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Development of Problem-Based Learning-Based Student Worksheets to Improve Elementary School Student Learning Outcomes

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Abstract

Objective: This study aims to develop a Problem-Based Learning (PBL)-based Student Worksheet (LKPD) on the topic of words and syllables to improve the learning outcomes of third-grade students in Indonesian language learning. **Novelty:** The developed LKPD integrates the PBL approach into Indonesian language lessons, offering an innovative learning medium tailored for elementary school students. **Methods:** The research used a Research and Development (R&D) design with the 4D model (Define, Design, Develop, and Disseminate). Subjects included 20 experimental and 20 control class students each from SDIT Harapan Bangsa, SDIT Rasyid Sedayu, and SD Negeri 1 Merak Batin. Data were collected through questionnaires, observations, tests, and documentation, then analyzed using descriptive quantitative and qualitative methods. **Results:** Expert validation showed high feasibility, with scores of 89.3 (material expert), 98 (media expert), and 76 (language expert), averaging 87.76 (very valid). Practicality tests yielded an average of 92 from teachers and 94 from students (both very practical). The N-Gain test indicated moderate effectiveness: 0.68 (SDIT Harapan Bangsa), 0.67 (SDIT Rasyid Sedayu), and 0.65 (SD Negeri 1 Merak Batin). The independent t-test showed a significance value of 0.000 < 0.05, confirming a significant difference between control and experimental classes. **Conclusions:** The PBL-based LKPD on words and syllables is highly valid, very practical, and moderately effective, making it a promising innovative medium to enhance elementary students' learning outcomes.

Keyword: Worksheet, Problem Based Learning, Learning Outcomes

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INTRODUCTION

The development of the industrial revolution 4.0 is now leading to the use of intelligence engineering and the internet of things as the basis for the movement and connectivity of humans and machines, many of the changes that have resulted from this are in terms of information technology. (Robbani et al., 2024) , communication and other efforts are being carried out by the Indonesian government in moving towards the era of the industrial revolution 4.0 which has major challenges. (Wiratama & Abadi, 2022 & Sa-Ngiemjit et al., 2025) , The educational aspect plays a very important role in preparing the generation to face the challenges of progress in the industrial revolution 4.0 era. (Hartono et al., 2025) . The era of the Industrial Revolution 4.0 brings its own demands to the world of education (Sabaruddin, 2022 & Sofyan & Komariah, 2016) .

Education is one way to complement the digital integration phenomenon where machines and humans are connected to solve problems in the discovery of new theories. (Kabassova et al., 2025) , Education 4.0 as a converter of information in a practical and digital-based way (Ponnusamy & Raman, 2024) . However, the digitalization program also has a negative impact on the environment. (Sola & Ojo, 2025) , The negative impact of the digitalization program is that the role of humans is taken over by machines which results in the number of unemployed people increasing, teachers and students not only compete with the intelligence of other humans but also have to compete with machines or robots, educational institutions must be able to always support their teaching and learning process in integrating more innovative methods, preparing competent and creative personnel in their fields is the task of education (Sabaruddin, 2022) .

In order to support good learning outcomes and optimize the learning process, teaching materials that are appropriate to the needs of students are needed. Teaching materials can be used in the form of Student Activity Sheets (LKPD). LKPD is defined as printed teaching materials in the form of sheets of paper containing materials, summaries, and instructions for implementing learning tasks that must be carried out by students referring to the Basic Competencies (KD) that must be achieved (Effendi et al ., 2021) , as well as being a solution for Student Activity Sheets (LKPD). (Esterlina et al ., 2019) .

Considering the importance of teaching materials in learning, it is necessary to pay attention to the quality Good from aspect content, Language, element graphics, illustration and its development methods. Student activity sheets (LKPD) are one of the teaching materials which contain instructions, materials and learning steps. functions as a guide for students in carrying out the learning process. Through LKPD, students' activities, creativity, critical thinking, and learning outcomes in learning can be improved, then the delivery of lesson material can be made easier with LKPD.

In their capacity as educators, educators are required to be able to provide an alternative to LKPD which can support the growth of activity learning Which centered on participant educate, and meet the demands of 21st century learning, namely communication, collaboration, critical thinking and creativity. One learning model that can meet these demands is model project-based learning, matter This in line with Ministry of Education and Culture No. 65 of 2013 states that to encourage students to produce contextual work, both individually and in groups, it is highly recommended to use a learning approach or model. Problem-based learning.

LKPD based on problem based learning is a solution that can be applied and developed to improve learning outcomes aimed at updating Indonesian language subjects in schools (Ariyani & Kristin, 2021) . The steps in problem based learning are: a) Orienting students to contextual problems; b) Organizing students to research by helping students define and

organize learning tasks related to problems; c) Directing students to solve problems, by motivating students to find the right information, to conduct experiments, and to seek explanations and solutions; d) Improving and presenting problem-solving results; e) Analyzing and evaluating the process and results of problem solving (Supriatna et al ., 2022 ; Rosana et al., 2022; Yusita et al., 2021 & Putri et al., 2020) .

problem-based learning model and learning outcomes is that when students are faced with solving the given problem, students will use their thinking as their initial knowledge and can provide a simple explanation. (Marzuki & Silvia, 2023 & (Zulfi et al., 2021) . The results of the problem-solving analysis are then connected to the previously explained theory. Next, students are required to explain further until they can find an argument. In the final stage, to support critical thinking, students draw conclusions from their findings and solve the problem. (Meilinda et al., 2024) .

LKPD based on problem based learning to improve student learning outcomes is suitable for use (Pranata et al., 2021 & Purwaningsih, 2023) , this is in accordance with preliminary research conducted by Mubin and Aryanto in 2024, so it is necessary to provide guidance from the elementary or elementary school (SD) level to improve the learning outcomes of elementary school students in Indonesian language subjects, because basically students experiencing learning difficulties will affect student learning achievement (Mubin & Aryanto, 2024) . Then it was reaffirmed by research conducted by Citra Gustianti and Sujarwo in 2021 showing that the use of LKPD based on problem-based learning in elementary schools significantly improved student learning outcomes compared to traditional methods. This study also found that students who used problem-based learning (LKPD) more able to solve problems in a creative and effective way (Huda et al., 2024) (Uliyandari et al., 2021) , Therefore, identifying learning difficulties is the first step in a series of processes to cure students' learning difficulties and improve student learning outcomes (Sujarwo, 2021) .

In relation to preliminary research, Indonesian language learning in elementary schools (Wiyono et al., 2025) is a very important thing to improve learning outcomes. (Noprinda & Soleh, 2019 & Puspita & Dewi, 2021) , self-learning outcomes are important in efforts to see students' learning success. (Ahmad et al., 2024) . where the learning outcomes of Indonesian language subjects, namely the final results obtained by elementary school students after participating in the learning process which includes cognitive, affective, and psychomotor learning outcomes, tend to be low (Wicaksono & Iswan, 2019) .

In order to support the reasons for the importance of this research, the researcher conducted a preliminary study by distributing questionnaires via Google Form to educators in the Natar area in the Nusa Indah Cluster. Several problems were found, namely Teacher Center Learning (TCL) learning, characterized by teachers dominating learning activities , 54% of students' learning outcomes in grade 3 in Indonesian language subjects had not reached the KKM, based on (Depdiknas, 2006) This percentage of incompleteness is relatively low because ideally learning is said to be successful if at least 75% of students are able to achieve the minimum completion criteria. (Effendi et al ., 2021) . A percentage of 65.2% of teachers have not been able to make LKPD based on Problem Based Learning, the language style available in LKPD at school does not use interactive language.

There is a gap in the mindset of teachers and students, that for teachers, Indonesian language material is not a difficult lesson, but this is different from the conditions of students' understanding which is proven by learning outcomes, and 100% of teachers agree to the development of LKPD based on Problem Based Learning to improve student learning outcomes in Indonesian language subjects in grade 3 of elementary school.

Based on the analysis of the problem, the researcher tries to meet the needs of students, in this case, he will innovate by developing LKPD based on Problem Based Learning to improve students' learning outcomes in the Indonesian language subject for grade 3 of elementary school. This development research is entitled "Development of LKPD Based on Problem Based Learning to Improve Students' Learning Outcomes in the Indonesian Language Subject for Grade 3 of Elementary School".

METHODS

The research method uses Research and Development (R&D) with model 4D with 4 steps, namely define, design, development, and dissemination. The population of this study were third-grade students of public/private elementary schools in the Natar area in the Nusa Indah Cluster. The research sample was a small portion of the population of third-grade students in elementary schools throughout the Nusa Indah Cluster of Natar. Therefore, the sampling technique used was random sampling, which is random sampling. Then the sample was selected randomly with the subject study consists of from 20 participant educate class experiment And 20 class control at SDIT Harapan Bangsa, 20 participant educate class experiment And 20 class control at SDIT Rasyid Sedayu, and 20 participant educate class experiment And 20 class control at SD Negeri 1 Merak Batin. Data were collected through questionnaires, observations, tests, and documentation, then analyzed descriptively quantitatively and qualitative.

RESULTS AND DISCUSSION

The purpose of this research and development is to produce a valid, practical, and effective Problem Based Learning- based Student Worksheet (LKPD) in Indonesian language learning in improving the learning outcomes of third-grade students at SDIT Harapan Bangsa, SDIT Rasyid Sedayu, and SD Negeri 1 Merak Batin. The development model used in this research is the 4-D development model which goes through four stages consisting of define, design, develop, and disseminate.

The reason researchers used the 4-D development model in this study is because it was systematically designed to produce valid, practical, and effective educational products. The results of each 4-D stage can be explained as follows.

1. Define (Definition)

Stage define in model development 4D is step beginning Which aim to determine and formulate basic needs in development. In the form of curriculum analysis, analysis of student characteristics, then formulating objectives

2. Design (Design)

Planning LKPD based on Problem Based Learning in this study includes several steps: formulating ATP in accordance with the independent curriculum, determining appropriate assessment tools—namely formative assessment conducted at the end of the lesson to measure the success of the teaching and learning process—and compiling the material.

3. Development (Development)

The development stage of problem-based learning (LKPD) is a crucial process aimed at producing valid, practical, and effective learning tools. At this stage, the initial LKPD design that has been prepared previously begins to be developed into a tangible product that is ready

for use. Product development is carried out in accordance with the LKPD framework in problem-based learning that has been prepared with an initial product draft. The following is an overview of the development of LKPD in problem-based learning. based learning.

Figure 1. Overview of LKPD Development in Problem-Based Learning.

Then the evaluation is carried out through several main steps which include expert validation, and product practicality testing, and product effectiveness testing which can be seen below.

4. Validation test

Initial testing was carried out to assess the readability and validity of the developed product before its implementation in learning activities. The validation process involved material, language, and media experts, whose comments and suggestions were used to determine whether the product was suitable and aligned with the skills to be measured."

Table 1. Summary Results from Validation Experts

Validation Expert	Mark	Average	Information
Subject Matter Expert	89.3	87.76	Very Valid
Media expert	98		
Linguist	76		

Based on the recapitulation results from material experts, media experts and language experts, the average score was 87.76, so the LKPD based on problem-based learning was declared very valid. Then the researcher conducted a practicality test. The data results from the questionnaire were responses from 9 students, which obtained a maximum of 94 practicality scores for Problem Based Learning- based LKPD for students who were explored in the learning process.

Table 2. Percentage of Student Answers Using the Scale

Name	Attraction	Convenience	Benefit	Total average
SDIT Harapan Bangsa	94	100	94	96
SD IT Rasyid Sedayu	94	100	94	94
SDN 1 Merak Batin	83	94	100	92
Average	90	98	96	94

The data results from the questionnaire are the teacher's responses obtained in the form of a study of the practicality of LKPD based on Problem Based Learning for students which is explored in the learning process. Based on the practitioner validation assessment above, the results obtained in the aspects of material, language, module presentation, graphics and proportional margin printing obtained an average of 92 with a very practical classification.

Table 3. Percentage of Teachers' Answers Using the Scale

Name	Attraction	Convenience	Benefit	Total average
SDIT Harapan Bangsa	94	100	94	96
SD IT Rasyid Sedayu	94	100	94	93
SDN 1 Merak Batin	83	83	100	88
Average	90	94	96	92

Problem-based learning (LKPD) products can be determined from a number of effectiveness tests conducted by students. This testing was conducted using pretests and posttests at three schools: SDIT Harapan Bangsa, SDIT Rasyid Sedayu, and SD Negeri 1 Merak Batin, adapted to the The comparative presentation of the effectiveness test results is as follows.

Table 4. Normality test

School name	control		experiment	
	pretest	posttest	pretest	posttest
SDIT Harapan Bangsa	0.816	0.820	0.970	0.815
SD IT Rasyid Sedayu	0.849	0.840	0.801	0.948
SDN 1 Merak Batin	0.815	0.848	0.929	0.974
Information	Normal	Normal	Normal	Normal

Table 5. Homogenity test

School name	Significant	information
SDIT Harapan Bangsa	0.77	Homogeneous
SD IT Rasyid Sedayu	0.33	Homogeneous
SDN 1 Merak Batin	0.54	Homogeneous

Table 6. Independent t-test

School name	Post-test of control class		Post-test of experimental class	
	Mean	Significant	Mean	Significant
SDIT Harapan Bangsa	66.60	0,000	88.35	0,000
SD IT Rasyid Sedayu	65.10	0,000	87.80	0,000
SDN 1 Merak Batin	65.60	0,000	87.15	0,000
Information	are differences between groups posttest of control class and posttest of experimental class.			

Table 7. N-Gain

School name	Average Pre-test (Experiment)	Average Posttest (Experiment)	Average N-Gain	information
SDIT Harapan Bangsa	73.3	88.3	0.68	Quite effective
SD IT Rasyid Sedayu	72.2	87.4	0.67	Quite effective
SDN 1 Merak Batin	71.7	87.1	0.65	Quite effective

School name	Average Pre-test (Control)	Average Post-test (Control)	Average N-Gain	information
SDIT Harapan Bangsa	64.85	66.3	0.29	Less effective
SD IT Rasyid Sedayu	63.8	65.1	0.15	Less effective
SDN 1 Merak Batin	63.4	65.6	0.30	Less effective

5. Disseminate

The dissemination stage in the development of LKPD based on problem-based learning is the final stage of the 4-D model development process which seeks to convey and introduce the results of LKPD development to relevant parties, such as teachers, schools, lecturers, students, and other educational communities.

CONCLUSION

The developed problem-based learning (PBL) LKPD product is declared very valid for use, as shown by expert validation results: 89.3 from material experts (very valid), 98 from media experts (very valid), and 76 from language experts (valid), with an average score of 87.76 categorized as very valid. The LKPD is also considered very practical, since teachers can directly use it in class following the PBL syntax—problem orientation, data collection, data analysis, solution proposals, and conclusions—without needing to compile additional materials. For students, the LKPD employs simple and communicative language supported by attractive illustrations, which facilitates independent or group learning. Its effectiveness is demonstrated by N-Gain values from several schools: 0.68 at SDIT Harapan Bangsa, 0.67 at SDIT Rasyid Sedayu, and 0.65 at SD Negeri 1 Merak Batin, all categorized as moderate improvements in the experimental classes, while control classes showed lower gains (0.29, 0.15, and 0.30, respectively). These results indicate that the PBL-based LKPD effectively improves grade III elementary school students' learning outcomes.

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