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# The Influence of the *Quick On The Draw* Learning Model on the Mathematical Communication Skills of Junior High School Students.

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**Abstract**
The Quick On The Draw model is a learning approach that emphasizes collaboration and student engagement in searching for, answering, and conveying information through games aimed at group dynamics and speed. Therefore, the researcher aims to investigate the effect of the Quick On The Draw learning model on the mathematical communication skills of students at SMP Negeri 2 Longkib. The objective of this study is to compare the mathematical communication skills of students taught using the Quick On The Draw model with those taught using conventional methods. The research design employs a quasi-experimental approach with a Pre-Test Post-Test Control Group Design. The population consists of all seventh-grade students at SMP Negeri 2 Longkib, while the sample is selected through simple random sampling, specifically classes VII A (experimental) and VII B (control). Data is collected using test sheets and analyzed using independent t-tests. The results indicate that the mathematical communication skills of students taught with the Quick On The Draw model are superior to those taught with conventional methods in the topic of Sets for seventh-grade students at SMP Negeri 2 Longkib.

## INTRODUCTION

Mathematical communication skills refer to students' abilities to express mathematical concepts through symbols, terminology, and ideas both in writing and verbally, as well as their capacity to listen, articulate, ask questions, and collaborate. These skills play a crucial role in mathematics education, as they help students enhance their mathematical thinking.

Cognitive aspects in mathematics learning include behaviors that emphasize intellectual capabilities, such as mathematical abilities. Mathematical skills encompass knowledge of mathematics and the ability to think mathematically. Among these skills, mathematical communication is essential for students in mathematics education (Wahyudin Zarkasyi, 2018).

Baroody highlights two key reasons for the importance of communication in mathematics learning: (1) mathematics as a language, emphasizing that mathematics serves not only as a tool for thinking, pattern recognition, or problem-solving, but also as a means to clearly and concisely communicate various ideas; (2) mathematics as a social activity, where communication between students and between teachers and students is fundamental in learning mathematics, facilitating interaction and collaboration (Dessy, 2017).

In practice, however, mathematics education often falls short of expectations. Many students tend to be passive, with teachers playing a dominant role and providing limited opportunities for students to develop their skills. Research by Agus Supriyanto indicates that students' mathematical communication skills are generally low, often due to perceptions of mathematics as a difficult subject filled with calculations and formulas, which can be boring. Mathematics can be challenging to communicate due to its abstract nature and use of symbols, leading to difficulties in both verbal and written expressions of understanding. Many students follow their peers instead of actively engaging in discussions, and few ask questions or respond during lessons (Agus Supriyanto, 2014).

The low level of mathematical communication skills is attributed to a lack of student engagement in the learning process, resulting in teacher-centered instruction that diminishes student responsiveness. To address these issues, teachers play a vital role in enhancing students' mathematical communication skills (Ismayanti, 2021). Students often do not practice articulating their understanding or questions about problems before attempting to solve them, leading to misinterpretations of the questions. Additionally, exercises provided may not effectively foster the development of their mathematical ideas.

Interviews with Agus Sutono, a mathematics teacher at SMP Negeri 2 Longkib, reveal that students remain passive during lessons, often failing to pay attention or ask questions, even when prompted. Most students are accustomed to solving problems similar to examples provided by the teacher and struggle with word problems, lacking the practice of identifying knowns and unknowns, which hinders their comprehension. They find it easier to tackle conceptual problems by memorization rather than engaging in deeper understanding (Researcher, 2022).

To improve students' mathematical communication skills, an effective teaching and learning process is necessary, where both teachers and students are prepared to engage. Students are deemed ready to learn when they actively seek to understand the material presented. Teachers should utilize appropriate learning models for the content being taught.

The Quick On The Draw learning model, according to Paul Ginnis, facilitates student engagement in mathematics through activities that promote thinking, independence, fun, interdependence, and emotional intelligence (Paul Ginnis, 2008). This model encourages teachers to explore students' abilities by posing questions that tap into prior knowledge, present phenomena, or examine facts related to the topic at hand. The learning process emphasizes discussion skills and collaboration, allowing students to generate new ideas, solve problems in various ways, and articulate their concepts, often using color-coded question cards to enhance group work (Rossyda Rahma Damayanti, 2020).

**Research Methodology**

This study employs a quantitative approach, generating numerical data analyzed statistically (Sugiyono, 2007). It utilizes a quasi-experimental design, as the researcher cannot control all variables affecting students' mathematical communication skills. The study follows a Pre-Test Post-Test Control Group Design involving two classes: an experimental class and a control class. The population consists of all seventh-grade students at SMP Negeri 2 Longkib during the 2022/2023 academic year, and the sample is selected using simple random sampling, ensuring each student has an equal chance of being chosen.

Data collection involves testing, including a pre-test administered before treatment and a post-test afterward. Instruments utilized include lesson plans and student worksheets. The mathematical communication skills assessment comprises both pre-test and post-test items, developed based on indicators of mathematical communication skills. The rubric for evaluating these skills is presented in the accompanying table (Isrok'Atun, 2011).

Table 1: Rubric for Scoring Mathematical Communication Skills

| **Indikator** | **Respon Siswa Terhadap Soal** | **Skor** |
|---|---|---|
| Menyatakan suatu situasi, gambar, diagram, atau benda nyata ke dalam bahasa, simbol, ide, atau model matematis. | Tidak Menyatakan benda-benda nyata, situasi, dan peristiwa sehari-hari ke dalam bentuk model matematika (gambar, tabel, diagram, grafik, dan aljabar). | 0 |
| | Menyatakan benda-benda nyata, situasi, dan peristiwa sehari-hari ke dalam bentuk model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran ≤ 25%. | 1 |
| | Menyatakan benda-benda nyata, situasi, dan peristiwa sehari-hari ke dalam bentuk model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran 25% sampai 50%. | 2 |

| | | |
|---|---|---|
| | Menyatakan benda-benda nyata, situasi, dan peristiwa sehari-hari ke dalam bentuk model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran antara 50% sampai dengan 75%. | 3 |
| | Menyatakan benda-benda nyata, situasi, dan peristiwa sehari-hari ke dalam bentuk model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran ≥ 75%. | 4 |
| Menjelaskan ide, situasi dan relasi matematis secara tulisan dengan benda nyata, gambar, grafik, dan aljabar. | Tidak menjelaskan ide dan model matematika (gambar, tabel, diagram, grafik, dan aljabar). | 0 |
| | Menjelaskan ide dan model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran ≤ 25%. | 1 |
| | Menjelaskan ide dan model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran antara 25% sampai dengan 50%. | 2 |
| | Menjelaskan ide dan model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran 50% sampai 75%. | 3 |
| | Menjelaskan ide dan model matematika (gambar, tabel, diagram, grafik, dan aljabar) dengan kebenaran ≥ 75%. | 4 |
| Menjelaskan hasil dalam bentuk tertulis. | Tidak dapat menyimpulkan hasil dalam bentuk tertulis sama sekali. | 0 |
| | Dapat menyimpulkan hasil dalam bentuk tertulis dengan kebenaran ≤ 25%. | 1 |
| | Dapat menyimpulkan hasil dalam bentuk tertulis dengan kebenaran antara 25% sampai | 2 |

| | | |
|---|---|---|
| | dengan 50%. | |
| | Dapat menyimpulkan hasil dalam bentuk tertulis dengan kebenaran antara 50% sampai dengan 75%. | 3 |
| | Dapat menyimpulkan hasil dalam bentuk tertulis dengan kebenaran ≥ 75%. | 4 |

outcomes based on predetermined scores. Subsequently, the data processing procedure is conducted with normality and homogeneity tests as prerequisites for hypothesis testing using the t-test. The formulation of the hypothesis is as follows:

- **H0**: The mathematical communication ability of students taught using the Quick On The Draw learning model is equal to the mathematical communication ability of students taught using the conventional learning model.
- **H1**: The mathematical communication ability of students taught using the Quick On The Draw learning model is better than that of students taught using the conventional learning model.

## RESEARCH RESULTS AND DISCUSSION

### Research Results

The data obtained in this study are the test scores for mathematical communication ability from pre-tests and post-tests, which underwent normality testing. In this research, normality testing was conducted using SPSS. The criteria for testing are as follows: (1) If the significance value > 0.05, then the score distribution is normally distributed. (2) If the significance value < 0.05, then the score distribution is not normally distributed. The results of the normality testing using the SPSS application are presented in the following table:

Table 2: Results of Normality Test for Pre-test Scores of Experimental and Control Classes

| **Tests of Normality** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Ko lmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
| | Kelas | Statistic | df | Sig. | Statistic | df | Sig. |
| Kemampuan Komunikasi Matematis | Eksperimen | ,102 | 19 | ,200* | ,961 | 19 | ,602 |
| | Kontrol | ,111 | 18 | ,200* | ,963 | 18 | ,663 |

| |
|---|
| . This is a lower bound of the true significance. |
| a. Lilliefors Significance Correction |

Source: Data Processing Results Using SPSS Version 26

Based on the results of the normality test output of the pre-test scores for the experimental and control classes using the Shapiro-Wilk test, the significance values for the mathematical communication skills test scores are 0.602 for the experimental class and 0.663 for the control class. Both significance values are greater than 0.05. According to the decision-making criteria, the samples from both the control and experimental classes come from a normally distributed population.

After conducting the normality test on the pre-test data, the next step is to perform a homogeneity test using Levene's test for equality of variances in SPSS version 26 for Windows. This is done to determine whether the data comes from populations with the same variance. The hypotheses for the homogeneity test are as follows:

a. H0: There is no difference in variance between the experimental and control classes.

b. Ha: There is a difference in variance between the experimental and control classes.

The criteria for the test state that if Ha significance > 0.05, then H0 is rejected. After processing the data, the output display can be seen in the following table:

Table 3: Results of Homogeneity Test for Pre-test in Experimental and Control Classes

| **Test of Homogeneity of Variance** | | | | | |
|---|---|---|---|---|---|
| | | Levene Statistic | df1 | df2 | Sig. |
| Kemampuan Komunikasi Matematis | Based on Mean | ,100 | 1 | 35 | ,754 |
| | Based on Median | ,104 | 1 | 35 | ,749 |
| | Based on Median and with adjusted df | ,104 | 1 | 34,247 | ,749 |
| | Based on trimmed mean | ,107 | 1 | 35 | ,745 |

Source: Data Processing Results Using SPSS Version 26

Based on the results of the homogeneity variance test in Table 3, the significance value is 0.754, which is greater than 0.05. According to the hypotheses in the homogeneity test, both classes have the same variance (homogeneous). Next, the examiner conducts a post-test data analysis for the control and experimental classes. The results of the normality test for the post-test data through SPSS can be seen in the following table:

Table 4: Results of Normality Test for Post-test Scores in Experimental and Control Classes

| **Tests of Normality** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Kelas | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
| | | Statistic | df | Sig. | Statistic | df | Sig. |
| Kemampuan Komunikasi Matematis | Eksperimen | ,074 | 19 | ,200* | ,985 | 19 | ,982 |
| | Kontrol | ,091 | 18 | ,200* | ,972 | 18 | ,827 |
| *. This is a lower bound of the true significance. | | | | | | | |
| a. Lilliefors Significance Correction | | | | | | | |

Source: Data Processing Results Using SPSS Version 26

Based on the results of the normality test output for the post-test scores for the experimental and control classes using the Shapiro-Wilk test in Table 4, the significance value for the mathematical communication skills test scores is 0.982 for the experimental class and 0.827 for the control class. Both significance values are greater than 0.05. According to the decision-making criteria, the samples from both the control and experimental classes come from a normally distributed population. The next step is to perform a homogeneity test using Levene's test for equality of variances in SPSS version 26 for Windows. This is done to determine whether the data comes from populations with the same variance. The hypotheses for the homogeneity test are as follows.

a. H0: There is no difference in variance between the experimental and control classes.

b. Ha: There is a difference in variance between the experimental and control classes.

The criteria for the test state that if Ha significance > 0.05, then H0 is rejected. After processing the data, the output display can be seen in the following table:

Table 5: Results of Homogeneity Test for Post-test Scores in Experimental and Control Classes

| **Test of Homogeneity of Variance** | | | | | |
|---|---|---|---|---|---|
| | | Levene Statistic | df1 | df2 | Sig. |
| Kemampuan Komunikasi Matematis | Based on Mean | ,607 | 1 | 35 | ,441 |
| | Based on Median | ,545 | 1 | 35 | ,465 |
| | Based on Median and with adjusted df | ,545 | 1 | 33,252 | ,466 |
| | Based on trimmed mean | ,606 | 1 | 35 | ,442 |

*Source: Data Processing Results Using SPSS Version 25*

Based on the results of the homogeneity variance test in Table 5, the significance value is 0.441, which is greater than 0.05. According to the hypotheses in the homogeneity test, both classes have the same variance (homogeneous). Given that the normality and homogeneity tests indicate that the data is normally distributed and homogeneous, we can proceed with the average equality test using a one-tailed t-test through SPSS version 26 with the independent sample t-test. The following output results were obtained:

Table 6: Results of t-test for Post-test Scores in Experimental and Control Classes

| **Independent Samples Test** | | | | | | |
|---|---|---|---|---|---|---|
| | | t-test for Equality of Means | | | | |
| | | t | Df | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Kemampuan Komunikasi Matematis | Equal variances assumed | -2,265 | 35 | ,030 | -2,29058 | 1,01148 |
| | Equal variances not assumed | -2,278 | 34,091 | ,029 | -2,29058 | 1,00538 |

In Table 6, the testing criteria based on the t-test for creative thinking skills in this study only apply to a one-tailed test, with a significance level (2-tailed) of 0.030. Since 0.030 < 0.05, H0 is rejected and Ha is accepted.

Thus, it can be concluded that the mathematical communication skills of students taught using the Quick On The Draw learning model are better than those of students taught using the conventional learning model. This indicates that the Quick On The Draw learning model has a significant effect on the mathematical communication skills of seventh-grade students at SMP Negeri 2 Longkib.

**Discussion**

The data collection technique used in this study is a written test. The test was conducted twice: a pre-test to assess students' initial abilities and a post-test to evaluate the mathematical communication skills of students in both the control and experimental classes. Based on the research data from SMP Negeri 2 Longkib, the Quick On The Draw learning model has a significant impact on students' mathematical communication skills.

The increase in the average scores of students' mathematical communication skills is attributed to the fact that during the learning process with the Quick On The Draw model, students become more engaged and attentive. This model helps students better understand the material being taught.

The Quick On The Draw learning model was applied to seventh-grade students at SMP Negeri 2 Longkib to compare the mathematical communication skills of those who learned using this model with those who learned through conventional methods. The implementation of the Quick On The Draw model successfully fostered students' interest and enthusiasm for learning. Students appeared very enthusiastic about the lessons, highlighting the importance of keeping their interest to ensure an effective learning process.

Learning will not be effective if students exhibit boredom or fatigue during lessons, as this can lead to a lack of focus and negatively affect their ability to understand and represent the problems presented. Throughout the learning process, students were active both in groups and individually, with interactions between students and teachers being very positive. Achieving learning objectives is crucial for the success of any educational process, and the effectiveness of this process greatly influences the outcomes of the research.

Grouping students effectively encourages good interaction and mutual support, allowing them to learn actively through concepts and principles. This experiential learning approach enables students to discover solutions aligned with the Quick On The Draw model.

## CONCLUSION

Based on the research results and data analysis in this study, it can be concluded that the mathematical communication skills of students taught using the Quick On The Draw learning model are better than those of students taught using the conventional learning model for the topic of set operations. This is evident from the significance value (2-tailed) of 0.000 < 0.05, leading to the rejection of H0 and acceptance of Ha.

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