

The Increased Estimation Capability Through Traditional Game Mpa'a Amba

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Abstract—Every tribe or region has a traditional game with different characteristics and the game itself becomes the own characteristics of each region or tribe. Some of the games are used in a learning strategy that adapted to certain theme of learning and its effectiveness depends on the ability of teachers to use it. One of the traditional games from the Bima region is Mpa'a Amba that can be an effective strategy to improve students' mathematical estimation skills. The purpose of this study is to examine the effectiveness of the Mpa'a Amba game strategy in improving students' estimation skills in mathematics. The results showed that teaching with the Mpa'a Amba strategy had a very significant effect in increasing students' estimation ability, reaching 184% with effectiveness using the n-gain formula ($\langle g \rangle$) in the high category. The learning process with the Mpa'a Amba strategy is to design the classroom atmosphere like market conditions include market products such as the replica of fruit, egg, and currency in the form of counterfeit money.

Keywords—Mathematical Estimation, Traditional Games, Mpa'a Amba, Effective

I. INTRODUCTION

Most people consider mathematics is a difficult and boring subject. This is proven by the results of interviews with hundreds of students who will enroll in a university in Bima, NTB Province. The result of interviews stated that almost 75% of students did not like mathematics because mathematics is only about standard numbers that are not appropriate with their ambition, and also they said that the way of mathematics teachers taught was difficult to understand.

The role of the teacher becomes very important in supporting the ability of students. In some places, teachers are still the main source of learning, how the stimulus is given, determine what students should do, as well as with the government efforts to revise the education curriculum, basically it will still return to how the teacher's abilities and strategies are used [1]–[3].

The selection of appropriate learning methods can make the material taught becomes additional motivation for students. Basically the mathematics does not only discuss the numbers, but can also be a social capital which is important for everyone. The science of mathematics is widely applied in daily life, of which 80% related to the estimation or guessing and not merely about the real calculations [4]. For example, a housewife who wants to calculate the amount of monthly expenses can calculate the average daily expenses by dividing monthly expense with the number of days in a particular month without having to use a calculator. Another example is estimating the number

of seats that must be provided in the room during a wedding by the organizer. Estimation is an easy and important way to operate classroom mathematics into daily life without using formal calculations or measurements and it is usually found in conditions related to calculation, numeration and measurement [5], [6].

Estimation is often applied by adults people, but the ability to estimate is also needed by students because mathematical estimation ability is able to encourage and enrich students' understanding of mathematics through flexible thinking and able to use various strategies [7], [8]. Post divides the estimation strategy, namely Front-End strategy, Clustering Strategy, Rounding strategy, Compatible number strategy and Special strategy [9].

Students can understand the estimation strategy if the method used by the teacher is appropriate. One way is to use traditional strategy game Mpa'a Amba. This traditional game is a traditional game of the Bima people, NTB province. In practice, Mpa'a Amba is very popular with children, especially girls [10], [11]. The usual theme used in Mpa'a Amba is related to buying and selling, with certain trading goods and leaves, broken tiles, candy wrap, or other items that are easily obtained by children as purchase tools.

II. RESEARCH METHOD

Several instruments were developed to support the improvement of mathematical estimation through traditional games in the form of Learning Implementation Plans, Student Worksheets, Student Textbooks and Mathematical Economics Estimation Capability Instrument [12]. Not only instrument needs to be valid and reliable, but the effectiveness of the Mpa'a Amba strategy can also be assessed by increasing ability of students to estimate through Gain/n-gain, Normality ($\langle g \rangle$) with criteria developed by Hake (2007). The criteria are: (1) High if $\langle g \rangle \geq 0.7$; (2) moderate if $0.7 > \langle g \rangle \geq 0.3$ and (3) low if $\langle g \rangle < 0.3$ (15). The formulas are:

$$(g) = \frac{\text{skor post test} - \text{skor pre test}}{\text{skor maksimum} - \text{skor pre test}} \times 100 \%$$

III. RESULTS AND DISCUSSION

The instruments that are developed in the form of Learning Implementation Plans (RPP), Student Worksheets (LKS), Student Textbooks (BAS) and the instrument have high level of validity or very valid (SV) as shown in the following table.

TABLE 1. RACAPITULATION OF LEARNING INSTRUMENT VALIDATION

Validation	Instrument			
	LKS	BAS	RPP	Instrument
Avarage	3.75	3.65	3.65	3.65
Criteria	SV	SV	SV	SV

The average score of instrument validation is more than 3.6. Referring to the criteria developed by Ratumanan, G. and Laurens [12], the instrument is very valid and can be used without having to be revised.

In the implementation of learning activities were carried out in accordance with the stages planned through the Learning Implementation Plans (RPP). The appropriate implementation of the Learning Implementation Plans (RPP) with planning is shown in the following graph.

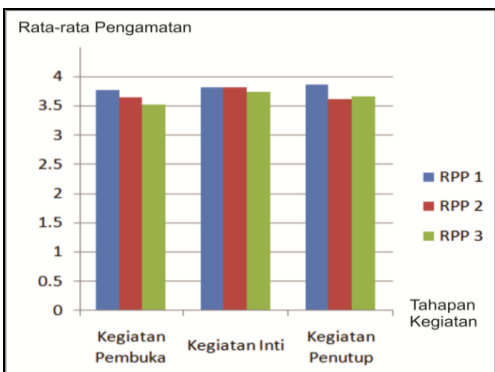


Fig. 1. Implementation of the RPP

The observations of the researcher during the implementation of activities took place in accordance with the planned stages, and the results showed the average implementation activity score at the first meeting was 3.83 with a Percentage of Agreement (R) 96.16; in the second meeting, the score was 3.71 with the Percentage of Agreement (R) 95.63; and the third meeting of 3.7 with the Percentage of Agreement (R) 93.65. The score spanned from 1 as the minimum to 4 as the maximum.

The same thing is also observed in student activities. Students state that there are different things in the learning process by using the Mpa'a Amba strategy than that they used to experience. This shows the percentage of student activity in learning activities is very high which is shown in the following graph

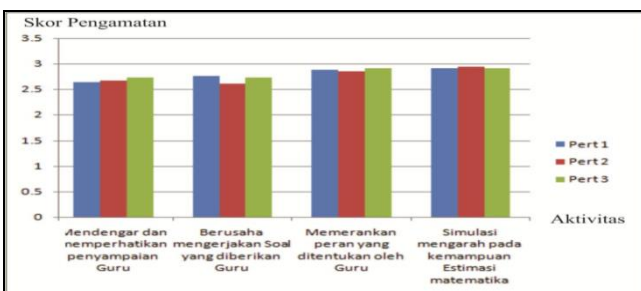


Fig. 2. Student Activity Score

Student activities show a high average score, i.e. above 3.7 out of 4, which indicates that students follow and pay

attention to every criteria that determined by the teacher. Different observations were noticed regarding students' activities when the game strategy was not implemented, where irrelevant activities such as chatting with peers or making paper planes rather than listening and focusing to the teacher were reported.

After the learning process is finished, students' progress was evaluated with instruments that have been prepared previously. Comparison of the pre-test and post-test scores regarding the students' estimation abilities are shown as follows:

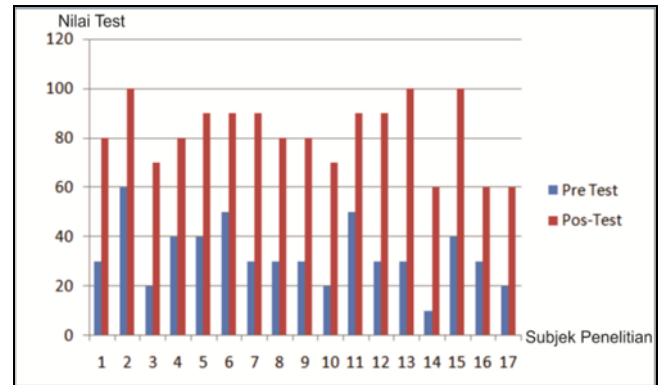


Fig. 3. Graph of recapitulation of Pre Test and Post Test Score

The learning process with Mpa'a Amba strategy has a very significant effect. It is shown from the increased average score from the pre-test to post-test, i.e. 32.94 to 81.76 in the post-test or increased by 148%. This suggest that Mpa'a Amba's learning strategy is an excellent strategy to improve the students' estimation ability.

To figure out the students' responses to the implementation of Mpa'a Amba learning strategy, students' feedback was recorded and the results are presented in the following table:

TABLE 2. STUDENTS RESPONSE

STATEMENT	INTERESTING	NOT INTERESTING
Completeness of Learning	100%	0%
A New Learning Atmosphere	100%	0%
Teaching Stages	82.35%	17.65%
Mpa'a Amba Strategy	100%	0%
Hoping Mpa'a Amba Strategy will be Applied to Other material's	100%	0%

Students' responses to the learning methods with the Mpa'a Amba strategy were very good and enthusiastic. According to students, the new learning strategy is something very interesting because much of the time they were exposed the conventional and unidirectional learning process that lead to boredom, while with this Mpa'a Amba strategy, students are easier to understand because they practice teaching materials without having to imagine abstract situation. Classroom atmosphere that is designed to be like a market will make teaching materials easier to

deliver because students find themselves convenient to portray the character based on the supporting materials and tools.

In order to know the effectiveness of the Mba'a Amba strategy in improving students' estimation abilities, n-gain scores were calculated and the results are as the following:

TABLE 3. N-GAIN TEST SCORE FOR MATHEMATICAL ESTIMATION ABILITY

Absent No	QUESTIONS									
	1		2		3		4		5	
	Pr	po	Pr	po	P	po	P	po	Pr	po
1	1	4	1	3	0	3	0	4	0	4
2	2	4	2	4	1	4	1	4	0	4
3	1	3	1	3	0	4	0	4	0	3
4	1	3	2	4	1	4	0	4	0	3
5	2	4	0	3	2	4	0	4	1	4
6	1	4	0	4	2	4	1	4	1	3
7	1	4	0	4	2	4	0	4	0	1
8	1	3	0	4	0	4	0	4	2	3
9	1	3	0	4	2	4	0	4	0	3
10	1	4	0	4	0	3	0	3	0	3
11	2	4	0	4	2	4	0	3	1	4
12	1	4	1	4	1	4	0	4	0	3
13	1	4	0	4	0	4	0	4	2	4
14	0	3	0	3	1	3	0	4	0	3
15	2	4	0	4	2	4	0	4	0	4
16	1	3	0	3	1	4	1	3	0	3
17	2	3	0	3	0	4	0	3	0	3
Amount	21	61	7	62	17	65	3	64	7	55
Max Score	68									
Category	0.85 High		0.9 High		0.94 High		0.94 High		0.79 High	

From the the n-gain analysis, the score obtained for each item is ≥ 0.7 , which means it falls to high effectiveness criteria. This finding is in line with Hake's study who showed that the traditional game of Mpa'a Amba is very effective in improving students' estimation skills [13].

Not only has an effect on improving mathematical estimation skills, but also teaching using the Mpa'a Amba strategy gets a positive response from students.

IV. CONCLUSION

Mpa'a Amba's strategy is very effective and has a very significant effect in improving students' estimation skills. Not only improve students' estimation skills, this strategy also creates a new atmosphere of learning that has been monotonous. Students feel mathematics lessons become more fun because this learning model is like doing transactions in the market.

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