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Effectiveness of Student Worksheets Based on the Kudus Local Wisdom for Elementary School Students

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Abstract: This purpose of the research is to determine the effectiveness of the Student Worksheet (LKPD) based on Kudus Local Wisdom in increasing students' understanding of concepts. The research method used is the 4-D development method which consists of 4 stages, namely the definition, planning, development and dissemination stages. The data collection technique used used were interviews, observations and tests. The data analysis technique used in this research was based on validation tests. The average percentage of validation results from media experts showed that 81.24% were declared very feasible, validation results by material experts showed that 85.7% were declared very feasible. Increasing students' understanding of concepts before and after being taught using LKPD received an N-gain of 0.452. This means that Student Worksheets (LKPD) Based on Kudus Local Wisdom are valid and effective for use in improving mathematics understanding of fourth grade elementary school students.

Keywords: Student worksheet, understanding concept, local wisdom

1. Introduction

Understanding concepts is an important aspect in developing students' abilities in learning mathematics (Atmadja, 2021). This agrees with (Jacques, 2015) that mathematics is a hierarchical subject where knowledge of a topic is a continuation of the previous topic so that students must be able to understand new knowledge by having pieces of information about previous knowledge. Understanding mathematical concepts should have been instilled in students since elementary school, because in elementary school students begin to understand learning concepts (Tahir & Marniati, 2022). Learning mathematics in elementary school is the basis for applying mathematical concepts at the next level. Therefore, in implementing mathematics learning in elementary schools, students should be able to organize and lay the foundation for students' mathematical knowledge, which can help clarify problem solving in everyday life (Wulandari, 2017).

One of the determinants of the success of learning in the classroom is the use of learning media, media helps concretize concepts or ideas and helps motivate active learning participants (Pratama & Siregar, 2019). This agrees with Zahro et al. (2017) that for students media can be a bridge. to think, understand concepts and act. Student Worksheets are a collection of basic activities that must be carried out by students to maximize understanding in an effort to form basic abilities according to the learning achievement indicators that must be taken (Al-Tabany, 2017). Based on the previous explanation, we can understand that to achieve a good understanding of concepts, media is needed in the form of structured and concise Student Worksheets so that it makes it easier for students to learn.

One of the student worksheets that can facilitate students' needs to increase students' understanding of mathematical concepts is developing student worksheets based on local wisdom. Local wisdom-based education is education that teaches students to always be attached to the concrete situations they face (Pingge, 2017). Local wisdom can support the delivery of material as well as introduce local wisdom values in the local area. Thus, mathematics learning based on local culture can provide meaningful learning and can be used as a contextual learning resource. However, currently very few schools implement learning that links local wisdom so that students are less familiar with the local wisdom in their area.

Based on the results of interviews conducted by researchers at SDN 3 Bae Kudus, several problems were found in learning, namely that teachers had never used teaching materials that were linked to local wisdom, apart from that, many students thought that mathematics was rote learning, so students found it difficult and were less interested in learning.

The problems obtained from the interview results make researchers need to develop student worksheets that is in accordance with Kudus local wisdom in mathematics learning to help students get to know the local wisdom that exists

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in their area and can help make it easier to understand mathematical concepts because the material and questions given are close to the students. . In this study, the researcher chose the local wisdom of the area where the students lived, namely the city of Kudus. The Kudus local wisdom taken by researchers is a tangible form of local wisdom, namely the Kudus tower and the Al-Aqsa mosque. The choice of local wisdom certainly has reasons for researchers, namely because the Kudus tower and the Al-Aqsa mosque are historical places for the development of the Islamic religion in the Middle Ages.

Another problem encountered is the relatively low ability to understand mathematical concepts. The teaching materials used in schools today are very simple and do not emphasize processes and the material is presented very instantaneously without detailed explanations. Based on this background, the researcher aims to produce student worksheets that can be effectively used to increase understanding of mathematics concepts for elementary school students.

Student Worksheets are a learning resource in the form of assignment sheets, instructions for carrying out assignments, learning evaluations that must be carried out by students which are made in accordance with the flow of learning objectives (ATP) that must be achieved (Pawestri & Zulfiati, 2020). The LKPD used should be made as interesting as possible and can address real problems according to students' experiences. This can be done by using real context in everyday life such as local local wisdom in each region (Saputri et al., 2022). Compile good student worksheets by paying attention to language use, sentence structure, vocabulary, level of difficulty, and clarity that students understand and evaluation questions that are tailored to learning objectives (Ambarmaya, 2019).

Njatrijani (2018) states that local wisdom is a view of life and knowledge as well as various life strategies in the form of activities carried out by local communities in responding to various problems in meeting their needs. Apart from that, local wisdom is an idea that arises and develops continuously in a society in the form of customs, values, rules, culture, language, beliefs and daily habits (Pingge, 2017).

Raharjo and Sulaiman (2017) states that understanding concepts is a student's ability in the form of mastering a number of subject materials, but being able to express them again in another form that is easy to understand, providing interpretation of data and being able to apply concepts that are in accordance with their cognitive structure. Conceptual understanding is a student's ability to understand the content of the lesson material and be able to explain again in his own language what knowledge he has gained and be able to apply it in solving problems. This research was conducted to determine the effectiveness of student worksheets (LKPD) in mathematics learning in grade 4 elementary schools. The results of data collection will be used to produce products and test product effectiveness to improve the learning process..

2. Methodology

The method used in this research is R&D (Research and Development) with reference to the 4D model development research design (Four D Models according to Thiagarajan. Fig. 1 shows the steps for the development model of Thiagarajan (1974).

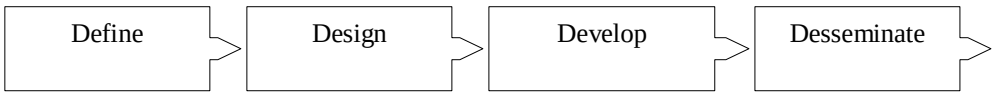

Fig. 1. Four D model

The subjects in this research were obtained directly, the researcher took 4th grade students at Bae Kudus Elementary School 3. The researcher chose this school because the school had never used student worksheets (LKPD) based on Kudus local wisdom. The research instruments used in this research consisted of observation, interviews, and concept understanding ability tests.

Data analysis in this research was obtained from quantitative and qualitative data from validation sheets which had been checked by experts. In this study, researchers used media experts and material experts. Qualitative data analysis was carried out by validators assessing the LKPD developed on the validation sheet that had been prepared by the researcher. The results of data analysis are used as a reference for improvements to the student worksheets being developed. The validation results can be calculated using the formula according to Sugiyono (2013).

$$P = \frac{\sum X}{N} \times 100\% \qquad (1)$$

Description:
P = Obtaining validation results
∑X = Selected score
N = Ideal score

The results of the feasibility calculation for the product being developed will be matched with the product feasibility criteria according to Sugiyono (2013) in Table 1. The student worksheets are said to be suitable for use if the total average meets the 50% achievement results with appropriate information.

Table 1. Persentase product suitability

Mean	Description
<35%	Not Feasible
35% - 49%	Not Eligible
50% - 75%	Eligible
76% - 100%	Very Eligible

The effectiveness of the student worksheets is determined based on the results of the pretest and posttest according to predetermined assessment guidelines. These results will be analyzed using N-gain which is expressed in the following formula.

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$$N_{gain} = \frac{X_{post} - X_{pre}}{X_{\max} - X_{pre}} \qquad (2)$$

Description:
N_{gain} = normalized gain score
X_{post} = posttest score
X_{pre} = pretest score
X_{max} = ideal score.

Table 2. N-Gain value criteria description

N-Gain Value	Criteria	Description
(g) ≥ 0.7	Tall	Very effective
0.3 ≤ (g) < 0.7	Currently	Effective
(g) < 0.3	Low	Less effective

3. Results and Discussion

This research produces LKPD based on Kudus local wisdom. The process of producing the LKPD is carried out through several stages as follows. The literature study was carried out by reviewing theories regarding Student Worksheet (LKPD) theory and local wisdom through articles in journals. Based on observations, interviews and comprehension tests, the next step is to formulate goals, formulate material, choose media, and prepare supporting tools. The aim formulated in the development of this student worksheets is to increase understanding of the concepts of Grade IV Mathematics content with a student worksheets design based on local wisdom in Kudus. Determining the learning material in the development of this student worksheets is the material in class IV with Chapter 12 Broad mathematics content which is integrated with Kudus local wisdom. The researcher concluded that the aim of this research was to improve the ability to understand broad mathematical concepts.

Selecting suitable material to present in making learning media in the form of student worksheets using local local wisdom. The topic chosen and developed by researchers is the area of squares and rectangles in class IV elementary school. In connection with this, consultations have been carried out with class IV teachers at SDN 3 Bae.

The format for developing student worksheets is structured into several components, namely 1) Title, 2) About the Book, 3) Table of Contents, 4) ATP and Instructions, 5) practice activities, 6) evaluation questions, 7) Key Answer, 8) Glossary. This student worksheets is presented in accordance with understanding mathematical concepts and is equipped with interesting pictures and illustrations.

The initial design of this student worksheets was made using the Microsoft Word application and printed on A4 size paper. The initial results are a draft student worksheets on the area of flat shapes based on local wisdom, where this student worksheets contains 2 sub-chapters, namely square area and rectangular area. The components in the student worksheets consist of the title, about the book, table of contents, ATP, instructions for use, work steps and evaluation questions. The local wisdom in this student worksheets is taken from the Kudus area, which includes the historic Kudus Tower building and the Kudus Al-Aqsa mosque.

This development stage is carried out with validation tests carried out to produce the final form of teaching materials in the form of student worksheets after going through revisions based on input and suggestions from experts. Draft student worksheets is given to media experts and material experts. Each expert is given a draft along with a student worksheets validation sheet which is filled in by ticking the appropriate value scale to test the validity of the LKPD and is equipped with input and suggestions from experts. The percentage of student worksheets validity criteria for each media expert obtained an average percentage of 81.24 (feasible) and material experts obtained an average percentage of 85.7 (very feasible). The LKPD has met the appropriate criteria and is very suitable so it can be used but requires a few minor

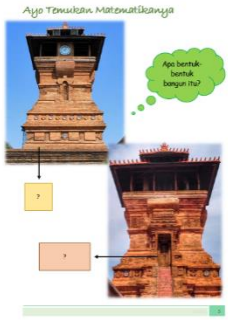
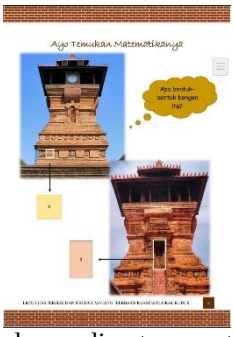
revisions. Furthermore, if the LKPD can be used in conducting research by conducting limited trials. The following is a recapitulation of the LKPD assessment by the validator.

Table 3. Data validity analysis results

Validator	Value	Criterion
Media	81.24%	Eligible
Material	85.70 %	Very Eligible

Based on the suggestions obtained from the validator, they are then used as revision material with the aim of making the product even better. The following are improvements that researchers have made based on suggestions and comments from experts.

Table 4. Revision results according to expert suggestions

Before Revision	After Revision
	
Fix an attractive cover	Cover repaired according to expert advice
	
Add help lines	Repaired according to expert advice
	
The layout contains empty space	Repair as suggested

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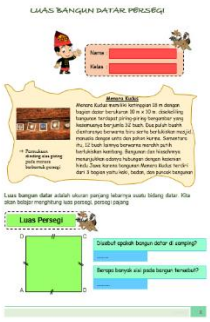

The relationship between the Kudus Tower and flat building elements

Added information about the connection between the Kudus Tower and flat building elements

After carrying out a practicality test, the next step is an effectiveness test to prove that the student worksheets based on Kudus local wisdom is effective for use in learning using the n-gain objective. At this stage, before learning, the experimental class and control class have carried out a pretest. Then do a posttest after learning. The gain results are as follows.

Table 5. N-Gain test results

Class	Average		N-Gain
	Pretest	Posttest	
Experiment	49,3	71,8	0,452
Ccontrol	48	67,8	0,38

Based on this data, the experimental class got a pretest average of 49.3. After being given learning treatment using student worksheets based on local wisdom in Kudus, there was an increase and obtained a posttest average of 71.8. This shows that the increase in the experimental class was 0.452. Meanwhile, for the control class, the pretest and posttest scores increased by 0.38. This means that the use of student worksheets based on local Kudus wisdom is effectively used to increase the concept understanding of fourth grade elementary school students (Febriani et al., 2022).

4. Conclusion

Based on the results of research conducted by researchers, it can be concluded that learning using students' worksheets based on local wisdom in Kudus is effective and increases the understanding of mathematical concepts for class IV students regarding the area of flat shapes. The effectiveness of the student worksheets can be seen based on the pretest and posttest scores for understanding mathematical concepts. Based on the results of the N-gain calculation, the experimental class got 0.452 while the control class got 0.38. This shows that the score for understanding mathematical concepts in the experimental class which was taught using student worksheets based on Kudus local wisdom was better than the control class. So the use of student worksheets based on local wisdom in Kudus is effective in increasing the understanding of mathematics concepts for class IV students at SD 3 Bae Kudus. Apart from that, concepts are very important for students in understanding the material in learning, therefore providing practice questions that are related to everyday life and emphasizing questions about understanding concepts is very necessary so that students are able to master the concepts.

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Conflict of Interest

The authors declare no conflicts of interest

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