



Development of Malay Culture Student Work Sheet to Improve Student Mathematics Critical Thinking Ability Elementary School

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Receive: 02/08/2022

Accepted: 22/09/2022

Published: 01/10/2022

Abstrak

Penelitian ini bertujuan untuk mendeskripsikan proses pengembangan LKPD matematika dan mengetahui kualitas LKPD yang dikembangkan pada materi geometri bernuansa budaya Melayu untuk meningkatkan kemampuan berpikir kritis siswa dalam pembelajaran matematika. Penelitian ini menggunakan metode *Research and Development* (R&D) yang digunakan untuk menghasilkan suatu produk yakni mengembangkan LKPD. Model pengembangan yang diterapkan dalam penelitian ini adalah model ADDIE yang terdiri dari 5 tahapan yaitu analisis (*Analyze*), desain (*Design*), pengembangan (*Development*), pelaksanaan (*Implementation*), dan evaluasi (*Evaluation*). Subjek pada penelitian pengembangan ini adalah dua orang dosen sebagai validator yang terdiri dari validator ahli materi dan validator ahli media, guru, dan siswa kelas V-A sebanyak 29 siswa sebagai sasaran pemakaian produk untuk uji coba secara terbatas. Jenis data yang digunakan dalam penelitian ini berupa jenis data kuantitatif dan data kualitatif. Instrumen yang digunakan pada penelitian ini memanfaatkan angket dan tes kemampuan berpikir kritis. Berdasarkan hasil uji coba yang dilakukan, diperoleh bahwa (1) Hasil perolehan rata-rata kedua validator yakni ahli materi dan ahli media untuk tingkat kevalidan adalah 4,41 pada kriteria "Sangat Baik". (2) Hasil perolehan rata-rata respon guru dan respon siswa terhadap LKPD untuk tingkat kepraktisan adalah 4,65 pada kriteria "Sangat Baik". (3) Tingkat keefektifan LKPD diperoleh dari hasil rata-rata skor peolehan tes kemampuan berpikir kritis yakni 75,86 dengan kategori "Baik" dan persentase ketuntasan siswa yakni 72,41 dengan kategori "Baik" sehingga dapat dikatakan bahwa kemampuan berpikir kritis siswa dengan penggunaan LKPD baik dan LKPD dinyatakan efektif. Kelayakan LKPD dapat dilihat pada perolehan rata-rata instrumen angket dari validator, guru, dan siswa yakni 4,53 dengan kategori "Sangat Layak". Dapat disimpulkan bahwa LKPD yang dikembangkan dapat meningkatkan kemampuan berpikir kritis matematika siswa khususnya pada materi geometri dan LKPD layak untuk digunakan oleh guru dan siswa sebab LKPD bersifat valid, praktis, dan efektif.

Kata Kunci: Lembar Kerja Peserta Didik (LKPD), Matematika, Materi Geometri, Budaya Melayu, Kemampuan Berpikir Kritis.

Abstract

This study aims to describe the process of developing mathematical LKPD and determine the quality of the LKPD developed on geometrical material with Malay cultural nuances to improve students' critical thinking skills in learning mathematics. This study uses the *Research and Development* (R&D) method which is used to produce a product, namely developing LKPD. The development model applied in this study is the ADDIE model which consists of 5 stages, namely analysis (*Analyze*), design (*Design*), development (*Development*), implementation (*Implementation*), and evaluation (*Evaluation*). The subjects in this development research were two lecturers as validators consisting of material expert validators and media expert validators, teachers, and 29 students of class V-A as the target of using the product for a limited trial. The type of data used in this research is in the form of quantitative data and qualitative data. The instrument used in this study utilizes a questionnaire and a critical thinking ability test. Based on the results of the trials carried out, it was found that (1) The results of the average acquisition of the two validators namely material experts and media experts for the level of validity were 4.41 on the "Very Good" criteria. (2) The result of obtaining the average teacher response and student response to the LKPD for the practicality level is 4.65 on the "Very Good" criteria. (3) The level of effectiveness of the LKPD is obtained from the average score of the critical thinking ability test, which is 75.86 in the "Good" category and the proportion of students' completeness is 72.41 in the "Good" category. LKPD is good and LKPD is declared effective. The feasibility of LKPD can be seen in the average acquisition of the questionnaire instrument from validators, teachers, and students which is 4.53 with the "Very Eligible" category. It can be interpreted that the LKPD developed can improve students' critical thinking skills in mathematics, especially on geometry material and LKPD is suitable for use by teachers and students because LKPD is valid, practical, and effective.

Keywords: Student Worksheet, Mathematics, Geometry Material, Malay Culture, Critical Thinking Ability.

Introduction

Elementary School Generally is a formal educational institution implemented in Indonesia in organizing integrated education for 6 years in the form of providing basic knowledge so that in the future it can become a provision for students (Alvariani and Sukmawarti 2022, 44) and students can apply their knowledge in life. As revealed by

Sriwanti & Sukmawarti (2022) that elementary schools can be used as a place to carry out formal education which aims to provide basic education in shaping students' process skills in terms of knowledge, attitudes and skills which are expected to be used as provisions for students in facing the demands of an increasingly developing era.

Elementary school education supports learning with several main subjects that must be studied, including Indonesian Language, Natural Sciences (IPA), Social Sciences (IPS), Citizenship Education (PKn), and Mathematics. Of the five main subjects, mathematics plays an important role for students in terms of understanding science and technological progress in real life. Mathematics learning is carried out to be able to train students' mindsets to be able to solve problems to form students' thinking skills creatively, critically, logically, analytically and systematically and to be able to work together. Based on Permendikbud Number 22 of 2016 on the objectives of learning mathematics, including (a) understanding mathematical concepts, describe how the relationship between mathematical concepts and applying concepts or logarithms efficiently, flexibly, accurately, and precisely in solving problems; (b) reasoning patterns of properties of mathematics, developing or describing arguments, formulating proofs, and mathematical statements; (c) solving mathematical problems which include the ability to understand problems, develop models of solving mathematics, solve mathematical models, and provide appropriate solutions; and (d) communicating arguments or ideas with diagrams, tables, symbols, or other media to clarify problems or conditions. and math statements; (c) solving mathematical problems which include the ability to understand problems, develop models of solving mathematics, solve mathematical models, and provide appropriate solutions; and (d) communicating arguments or ideas with diagrams, tables, symbols, or other media to clarify problems or conditions.

Geometry is not just a lesson that only realizes in the form of theory and practice or requires students to memorize the formulas, but students must be able to learn in real terms based on the phenomena they experience and occur around them so that students more easily understand mathematical concepts in geometry and can improve their learning. critical thinking skills.

Although geometry is very often related to problems that exist in everyday life, it is possible that elementary school students still find it difficult to understand the concepts taught in geometry.(Wandari, Kamid, and Maison 2018)so that this can affect the mathematics learning outcomes of students who are categorized as still low.

Several studies have also revealed that student learning outcomes in mathematics are still very far from improving. Through the results of TIMSS (Trends in International Mathematics and Science Study) research, it shows that Indonesia in its participation in 2015, the achievements obtained only increased by a few percent from previous years, thus setting Indonesia still in a lower position at the international level.(Hadi and Novaliyosi 2019).

Table 1. Results of Indonesia's Achievements in TIMSS 2015

Subjects	2015 TIMSS Results			
	Level / Criteria			
	Low	Currently	Tall	Carry on
Mathematics	54%	15%	6%	0%
Science	54%	15%	6%	0%

The table above can prove that the ability of Indonesian students, especially in mathematics, in the TIMSS survey, results obtained are still very low and are ranked at the bottom of 45 out of 50 countries that contribute(Martyanti and Suhartini 2018).

Based on the results of observations that have been made on the process of learning mathematics both from Internship activities, the Teaching Campus Program, as well as from interviews with a teacher at SD Negeri 104233 Bandar Labuhan, it shows that mathematics learning carried out in class until now has only focused on theory, memorizing formulas-mathematical formulas, and doing exercises, especially on geometry material. Learning that takes place tends to be centered on the teacher so unwittingly this causes students to become passive in learning mathematics and find it difficult to understand the mathematical concepts being taught.

In this study, student worksheets were designed based on Malay culture. Malay culture was chosen because the island of Sumatra is very attached to Malay culture or can be said to be a Malay family, and everything related to Malay culture, starting from

traditional clothes, traditional houses, food, and so on, of course, can be related to the concept of shape in geometry which can be used as a problem solving for elementary school students, as well as being able to improve student's critical thinking skills towards mathematics as expected in learning mathematics.

This Malay nuanced geometric worksheet was chosen. After all, Malay culture certainly contains elements that can bring students closer to mathematical concepts that are easy to understand and critical, because culture is very attached to society. This is also so that students can get to know the culture well, be able to preserve culture and appreciate it, not only Malay culture but cultures that have existed in Indonesia so far.

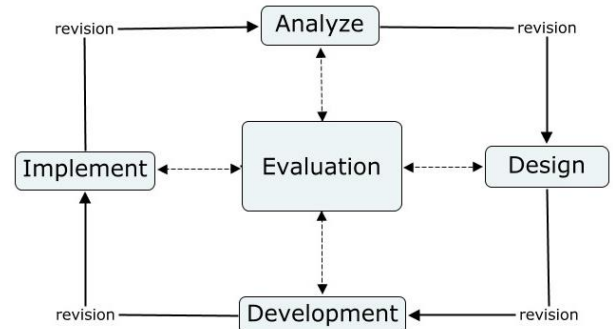
Based on the description of the background problems that have been described, it is necessary to develop student worksheets that can direct students to get to know the culture, especially the Malay culture and improve the critical thinking skills of elementary school students through mathematics learning geometry material, and researchers are interested in carrying out research with the title "Development Geometry Students Worksheet with Malay Culture To Improve Elementary School Students' Critical Thinking Mathematics Ability.

Method

In this study uses research and development methods R & D (Research and Development). R&D is a research method that is often used to produce certain products and the feasibility of a product is tested (Sugiyono 2013, 297). The product produced and tested for feasibility in this study is a student worksheet (LKPD) in geometry lessons by approaching the learning process with nuances of Malay culture to improve elementary school students' critical thinking skills in mathematics.

The subjects in the research on the development of geometric LKPD with Malay cultural nuances to improve the critical thinking skills of elementary school students are Media Expert Lecturers, Material Expert Lecturers, Teachers, and Students of SD Negeri 104233 Bandar Labuhan. This research was conducted in 2022 with an estimated research schedule, namely in the 2022/2023 school year located at SD Negeri 104233 Bandar Labuhan.

R&D research in this study applies the ADDIE model which consists of 5 stages, namely analysis (Analysis), design (Design), development (Development), implementation (Implementation) and evaluation (Evaluation). Benny (2016, p. 23) said that the ADDIE model is a model that is implemented to design or develop products as a more effective and efficient training program, because the ADDIE model is simple and can be carried out gradually and systematically in order to realize a more comprehensive program.



Picture 1. ADDIE Development Model

(Source: https://id.wikipedia.org/wiki/ADDIE_Model)

Results and Discussion

Research and development of student worksheets (LKPD) with Malay cultural nuances to improve students' critical thinking skills in mathematics begins with direct observation at the school that is intended as a place of research, namely SD Negeri 104233 Bandar Labuhan. Based on the results of observations and interviews with Mr. M. Hayat Ginting, S.Pd. and Mrs. Dewi Anggraini, S.Ag. as a teacher at the school, information was obtained that the learning tools used in the school varied from textbooks, LKPD, and other learning tools that could support student learning. However, the available LKPDs are LKPD, which, like the exercises, are still sourced from textbooks, so the worksheets are just like repeating the discussion in the book and have not provided opportunities for students to be able to develop their competencies. This also causes students not to be accustomed to solving problems in their way and not accustomed to constructing concepts in mathematics.

In addition, learning tools should be arranged more attractively, systematically, and adapted to the characteristics of students. There is nothing wrong with understanding mathematical concepts

differently, namely by bringing mathematical problems closer to concrete examples that exist in their daily lives or those in their environment. So that it is expected that students can understand mathematical shapes and concepts in real terms, especially on geometry material, namely flat shapes and spatial shapes. Therefore,

The developed LKPD has gone through a series of development stages, namely by implementing the ADDIE stages, starting from the analysis stage, the design stage, the development stage, the implementation stage, and the evaluation stage so that it can produce a mathematics learning tool in the form of LKPD which is associated with the nuances of Malay culture. This LKPD is designed based on the applicable curriculum, namely the 2013 curriculum which applies according to the level of education, namely SD/MI.

According to Nurul and Sukmawati, With the development of the world of education, interactive learning tools are also needed as well as the need for cultural teaching as a stage of introducing students to the culture of an area, especially the area where students live.

Learning tools that are closer to teaching local culture can instill cultural values in students and will become of particular interest to students because there are significant differences from what they learn in general. Conscious learning tools that draw closer to cultural nuances will arouse students' curiosity and foster good character values.

Educators should be able to facilitate students by designing learning tools that involve students' skills and abilities independently (Sukmawarti, Hidayat, and Suwanto 2021), this is so that students can solve a problem they face in their way so that later it can be measured to what extent students' ability to solve a problem with their thinking ability.

As for what is characteristic of the developed LKPD, namely the existence of cultural elements which are limited to Deli Malay culture so that the material discussed is combined with Deli Malay cultural elements which can later provide an understanding of basic mathematical concepts to students. With the existence of mathematics learning that is closer to cultural nuances, students will be able to learn new things and not feel foreign to the material presented, this is due to the concrete

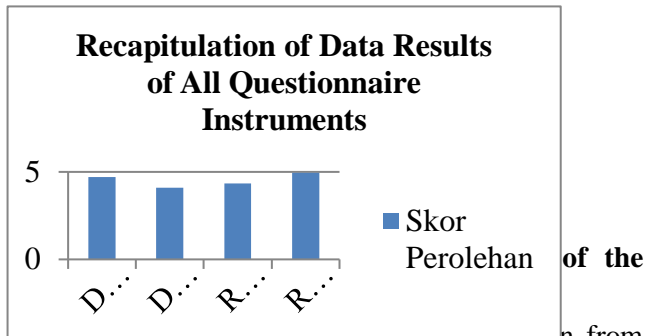
meaning of mathematical concepts based on students' understanding as people who inhabit an area with their culture so that later there will be dynamic learning atmosphere, gain experience and new knowledge, and provide opportunities for students to develop their abilities.

Culture is one of the right problems to be associated with mathematics learning materials, especially the Malay deli culture which is where the students of SDN 104233 Bandar Labuhan are located, where this school is located in Medan as it is known that Medan is one of the areas known as the deli sultanate, which is a city that become the civilization of the deli Malay tribe. In addition, mathematics learning that is associated with culture can create a motivating and fun learning environment that it fosters student interest in learning new things and can train their critical thinking skills.

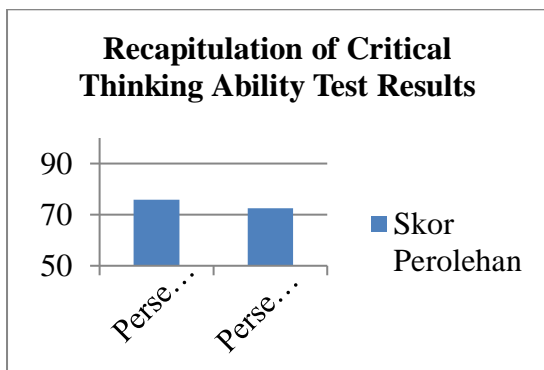
Based on the results of the validity test, namely the assessment of the validators, it was concluded that Geometry Students' Worksheets with Malay Cultural Nuances to Improve Mathematical Critical Thinking Skills for Elementary School Students met the validity criteria as stated in chapter III. Even though it had previously been revised as an improvement provided by the validator. Based on the results of the validation analysis from the validator, validation results were obtained on several validity instruments including material experts with an average of 4.72 with the criteria of "Very Good" and media experts with an average of 4.1 with the criteria of "Good", then the value recapitulated by calculating the results of the two validators obtained, namely 4.41 with the "Very Good" criterion, thus the LKPD meets the "validity" criteria.

The LKPD that has been declared valid is then tested on a limited number of students to determine its practicality and effectiveness through the data obtained in the pilot activity in the form of a critical thinking ability test and teacher response questionnaires and student response questionnaires. Based on the previous discussion, namely in the practicality test, the practicality of the LKPD can be seen from the results of the teacher response questionnaire data and student response questionnaires to the LKPD. The results of data analysis from the teacher's response questionnaire with an average of 4.94 with the criteria of "Very

Good" and the student response questionnaire with an average of 4.35 with the criteria of "Very Good", then the value obtained from each questionnaire obtained results an average of 4.65 with the criteria of "Very Good". Thus the LKPD developed meets the "Practical" criteria.



The effectiveness of LKPD can be seen from the results of tests of students' critical thinking skills. The results of the analysis of the critical thinking ability test data obtained an average percentage of 75.86% with the "Good" criteria and a completeness percentage of 72.41% with the "Good" criteria. So it can be stated that students' critical thinking skills using LKPD are categorized as good so that LKPD can be said to be "effective".



Picture 3. Diagram of Recapitulation of Critical Thinking Ability Test Results

The obstacles found in the development of this LKPD are that there are several materials and pictures directly to be used as reference materials that are difficult to find related to the Malay deli culture as well as the traditional Malay deli house which is difficult to find in the city of Medan, as well as the limited knowledge of researchers. In learning by linking the culture in it so that the process of working on the product takes a long time. Efforts made to overcome this obstacle include researchers looking for reliable reference sources to explore mathematics learning by linking the culture in it, especially those related to the Malay deli culture.

In this development, the product in the form of LKPD that has been developed has several advantages as a learning tool, including:

1. LKPD is able to provide a view of learning mathematics that is different from the general one.
2. LKPD can be used in the learning process, so that the learning process is more interesting.
3. LKPD can be used as a reference by teachers in developing better and more interesting learning tools adapted to the characteristics of elementary school students.
4. The pictures and objects in the LKPD are designed with a full color display so that they are enough to motivate students to learn and use them.
5. This worksheet provides opportunities for students to dare to solve problems.
6. LKPD can introduce local culture, especially in Malay deli culture.
7. Providing new knowledge that cultural elements are also interconnected with mathematical concepts.
8. Mathematics learning is more concrete so that it can be well received by students.

However, in research and development of products in the form of LKPD, of course there are still limitations, here are the limitations of the LKPD products developed:

1. LKPD is still relatively simple, where the LKPD only contains one subject matter, namely the properties of flat and spatial structures.
2. The application of Malay culture in LKPD is quite limited which only includes traditional houses and woven fabrics (songket).
3. LKPDs are still printed using ordinary printing presses, so there are still problems with image quality and color contrast that are not optimal.

Conclusion

The conclusion that can be drawn from this study is that student worksheets (LKPD) on geometry material, namely flat shapes and geometric shapes by relating them to the nuances of Malay culture, especially in Malay deli with the aim of being able to improve the critical thinking skills of elementary

school students using the ADDIE development model which includes the analysis stage, the design stage, the development stage, the planning stage, and the evaluation stage to produce a valid, practical, and effective product.

Based on the results of the validation analysis from the validator, validation results were obtained on several validity instruments, including: material experts with an average of 4.72 with the criteria of "Very Good" and media experts with an average of 4.1 with the criteria of "Good", then the value recapitulated by calculating the results of the two validators and the results obtained were 4.41 with the "Very Good" criterion, thus the LKPD met the "valid" criteria. The practicality of LKPD can be seen from the results of the teacher's response questionnaire data and the student's response questionnaire to LKPD. The results of data analysis from the teacher's response questionnaire with an average of 4.94 with the criteria of "Very Good" and student response questionnaires with an average of 4.35 with the criteria of "Very Good", then the values obtained from each questionnaire obtained the results average 4.65 with the criteria of "Very Good".

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As a determination of the feasibility of geometric students' worksheets with Malay cultural nuances to improve critical thinking skills in elementary school students' mathematics, the results of the data obtained from the questionnaire as a whole were analyzed for the results of the data and it was found that the LKPD developed showed a good category with an average score of 4 .53 out of a maximum score of 5.00 so that the LKPD is declared "Very Eligible" to be used by students and applied in schools as a reference for teachers in developing LKPD.

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