



## Development of Students Work Sheets (LKPD) with A Problem-Based Learning Model (PBM) in The Context of Riau Traditional Games in Circle Materials

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### ABSTRACT

This research is motivated by the lack of LKPD that provides steps that can guide students to understand the concept of material and the designed model is not appropriate to construct students' knowledge independently and there are no contextual problems that cause lack of interaction between students. LKPD will be more optimal if it is based on a learning model that teaches how to solve a problem. With the LKPD Problem Based Learning Model (PBM) students can gain learning experiences that teach real skills, investigation, and problem solving. The purpose of this study was to produce student worksheets (LKPD) through the application of the problem-based learning model (PBM) of SD Negeri 163 Pekanbaru students on circle material. This type of research is development research using the Borg & Gall model. The instruments in this study were validation sheets and student response questionnaires. The results of the study showed that the validity test of three validators on the syllabus was 91% with very valid criteria. While the practicality test for LKPD with a response questionnaire to six students showed an average percentage of 90.52% with the very practical category.

## 1. Introduction

Mathematics has a significant role in providing various abilities to students in order to develop thinking skills and problem-solving skills, especially in solving daily life, especially local life where students are in direct contact with their environment (Imayati et al, 2020). Mathematics lessons have several roles for students, including, (Abdurrahman, 2012): (1) a clear and logical means of thinking; (2) means to solve problems of daily life; (3) means of recognizing relationship patterns and generalizing experiences; (4) means to develop creativity; (5) means to increase awareness of cultural development. Mathematics

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is one of the main subjects in the implementation of the 2013 curriculum. This shows how important mathematics learning is in the world of education and technological developments today.

Based on the survey results of The Trend International Mathematics and Science Study (TIMSS) in 2011 which stated that the mathematics learning achievement of elementary school students in Indonesia from 42 countries participating in the study was ranked 38 with an average score of 386. Only 28% of participants Indonesian students who answered correctly while the international average was 47%. When compared to other countries, the ability of Indonesian students to translate questions into language or mathematical ideas is still below average.

Seeing the results of the TIMSS survey, there is a need for efforts to increase the role of teachers in guiding students. Teachers need to involve students actively in the learning process. One way that can be done by the teacher is to use interesting learning resources in order to help students understand the concepts presented by the teacher, which can be in the form of student worksheets or abbreviated as LKPD.

LKPD is a form of learning resource that is often used by teachers in the learning process. According to Majid (2014) LKPD is intended to trigger and help students carry out learning activities in order to master an understanding, skills and attitudes. LKPD is a guide for carrying out investigative or problem-solving activities which can be a guide for developing cognitive aspects as well as a guide for developing all aspects of learning (Zulfah, 2017). LKPD does not only contain practice questions but a collection of activities in the learning process. So it can be concluded that LKPD is a sheet containing material, descriptions, work steps, and exercises that must be done by students.

Based on the research of Yustianingsih, et al (2017), the LKPD used in schools in general has not provided steps that can guide students to understand the concept of the material. LKPD is not designed with the right model to construct students' knowledge independently and there are no contextual problems that cause a lack of interaction between students. LKPD will be more optimal if it is based on a learning model that teaches how to solve a problem. With the LKPD Problem Based Learning Model (PBM) students can gain learning experiences that teach real skills, investigation, and problem solving.

Problem Based Learning Model or abbreviated as PBM is a learning model that helps teachers to relate material to the real situation of students. The PBM model can also increase student participation in learning (Atika et al, 2019). PBM makes giving problems the first step in the learning process. One alternative that teachers can do to develop LKPD with a PBM model that contains contextual problems is by applying a cultural context.

This is in accordance with Ministerial Regulation Number 57 of 2014 concerning the philosophical foundation of the 2013 Curriculum, which states that education is rooted in the nation's culture to build present and future life. According to

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Kusmaryono (2012) the use of local culture in mathematics learning is a form of creative learning design to produce contextually meaningful learning. So, by including a cultural context can provide and create meaningful learning in every activity undertaken so that it can be used as a contextual material or source of mathematics learning.

Kusmaryono (2012) also said that the implementation of culture into mathematics learning can make students more familiar with their own local culture, so that the learning process becomes meaningful. One culture that can be used is traditional games. LKPD in this cultural context is something new for students that will make students enthusiastic about working on the LKPD designed and developed by the teacher. Teachers can develop and enrich learning materials and activities by linking LKPD and traditional games and not forgetting the objectives of learning. Students can also know and get to know various kinds of traditional games in Riau and can preserve traditional games in Riau.

Mathematics learning needs to link mathematics material with culture so that students feel the cultural connection with the mathematics material they are learning, one of which is traditional games (Yani, 2021). Traditional games are games played by children with simple tools without machines and materials that are used. Nature has also provided traditional toys to make toys (Saputri, et al., 2012). According to Suryana (2018), traditional games have benefits in shaping the character of students and training children to socialize with the community.

Traditional games can also make students complete the tasks given in new ways, with the aim that students don't get bored easily and can understand the material well while introducing various kinds of traditional games in Riau. Some of the traditional games of the Riau people have mathematical thinking in them. Mathematical thinking arises not only from the course of the game, but also from the media of the game. This traditional folk game is expected to be a means for students to understand learning material. (Roza, 2012)

The application of traditional games can be applied to circle material. Circles are the material taught in the sixth grade mathematics books of even semester. Circle is one of the subjects that fall into the category of geometry. Learning geometry clearly distinguishes between meanings, images and models of a shape. Basically, students are familiar with geometric forms, such as recognizing lines, shapes, shapes, and circles. Circles are found in everyday life such as marbles, balls and so on (Friansyah et al, 2018).

Based on the results of the daily test scores of the circle grade material of even semester VI grade SD Negeri 163 Pekanbaru, the results were unsatisfactory. It can be seen from the daily test scores for even semester sixth grade Public Elementary School 163 for the 2018/2019 academic year, it is known that out of 120 students, only 50 students achieved grades above the KKM.

Based on the existing problems, researchers feel the need to design student worksheets (LKPD) that are oriented towards learning outcomes, with a problem-

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based learning model. (PBM) in the context of traditional Riau games on circle material. Nieveen (2007) states that student worksheets (LKPD) are said to have good quality if the tools are valid and practical.

## 2. Methodology

The form of this research is Research and development according to Borg & Gall which was modified by Sugiyono consisting of research and data collection (research and information collecting), planning, development of initial product drafts (develop preliminary form of product), small-scale trials ( preliminary field testing) Revision of the results of small-scale trials (main product revision), dissemination and implementation (dissemination and implementation). The subjects of this study were 6 students of class VII SMP Negeri 37 Pekanbaru in a small-scale trial. Data collection techniques in this study were literature studies and interviews. While the data analysis techniques in this study are as follows

### 1. Valid

#### a. Data Analysis of Validator Assessment Results

The evaluation of the validity of the product in the form of LKPD was carried out by a validator consisting of 3 validators. The evaluation by the validator uses a scale of 1 to 4. The data to determine the validity of the product obtained will be analyzed by the following formula.

$$\bar{M}_v = \frac{\sum_{i=1}^n \bar{V}_i}{n}$$

(adapted from Sudijono, 2011)

Information:

$\bar{M}_v$  = mean of total validity

$\bar{V}_i$  = the average validation of the i-th validator

n = number of validators

LKPD validation is obtained using the following formula.

$$Va = \frac{Tsa}{Tsh}$$

Information:

Va = validation score

Tsa = total empirical score of the validator

Tsh = the maximum total score expected

The criteria for learning devices can be seen in Table 1

Table 1. LKPD Validity Criteria.

No	Achievement Level	Validation Criteria
1	85,01% - 100,00%	Very Valid
2	70,01% - 85,00%	Valid
3	50,01% - 70,00%	Less Valid
4	01,00% - 50,00%	Invalid

## 2. Practical

Practicality assessment is used by teachers and students against LKPD in the circle material developed. For closed questionnaires using a Likert scale with the answer choice criteria are very practical, practical, less practical, impractical with successive scores of 4, 3, 2, 1. Open questionnaires are used to find out suggestions from the teacher to be used as a basis for revision. The data to determine the practicality of the product obtained will be analyzed by the following formula

$$V_p = \frac{Tsa}{Tsh} \times 100\%$$

(Akbar, 2013)

Information:  $V_p$  = respondent's score

Tsa = total empirical score of the respondent

Tsh = the maximum expected total score

The questionnaire criteria for student responses to the practicality of LKPD are seen in table 2.

Table 2. Criteria for Practical Learning LKPD

No.	Interval	Practicality Criteria
1.	85,01% - 100,00%	Very practical.
2.	70,01% - 85,00%	Practical
3.	50,01% - 70,00%	Less practical
4.	01,00% - 50,00%	It's not practical

Sourch: Akbar, 2013

## 3. Results and Discussion

At the research and data collection stage, a needs analysis, analysis of traditional Riau games, material analysis and student analysis were carried out. At the planning stage the researcher designed the syllabus, lesson plans, and student worksheet based on the results of the research stages and data collection. The initial product draft development stage, the researcher develops LKPD based on the draft that has been prepared, as well as the syllabus and lesson plans as a reference for developing LKPD.

The LKPD that has been developed applies traditional games to each of the problems presented, so that students will still be motivated to solve these problems. The problems presented also illustrate the game, so that students do not get bored easily in understanding the problem. The following is a picture (Figure 1) of the LKPD that the researcher has developed.

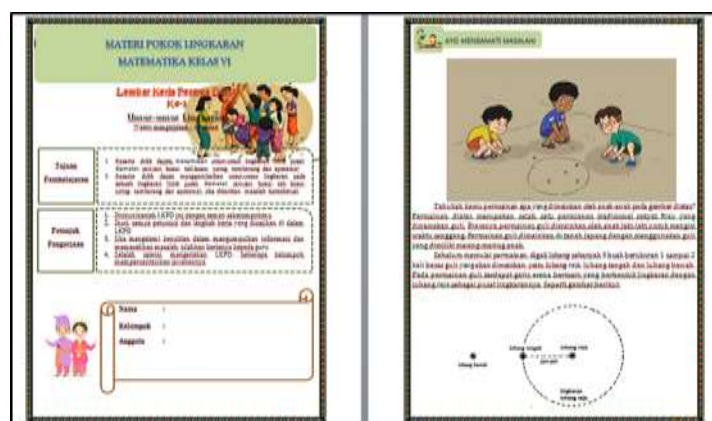


Figure 1. LKPD-1

In the small-scale trial stage, the revised LKPD from the validator was then tested on 6 grade VII students of SMP Negeri 37 Pekanbaru. At the stage of revising the results of the small-scale trial the researcher revised the LKPD based on the results of the limited trials that had been implemented. The last stage is the dissemination and implementation of researchers reporting the results of research on developing LKPD in the results seminar. The research articles are then published in the journal. The results of the validity of the validators are in table 4 below.

a. LKPD Validation Results

The validator's assessment of the LKPD includes several aspects, namely: (1) completeness of the LKPD components; (2) suitability of learning materials; (3) presentation of learning material; (4) suitability of LKPD with PBM steps; (5) the suitability of the LKPD with the level of ability of students; (6) accuracy in choosing the words and language used; (7) letters used in LKPD; (8) the image presented in the LKPD; and (9) LKPD display. The results of the LKPD validation for all aspects were considered good. . The results of the LKPD validation can be seen in Table 3.

Table 3. LKPD Validation Results

Rated Aspect	LKPD-1 (%)	LKPD-2 (%)	LKPD-3 (%)	LKPD-4 (%)	Average (%)	Information
LKPD components	100	100	100	100	100	Very Valid
Learning materials	96	93	93	95	94,25	Very Valid
LKPD and PBM	76	76	76	76	76	Valid
LKPD and	95	89	86	86	89	Very Valid

Didactic Terms						
LKPD and Construction Requirements	92	94	94	94	93,5	Very Valid
LKPD and Technical Requirements	94	93	93	93	93,25	Very Valid
Average	92,2	90,8	90,3	90,67	91	Very Valid
Information	Very Valid	Very Valid	Very Valid	Very Valid	Very Valid	Very Valid

Overall, the results of the validation of the LKPD obtained an average score of 91 which were in the very valid category, meaning that the LKPD used the PBM model developed which was feasible to be tested.

#### b. Small Scale Trial Results

The revised LKPD from the validator was then tried out on 6 grade VII students of SMP Negeri 37 Pekanbaru. Students in the limited trial stage were selected based on advice and consultation with mathematics teachers who had not studied circle material. The results of student responses can be seen in table 4. Below

Table 4. Student Response Questionnaire Results to Readability of LKPD

Rated Aspect	LKPD-1 (%)	LKPD-2 (%)	LKPD-3 (%)	LKPD-4 (%)	Average
Theory	91,7	87,5	91,7	93,8	91,175
Display	92,2	87,5	92,2	89,1	90,25
Use of LKPD	89,6	89,6	89,6	91,7	90,125
Average	91,17	88,2	91,17	91,53	90,52

Source: Researcher Processed Data

Overall the results of the students' assessment of the readability of the LKPD with an average score of 90.52% were in the "very practical" category. This means that the readability of the developed LKPD is "very practical" used by students.

#### c. Deployment stage.

At this stage, the researcher reported the results of the research on developing learning LKPD by applying the problem-based learning model (PBM) in the context of the traditional games of the Riau people on the material of the circle of class VI SD / MI in the results seminar. The research articles are then published in the journal.

## 4. Conclusion

The development research carried out has resulted in the LKPD using a problem-based learning model (PBM) with the context of the traditional games of the Riau people on circle material for grade VI SD / MI students. The resulting LKPD was

arranged in four meetings. Based on the results and discussion, the following conclusions were obtained.

1. The LKPD developed using the PBM model in the context of the traditional games of the Riau people for grade VI SD / MI students have met the validity criteria.
2. The LKPD developed using the PBM model with the context of the traditional games of the Riau people for grade VI SD / MI students has met the criteria of practicality.

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