

## Improving Learning Outcomes in Mathematics Using the Talking Stick Learning Model

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### ABSTRACT

Measurement-related math subject is taught in Madrasah Ibtidaiyah, but many students still struggle to understand the concepts making the subject becomes boring and unappealing. Low learning outcomes in mathematics might be caused by boredom with the subject and problems in comprehending. The Talking Stick learning model is implemented to help students who are struggling with mathematics. This study sought to determine whether the Talking Stick learning model may improve learning outcomes in mathematics. This experimental study used quantitative methodology. The participants were third-graders at MIN 9 Aceh Tengah. A formative test with multiple choice questions was used as the data collection tool. The test was administered to both the experimental and control classes in two stages, namely the pretest (beginning test) and post-test (final test). The t-test was the analytical method utilized. The data demonstrated that the Talking Stick learning approach might be used to enhance learning outcomes in mathematics.

**Keywords:** *Learning Outcomes in Mathematics, Learning Model, Talking Stick*



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### INTRODUCTION

The education provided in a society or country can impact its growth and development. Education can be seen as a stage in developing a person's potential, specifically in cognitive, affective, and psychomotor abilities. The purpose of education is to maximize potential, build character, and actualize a dignified nation through intelligence and attitudes. The educational process must be planned to select relevant resources, methodologies, and evaluation method to be realized. Therefore, students can accomplish learning objectives throughout the educational process (Fattah, 2013).

Education is a deliberate human endeavor to form the character, thinking and psychomotor abilities required by the individual, the environment, and the larger community. Students can participate in learning through education and make the most of their innate talents to develop them into competent and creative adults who, of course, have faith in Allah

the Almighty. Through educational platform, a society can become more assertive, autonomous, and prepared to compete worldwide.

The researchers discovered several issues in teaching and learning process on multiple occasions, indicating that the purpose of education has not been fully realised in the area. Mathematics is taught at all academic levels, including in elementary school and the Madrasah Ibtidaiyah. Students in the final grade take the National Examination, often known as the UASBN, including the mathematics subject as one of the test subjects. This makes it necessary for teachers to be effective educators for students to fully understand the mathematics subject taught. On the other hand, due to its reputation as being extremely demanding and challenging, mathematics is extremely disliked by students.

According to the field observations and conversations with the teachers of III-graders, there were issues with teaching and learning mathematics in the classroom. For instance, students believed math is complex since it involved numbers and counting. Moreover, during learning activities, students are still playing while the teacher explains the material. This impacts the ability to master the material. Meanwhile, traditional learning method is still used making the students to become easily bored, demotivated, lazy, and socially isolated. The variety of the learning strategy used to teach the subject is still low, making it difficult for students to pay attention. The teacher serves as the focal point of classroom learning.

The aforementioned produces outcomes that at least demonstrate student understanding of the measurement material in the mathematics subjects, as evidenced by the data. However, most were under the passing grade. Additionally, it can be claimed that students were not yet sufficiently mastered or have not yet reached the passing grade. This shows that students are not engaged and enthusiastic in learning process. Alternatively, there may be issues with how students learn in the classroom, particularly the mathematics subject, which is a crucial component in elementary school or Madrasah Ibtidaiyah.

Having students with varying degrees of ability and drive in their courses, where some students flourish while others fail is another issue for math teachers (e.g., in literacy or numeracy). Many students in higher grades do not understand the fundamentals of mathematical reasoning, like rational numbers (fractions) or even simple integer arithmetic. It is challenging for math teachers to meet the demands of every student in a class because each student has different mathematical skills. Students frequently encounter general difficulties, such as in understanding numbers, quantity, magnitude, and length (Mazzocco et al. 2011); in making reasonable estimates; and other weaknesses (Lemaire & Lecacheur, 2011). There are some challenges when applying mathematical knowledge to new situations, as well as challenges in dealing with even little alterations in the same environment (Carragher et al., 1985; Carragher & Schliemann, 2002). Rapid retrieval of long-term memory is an activity affecting the working memory capacity and executive function in students with low mathematical skills (Bull & Scerif, 2001) (Tronsky and Royer 2003). These very fundamental cognitive skills, are essential for completing any challenging math task (Geary & Hoard, 2003; Royer, 2003). However, those who struggle with math need extra help and practice. These students frequently lose interest in their studies, fail to master and apply the best metacognitive techniques, and as a result, they will develop more adverse relationships with mathematics and express more adverse emotions in solving mathematical problems (Woolf et al., 2010).

Teachers must be innovative in their idea, engage students in various activities, guide, support, and help them improve their abstract thinking skills (Arroyo et al., 2014). Teachers must expand their learning creativity because of the various obstacles and difficulties in learning activities. Students should be supported by the learning system created as they learn about numbers and operations, measurement and data, statistics and probability, geometric concepts in 2D and 3D, algebra and equations, relationships, and functions. In numerous studies, new adaptive learning systems have produced positive outcomes in thousands of

students thus giving teachers insightful data about their mathematical skills. The improvement is related to particular elements and treatments that are naturally affective, cognitive, and metacognitive.

According to Kusnadi, the Talking Stick Learning model encourages students to contribute their ideas. The Talking Stick learning model starts with the teacher briefly introducing the topic to be discussed with the class. Students are expected to read and comprehend the lessons covered (Kusnadi, 2018). The talking stick learning method can encourage students to quickly read and comprehend the teacher's explanations and then test the students' ability to respond to remarks or questions the teacher may ask unexpectedly during the talking stick. By promptly and randomly handing out sticks to students, the teacher might motivate them to study harder in anticipation of receiving one.

Following a discussion with the teacher on the best learning model to address the learning issues, the researchers determined that the problems mentioned above were caused by several factors affecting learning outcomes. It provides an appealing learning model by placing them at the center of learning activities and enabling them to participate actively. In order to improve learning outcomes in mathematics, the researchers propose a study with the title "Improving Learning Outcomes in Mathematics Using the Talking Stick Learning Model." This study aimed to ascertain whether the Talking Stick learning method could enhance students' learning outcomes in mathematics.

## LITERATURE REVIEW

Following a discussion with the teacher on the best learning model to address the learning issues, the researchers determined that the problems mentioned above were caused by several factors affecting learning outcomes. It provides an appealing learning model by placing them at the center of learning activities and enabling them to participate actively. In order to improve learning outcomes in mathematics, the researchers propose a study with the title "Improving Learning Outcomes in Mathematics Using the Talking Stick Learning Model." This study aimed to ascertain whether the Talking Stick learning method could enhance students' learning outcomes in mathematics.

Cooperative learning is one teaching strategy used in classrooms where students work together in small groups to comprehend the subject. Students work together in these small groups to address topics and solve problems related to their academic work. In most cases, cooperative learning takes place without being ordered rather than from instruction. Students collaborate to ensure that each group member comprehends the covered material. In the end, the shared conviction that the other students can understand each concept is the key to group success (Slavin, 1995).

Five key components are listed by Johnson and Smith (1998) for effective cooperative learning. First, there must be a healthy interdependence in which group members recognize that they must work together to learn to accomplish their objectives. The second requirement is the promotive engagement or face-to-face group interaction between students. Third, individual and collective accountability are needed by each person for the group's success. Fourth, there should be group discussion to evaluate their teamwork to make it more effective. Fifth, there needs to be the growth of interpersonal abilities for small groups, including giving helpful criticism and coming to an agreement.

The cooperative learning model uses the talking stick paradigm. This is so that students can actively participate in their learning activities. Students in the class actively participate and collaborate, so they do not simply take in information quietly or passively. According to Suprijono (2010), students are inspired to be active and dare to express their views and ideas using this talking stick learning method.

According to Kurniasih (2015), the cooperative learning model also uses the talking stick learning method. During teaching and learning exercises, the stick is used to identify whose turn to comment or answer direct inquiries from the teacher. Like Kurniasih (2014), Huda (2014) stated that the talking stick method is a communal learning paradigm using stick in learning interactions. The group that first has a chance to respond to the inquiries on the teaching topic is the group holding the stick. The teacher determines the group receiving the opportunity to use the stick.

The talking stick method was developed by Native Americans to encourage everyone to share their thoughts and opinions during a conversation (Shoimin, 2014). This method is currently used as a learning model in classrooms. Along with adopting the name, this learning model replicates the technique's operational phases. As a result, it can be said that the talking stick learning model is a teaching and learning activity in which groups of students take turns responding to the teacher, answering questions, and expressing ideas while utilizing a stick as a learning instrument. The stick is employed as a teaching tool to encourage group cooperation when students complete tasks assigned by the teacher. The teacher serves as a learning facilitator during the exercises. Every student takes part in the talking stick method.

Isrok'atun claimed that he listed the benefits and drawbacks of the talking stick instructional model. Isrok'atun and Tiurlina (2016) listed the following benefits of Talking Stick: (1) boosting students' self-confidence in expressing their ideas and ideas; (2) igniting students' enthusiasm for learning so they can learn on their own before being guided by the teacher; (3) encouraging students to quickly assimilate teaching materials; (4) the occurrence of mutual respect for views among students in the class; and (5) evaluating student understanding. The drawbacks of this learning model are (1) the chance that students will feel psychologically burdened because they lack confidence in their capacity to express their opinions; (2) the need for the teacher to create a list of questions for each student's level; and (3) the need for the teacher to manage the class so that the discussion stays on topic and yields the right solutions.

Shoimin (2014) offered a fresh perspective on the benefits and drawbacks of the talking stick method. He claimed that the talking stick method has the following benefits: (1) assessing students' readiness for learning activities; (2) encouraging quick assimilation of teaching materials; (3) encouraging students to participate more actively in their learning because they have prepared for face-to-face instruction with the teacher; and (4) encouraging students to express their thoughts and ideas. The talking stick model has four drawbacks: (1) It puts mental pressure on students who are not ready to learn; (2) Some students cannot respond to questions about learning when they are not ready; (3) It causes mental tension in students; and (4) It causes students to feel afraid if the teacher asks them questions.

According to the explanation above, the benefits of the talking stick learning model are for: determining the level of students' readiness to participate in learning; enhancing reading skills and enthusiasm; encouraging students to understand learning material quickly, and inspiring students to have the courage to express their ideas and ideas individually. There are still some students who are not brave or prepared to answers the questions related to the materials presented in class. Students are beginning to express fear and doubt about the possible questions that the teacher will ask them. To ensure that learning activities continue to be productive, teachers must maximize the benefits of the learning activities and reduce the impacts of learning weaknesses.

According to Huda (2014), there are several stages of learning using the talking stick learning model, namely: (1) a 21 cm stick should be prepared; (2) the teacher presents the learning materials and asks each group to review what the teacher said in more detail; (3) the groups are discussing problems or questions related to the learning material from the teacher; and (4) students are asked to make small group presentations. This stage continues until nearly every student has received the stick and had a chance to respond to the teacher's questions;

(6) the conclusions of the learning materials are created jointly by the teacher and students; (7) an assessment should be conducted; and (8) the teacher concludes the learning activities.

According to Widoyoko (2010), the main focus of learning activities should be on the learning outcomes. The accomplishment of learning objectives can be seen in the learning outcomes. By focusing on various aspects of the evaluation process, efforts can be made to improve the quality of teaching and learning. Purwanto (2014) asserted that learning outcomes indicate whether predefined learning objectives have been met. Students' behavior varies according to their learning outcomes by participating in instructional activities aligned with preset learning objectives. The results of learning activities are known as learning outcomes. This capability combines comprehension, attitude, and skill components. Learning outcomes are one of the critical components of educational activities and are a byproduct of the interaction between learning elements from within and outside of the classroom. In order to assess the achievement of learning success indicators, it is crucial to understand the outcomes that students achieved during the learning process.

Since problem-solving activities and mathematics are related, the teacher must set up an encouraging learning environment for students to consider solutions when they are engaged in a learning activity to catch up in class. Mathematics is a crucial topic in school since it is the way of thinking. Mathematics is always taught, from primary to secondary levels. The mathematical thinking skills are encouraged in the classroom. Sriyanto (2017) claimed that studying mathematics has several benefits, including: (1) Mathematics is taught to students as a communication tool; (2) Practicing math helps to improve problem-solving abilities; (3) Developing creativity in mathematics requires the capacity for abstract, intuitive, and scientific thought; and (4) Recognizing connection and organization is a task in mathematics.

There indeed exist learning objects in studying mathematics, namely direct and indirect objects. Mathematics in schools worldwide has an abstract aspect and a nature of thinking advancement based on the nature or qualities of the learning itself. This is then added to various educational materials for geometry, numbers, trigonometry, probability, measurement, and other subjects.

## **METHODS**

This study used quantitative method with data in the form of numbers through quasi-experimental (Lubis, 2018). The control and test groups were utilized to determine whether there was an interaction or connection between the two variables (Ardianto, 2014). The Talking Stick learning model was examined in the experimental group which then the outcomes were compared to those obtained using more the traditional learning model.

This study was carried out at MIN 9 Central Aceh, Tan Saril Village, Aceh Province. The study took place from June to October of 2019. 20 students from class III A (experimental class) and 21 students from class III B (control class) of MIN 9 Central Aceh were the participants. The experimental class used the talking stick model while the control class used the traditional learning model.

Data were collected using a test consisting of several tasks or questions for students to determine their level of accomplishment in a particular area (Arifin, 2016). The test was administered to both the experimental and control classes in two stages, namely the pretest and post-test. Students in the control and experimental classes completed a multiple-choice formative test with numerous items with high difficulty, moderate difficulty, and low difficulty. Multiple-choice instruments are questions with written responses that can be answered based on available options (Hamdayama, 2016).

The Chi-Square formula was utilized to determine whether the sample was typical (Reksoatmodjo, 2007). A homogeneity test was utilized to determine whether the data are homogeneous or not. The homogeneity test is conducted by comparing the most significant

variance to the minor variance or also known as the resemblance test of two variances. Statistics The hypothesis was tested using the t-test.

## RESULTS AND DISCUSSION

### Results

Classes III A and B at MIN 9 Central Aceh were used as the experimental and control classes. The test was conducted in two stages: the pretest and the post-test to obtain the conclusion of the study. All participants in the experimental and control classes received pretest to find out the initial score. After the treatment, which the experimental class used the talking stick learning model while the control class used the traditional method, all participants received post-test.

Prerequisite tests (homogeneity and normality tests) are the first stage of data processing to determine the continuation to the next stages.

Table 1 below shows the pretest and post-test scores from two classes

Class	Type of Test	Min	Max	M	x	S <sup>2</sup>	S	N
Experiment	Pre	15	55	38.5	38.5	113.42	10.64	2
	Post	20	95	75.5	75.5	562.89	23.72	2
Control	Pre	15	50	35.95	35.95	104.04	10.2	2
	Post	20	85	58.33	58.33	363.33	19.06	2

According to the table above, the pretest scores in experimental class has an average (x) of 38.5, a variance (S<sup>2</sup>) of 113.42, a standard deviation (S) of 10.64, the highest score of 55 and the lowest of 15. Meanwhile, the post-test scores in experimental class has an average (x) of 75.5, a variance (S<sup>2</sup>) of 562.89, and a standard deviation (S) of 23.72, the highest score of 95 and the lowest of 20.

The pretest scores in control class has an average (x) of 35.95, a variance (S<sup>2</sup>) of 104.04, a standard deviation (S) of 10.2, the highest score of 50 and the lowest of 15. Meanwhile, the post-test scores in control class has an average (x) of 58.33, a variance (S<sup>2</sup>) of 363.33, a standard deviation (S) of 19.06, the highest score of 85 and the lowest of 20.

#### 1. Normality Test

The researchers conducted a normality test after collecting post-test data of the control class and the experimental class. The data can be considered having normal distribution if  $\chi^2_{count} < \chi^2_{table}$ , and is usually distributed. Thus, the data of experimental class had a normal distribution because  $\chi^2_{count} (25.19) < \chi^2_{table} (30.14)$  as well as the control class with  $\chi^2_{count} (15.76) < \chi^2_{table} (31.41)$  as shown in the table below.

Table 2. Normality Test Results

Class	$\chi^2_{count}$	$\chi^2_{table}$	Description
Experiment	25.9	30.14	Normal
Control	15.76	31.41	Normal

#### 2. Homogeneity Test

The researchers conducted the homogeneity test using the F test with a significant threshold of  $\alpha = 0.05$ . Data were homogeneous if  $F_{count} < F_{table}$ . The results of the homogeneity test calculation are shown in Table 3 below.

Table 3: Homogeneity Test Results

No	N	Type of Test	F-count	F-table	N
1		Post	1.54	4.41	20

The homogeneity test results of experimental and control classes showed that  $F_{count} (1.54) < F_{table} (4.41)$  showing homogenous data.

### 3. Hypothesis Testing

In this study, the t-test was used for hypothesis testing after the data met normality and homogeneity criteria. Researchers used a hypothesis testing to determine whether the Talking Stick learning paradigm improves learning outcomes in mathematics. The results of hypothesis testing are as follows:

$$H_0 : \mu_1 \geq \mu_2$$

$$H_a : \mu_1 \leq \mu_2$$

Table 4: Hypothesis Testing Results

No	Type of Test	t-count	T-table	N
1	Post	2.74	1.72	20

This shows that  $t_{count} (2.74) > t_{table} (1.72)$ , then  $H_a$  is accepted and  $H_0$  is rejected at the significance level = 0.05. Thus, it can be concluded that the Talking learning model has an impact to maintain the commitment to enhancing the academic performance of third graders at MIN 9 Central Aceh in the mathematics course of measuring material.

### Discussion

This study sought to ascertain whether the Talking Stick learning paradigm may enhance third-grade students' learning results in mathematics especially the measurement chapter at MIN 9 Central Aceh. Students from the experimental and control classes served as the subjects from July 22, 2019, to August 5, 2019. The talking stick learning model was used in the experimental class, while the control class used the traditional learning method.

The average post-test score in the experimental class was 75.5 while in the control class was 58.33 which support the hypotheses.

The t-count was 2.74 or higher than  $t_{table} = t(0.05)(20.21) = 1.72$ . The results showed that students using Talking Stick learning method had higher learning outcomes than students using traditional learning method. Therefore, it can be said that the Talking Stick learning method had an impact on how well students learn mathematics as evidenced by the scores of 13 students from the experimental class higher than the passing grade (80) while in the control class only 6 students.

The Talking Stick Learning Model, a teaching and learning strategy involving students to make them have the guts to share their ideas and opinions in order to develop and boost their self-confidence. A breakthrough in teaching and learning techniques encourages students to take the initiative through multi-member group forum activities. Students are asked to develop a cooperative nature when the learning process is implemented to comprehend the learning concepts.

It turns out that students still have trouble at the start of teaching and learning activities using the talking stick learning model. Students have not engaged in active learning and lack the confidence to challenge the difficult concepts to comprehend. In group activities, many

students still work alone or only depend on other group members because they are still hesitant to ask questions on concepts they do not understand.

The talking stick learning method was introduced at the following meeting, and students started to adjust to it. As a result, they became more engaged and proactive throughout teaching and learning activities. The talking stick learning method is implemented in stages, and students are encouraged to continue doing so to encourage them to answer questions from the teacher and have a deeper understanding of the content discussed in class. As a result, students who have been taught utilizing the talking stick learning method have been able to adjust to the learning process activities, participate actively in group discussions, and have the bravery to respond accurately to questions asked by the teacher.

Sukma et al. (2016) found that the talking stick learning model is a part of the cooperative learning model. By assessing students' readiness, fostering their confidence to communicate their thoughts, and enabling discussion in learning classes, this learning method involves students to solve problems together. As a result, it can improve the ultimate learning results as indicated by learning outcomes. Cooperative learning has a significant favorable impact on students' learning results in the subject of mathematics, according to Peklaj and Vodopivec (1999).

Numerous studies have shown the benefits of group work in school contexts for developing academic knowledge, social skills, and the capacity for collaboration (e.g., Baines et al., 2007; Hattie, 2008; Gillies & Boyle, 2010; Chiriack, 2014; Gillies, 2016). It also found that students who cooperate in groups outperform those who study alone on tests (Yamarik, 2007). Furthermore, group work fosters the development of crucial 21st-century skills like teamwork, problem-solving, critical thinking, and self-management, according to Pellegrino, Hilton, and Van Aalst (2012).

According to the description above, it can be concluded that the learning method used in the class can impact the learning outcomes. Compared to learning utilizing traditional method, the talking stick method has a favorable effect or can increase learning outcomes in mathematics.

To get the best findings for this study, researchers have taken various actions. It is acknowledged that the study has certain flaws, however. Due to this restriction, the goals were not fully met. The following are the limitations:

1. Researchers only employed the talking stick learning method on the measurement chapter, their findings cannot be generalized to other discussions.
2. Time allotment was constrained.
3. Researchers only have control over the factors examined regarding learning outcomes; they have no control over other variables.

## **CONCLUSION**

This study aimed to ascertain whether the talking stick method approach at MIN 9 Central Aceh can improve the learning outcomes of third-grade students in studying the measurement chapter. The researchers concluded that the talking stick learning model improved the learning outcomes of third-grade students in mathematics especially the measurement chapter at MIN 9 Central Aceh.



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