

**Developing Mathematic Teaching Material
for 4th Grade of Elementary School
Based on Traditional Folk Games of Riau Province**

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Abstract

The purpose of this research is to develop mathematical learning materials based on traditional folk games for grade 4th of elementary school in Riau. Good and attractive instructional can be seen from various aspects, including the aspects of the language that is easy to understand by the students, support of an interesting picture according to the learning material. Concrete learning mathematics will be more easily accepted when children learn while playing, in this research children experiences playing with the Riau traditional game. Learning material developed by this research help teacher to facilitate student to learn mathematics in a better situation. This Research use Research and Development (R & D method). Development model used in this study is a model of Plomp that consists of four phases, namely: (1) Initial Research, (2) Design, (3) The realization phase, (4) Testing, evaluation and revision. The learning material is developed based on curriculum 2013. The folk games used in this learning material were congklak, guli, besimbang, gasing, setatak and rimau. The valid product was tested to 30 students of 4th grade at elementary schools to see it practicality. Based on the results of the data analysis and discussion, it can be concluded that the teaching material is valid with an average rating of 3.41 and has the practicality to be used in 4th grade of elementary school with score reached 90%. This learning material is recommended to use for mathematics class at 4th grade of elementary schools especially in Riau.

Keywords: Mathematics teaching material for fourth grade, traditional folk games of Riau,

Introduction

Education is one of the manifestation form of human culture which is dynamic and developmental. The goals of national education have not only intelligent form but also personality form, so the younger generation will have personality of religion value and Pancasila (Trianto, 2009). Mathematics is one of materials science that has abstract objects and constructed through the process of deductive reasoning on the education development

Rusefendi (2005) stated that mathematics is a subject which is considered as difficult subject by students. These difficulties might make students become unhappy about mathematics because of the lack of variety of teaching materials.

The good teaching materials can be observed based of several aspects, such as aspects of language which is understood easily by learners, the attractive supporting images which is in accordance with the material, and the concepts which are easy to be understood by students (Abdul Majid, 2007). The making of teaching materials also need the characteristics of students at particular age. In this study, the students in this case are the elementary school students. According to Piaget, the elementary school students are at-concrete operational stage.

Rohmitawati (2008) stated that math learning which is concrete and tangible can be obtained from the surrounding environment and experiences of students. One of them can be done through the game because children like to play, move, work in groups and having happy feeling on doing something directly. Because of that, the teachers

should be able to relate the games into learning process. By interacting games into learning process, the students can learn and play at the same time, so that the students will become active and happy. In this study, researcher used traditional folk games.

Traditional folk games have educational value and mathematical concepts. For example, there is the concept of summation in the congklak game, so the traditional folk games is suitable as learning media. The teachers must be able to create the new and innovative ideas in learning, so that students will be interested in following the learning process. However, not all of teachers have time and opportunity to create innovative and fun teaching materials to increase the character values of students. Based of that, the researcher developed the mathematics teaching materials based on traditional folk games of Riau Province.

This teaching material is presented on the form of interesting book. The colorful teaching materials made students interested on using these materials. Beside that, the teaching materials can also help the preservation of traditional game. Nowadays, the modern technologies such as computers and internet made children would rather sit quietly in front of the television to watch or play online games individually than played with their friends. Beside that, the building development began to narrow the playground of children. If this condition continues, it will make traditional games become extinct.

Based on the above case, the problem formulation of this study is "Is mathematics teaching materials based on traditional folk games of Riau Province already practical to be used the practicalities for 4th Elementary School students?". The purpose of this study is to produce the mathematics teaching materials based on traditional folk games of Riau Province for 4th Elementary School students.

Research Methods

This study is classified as development research. That research in tends to produce a certain product such as the mathematical teaching materials and test analysis the practicality of that product. The development research is a process to develop a new product or complete the previous existing product (Sugiyono, 2007).

Sugiyono (2007) stated that the strategy of development research is widely used to develop the design models or the planning of learning, learning process, evaluation of learning and teaching programs. The product of this study is teaching material which will be packaged on a textbooks which can be used by students. The researcher only tested the practicality of legibility, not tested the effectiveness.

This development research refers to the general model of design education by Plomp (Widya Dharma, 2011), which consists of five phases. The phases of development are: (I) the initial investigation phase, to analyze the mathematics curriculum of 4th grade, consist of main competency (KI) and basic competency (KD), then analyzing the material of 4th grade Elementary school to match that material with KI and KD as reference to make concepts. (II) the design phase, according to the previous investigation, the researcher made a blue print of teaching material and activity that had been developed in teaching material based on traditional games of Riau, like collecting and designing the teaching material. (III) phase of realization/construction, the researcher made the mathematics teaching material for 4th grade based on traditional folk games of Riau. (IV) phase of testing, evaluation, and revision, in this phase, there will be validation of mathematics teaching material for 4th grade by the experts. The result will be used as the main basis to revise the first prototype and the instrument of data

collecting. After the result of the prototype revision was validated by the experts, the prototype will be tested to a small group of 5 participants, to get the response data and practicality of teaching material in small group. (V) Implementation Phase. In this study, the development process which is used not include the implementation phase.

This study was implemented in Elementary School 163 Pekanbaru. The subject is a group of studying which consists of 5 students and the students of 4th grade Elementary School 163 which consist of 33 students. The instrument of data collecting consists of validation sheet of mathematics teaching materials based on traditional folk games of Riau to fourth grade which is filled by experts, and the questionnaire of using mathematics teaching material based on traditional folk games of Riau for fourth which is filled by students.

Data collection techniques in this study is the validity test and practicality test of teaching materials in small groups and large groups. This study used descriptive data analysis technique.

1. The Data analysis of the result of validity was performed as following stages:
 - a. Summing the score for each indicator on validation sheet

The scale assessment sheet based on a Likert Scale validation is presented in Table 3.1 below

Table 3.1 Category Rating Sheet Validation

Category	Score
Very not clear, very not interesting, totally not easy to learn	1
not match/not easy to learn	2
Clear/point to point/interesting/easy to learn	3
Very clear/totally easy to learn/very interesting	4

- b. Determining the average number of each indicator that given by validator

$$\text{Summarize of Avg} = \frac{\text{the number of nilai indicator}}{\text{the number of validator}}$$

- c. Determining the category of average score based on Likert Scale and finding the validation Category of learning material use the table below: Tabel 3.2

The category of learning material

Average Number	Category
$3,25 \leq R < 4$	Totally valid
$2,5 \leq R < 3,25$	Valid
$1,75 \leq R < 2,5$	Valid Enough
$1 \leq R < 1,75$	Not Valid

(Sumber : Sugiyono, 2007)

2. Analyzing the result of questionnaire the teaching materials based on traditional games of Riau for 4th grade students counted by the formula below

$$P = \frac{f}{N} \times 100\%$$

Keterangan:

P = the percentage of achievement

f = the frequent of students

N = the number of students

Determining the category of practicalities learning materials based on Guttman Scale

Tabel 3.3 Persentase Keterlaksanaan Teaching material

Average Number	Category
81-100%	very easy to use
61 - 80%	Easy to use
41 - 60%	easy enough
21 - 40%	not easy to use
< 21%	hard to use

(Sumber : Sugiyono, 2007)

Results and Discussion

Validity Based on Mathematics teaching material based on traditional folk games of Riau for 4th grade elementary school. The validation process of the teaching material is observed by three aspects: the material aspect, the media aspects and aspects of language. The validator of this study are experts that understand about the learning of mathematics.

The validation of material is performed to assess the suitability of the material construction on teaching materials with the curriculum. The assessment indicators are a) having main competence and basic competence based curriculum, b) relation between traditional games with learning materials, c) the material in accordance with the concept, d) Presentation of exercises according to the material presented, e) well organizing of material. Based of the validation results, the result of validation analysis data on material aspect having average score 3.5 with very valid category.

The media validation is done to assess the suitability of media with teaching materials. Validation test on the media aspects assessment includes four indicators, namely: a) the use of appropriate instruction on teaching materials clearly, b) the use of clear text and easy to understand, c) the use of attractive images and appropriate with material, d) The use of the right color combination. The results of the validation aspects of the media on mathematical teaching materials for 4th grade based traditional folk games of Riau by the validator is 3.5 with a very good category.

Language Validation is done to assess the style of language used in teaching materials. The assessment indicators are assessed here is a) The language used is simple and easily understood by elementary school students, b) the use of appropriate language with standard Indonesian rule. The results of the validation aspects of language in mathematical teaching materials for 4th grade based on traditional folk games of Riau is 3.2 with valid category.

Overall the results of the validation of the three aspects: materials, media and aspects of language can be concluded that the mathematical teaching materials for 4th grade based traditional folk games of Riau is very valid. With this result, these materials can be used as a complement teaching materials in learning mathematics.

1. Practicality of Mathematics Teaching Materials Based on Traditional Folk Games of Riau for 4th grade elementary school.
2. The practicality level of Mathematics Instructional Materials Based on Traditional Folk Games of Riau for 4th grade elementary school students is obtained from the questionnaire responses showed that the average percentage reached 94% for the small group test and 87% for large group test.

The students stated that they can use teaching materials well. The description of the material in the teaching material is easy to learn, having very attractive display teaching materials and the language used is easy to understand. Students also stated teaching materials can increase their motivation to learn. They also added that the images and text contained is clear and interesting, so that studying by using media learning becomes fun.

The teaching materials were designed into 4 sections, the first part is about observation (Let's observe) :



The preparation of teaching materials is made by using Microsoft Office Word 2007. Its header and footer used the Malay songket motifs awat melarat kembang beratur. Beside that, researchers also used dialog boxes and colorful cartoons, so that the students are interested to read the materials.

The second part is about the work (let's do) which contained the questions,



The “let's do” page consisted of guided practice which is designed by using picture and words, so it will be interesting for students.

The third part is about discussion section (Let's discuss)

Ayo Diskusikan

Mainlah guli dengan teman-temanmu.

Bentuklah sebuah kelompok yang terdiri dari 4 orang.

Untuk menentukan urutan pertama permainan, kamu harus melemparkan guli dari lobang raja ke lobang bawah.

Ukurlah jarak gulimu dari lobang raja ke lobang bawah dengan menggunakan penggaris.

Kemudian, Isikan hasil pengukuran guli dikelompokmu pada tabel dibawah ini

diskusikan dengan cermat dan tertib bersama teman-temanmu

Ayo ikuti aturan permainan guli dengan tertib.

Siapakah yang mendapatkan giliran pertama bermain guli?
Siapakah yang mendapat giliran terakhir bermain guli?

NAMA	HASIL PENGUKURAN	PEMBULATAN

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The page “let’s discuss” consists of practice paper which has been matched with traditional games. The students can discuss with their friends. The fourth part is about practice (Let’s practice)

Ayo Berlatih

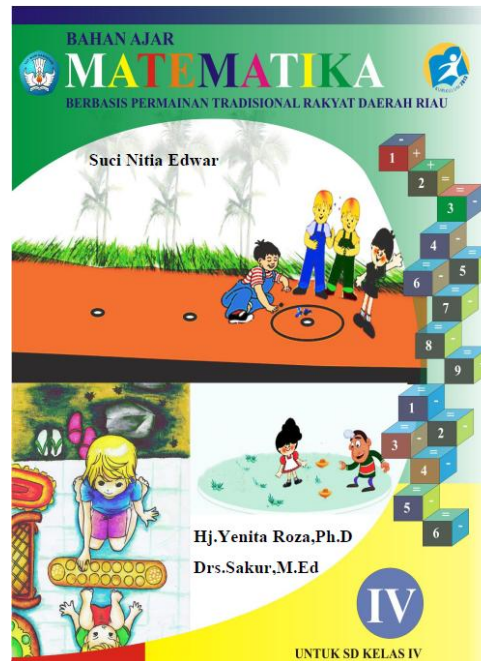
Lengkapilah tabel berikut

No	Bangun Persegi	Panjang Sisi (satuan)	Luas Persegi (persegi satuan)
1.			
2.			
3.			

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The page of “let’s practice” consists of the question about material which had been learned by students.

The front cover page of the teaching material is:



By using this teaching material, the material is easier to be understood. Based on the results of the questionnaire responses and the feasibility of the teaching materials, it can be concluded that the Mathematics Teaching Materials Based on Traditional Folk Games Riau for 4th grade elementary school has been used practically as a complement teaching materials in mathematics learning.

Conclusions and Recommendations

This study has produced the mathematics teaching material based on traditional folk games of Riau for fourth grade. This teaching material is considered to be practical after going through the process of validation by experts and twice trial stages to observe the level of the practicality.

During this study, the researcher has been through various obstacles and success. The researchers want to give some suggestions related to the development of this study. This advice is addressed to the following researchers who want to take similar research. The suggestions are as follows:

1. In this development, the mathematics teaching material based on traditional folk games of Riau who made by the researcher only for fourth grade, it means that there are many other subject of math that can be developed into mathematics teaching material.
2. In this study, the researchers only determine the practicality of this media. For further research, this media can be used as a basis to research the other aspects of learning, such as the relation of teaching material with the effectiveness of learning.

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