasks with male students who were considered lazy and less intelligent in their group. This makes some students "discarded by their groups" do not get groups and create their own groups. Conditions like this, confuse the design of the working group which is based on the distribution of the abilities of students that have been formed by educators. In addition, a lack of collaboration skills was also identified during learning.

In a working group, each member should have the same goals and targets, unable to complete the assigned practicum assignments. In that one working group there was no clear division of tasks and no one of the students took the initiative to take the role of coordinator or chairman in the group. Thus, group work becomes messy and only a handful of students are active and serious working on practicum while other students are just playing around.

The arrangement of the appropriate Problem Based Learning worksheets is expected to present more interesting activities, increase the collaboration skills of students so that students are more active in learning activities in class, do not get bored easily and students can build their own knowledge through activities that are done during the learning process.

II. Material And Methods

This type of research uses research and development refers to the theory of Borg & Gall in (Sukmadinata, 2013) regarding Reasearch-Based-Development according to the research objectives, namely research procedures with the aim of developing and validating the educational products developed. Research and development carried out are only not up to all stages , because of limited resources. The study population of students in grade V public elementary school 1 in Banding Agung had implemented the 2013 curriculum, and the sample was determined by purposive sampling as many as 12 students. The data collection tool for developing student worksheets based on problem-based learning uses a questionnaire, namely validation of material, design, and language experts, as well as testing practitioners. The test on students also uses a questionnaire to see the attractiveness, convenience, and usefulness of the worksheets being developed. Meanwhile, the effectiveness test uses n-gain.

III. Result

Based on the results of developing student worksheets based on problem-based learning learning for grade V students at State Elementary Schools in Banding Agung, it was carried out using validation from experts and educators as well as students to see the feasibility and attractiveness of problem-based learning learning-based student worksheets to be developed. The results of the research from this stage of development research are as follows:

Research and Information Gathering

The information was collected by observing and interviewing the principal and the fifth grade teacher at the Banding Agung public elementary school. The results of observations and interviews obtained information that (1) Educators have not developed student worksheets that meet the learners' learning model. (2) Educators have not used an attractive learning model. (3) the student worksheets used are not in accordance with the requirements for making student worksheets because the student worksheets used only contain questions with little material. (4) Less active and interesting learning activities. (5) Not yet used student-based worksheets

(Problem Based Learning). (6) The lack of collaboration skills of students can be seen from poor cooperation between students.

Planning

Planning is done by analyzing the results of gathering information. The products to be developed are in the form of learning tools consisting of a syllabus, lesson plans, worksheets, and assessment instruments. Furthermore, the authors systematically compile the basic competencies, indicators, and learning objectives developed in this study. The theme and sub-theme that was determined was "clean air for health" in fifth grade elementary schools. **Initial Product Format Development**

The steps in developing student worksheet products based on problem based learning are as follows. The product of problem-based learning equipment that was developed was learning equipment in fifth grade in subtheme 1 "the importance of clean air for health". The following is a prototype of the initial product of the learning tools prepared: Syllabus, lesson plan, and student worksheets (Cover, Foreword, Table of Contents, Basic Competency Mapping, Instructions for Use, Description of Material and Activities, Evaluation, Bibliography) and Test Instruments.

Initial Product Trial

This trial is the stage of testing the designed student worksheets. Evaluation is designed through expert validation, and students' responses are through limited class trials.

Validation of material experts, design experts, and linguists

Judging from the feasibility of the material, every aspect that is assessed in the student worksheet developed is good enough to meet the eligibility criteria because the material used is based on Core Competencies and Basic Competencies, the linguistic aspect is considered to have met good linguistic criteria. Furthermore, in the aspect of product design used in accordance with the level of knowledge of students, attracting students' interest, the cover used also represents the theme taken. Assessment aspects are didactic, construction and technical requirements. Based on the analysis of data from the validation results of media experts, the student worksheets developed can be said to be valid and can be implemented, although there are still some things that need to be revised according to expert advice, including student worksheets that must contain more illustrations and use real pictures. The design results in the form of a prototype are then validated by experts. Design validation is carried out by experts, namely material expert lecturers, evaluation experts, and linguists as follows.

Table 1. Results of Validation by Experts

No	Validator	Value
1	Material Expert	85,5
2	MediaExpert	89,0
3	Linguist	83,3
average		

Based on table 1. The results of the 3 expert validation test, namely (1) the expert material test obtained an average score of 85.5, (2) the media expert obtained an average score of 89.0 and (3) the validation test language expert received an average score an average of 83.3 in the validation test of 3 experts is categorized as very feasible to use.

Test practitioners

After passing the validation test which is declared valid and feasible, then the practitioner test on the student worksheet according to the teacher's response. Product trials are intended to determine the responses of students as users of LKPD. The test sample was 2 educators in grade V for public elementary schools 1 to Agung. The test was carried out by distributing questionnaires to respondents after students were given learning treatment using student worksheets. The results of questionnaire data collection aim to determine the quality of student worksheets based on language, material, and design requirements. Based on the validation results obtained an average value of 92.5 and is in the very good category. The data from the questionnaire that was filled in by the students were then analyzed descriptively using a qualitative approach based on the percentage of answers that were less, good enough, good and very good given. The questionnaire shows that the feasibility of the student worksheets is very high.

Test of attractiveness, ease and benefit of using student worksheets

The test results obtained the value of the attractiveness of using student worksheets based on the average value of the attractiveness, ease and usefulness of student worksheets in learning. Overall, the assessment of the usefulness of student worksheets according to students' responses shows that the use of

student worksheets is categorized as interesting, easy, and very useful in learning. This shows the recognition of students that the function of student worksheets can help students learn the material more easily in an effort to improve understanding of the concepts being learned. The questionnaire shows that the feasibility of the student worksheets is very high. Based on the results of students' responses to student worksheet products based on problem-based learning using a questionnaire filled in by students with the aspects assessed, namely attractiveness, convenience, and usefulness with an average score of 84.2. The overall mean results are in the "very good" category.

Initial Product Revision

Based on the results of problem-based learning learning-based student worksheet trials, the next stage is the repair and refinement of the developed student worksheets. The data obtained from the results of the validation show that the product meets the theoretically feasible criteria and can be used by students for learning on theme 8, sub-theme 1 in class V. The results of the suggestions are described as follows.

a. Revised material expert

The results of the material expert's suggestions are as follows

- 1) The material and examples are adjusted to the level of the child's thinking experience.
- 2) The material is adapted to the concept of learning according to the child's environment.

b. Design expert revision

The results of the descriptions from the design experts' suggestions are as follows

- 1) Fix the cover to better fit the title.
- 2) Improve the introduction into a preface.
- 3) Improve supporting images with clear captions.

c. Linguist revision

The results of the description from the linguist's suggestions are as follows

- 1) Improve the use of standard words in the product.
- 2) Correct use of capital letters and spaces.

Main Field Testing

a. Hypothesis testing

The main field trial was carried out by limited testing, carried out in class V of public elementary school 1, Banding Agung amounting to 12 students in the experimental class and control class and the results were tested using the t-test. The t-test is used to determine whether there is a difference or not between the two groups of the experimental class and the control class. This is intended to determine the effectiveness of PBL-based student worksheets in the experimental and control groups. Based on the results of calculations using the independent t-test formula used for testing the comparative hypothesis of two independent samples, namely the T-count value is 7.04 while the T-table value is at $\alpha = 0.05$; $df = 10$ is 2.23. In accordance with the criteria for testing the hypothesis above, because $T\text{-count} > T\text{-table}$, H_0 is rejected and H_1 is accepted.

b. Collaboration Ability Effectiveness Test

The effectiveness test of PBL-based student worksheet products was also studied from the results of the collaboration questionnaire analysis on students. The questionnaire results obtained are as follows

Table 2: Questionnaire Results Based on Aspects of Collaboration

No	Indicator	Score	Percentage
IV.			
V.			
VI.	Develops shared responsibility and values the contributions of each team member	257	85,67 %
VII.	Demonstrated ability to work and willing to help other teams	271	90,33 %
VIII.			
IX.	Shows flexibility and a willingness to accept other people's opinions	283	94,33 %
X.			
Average		270	90,11 %
XI.			
XII.			

The number of students who filled out the questionnaire was 12 people and the number of questionnaire items was 15 items with detailed indicators on each aspect as many as 5 questions. Based on the results of the analysis of these indicators, it shows that each aspect of collaboration shows various skills. The indicator in the first aspect gets the lowest category (very good category but needs improvement through habituation of students in carrying out responsibilities in the group) and the third aspect indicator gets the highest results, which shows flexibility and willingness to accept other people's opinions.

Improving Field Test Results

The last stage carried out in this research is product revision which is carried out based on the results of product trials and the findings when the product is tested. Based on the trial, it is known that the collaboration ability of students has increased. The collaboration skills of students, validation of material experts, media experts, and language are a reference in making the conclusion that student worksheets based on the problem-based learning model are not revised and are feasible to be implemented.

Discussion of Research Results student worksheets based on problem based learning learning Eligibility Development of student worksheets based on PBL

The development student worksheets based on PBL in thematic learning is focused for class V on sub-theme 2 "the importance of clean air for breathing". This development student worksheet based on PBL adapted from the R&D step by Borg & Gall (1983: 784) using seven out of ten steps. The development of student worksheets based on PBL begins with the collection of initial information, then planning, developing student worksheet products, testing the initial product, then revising the initial product, testing the product, then revising the product. The first stage is research and collection of preliminary information on the fifth grade learning of Elementary School 1 Banding Agung. Initial information is obtained that learning tends to be conventional so that it is a teacher center, educators have not used an attractive learning model, and educators have not developed student worksheets that meet the learning model for students, and the lack of students' collaboration skills can be seen from poor cooperation between participants. students.

After the researcher knows the problem that occurs, the researcher plans the target material on the core and basic competencies to then develop PBL-based student worksheets. Student worksheets will be used by students so as to improve collaboration skills seen from students' collaboration abilities. Furthermore, the researcher arranges the initial product development of the student worksheets, in this step the researcher sets out the pattern for developing the content and design of the PBL-based student worksheets according to the PBL steps systematically based on the steps that are determined so that the student worksheets can meet the compilation requirements must be fulfilled in accordance with the opinion of Ranjit (2012: 2).

The next step is testing the initial product, the researcher conducts a validation test with three validators with the aim of validating whether the product developed is in accordance with the development requirements so that it is feasible to be tested. The results of the validation test are described as follows. The material expert's assessment includes the suitability of the student worksheets developed with the quality of the content and the suitability of the PBL model student worksheets. The assessment of this material expert obtained a value of 85.5 in the very good and valid category. The media expert's assessment includes the requirements for making student worksheets, namely didactic, construction, and technical requirements. The value obtained based on the validation test is 93.0 with the very good category. Assessment carried out by linguists includes the suitability of student worksheets that are developed with the suitability of writing and the use of the right words in the product. Some suggestions from linguists for product improvement include improving the use of standard words in products and improving writing according to KTI.

After conducting the validation test, the researcher revised the product based on the suggestions and comments of the validators and practitioners, then the next step was the small group trial stage to see the level of validity of the instrument to be used. The next stage is to see the effectiveness of student worksheets based on PBL which is first carried out a pretest to determine the initial abilities of students before using PBL-based student worksheets. Then the product was tried out to obtain student responses during the learning process using PBL-based student worksheets in the experimental and control groups. Based on the questionnaire data obtained, it shows that students' responses are more positive in the experimental group than the control group on the collaboration aspect. This result is supported by research conducted by (Fatade, Mogari, & Arigbabu, 2013), which shows the results suggesting the use of PBL as a learning strategy to improve student performance in both cognitive, affective and psychomotor outcomes. The results of the analysis showed the mean increase and the total difference between the pretest and posttests through the N-Gain test and analysis on the affective and psychomotor aspects. In line with this study, the results of research conducted by (Barry, 2012) were the results of the PBL model interaction research and learning styles on students' collaboration skills. If it is seen from the results, it shows that the interaction of the learning model with the learning style towards PBL explains that the group of students who have a slightly higher kinesthetic learning style than students who have an auditory learning style in the experimental class, while in the control class, students who have a much more auditory learning style. The high level of students who have a kinesthetic learning style is supported by the collaboration ability of students who have a learning style that is in accordance with the application of the PBL model with local content media found high collaboration skills and vice versa students with unsuitable learning styles have low collaboration abilities.

Effectiveness of PBL-based student worksheets to enhance collaboration

The effectiveness test was carried out to determine the effectiveness of student worksheets based on PBL in the learning process that has been carried out and the collaboration abilities of students which refer to collaboration skills. The effectiveness test with a collaboration ability test that is designed and assessed based on three aspects of collaboration skills including the skills to develop joint responsibility and appreciate the contribution of each team member, skills in demonstrating the ability to work and being willing to help others, and showing flexibility and willingness to accept other people's opinions. The effectiveness test was analyzed using the t-test by comparing two groups, namely experimental and control. The results of calculations using the independent t-test formula used for testing the comparative hypothesis of two independent samples, namely the T-count value is 7.04 while the T-table value is at $\alpha = 0.05$; $df = 10$ is equal to 2.23. In accordance with the criteria for testing the hypothesis above, because $T\text{-count} > T\text{-table}$, H_0 is rejected and H_1 is accepted. This shows a difference between the experimental and control groups after using PBL-based student worksheets.

The increase that occurred in student collaboration was seen from the results of the questionnaire given to students in the control group with conventional learning and the experimental group using PBL-based student worksheets with reference to the collaboration indicator. On the indicator "developing shared responsibility and appreciating the contribution of each team member" got a score of 257 out of a maximum score of 300. Then the indicator "shows the ability to work and is willing to help other teams" gets a score of 271 with a percentage value of 90.33%, and on The last indicator, namely "showing flexibility and willingness to accept other people's opinions" obtained a score of 283 with a percentage of 94.33%. Based on the results of the comparison between the control and experimental groups, there was an increase from the overall score of 60.67 to 80.67.

This is reinforced by the results of research conducted by (Sudrajat, 2017), the study shows that the student worksheets developed are effectively used in accordance with the results of the analysis of the difference in the average post-test collaboration ability of the experimental class, namely 77.81 while the control class is 68, 93. The relevant results in this study are the development of student worksheets and the effectiveness of thematic student worksheets based on problem-based learning in elementary school students. Therefore, this PBL-based student worksheet is highly recommended to be applied in learning activities at school.

Strengths Development of student worksheets based on PBL

Based on the results of developing PBL-based student worksheets, they have the following advantages:

- 1) The content of this PBL-based student worksheet teaching material is in accordance with the 2013 curriculum revision and in accordance with the needs of students in relation to the surrounding environment.
- 2) Learning activities direct students to be actively involved in groups. This makes students learn to work together well.
- 3) The material in PBL-based student worksheet learning is presented clearly, and is easy to understand. An attractive student worksheet display with a harmonious combination of letters, pictures, colors. So that the learning atmosphere is fun and can motivate students to be enthusiastic about participating in learning.
- 4) The PBL-based student worksheet teaching materials developed have met the writing rules and have met the validation criteria.

Limitations of Research and Development of student worksheets based on PBL

The product of developing student worksheets based on PBL has the following limitations.

- 1) Product testing is only carried out in 6 lessons, so it is possible that the collaboration ability of students is not optimal.
- 2) The development of this product is only on one of the three sub-themes in theme 2.
- 3) This research and development is only up to the seventh step of the ten steps of Borg and Gall's research and development.
- 4) Potentials and problems are only focused on fifth grade and testing the effectiveness of PBL-based student worksheets was only carried out in one school due to the conditions of the Covid-19 pandemic.

XIII. Conclusion

Based on the results of research on developing student worksheets based on problem based learning, it can be concluded that:

- 1) Student worksheet products based on problem-based learning to improve collaboration developed theoretically and empirically are suitable for use in fifth grade elementary school. This is evidenced by the assessment of experts, namely material experts, media experts, linguists, and practitioner experts who state that the student worksheets developed are in the very good category. The results of the material expert's assessment obtained a score of 85.5, media experts 89.0, linguists 83.3, and expert

practitioners of 92.5. Based on the suggestions and validation results, the student worksheet based on problem based learning is declared valid and suitable for use as teaching material in learning in fifth grade public elementary school 1 Banding Agung.

- 2) Student worksheet products developed are effective to increase collaboration between fifth grade elementary school students. This is evidenced by the test results from the use of problem based learning student worksheets that were developed. In addition, student worksheets based on problem-based learning to improve collaboration are also used in learning accompanied by conducting an observation process to see the effectiveness of the products developed using questionnaire sheets arranged based on collaboration indicators.

References

- [1]. Barry. (2012). *Retailing Management, 11 th edition*. Boston: Pearson Education.
- [2]. Fatade, A. O., Mogari, D., & Arigbabu, A. A. (2013). Effect of Problem-Based Learning on Senior Secondary School Students' Achievements in Further Mathematics. *Acta Didactica Napocensia*, 6(3), 27–44.
- [3]. Frydenberg. (2011). *Learning for 21 st Century Skills*.
- [4]. Mukhlis. (2005). *Pembelajaran Matematika Realistik untuk Materi Realistik Pokok Perbandingan di Kelas VII SMP Negeri 1 Pallangga*. Tesis PPs Unesa. Surabaya.
- [5]. Rusman. (2013). *Model-Model Pembelajaran*. Jakarta: Raja Grafindo Persada.
- [6]. Sudrajat. (2017). *Pengembangan Lkpd Tematik Berbasis Problem Based Learning Pada Suibtema Peninggalan-Peninggalan Kerajaan Islam Di Indonesia Untuk Kelas V SD*. Lampung.
- [7]. Sukmadinata. (2013). *Metode Penelitian Pendidikan*. Bandung: PT. Remaja Rosdakarya,

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