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EMPOWERING YOUNG LEARNERS: TALKING STICK WITH QUESTION BOX MEDIA TO BOOST MATHEMATICS ACHIEVEMENT

Putri Nial[1] , Andi Mulawakkan Firdaus[2] , Ernawati[3]
[1,2,3]PGSD FKIP Muhammadiyah University of Makassar
putrinial2502@gmail.com,andi.mulawakkan@unismuh.ac.id
Ernawati@unismuh.ac.id

ABSTRACT
This study investigates the effect of the Talking Stick learning model supported by Question Box media on third-grade students' mathematics achievement at SDN 65 Pajalesang, Palopo City. Employing a pre-experimental One-Group Pretest-Posttest Design with 23 participants, the research utilized mathematics achievement tests, observation sheets, and response questionnaires. Findings revealed a significant improvement in learning outcomes, with average scores rising from 50.00 to 80.52 and an N-Gain of 0.4354 (moderate category). The Wilcoxon Signed Rank Test indicated a significance value of < 0.001, confirming a substantial difference before and after treatment. Students also demonstrated increased motivation, activeness, and confidence in learning. The novelty of this study lies in integrating the Talking Stick model with Question Box media to stimulate active participation and comprehension. The results contribute to innovative mathematics pedagogy by demonstrating an effective, engaging approach to improving elementary students' learning outcomes.

Introduction

Education is an important element that determines the progress of a nation. Therefore, improving the quality of education is essential to produce competent human resources and a high-quality generation. Society's expectations of education are increasing in line with the development of science and technology in the modern era.

The implementation of education in schools involves teachers as educators and students as learners through the teaching and learning interaction process. In the context of Talking Stick learning combined with the Question Box media, learning activities are systematically arranged based on the curriculum so that learning objectives can be achieved effectively.

Mathematics is an abstract science with a hierarchical structure, so it is often considered difficult for students to understand. At the elementary school level, mathematics learning aims to develop logical and systematic thinking skills. These skills will develop optimally if the learning process is effective and interesting.

One factor that influences student activity and learning outcomes is the use of learning media by teachers. However, in reality, the learning process in the classroom is still teacher-

centered, so students are less active and learning media are rarely used. Efforts to increase student activity need to be made by changing the learning paradigm towards student-centered learning.

Teachers play an important role in the success of learning. Therefore, teachers need to understand the subject matter and the appropriate methods for delivering it so that students can participate actively. The use of interesting learning media can help increase student engagement and learning outcomes, especially in mathematics.

Based on observations and interviews at SDN 65 Pajalesang Kota Palopo**,** it was found that students' mathematics learning outcomes were still low. This is due to several factors, namely: (1) students have difficulty understanding the material, (2) students are passive during the learning process, (3) low interest in learning, (4) high-ability students are reluctant to help their friends, and (5) teachers rarely use cooperative learning models and media in the classroom.

Many students find mathematics lessons boring because teachers still use conventional lecture methods, so students only listen to explanations without being actively involved. As a result, their understanding of concepts is low and their interest in learning declines.

Students' interest in learning is influenced by two factors, namely internal and external factors. Internal factors include physical condition, intelligence, talent, attitude, curiosity, readiness, and motivation. Meanwhile, external factors include the social environment (school, family, peers) and the non-social environment (learning facilities, materials, learning time, methods, and media used). Among these various factors, the learning model used by teachers has a major influence on student learning outcomes.

Therefore, a creative learning model that can foster student activity and critical thinking skills is needed. One alternative that can be applied is the Talking Stick model combined with the Question Box. This model emphasizes active student participation through turn-taking speaking and discussion activities. In mathematics learning, this approach helps students understand concepts through interaction and cooperation.

Previous studies have shown that the implementation of Talking Stick can increase student motivation, participation, and learning outcomes at various levels of education. Meanwhile, the use of Question Box—a box containing questions that are randomly selected by students to be answered individually or in groups—can foster curiosity and make the learning process more interesting.

The Talking Stick model has advantages over conventional methods such as lectures because it is more effective in increasing engagement, training speaking skills, and creating an active and enjoyable learning atmosphere. With proper implementation, this model can significantly improve students' mathematics learning outcomes

Research Method

This research used an experimental method with a quantitative approach. The type of research used was a pre-experiment with a One Group Pretest-Posttest design, which is research involving one group as the experimental class without a comparison group.

The research was conducted at SDN 65 Pajalesang Kota Palopo in the even semester of the 2024/2025 academic year. The research population included all students at SDN 65 Pajalesang Kota Palopo, while the research sample consisted of 23 third-grade students.

This research was categorized as a pre-experiment with a *one-group pretest-posttest* design, in which measurements were taken twice, namely before (pretest) and after (posttest) the application of the learning model. A comparison of the pretest and posttest results was used to determine the effect of the treatment on student learning outcomes.

The research procedure consisted of three main stages, namely the Preparation Stage, which included planning instruments, developing learning tools, and preparing for the implementation of the research. The Implementation Stage involved applying the *Talking Stick* learning model assisted by the *Question Box* media in the experimental class. The Completion Stage involves collecting learning outcome data, processing data, and compiling research reports. The instruments used in this study include learning outcome tests, observation sheets, and student response questionnaires. These three instruments serve to obtain data systematically and relevant to the research objective, which is to determine the effect of the *Talking Stick* learning model on students' interest and learning outcomes in mathematics.

Data collection techniques were carried out in three ways, namely observation, questionnaires, and documentation. Meanwhile, the data analysis techniques used included descriptive statistical analysis to describe the data in general and inferential analysis to test the research hypothesis.

Research Results and Discussion

Based on the results of descriptive data analysis, it was found that there was a significant increase in the mathematics learning outcomes of third-grade students at SDN 65 Pajalesang Kota Palopo after the implementation of the Talking Stick learning model assisted by the Question Box media**.**

The average value of student learning outcomes increased from 50.00 on the pretest to 80.52 on the posttest, with an increase of 41.95 points. The median score also rose from 56.00 to 80.00, while the mode shifted from 56 to 80, indicating that the scores most frequently obtained by students were in the higher category after the treatment was given.

In addition, the minimum score increased from 24 to 48, and the maximum score rose from 72 to 98. Meanwhile, the standard deviation decreased from 18.228 to 15.635, which means that the variation in learning outcomes between students was smaller and learning outcomes were more evenly distributed.

From all these indicators, it can be concluded that the application of the Talking Stick learning model with the help of the Question Box media has a positive and significant effect on improving students' mathematics learning outcomes.

Table 1 Descriptive Data Analysis of Student Learning Outcomes

Statistics	Pretest	Posttest
Mean	50.00	80.52
Median	56.00	80.00

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Statistics	Pretest	Posttest
Mode	56	80
Standard Deviation	18.228	15.635
Minimum Value	24	48
Maximum Value	72	98
Number of Students	23	23

Normality Test

The normality test was conducted to determine whether the data for each research variable had a normal distribution or not. This test was applied to the mathematics learning outcome variable of third-grade students at SDN 65 Pajalesang Kota Palopo, both before and after the implementation of the Talking Stick learning model assisted by the Question Box media**.**

The method used was the Shapiro-Wilk test, and the entire analysis process was carried out using the SPSS version 30 for Windows program**.** The data was said to be normally distributed if the significance value (Sig.) was greater than 0.05 at a significance level of α = 0.05**.**

The test results showed that the pretest significance value was 0.063 and the posttest significance value was 0.005**.** Since both values were below the limit of 0.05 ($p < 0.05$), it can be concluded that neither the pretest nor posttest data were normally distributed**.** Therefore, the subsequent hypothesis analysis does not use the paired sample t-test, but rather the Wilcoxon Signed-Rank Test, which is more appropriate for paired data that does not meet the assumption of normality.

N-Gain

N-Gain analysis was conducted to determine the extent of improvement in students' mathematics learning outcomes after being given treatment with the Question Box-assisted Talking Stick learning model. The N-Gain value was calculated using a formula that compares the pretest and posttest scores for each student.

Based on the results of data analysis from 23 third-grade students at SDN 65 Pajalesang Kota Palopo, the lowest N-Gain value obtained was 0.18 and the highest was 0.86**.** These results indicate that the improvement in students' mathematics learning outcomes ranged from low to high. The average N-Gain score achieved was 0.4354, which according to Doyan's (2020) criteria falls into the moderate category.

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Table 2 N-Gain Categories

N-Gain Value	Category
> 0.7	High
0.3 – 0.7	Moderate
< 0.3	Low

This increase in N-Gain values indicates that the application of the Talking Stick learning model assisted by the Question Box media has a significant effect on improving students' mathematics learning outcomes. The standard deviation value of 0.21728 indicates that the increase in learning outcomes among students is not entirely uniform—some students experience a high increase, while others experience a lower increase. learning outcomes among students is not entirely uniform—some students experience a high increase, while others experience a lower level of increase.

Hypothesis Testing

Hypothesis testing in this study was conducted using the Wilcoxon Signed Rank Test. This test was chosen because the research data did not meet the assumption of normality and was paired. The Wilcoxon Signed Rank Test is a non-parametric alternative to *the paired sample t-test* used to analyze ordinal or interval scale data that is not normally distributed.

This test serves to determine whether there is a significant difference between two measurement conditions in the same group, namely learning outcomes before (pretest) and after (posttest) the application of the learning model. Thus, the use of this test ensures that the analysis remains valid even though the data is not normally distributed.

Based on the results of the Related-Sample Wilcoxon Signed Rank Test analysis of the pretest and posttest scores for mathematics learning outcomes of third-grade students at SDN 65 Pajalesang Kota Palopo**,** the sample size **(**N) was 23 students. The calculation results showed a test statistic value of 270,000, a standard error of 32,821, a Z value of 4,022, and an Asymptotic Significance (2-tailed) value of < 0.001.

Because the significance value obtained is less than **0**.05 (p < 0.05), it can be concluded that there is a significant difference between the pretest and posttest results. The positive difference indicates that the average posttest score is higher than the pretest score. Thus, the application of the Talking Stick learning model assisted by the Question Box media has proven to be effective in improving students' mathematics learning outcomes.

Conclusion

Based on the results of the study on the effect of applying the Talking Stick learning model assisted by the Question Box media on the mathematics learning outcomes of third-grade students at SDN 65 Pajalesang Kota Palopo**,** it can be concluded that a learning model that involves active interaction and the use of concrete media can be an effective alternative to improve learning outcomes, especially in subjects that are often considered difficult, such as mathematics.

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The research results show several important findings as follows:

1. The Talking Stick learning model assisted by Question Box proved to be effective in improving students' mathematics learning outcomes. This can be seen from the increase in the average score from 50.00 (pretest) to 80.52 (posttest)**.** In addition, there was a significant change in the learning outcome category from low to high and very high.
2. The Wilcoxon Signed Rank Test showed a significant effect between the pretest and posttest scores. A significance value of < 0.001 (p < 0.05) confirmed that there was a real difference between the results before and after the treatment. This means that the learning model used had a positive impact on improving student learning outcomes.
3. The questionnaire results showed positive responses from students towards learning with the Talking Stick model. Students felt more active, motivated, and found it easier to understand the material. The question and answer process and interaction through the Question Box created a more interesting and enjoyable learning atmosphere and encouraged cooperation among students.
4. Limitations of the Research an**,** Several limitations encountered in this study include:

The limited sample size, which only involved one class in one elementary school, so that the research results cannot be generalized to a wider population. The relatively short implementation time**,** so that it was not possible to describe the long-term impact of applying this learning model.

Non-academic aspects, such as intrinsic motivation and students' social skills, have not been the focus of measurement even though they clearly have an impact during the learning process. These limitations provide opportunities for future researchers to conduct further research with a broader scope and longer implementation period so that the results obtained are more comprehensive.

Overall, the application of the Talking Stick learning model assisted by the Question Box media not only contributes to improving mathematics learning outcomes, but also increases student activity and engagement in the learning process. Students become more active in discussions, dare to express their opinions, and the classroom atmosphere, which was previously passive, becomes more lively, interactive, and collaborative**.**

REFERENCES

Adzkiya, Y., & Sundi, V. H. (2023). The effect of the Talking Stick learning model in mathematics on the critical thinking skills of fourth-grade students. Pendas: Journal of Primary Education, 8(3), 217–226.

Arum, K. R. L. (2023). "The Effectiveness of Applying the Talking Stick Learning Model Assisted by Question Boxes on Speaking Skills in Indonesian Language Lessons."

Ayuni, I. A., Kusmariyanti, N., & Japa, I, N. (2017). "The Effect of Talking Stick Assisted by Question Box on Science Learning Outcomes in Grade V." Journal of Education Technology, 1, 183-190. Accessed February 28, 2025, from

Ernawati, M., Sari, R.P., & Wahyudi, A. (2021). Problematic Mathematics Learning in the Context of Learning Models. Journal of Mathematics Education, 10(2), 45-60.

Fathurrohman, P. (2015). "The Effectiveness of the Talking Stick Cooperative Learning Model in Improving Student Participation and Learning Outcomes." Journal of Mathematics Education, 9(2), 101-102.

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Firdaus, A. M., & Ma'rup, M. (2020). The effectiveness of mathematics learning through the application of the Talking Stick cooperative model in seventh grade students at Saribuan Makassar Junior High School. *Journal of Mathematics and Science Education*, 8(2), 97–106.

Imaniar, Berliana Oni. "The Effect of the Argument-Driven Inquiry (ADI) Learning Model on Students' Argumentation Skills and Learning Outcomes in Physics Learning in Senior High School." University of Jember, 2020

Ministry of Education and Culture. (2021). Mathematics Learning Strategies in Elementary Schools.

Khasanah Diah Laila, et al. 2013. "The Effectiveness of the Talking Stick Learning Model on Learning Outcomes in Algebra". Unnes Journal of Mathematics Education (Online). Department of Mathematics Education, FMIPA, Semarang State University.

Sari, N. M (2020). "Application of the Talking Stick Model to Improve Mathematics Learning Outcomes in Lower Grade Students." Journal of Educational Innovation, 8(3), 75-85.

Sari, P., Kurniati, T., & Fitriani. (2017). "The Effect of the Teams Games Tournament (TGT) Cooperative Learning Model Assisted by Question Boxes on Student Learning Outcomes in Solubility and Solubility Product Material for Grade XI IPA MAN 1 Pontianak." Ar-Razi Scientific Journal 5, 93-103.

Sari, I. N. (2019). The Relationship Between Learning Motivation and Learning Outcomes of Grade IV Students at Labuhan Ratu 6 State Elementary School, East Lampung. Thesis, FKIP University of Lampung.

Sadiman, A. S. (2006). Educational Media: Definition, Development, and Utilization.

Setiawan, R., & Lestari, P (2018). "The Effect of the Talking Stick Model on Elementary School Students' Mathematics Learning Outcomes." Scientific Journal of Primary Education, 5(1), 45-52.

Sirajuddin, et al. (2024). "The Effectiveness of the Talking Stick Learning Model Assisted by Board Media in Static Material." Journal of HOTS Research in Mathematics Education, 4(1) 416-429.

Sugiyono. (2020). Quantitative, Qualitative, and R&D Research Methods. Bandung: CV Alfabeta.

Vista, Nadila Aulia, Neni Hermita, and Zufriady Zufriady. "Application of the Talking Stick Cooperative Learning Model Assisted by Question Box Media to Improve Social Studies Learning Outcomes of Third Grade Students at SDN 161 Pekanbaru". Tunjuk Ajar: Journal of Educational Science Research 2, no. 1 (February 28, 2019): 20.

Wicaksono, Hardika Tri, and Henny Dewi Koeswanti. —Application of the Scientific-Based Talking Stick Learning Model to Improve Mathematics Learning Outcomes .HOLISTIKA : PGSD Scientific Journal 3, no. 1 (2019).

Widodo, A. (2022). "The Importance of Interactive Learning Models in Improving Student Learning Outcomes." *EduTech Journal.*