

# Improving 2<sup>nd</sup> Graders' Calculation Skill through Pathilan Traditional Game

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**Abstract.** *This research was carried out by the fact that many students are not interested in mathematics, and their calculation skill is still under expectation. Less of student engagement and too much teacher intervention are still dominating along mathematics learning process. This study aimed to improve 2<sup>nd</sup> grade students' calculation skill through Pathilan traditional game in MI Muhammadiyah Bekangan. This research subject were 29 2<sup>nd</sup> graders of MI Muhammadiyah Bekangan period 2015/2016. This research combines classroom action research which refers to Stephen Kemmis and Robin Mc Taggart. This research was conducted in two cycles and each cycle was done in two meetings. Every cycle consisted of 4 steps i.e. preparation, action, observation, evaluation, analysis and reflection. The technique of collecting data was done by assessing test result and observation, test instrument, observation sheet, and field notes. The data was analyzed by using quantitative-descriptive approach. The study showed that students' learning results were bellow minimum limit of 50% completeness before the implementation Pathilan traditional game during learning process. After the implementation of Pathilan traditional game, the percentage of students' learning results that passed minimum limit (KKM) of 50% completeness was improving, from 75,86% in the first cycle to 86,21% in the second cycle. The average of students' learning result was also improving from 67,83 becamed 75,79 in the last cycle. In the end, learning with Pathilan traditional game could motivate students to study calculation continuously.*

**Keywords:** *Pathilan, Calculation, Learning Result*

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## Introduction

Mathematics is one of topics in school to achieve the goals of KTSP. The importances of mathematics make it becomes one of main topics that must be taught in schools. In Elementary School, students have to do calculation. School mathematics give a great contribution as a fundamental skill that students must have, and also it has abstract basic objects and based on a consistency truth to gain educational goals. Along with those goals, so the general purpos of teaching mathematics in Elementary School is to prepare the students so that they are ready enough to face the challanges of this developing world, through such trainings as sensible action, reasoning, critical thinking, honesty, and efectivity, and also prepare the students in order they can utilize mathematics in their dialy life and in studying any science (Patmonodewo, 2003).

According to Zoltan P. Dienes in Marpaung (2003) that every mathematical concept can be understood by the student if the use of concrete teaching media can be

presented for students in studying mathematics. Syafik (2006) says that elementary school and junior high school students are still in concrete phase, therefore teacher needs to choose the right approach in delivering mathematics concepts.

The ability of calculating number is one of standards of competency that its proficiency is a mandatory for elementary school students. In lower grade students, subtraction and addition are suppose to be mastered by them. This is because its proficiency becomes a condition to learn the next topics in mathematics. Pupils who already have mastered calculation skill will be able to do other advance calculation namely mix calculation, fraction, and story-based problem.

The facts that have to be faced based on observation and interview to mathematics teacher and 2<sup>nd</sup> grader students of II MI Muhammadiyah Bekangan are: 1) some students perform slow calculation, 2) 2<sup>nd</sup> graders have less intention in studying mathematics, 3) their score for some daily test (in average) are still low such as for topic of addition and calculation are 64,5 and 60,1 for topic of multiplication and division, 4) about 50% of students's score are still below KKM score, 5) lecturing style of teaching is still dominating in mathematics learning process, and 6) the learners are not fully engaged during the class.

Topic of calculation is still assumed as the most difficult one for the students. Gustiany (2014) says that students find difficulties in addition. Therefore, mathematics should be taught through interesting media and in a joyful condition such as integrating traditional games in a learning process. Mayke (Ulfah, 2010) says that learning by playing gives opportunities for students to manipulate, to repeat, to discover independently, to explore, to implement, and to gain various concepts and understandings.

*Pathilan* is a traditional game from Java especially Central Java. This games uses palm leaf ribs (*lidi*) to play. Sadiman (2005) says that its use is to teach the students about addition, subtraction, multiplication, and division. With this game, students will easily understand the concepts of calculation, in addition, this game engages students to learn calculating i.e. addition, subtraction, multiplication, and addition. To play this game, the students must follow the following rules:

1. Students have to sit in a circle form,
2. They have to do *pin suit* to determine who play first,
3. The first player has to mash the *lidi* on the floor,
4. Afterward, he has to take the *lidi* one by one without move other *lidis*, if he makes mistake, the next player will replace him,
5. The game is over when all *lidis* are taken off whether by one player or more,
6. After all *lidis* are taken off, all students are required to count their *lidis* based on the determined operation and the value from every *lidi*.

While calculation is part of mathematical concepts specifically of number concepts which is a basic for mathematical development and also the readiness to enter Elementary School. According to Piaget, numeracy learning goals for students are as logico-mathematical learning or learn to think logically and mathematically in a fun and uncomplicated. So that students are not only able to count to a hundred or a thousand, but to understand and use mathematical language to think (Suyanto, 2005).

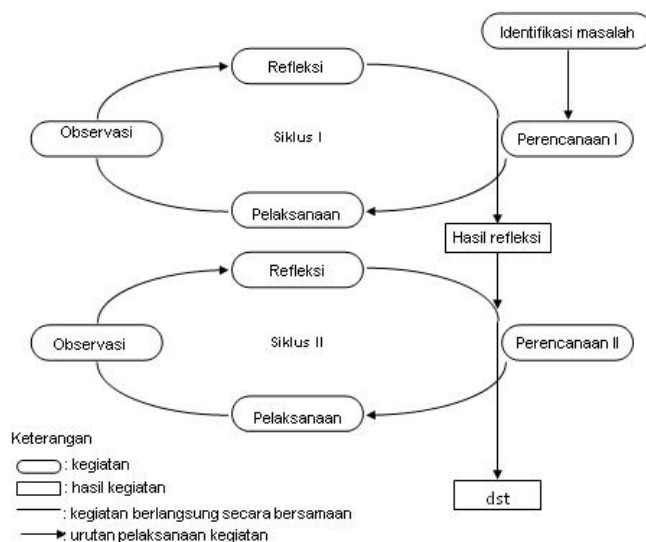
So the purpose of learning numeracy for students is to train students to think logically and systematically, and introduce them the basics of learning to count so that in time the students will be more prepared to be able to follow the learning to count at the next level where it becomes more complex. Math games require a pleasant atmosphere and provide a sense of security and freedom for students. It required props / media that correspond to actual objects (imitation), interesting and varied, easy to use and do not harm. Besides, the language used in the introduction of the concept of counting should use simple language, and if it is possible to take the examples provided by the

neighborhood. Based on the principles of calculating above, it can be concluded that the learning is directly done by the student, or through a given game which can be played gradually, fun, and educates students and not to impose the teacher's will where students are given the freedom to participate or engage directly resolve the problems.

Based on the description above, the prombel is on how to upgrade 2<sup>nd</sup> graders' counting ability through *Pathilan*. This study aimed to upgrade 2<sup>nd</sup> graders' ability of calculation using *Pathilan*.

### Research Method

This action research was conducted by following the research procedure that was developed by Stephen Kemmis and Robin Mc. Taggart (Tim Pusdi Dikdasmen Lemlit UNY, 2007: 7). This research had done in some cycles including planning, action, observation, and reflection. The phases is illustrated as follow:



**Figure 1. Cycle of Action Research with Model of Kemmis and Robin Mc. Taggart**

The technique of collecting data that was used in this study was by giving test and doing observation. The instrument of this research were test paper, observation sheet, and field note. Test was used to acknowledge students' calculation skill, while the observation sheet and field note were used to know learning activities using *Pathilan*. To analyze the data of observation and test in this study were done descriptively and quantitatively. Students' test result and observation data that were gained in the last cycle was calculated and determined the percentage by determining its classical average. This research was done on 29 second graders in MI Muhammadiyah Bekangan, Sembungan, Nogosari, Boyolali, Education Year 2015/2016.

Goal indicator in this research was the rise of students' calculation skill after studying through *Pathilan* game with minimum score was 75% from 65 students.

### Result And Discussion

#### 1. Description of Cycle 1

This research was conducted on 7 and 9 April 2016. This study consists of two cycles where each cycle was done for 4 studying hours or in two meetings.

##### a. Planning of Cycle I

In the planning stage on the first cycle, the researchers conducted the following activities: 1) the preparation of the learning device in the first cycle in the form of Lesson Plan (RPP), Student Worksheet, test in Cycle I, 2) creation of a media "Pathilan" game and 3) the preparation of research instruments in Cycle I.

### b. Action and Observation

The first meeting in Cycle 1 was conducted on Thursday, April 7, 2016. The material in the first meeting is the sum of three-digit numbers. The second meeting in Cycle 1 was conducted on Saturday, April 9, 2016. The materials discussed is the reduction of up to three digit numbers, and the final test cycle.

Some aspects are observed, such as: paying attention to the teacher's explanation, asking / answering questions teacher, student interest in following the learning process by using "Pathilan" game actively, and students' passionate learning. Results of student activity observation can be seen in Table 1.

**Table 1. Students' Observation Data in Cycle I**

No	Meeting	Percentage
1	First	71,4%
2	Second	80,6%

While students' score and the percentage of students' score can be seen in the following table.

**Table 2. Learning Result and The Percentage of Students Who Pass The Minimum Score in Cycle 1**

No	Aspects	Informations
1	Total	1967
2	Average	67,83
3	Students who pass the limit score (score > 65)	22 (75,86%)
4	Students who do not pass the limit score (score < 65)	7 (24,14%)

### c. Reflection

In the learning process of the first cycle shows:

- 1) The classroom atmosphere was tense as students of learning while playing is not the usual thing. This demonstrates the attainment of the objectives of learning while playing. Students need to be given an explanation before starting the game.
- 2) At the first meeting, there are still some students who are hesitant to play, but the liveliness of the students to learn to use the media game "Pathilan" is good enough. This demonstrates the suitability of pathilan game in the learning process.
- 3) The average of the student activity obtained in cycle 1, that the first meeting was 71.4%, and the second meeting was 80.6%. Activity of students during the learning process has shown improvement and are expected to increase even more in the second cycle.
- 4) Based on the results of tests on the first cycle, from 29 students only 75.86% achieved grades above KKM, with details of KKM has exceeded 22 students and 7 students have not exceeded the KKM. Rated students are showing improvement, but it is expected that the unfinished will be reduced again in the next cycle.
- 5) The classical average score obtained in the first cycle was 67.83. This score has shown an increase compared to prior to the action, but the improvement target is still

lacking. Students need to be directed more on how to play to ease their understanding of the calculation concept.

## 2. Description Results Cycle II

### a. Implementation of Actions and Observations

Learning process on the second cycle performed in 2 sessions starting on 11 and 13 April 2016. The first meeting of the second cycle held on Monday, April 11, 2016. The materials discussed at the first meeting of numbers multiplying the result of two numbers. 2 in cycle II meeting held on Wednesday, April 13, 2016. The material provided is the division number two digits and the final test cycle.

Overview of the observation results in Cycle II can be explained in the following table:

**Table 3. Observation Result in Cycle II**

No	Meeting	Percentage
1	First	84,5%
2	Second	88,7%

While the test results of learning and the percentage of students who completed study on the second cycle is presented in Table 4 below.

**Table 4. Learning Outcome and The Percentage of Sutdy Completeness on Cycle II**

No	Aspect	Information
1	Total	2198
2	Average	75,79
3	Students who pass KKM (Score > 65)	25 (86,21%)
4	Students who do not pass KKM (Score < 65)	4 (13,79%)

### b. Reflection

- 1) Learning environment using media Pathilan game already looks more relaxed, lively and conducive. This shows that the purpose of using Pathilan game to get more lively classroom atmosphere has been reached. Mentoring teachers need to be done in order to implement the game in the learning process.
- 2) The average of student activity obtained in the second cycle is also increasing that the first meeting amounted to 84.5% and in the second meeting of 88.7%. This shows an increase from the previous cycle.
- 3) Based on the results of tests on the second cycle of 29 students as much as 86.21% achieved grades above KKM, with details of 25 students have been completed and there are still 4 students who have not completed. Students who have not completed decreased. This suggests that learning fun will make students more eager and reduce the number of students who have not completed.
- 4) The average value of grade obtained in the second cycle also increased from 67.83 on being 75.79. The average value increased so that the game can be applied in further learning.
- 5) Based on the results obtained in the second cycle, it can be concluded there has been a increase in the average value of the class and the percentage of students that scored above the KKM after the implementation of game media Pathilan.

According to Dienes (Pitadjeng, 2006: 32), study is an interaction that has planed between one structured segment of knowledge and active learning, and can be done through learning media that specifically designed. According to him, the game of mathematics has a very important role in the game because of a mathematical operation that indicates rules and more concretely guide and sharpen the understanding of mathematics in students. Pathilan is the traditional game of the island of Java, especially Central Java. The game uses a stick as a tool to play. Its function is to learn one of the students on addition, subtraction, multiplication, and division. Number of skewers ranging from 20 to 30 pieces with a size of 20 cm. Sticks are rated according to need or according to the arithmetic operation that will be played and adapted to grade level. The values given for example 5, 10, 15 and so on.

This study is in line with some previous research studies conducted by Kurniawati and Ardianingsih (2015) which states that there is a significant influence on the modified traditional game *bandaran* to the learning outcomes of children with autism math grade 2 in SLB Autism Mutiara Hati Sidoarjo. This study uses the same traditional games. Through this study, the use of traditional games can stimulate students to think critically and explore the concept of arithmetic discovery through play Pathilan. The researcher stimulates students' understanding of the concept through an open question. Further activities in research Pathilan game is described as follows:



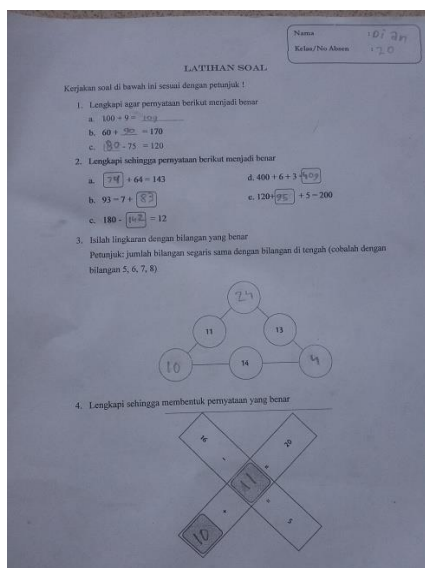
Figure 2. Activity Learning Process per Cycle

Information:

- |   |   |   |                                 |
|---|---|---|---------------------------------|
| a | : Description of <i>Pathilan</i>        | d | : Students play <i>Pathilan</i> |
| b | : Students study in group               | e | : Students do the tasks         |
| c | : Media distribution of <i>Pathilan</i> | f | : Test in the end of cycle      |

In accordance with previous studies (Atika, 2010), the use of game Pathilan, in this study were designed specifically as the media in the learning of mathematics which is very attractive and in accordance with the characteristics of elementary school students who still love to play. Learning becomes fun and make students feel at home. Student activity and learning outcomes, which is one indicator of the success of learning must be

considered. Atika (2010) stated that the application of the methods of educational games in math learning can enhance the activity and student learning outcomes. Students are also more creative to work on the problems that were created by teachers in the form of pictures. Through questions given at the end of each cycle, students are invited to understand the concepts that improve student learning outcomes. Students are easier to apply the concept of counting while playing in the matter, although there are some students who find it difficult to work on the problems. The figure below shows one of the results of the students' work on the concept of counting after Pathilan game was applied:



**Figure 3. A sample of student's work**

This is in line with the opinion of Jane M. Healy in Ulfah (2010) which says that the quality of a person's brain depends on the development pattern of interest, active involvement of children, and diverse stimuli. The formation of neural networks depends on the interest and efforts of the child. The use of all five senses (sight, hearing, taste, taste, and smell) accelerate the relationships that exist in the nervous knot. The home environment is an important element in the formation of the network. In favorable circumstances, the connectivity of brain cells will grow exponentially. From here we understand the importance of the means of play and the use of the learning resources. Play in addition to fun also helps the child to be able to understand the concepts naturally. Research Sulistyowati (2014) also stated that the game can be used for planting concept that others such as multiplication realistically.

In addition, the use of game media Pathilan give students the chance to continue to hone the ability of calculation, so that children are more nimble counting. In principle, Thorndike also emphasizes that much to give practice and training (drill and practice) to the learners to the concepts and procedures can be controlled well and certainly in a pleasant atmosphere. This is according to research done by Sagala (2006), so if students practice more then their calculation ability also increased and students become more proficient and skilled in solving problems.

Before applying media Pathilan game, the result of the average value of daily tests, especially students KD addition and subtraction is still low at 64.5 and only 14 students (48.28%) of the 29 students who can work on the problems with values  $> 65$ . KD multiplication and division while the average value is 60.1, and only 12 students (41.34%)

to work on the problems with values  $> 65$ . However, the results obtained in the first cycle and the second cycle, showed an increase in the average grade of 67.83 into 75.79. Total percentage of students who pass the KKM also increased by 75.86% in the first cycle to 86.21% in the second cycle. This indicates that the game Pathilan appropriate numeracy concepts applied to the material to improve student learning outcomes. Through this game, the students learn math concepts through play. Learning does not only come from the teacher's explanation only. It is the same with the use of props as well as media in learning. Media in learning can be with the game and the media that take advantage of technology where appropriate with research Patahuddin and Rokhim (2009) that the website can be used to build an understanding of concepts, develop critical thinking, and train numeracy (drilling).

An increasing are by no means the impact of the application of game media Pathilan in learning mathematics are generally going well. Maulana Research (2010) also stated that the game in mathematics and contribution in motivating students to learn mathematics. Other traditional games can be used in mathematics. This is because the elementary students are more receptive to the concept through an activity that's fun. Along with researchers, Abdillah and Sudrajat (2014) in a research also uses the game of snakes and ladders in the learning of mathematics. The game turned out to be able to provide new innovations in the implementation of learning to enhance students' understanding.

### **Conclusion**

Learning the game media Pathilan can motivate students to continue to learn to count, so that students can be actively involved in the learning process, and teachers are not only limited transfer of knowledge but also guide students to be skilled and invented the concept of counting with the experience itself that will have an impact on improving the ability of berhitungnya , Based on the results of research and discussion, we can conclude that the media Pathilan game can improve numeracy skills graders 2 MI Muhammadiyah Bekangan. It can be seen from the increase in the percentage of students who pass the KKM as much as 75.86% in the first cycle to 86.21% in the second cycle, and increasing the average class score of 67.83 in the first cycle to 75.79 in the second cycle, Many limitations in this study so it is possible for the holding of further research on the topic of this study, so it can provide wider benefits.

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