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Development of Student Worksheets on Environmental Pollution Based on *Problem-Based Learning* Integrated with Local Wisdom to Increase Students' Learning Motivation

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Abstract: This research is based on the urgency of teaching materials or learning intermediaries. Considering that several factors make learning less than optimal, which has an impact on student motivation and learning outcomes. However, teacher and student statements emphasize that most of the learning is still emphasized on providing teacher-focused/centered theory. Hence, this research aims to develop Student Worksheets (LKPD) that focus on environmental pollution based on Problem-Based Learning (PBL) oriented to local wisdom, which is expected to increase student learning motivation. The research method used is research and development, which refers to the Borg & Gall procedure, which involves six stages: preliminary research, planning, initial product development, expert testing and initial field trials, revision of initial field trial results, and main field trials. The research design is to test a learning device product in the form of a Student Worksheet (LKPD) on environmental pollution based on local wisdom-oriented Problem-Based Learning (PBL) to identify things that need to be considered and completed in developing the Student Worksheet (LKPD). which is suitable for use. The data collection technique in this research is through giving validation sheets/questionnaires to material experts, design experts, and Biology subject teachers. Qualitative data analysis techniques and quantitative data analysis were used to process data based on validation results and trials on developing a Problem-Based Learning (PBL)-based Environmental Pollution Student Worksheet (LKPD) oriented to local wisdom. The assessment results from qualitative and quantitative data analysis obtained from material experts obtained an average of 3.68, design experts 3.33, first science teacher 3.35, second science teacher 3.27, and student responses 3.41, which included the criteria of Decent and Very Decent. Furthermore, product validity is based on the percentage score from material experts 92%, design experts 83.33%, first science teacher 83.75%, second science teacher 81.87%, and student responses 85.25%, which includes Very Good criteria. The implementation of the main field test showed an increase in student learning motivation in the experimental class by 0.52% and 0.42% in the control class. Therefore, broader research is needed to determine environmental pollution based on local wisdom.

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INTRODUCTION

Article 20 of the 20023 Law concerning the National Education System states that education is an aspect of development and is sometimes used as a guideline in advancing national development. Education is dynamic, through education we can strengthen or develop values that are in accordance with holistic human development initiatives. This statement is in accordance with the function and objectives of national education, namely: to educate the life of the nation by increasing abilities and creating empowered character and civilization, and aims to develop the potential to become individuals who believe and are devoted to God Almighty, have noble character, are physically and spiritually healthy, knowledgeable, capable, creative, independent, democratic, and responsible as citizens (Asmah, 2021). Ahmad Beni (2012) stated that education is essential for individual development and realization, especially for nation and state development. In line with the aim of national education, which is to

educate the life of the nation and state, schools, as formal educational institutions, have the responsibility to educate and guide students. In this way schools are expected to be able to improve students' abilities towards maturity and improve individual abilities optimally. Education is an effort to educate, guide, develop, influence, and direct with a set of knowledge (Adawiyah, 2021).

This research is based on the urgency of teaching materials or learning intermediaries. Bear in mind that several learning problems underlie this research, namely factors that make learning less than optimal and thus impact student motivation and learning outcomes. However, statements from teachers and students emphasize that most of the learning is still emphasized on providing teacher-focused/centered theory. Meanwhile, the use of teaching materials to support students in understanding the material, such as Student Worksheets (LKPD), is still underused. 95% of students also stated that Student Worksheets (LKPD) were rarely used in science learning, note-taking activities were occasionally carried out using the Student Worksheets (LKPD) that students purchased. As a result, the potential of Student Worksheets (LKPD) as a tool to improve students' understanding in science learning has not been fully utilized optimally. Moreover, learning methods still use lecture and note-taking methods more often than discussion and practice methods. Apart from that, the availability of facilities and infrastructure is also inadequate to support learning. During ongoing observations in the learning process, it was seen that students' learning motivation was still not optimal. Many students seem less enthusiastic about actively participating in learning. Students show signs of a lack of interest in asking questions or expressing opinions. This indicates that further efforts are still needed to increase students' learning motivation so that the learning process can occur more effectively.

According to Sugiyono (in Sari & Lepiyanto, 2016), Student Worksheets (LKPD) or in other words, Student Worksheets (LKS) or worksheets are a learning medium that can be used to support the student learning process, whether individually or in groups. They can build their own knowledge with various learning resources. The teacher plays more of a facilitator role, and one of the teacher's duties is to provide learning tools (including LKPD) that suit needs. Based on the explanation given by Sugiyono, it is clear that the importance of Student Worksheets (LKPD) for students is that they can be a tool to build their knowledge, whereas Student Worksheets (LKPD) are what the teacher will prepare.

Based on the previous explanation, researchers are trying to offer a solution through the development of teaching materials in the form of Student Worksheets (LKPD), especially in science learning material on environmental pollution based on Problem-Based Learning (PBL), which is oriented to local wisdom as an initial stage for students to increase motivation and facilitate the process. student learning. Ideal teaching materials not only present material in concise writing but are also able to motivate and are easy to apply in daily learning and will certainly be more interesting for students. Based on the problems and solution efforts offered, it is hoped that this can become a sustainable solution and joint effort to overcome related learning problems.

Student Worksheets (LKPD) are printed teaching materials containing questions and instructions that students must complete. Student Worksheets (LKPD) are learning tools that educators can use to increase student involvement and activity during the learning process. Preparing Student Worksheets (LKPD) aims to change learning conditions from Teacher-Centered to Student-Centered, increase student involvement or student activity in the teaching and learning process, and help educators direct students to find ideas (Lase & Lase, 2020). The structure of the Student Worksheet (LKPD), which has been determined by the Department of National Education (Depdiknas), consists of several components: 1) Title, 2) Study instructions, 3) Competencies to be achieved, 4) Supporting information, and 5) Tasks - tasks and work steps (Sari et al., 2019:56). Problem-Based Learning (PBL) learning stages according to Kunandar (Astuti, 2021), consist of five stages: 1) Problem Orientation, 2) Learning Organization, 3) Guiding individual or group investigations, 4) Developing and presenting student work, 5) Analyzing and evaluating the problem solving process. The advantages of Problem-Based Learning (PBL) are that it remembers better and improves students' understanding of teaching material, increases focus on relevant knowledge, encourages thinking, builds teamwork, leadership, and social skills, builds learning skills, motivates learners, and is realistic about students life (Rerung et al., 2017).

METHOD

Development Model

This research is a type of educational development research (Educational Research and Development). The procedure used in this research and development refers to the Borg & Gall model, which consists of 10 steps but is simplified to 6 steps based on the needs of the development being carried out. Researchers only looked at the validity and feasibility of the product based on the results of assessments from expert validators, looked at student responses to the Student Worksheet (LKPD) product that was developed, and assessed student motivation based on motivation questionnaires, which were strengthened by the learning results tests. In general, the product development procedures in this research can be described as follows: (1) Preliminary research/pre-survey. At this stage, information is collected and analyzed, defining existing problems in the field. The steps in this stage are literature study and field study. (2) Planning. At the planning stage, the product begins to be designed for Student Worksheets (LKPD) on environmental pollution based on Problem-based Learning (PBL) and is oriented toward local wisdom will be developed. (3) Initial model/product development, Initial model/product development is carried out to prepare Student Worksheets (LKPD) which are equipped with Learning Outcomes (CP), Learning Objectives (TP) to be achieved, Learning Objective Flow (ATP), instructions learning, material descriptions, and discussion materials in the form of group discussions (4) Expert testing and initial field trials. At this stage, validation is carried out by material experts, design experts, and science teachers. After the product was declared feasible and valid by experts, an initial field trial was then carried out on 20 class IX students at MTs NW Rumbuk. (5) Revision of initial field trial results. After conducting initial product trials on a small scale, an analysis of deficiencies in the product being developed is carried out, so that it is used as a material for improvement which aims to improve product quality to produce a more feasible and valid product before it is carried out. (6) Main field test, the product was tested again on a wide scale with control class and experimental class treatment by administering a motivation questionnaire to assess the increase in learning motivation of class VIII students at Mts NW Rumbuk

Data collection techniques in this research are in the form of questionnaires and tests. The validation questionnaire instruments used were according to the National Education Standards Agency (BSNP), student response questionnaires, learning motivation questionnaires, and learning outcomes tests. The questionnaire applied uses a checklist system with a rating scale using a Likert scale, which has categories from very good, good, not good, to very bad. Meanwhile, the assessment scale used in student questionnaires has different categories to suit the type of research criteria used, starting from strongly agree, agree, disagree, to strongly disagree.

Qualitative data analysis and quantitative data analysis techniques are used to process data based on the results of validation, trials, and main field tests. Based on Saputra, et. al. (2020), the Data Analysis of Validator Assessment Results and Student Responses is calculating the overall average score for each assessment component using a formula: $\bar{x} = \frac{\sum x}{n}$

Information: $\bar{x}$ = Average score for each assessment component
$\sum x$ = Total score for each assessment component
n = Number of validators

The scores obtained are then converted into five-scale qualitative data with the following formula.

Table 1. Qualitative Data Score Conversion Formula based on Validator and Student Responses

Formula	Category
$\bar{X} > Xi + 1{,}80\ SBi$	Very Eligible
$Xi + 0{,}60\ SBi < \bar{X} \leq \bar{X}i + 1{,}80\ SBi$	Eligible
$Xi - 0{,}60\ SBi < \bar{X} \leq Xi + 0{,}60\ SBi$	Moderately Eligible
$Xi - 1{,}80\ SBi < \bar{X} \leq Xi - 0{,}60\ SBi$	Ineligible
$\bar{X} \leq Xi - 1{,}80\ SBi$	Totally Ineligible

Information :

X : Average final score or actual score
X̄I : Average ideal score = ½ (ideal maximum score + ideal minimum score)
Sbi : Ideal standard deviation = 1/6 (ideal maximum score – ideal minimum score)

Ideal maximum score : The highest score
Minimum ideal score : The lowest score

The student learning motivation questionnaire was analyzed using the following formula (Afifah & Hartatik, 2019):

$$P = \frac{Total\ score\ acquired}{Maximum\ score}\ x\ 100$$

RESULT AND DISCUSSION

Based on research on the development of Student Worksheets (LKPD) on environmental pollution based on Problem-Based Learning (PBL) oriented to local wisdom to increase student learning motivation which has been carried out at MTs NW Rumbuk, results were obtained at each stage of the research using the Borg and Gall development model. This research and development only uses six (6) stages, namely: Initial information collection, planning, initial product development, small-scale trials, product revisions, and field trials.

1. Initial Information Gathering

The initial information-gathering stage aims to determine needs analysis and learning objective analysis through literature studies and field studies which are detailed as follows:

a. Literature Study

In this literature study, the first thing to do is curriculum analysis. Based on the information obtained, the school has started using the Merdeka curriculum. However, it has only been implemented in class VII, while class VIII and IX still use the 2013 curriculum.

Second, the results of material analysis based on Learning Outcomes (CP), Learning Objectives (TP), and Learning Objective Flow (ATP) show that there is a connection between the basic concepts of environmental pollution and the development of student competence in understanding and overcoming environmental problems. Learning Outcomes (CP) emphasizes students' awareness of the importance of maintaining, preserving, preventing, or overcoming environmental pollution. Meanwhile, the Learning Objectives (TP) are designed to ensure students are able to analyze environmental pollution that occurs along with its causes, impacts, and formulate effective solutions or actions to reduce the level of environmental pollution. The Learning Objectives Flow (ATP) then details the learning steps emphasizing practical skills, such as analyzing information and proposing solutions based on research or hands-on inquiry. Thus, the material analysis results show that the environmental pollution material not only focuses on theoretical aspects but also practical applications and sustainable solutions.

Third, material analysis is done by paying attention to several aspects, namely content, presentation, language, and of course, the learning model that researchers use in developing teaching materials, namely the Problem-Based Learning (PBL) learning model. In this case, the main material used is environmental pollution in the context of local wisdom.

Fourth, formulate Learning Objectives (TP) and Learning Objective Flow (ATP) to avoid deviations from the determined Learning Outcomes (CP). The learning objectives in this Student Worksheet (LKPD) on environmental pollution material are: 1) Students are able to identify the types of environmental pollution that occur based on pictures; 2) Students are able to identify environmental pollution based on observations in the surrounding environment; and 3) Knowing the causes of environmental pollution; 4) Knowing the impacts that occur due to environmental pollution; 5) Describe the role or actions that can be taken as a student in reducing environmental pollution (preserving the environment). Next, the Learning Objectives Flow (ATP) are: 1) Students identify types of environmental pollution based on pictures; 2) Students observe and determine environmental pollution problems that occur in the surrounding environment; 3) know and state the causes of environmental pollution; 4) know and explain

the impacts that occur due to environmental pollution; 5) know or describe efforts to protect and preserve the environment related to local wisdom.

b. Field Study

The field study aims to examine problems that occur in the learning process by giving questionnaires to students and teachers regarding problems found in learning so the following data is obtained:

1) When learning science, students occasionally only use purchased Student Worksheets (LKPD).
2) Learning is still more focused/centered on the teacher
3) Learning uses the lecture and note-taking method more often than the group discussion method.

Based on this, it is necessary to have a new development to help overcome the problems that occur, namely by developing Student Worksheets (LKPD) with material on environmental pollution based on Problem-Based Learning (PBL) and oriented to local wisdom to increase student learning motivation and involve students are active in the learning process. This Student Worksheet (LKPD) contains pictures/illustrations to clarify the meaning of the material presented, examples, and discussion material so that it can attract interest and increase students' motivation in learning through real environmental problems that are often found in the surrounding environment.

2. Planning

The explanation of this planning stage can be detailed about design of teaching material assessment instruments. The assessment instrument used is a questionnaire to assess the teaching materials developed, namely the Student Worksheet (LKPD) on environmental pollution based on Problem-Based Learning (PBL) oriented to local wisdom. The product assessment questionnaire is divided into four questionnaires with several statements about the product being developed. The four questionnaires were addressed to 1) the Material expert questionnaire, 2) the Design expert questionnaire, 3) the Science teacher questionnaire, and 4) the Student response questionnaire. This questionnaire is used as an assessment tool for teaching material products that are developed to determine product quality and the percentage of feasibility and validity so that they can be used in the learning process. The student motivation questionnaire instrument was also used to assess the increase in student learning motivation through the use of Problem-Based Learning (PBL)-based Environmental Pollution Student Worksheets (LKPD) oriented to local wisdom in the learning process.

3. Initial Product Development

The initial product development stage aims to produce a product based on the analysis results at the information-gathering and planning stages. In detail, it can be explained as follows:

a. Preparation of Teaching Material Development

The Student Worksheet (LKPD) on environmental pollution based on local wisdom-oriented Problem-Based Learning (PBL) is prepared with the following stages:

1) Writing Student Worksheets (LKPD) Based on Aspects of Material Content

In the Student Worksheet (LKPD) developed, the learning material is arranged systematically to facilitate students' understanding of environmental pollution. At the beginning, the details of Learning Achievements (CP), Learning Objectives (TP), and Learning Objective Flow (ATP) are explained on page IV. This section provides a general overview of the competencies students are expected to achieve. Furthermore, on page V, there are learning instructions that guide students in following the learning activities in the Student Worksheet (LKPD).

The discussion of environmental pollution begins with the topic of water pollution, which is discussed on pages 2 to 4. In this section, students are invited to understand the meaning, causes, impacts, and efforts to deal with water pollution. Then, proceed with soil pollution on pages 5 and 6, which explain the meaning, causal factors that influence soil quality, and negative impacts on the environment. Material regarding air pollution is discussed on pages 7 to 10, which also includes the definition, sources, impacts, and efforts that can be taken to overcome air pollution. Next, on pages 11 to 12, students learn about noise pollution, which includes the definition and sources, the impacts that can be caused, and, of course, efforts to minimize the occurrence of noise pollution. On page 13,

there is also a discussion regarding nature preservation efforts that can be carried out based on traditions and customary rules in Lombok, which emphasizes the importance of local wisdom in preserving the environment.

The discussion material section is on pages 14 to 16, which provides space for students to discuss and develop a deeper understanding of the topic of environmental pollution being discussed by presenting a series of questions that are discussed in group form about identifying environmental pollution that occurs based on pictures and observations in the surrounding environment, causes, impacts, and the role that can be played in maintaining or overcoming environmental pollution in school areas. The last section on page 17 provides assessment evaluation points to measure the level of students' affective and psychomotor abilities during learning.

2) Writing Student Worksheets (LKPD) Based on Presentation Aspects

Writing Student Worksheets (LKPD) is adapted to the structure of Student Worksheets (LKPD) to obtain an orderly and systematic arrangement, making it easier for students to use. The structure of the Student Worksheet (LKPD) consists of several components, namely:

a) Cover Page

On the cover page, there are several sections, including:

(1) The name of the teaching material being developed, namely the Student Worksheet written, is included as one of the product identities.
(2) The title contains the material in this Student Worksheet (LKPD), namely Environmental Pollution.
(3) There is a target for the Student Worksheet (LKPD), namely SMP/MTs equivalent to Class VIII.
(4) The name of the author and the name of the supervisor are included as identification marks for the compiler and supervisor in writing the Student Worksheet (LKPD).
(5) The cover illustration/image corresponds to the material used to reflect the content of the Student Worksheet (LKPD) material and make the cover more attractive.

b) Identity Page

The identity page contains the curriculum used, physical form, title, material, target, author's name, size, number of pages, printing, and the year the Student Worksheet (LKPD) was prepared.

c) The foreword contains expressions of gratitude, a general description of the Student Worksheet (LKPD), and the researcher's hopes for the reader.
d) The table of contents is created to make it easy for users to find the material points or images they want to address.
e) Description of Learning Achievements (CP), Learning Objectives (TP), and Learning Objective Flow (ATP), complete with learning instructions for teachers and students, in accordance with the material used in the Student Worksheet (LKPD).
f) Learning activities in the Student Worksheet (LKPD) contain:

(1) Material description is the main material presented and is equipped with illustrations/pictures to clarify the meaning of the material.
(2) Discussion materials contain questions and pictures regarding the material studied and are packaged based on the steps of the Problem-Based Learning (PBL) learning model in the form of group discussions
(3) The assessment evaluation table provides scores to all students individually during the learning process.
(4) The bibliography contains a list of sources used as references in preparing Student Worksheet (LKPD) products.
(5) The author's profile contains the author's personal identity as the compiler of the Student Worksheet (LKPD)

b. Development of Student Worksheet Assessment Instruments (LKPD)

The assessment instrument was developed after the Student Worksheet (LKPD) on environmental pollution based on local wisdom-oriented Problem-Based Learning (PBL) to increase student learning

motivation was completed. The instruments developed were questionnaires consisting of assessment questionnaires from material experts, design experts, science teachers, student response questionnaires, and student motivation questionnaires. The details of the questionnaire instrument are as follows:

1) Material Expert Assessment Questionnaire

   The material expert assessment questionnaire consists of 25 statements divided into three assessment aspects, namely the content suitability aspect composed of 10 statements, the presentation suitability aspect consisting of 5 statements, and the language suitability aspect composed of 10 statements.

2) Design Expert Assessment Questionnaire

   The design expert assessment questionnaire contains 15 statements containing aspects of graphic feasibility, which are divided into four parts, namely the size of the Student Worksheet (LKPD) consisting of 3 statements, the cover design consisting of 4 statements, the content design composed of 5 statements, and the image/ The illustration consists of 3 statements.

3) Science Teacher Questionnaire

   The assessment questionnaire by the science teacher consists of 40 statements, which are divided into four aspects, namely the content suitability aspect composed of 10 statements, the presentation suitability aspect consisting of 5 statements, the language suitability aspect composed of 10 statements, and the graphic suitability aspect consisting of 15 statements.

4) Student Response Questionnaire

   Student response questionnaires were created to find out students' responses to the products provided and have been used in learning trials. The student response questionnaire contains 30 statements.

5) Student Motivation Questionnaire

   The motivation questionnaire is used to measure the increase in student learning motivation through the use of Student Worksheets (LKPD) on environmental pollution material based on Problem-Based Learning (PBL) and oriented to local wisdom in the learning process, which is based on several indicators of learning motivation which include: 1) High learning activity consists of 4 statements; 2) Diligence in carrying out tasks consisting of 6 statements; 3) Tenacious in facing the exam consisting of 6 statement items; 4) The presence of information from the teacher consists of 4 statements; 5) There is feedback consisting of 6 statements; 6) The reinforcement consists of 4 statements, so that the total number of statements in the student learning motivation questionnaire is 30 questions.

6) Test

   This test was created to determine students' cognitive learning outcomes after using the Student Worksheet (LKPD) on environmental pollution based on local wisdom-oriented Problem-Based Learning (PBL). This test is used as a pre-test and post-test as secondary data, which is closely related to increasing student learning motivation.

4. Validation Stage

The validation stage aims to determine the suitability of the product before testing and whether the instruments that have been prepared are suitable for use in data collection. The student worksheet (LKPD) product assessment stage used a questionnaire involving two material expert lecturers and design experts at Hamzanwadi University, namely Dr. Marhamah, M. Pd and Dr. Muhammad Khairul Wazni, M.Pd and two science teachers at MTs NW Rumbuk, namely Siti Husnussyifa' S.Pd and Kuratul Aini, S.Pd. Further revisions were made based on consideration of comments and suggestions provided by the four validators as follows:

1) Initial Product Development Results

Based on related research, results were obtained at each research stage using the Borg & Gall model.

a. Material Expert Validation Results

Based on the assessment of the material expert (Dr. Marhamah, M.Pd), the following scores were obtained in Table 2.

Table 2. Material Expert Assessment

No.	Aspect	Eligibility		Criteria	Validity		Criteria
		Score	Average		Score	%	
1	Appropriateness of content	36/10	3,60	Eligible	36	90.00	Very Good
2	Appropriateness of presentation	19/5	3,80	Eligible	19	95.00	Very Good
3	Appropriateness of language	37/10	3,70	Eligible	37	92,50	Very Good

Obtaining assessment scores by material experts for each aspect of the assessment, which includes aspects of the appropriateness of content, aspects of appropriateness of presentation, and aspects of appropriateness of language, can be seen in the form of a diagram as follows:

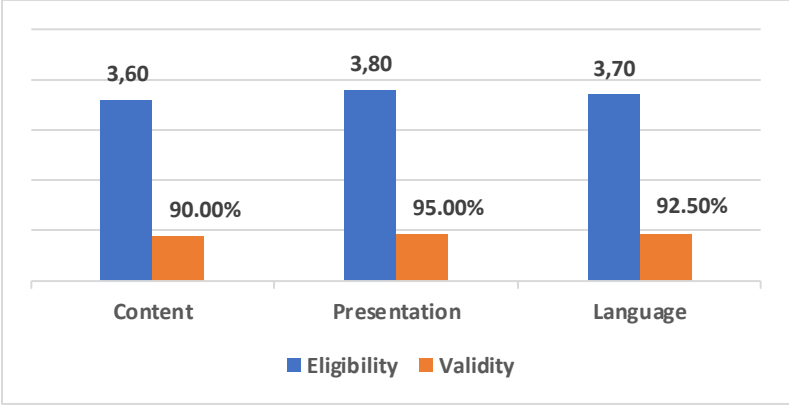

Figure 1. Material Expert Assessment Diagram

b. Design Expert Validation Results

Based on the assessment of the design expert (Dr. Muhammad Khairul Wazni, M.Pd), feasibility and validity scores were obtained for each aspect of the assessment, which can be seen in Table 3.

Table 3. Design Expert Assessment

No	Aspect	Eligibility		Criteria	Validity	Criteria	
		Score	Average		Score	%	
1	Size	9/3	3.00	Eligible	9	75.00	Good
2	Cover design	13/4	3,25	Eligible	13	81,25	Very Good
3	Content design	19/5	3,80	Very Eligible	19	95.00	Very Good
4	Images/ illustrations	9/3	3.00	Eligible	9	75.00	Good

Obtaining assessment scores by design experts on aspects of graphic feasibility, which include aspects of Student Worksheet (LKPD) size, cover design, content design, and images/illustrations, can be seen in diagram form as follows:

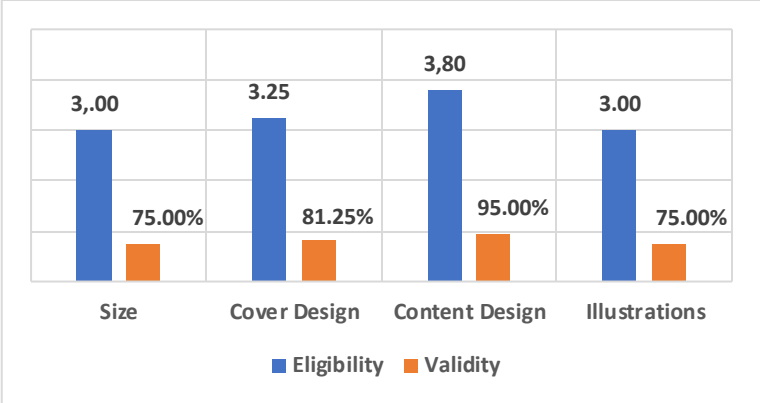

Figure 2. Design Expert Assessment Diagram

c. Validation Results of MTs NW Rumbuk Science Teachers

Validation was carried out by two science teachers at MTs NW Rumbuk based on aspects of appropriateness of content, appropriateness of presentation, appropriateness of language, and appropriateness of graphics.

(1) Science Teacher 1

Based on the assessment of the 1st Science teacher (Siti Husnussyifa', S.Pd), the scores obtained for each aspect are as follows:

Table 4. The Assessment of The 1st Science Teacher

No	Aspect	Eligibility		Criteria	Validity		Criteria
		Score	Average		Score	%	
1	Appropriateness of content	33/10	3,30	Eligible	33	82,50	Very Good
2	Appropriateness of presentation	15/5	3.00	Eligible	15	75.00	Good
3	Appropriateness of language	2/10	3,20	Eligible	32	80.00	Very Good
4	Appropriateness of graphic	54/15	3,60	Very Eligible	54	90.00	Very Good

The assessment scores obtained by the science teacher one on each aspect of feasibility, which includes aspects of appropriateness of content, aspects of appropriateness of presentation, aspects of appropriateness of language, can be seen in the form of a diagram as follows:

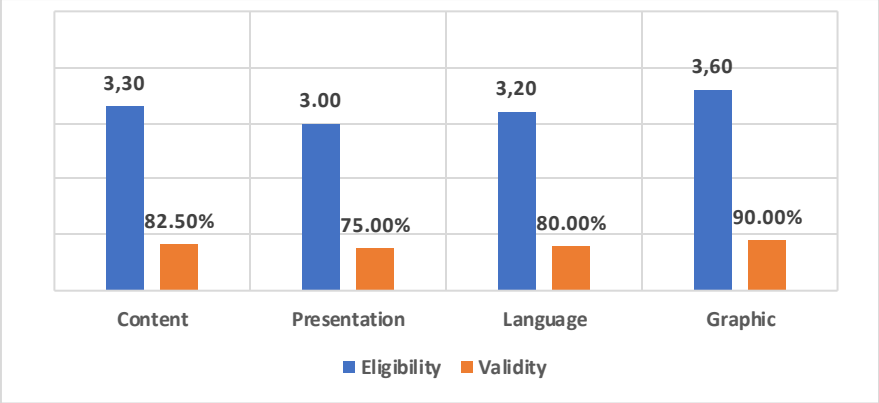

Figure 3. The Assessment of The 1st Science Teacher Diagram

(2) Science Teacher 2

Based on the assessment of the 2nd Science teacher (Kuratul Aini, S.Pd), the assessment scores obtained can be seen in Table 5:

Table 5. The Assessment of The 2nd Science Teacher

No	Aspect	Eligibility		Criteria	Validity		Criteria
		Score	Average		Score	%	
1	Appropriateness of content	32/10	3,20	Eligible	32	80.00	Very Good
2	Appropriateness of presentation	16/5	3,20	Eligible	16	80.00	Very Good
3	Appropriateness of language	29/10	2,90	Eligible	29	72,50	Good
4	Appropriateness of graphic	51/15	3,40	Very Eligible	51	85.00	Very Good

The assessment scores obtained by the 2nd Science teacher on each aspect of feasibility, which includes aspects of appropriateness of content, aspects of appropriateness of presentation, aspects of appropriateness of language, can be seen in the form of a diagram as follows:

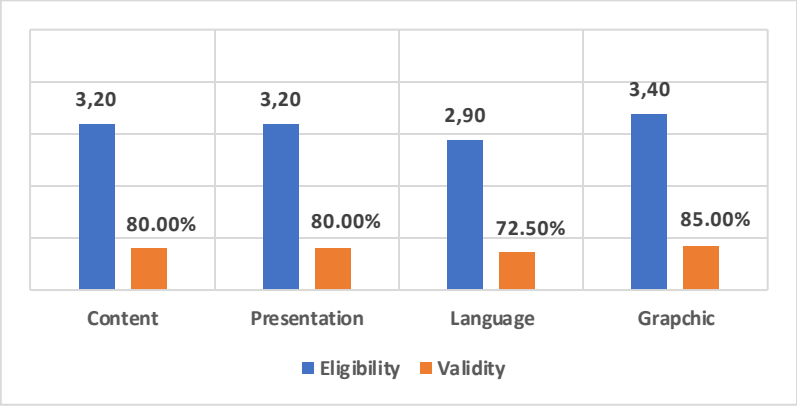

Figure 4. The Assessment of The 2nd Science Teacher Diagram

d. Student Response Questionnaire Results

Based on the student response questionnaire, scores were obtained, which can be seen in Table 6.

Table 6. Results of The Student Response Questionnaire

Student Response Questionnaire	
Eligibility	Validity
3.41	85.25%

Based on the results of student responses, an average feasibility score of 3.41 was obtained, which is included in the Very Eligible criteria. Meanwhile, the product validity percentage was received at 85.25%, including the Very Good criteria, which is presented in Figure 5.

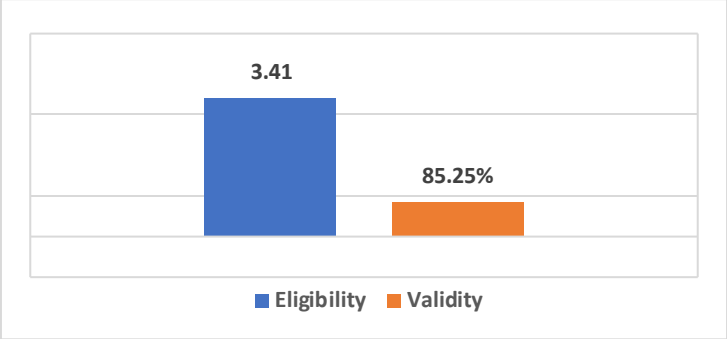

Figure 5. Diagram of The Student Response Questionnaire Results

5. Product Trial Results

a. Results of Experiment Class Students' Learning Motivation Questionnaire

Based on data on student learning motivation in the experimental class with a total of 21 students and 30 statement items, it shows that the percentage of learning motivation that students had before learning was 66.27%, whereas after learning using Student Worksheets (LKPD) environmental pollution based on Problem-Based Learning (PBL) oriented towards local wisdom experienced an increase of 66.79%.

Table 7. Experimental Class Students' Learning Motivation

Students' Learning Motivation	
Before	After
66.27%	66.79%

Based on the percentage of experimental class students' learning motivation in Table 8, the total increase in students' learning motivation after learning was 0.52%.

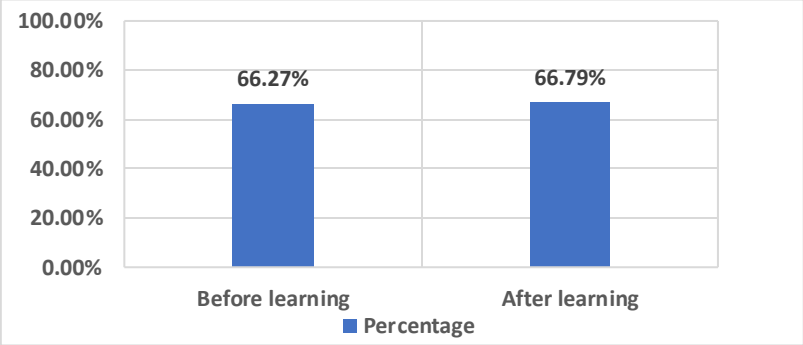

Figure 6. Diagram of Data Analysis Results of Experimental Class Students' Learning Motivation

b. Results of the Control Class Students' Learning Motivation Questionnaire

Based on data on student learning motivation in the control class with the number of students involved, namely 16 people with 30 statement items, it shows that the total percentage of learning motivation that students had before learning was 71.40%, then after learning using conventional methods (not given special treatment/not using LKPD) experienced an increase with an average of 71.82%.

Table 8. Control Class Students' Learning Motivation

Students' Learning Motivation	
Before	After
71.40%	71.82%

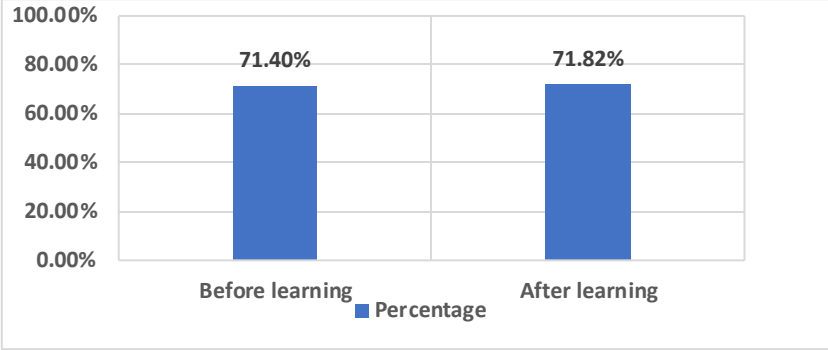

Figure 7. Diagram of Control Class Students' Learning Motivation

Based on the percentage of control class students' learning motivation in Table 8, the total increase in students' learning motivation after learning was 0.42%.

CONCLUSION

Based on the research and development results, it can be concluded that the Student Worksheet (LKPD) on environmental pollution based on local wisdom-oriented Problem-Based Learning (PBL) has proven eligible and valid for use as teaching material in increasing student learning motivation. This is supported by validation results, which show that the Student Worksheet (LKPD) developed meets the eligible and very good criteria according to validators and science teachers and gets a positive response from students. The application of Student Worksheets (LKPD) shows an increase in student learning motivation, although the difference is not very significant compared to conventional methods. This indicates that the use of Student Worksheets (LKPD) on environmental pollution based on local wisdom-oriented Problem-Based Learning (PBL) can be a solution in overcoming learning problems that are still predominantly teacher-centered and do not utilize learning methods that actively involve students. Although the results of increasing learning motivation are not very large, this research provides a strong basis for further development in improving design and implementing more varied learning strategies. This research also emphasizes the important role of local wisdom in education, bringing students closer to the realities of everyday life and helping them understand and appreciate local culture.

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