



ISST 2023

CERTIFICATE OF PRESENTATION

has been awarded to

Dini Andiani

for presenting in

**The 3rd International Seminar of Science and Technology
"Trends in Science and Technology for Sustainable Living"**

Organised by

Faculty of Science and Technology, Universitas Terbuka
19th of October 2023, South Tangerang, Indonesia

Dean of Faculty of Science and Technology
Universitas Terbuka



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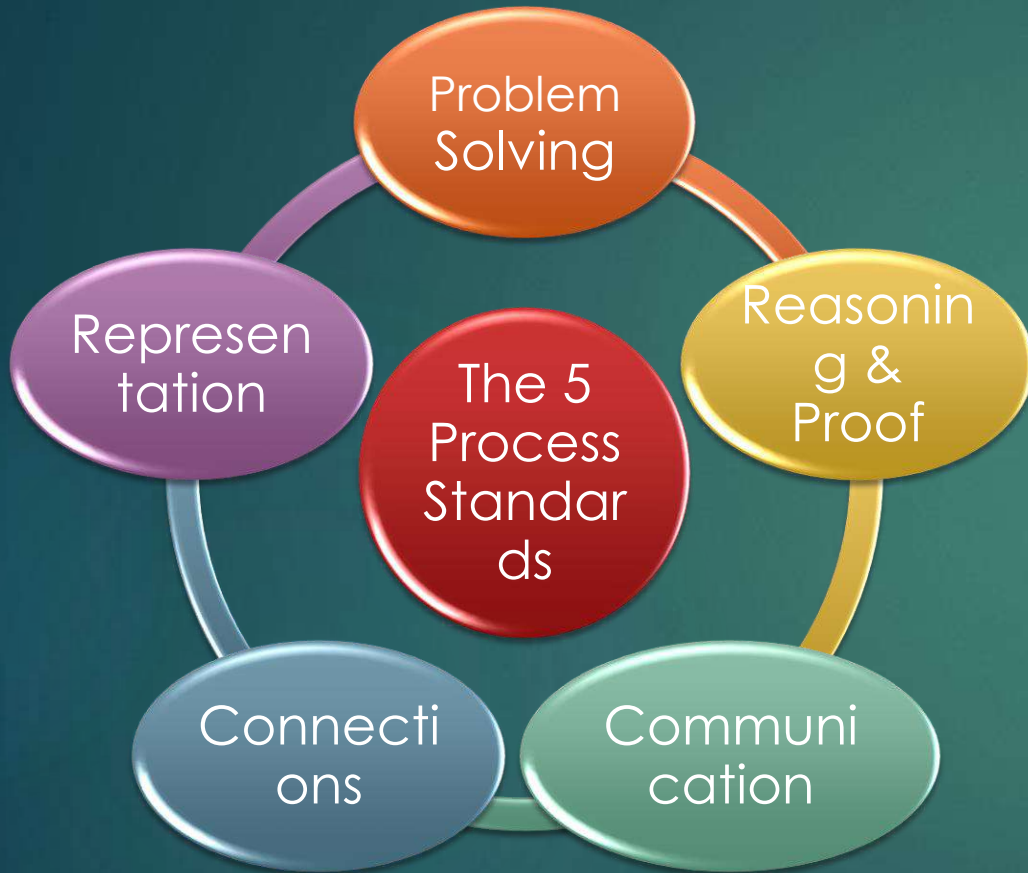
Trends in Research on **Mathematical**
Representational Ability in the
Journal of Mathematics Education for
sustainable living across
Indonesia: from Research Design to Data Analysis

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The 3rd International Seminar of Science and Technology (ISST)
Faculty of Science and Technology, Universitas Terbuka
Oktober 2023

Introduction



According to Process Standards NCTM, there are five standards for mathematics content, namely:

- (1) Communication;
- (2) Connections;
- (3) Representation;
- (4) Problem Solving;
- (5) Reasoning and Proof

Analysis on a Number of Articles in
Mathematics Education
Journals throughout **Indonesia**
since **2014-2022**

The aspect and Categories used for Content Analysis in the Study

- ❑ Types of research
- ❑ Research Subject
- ❑ Data analysis Methods
- ❑ Subject Matter
- ❑ Using Technology
- ❑ Support SDG's

Types of research



Research Subject

III Grade
ES students

IV Grade
ES students

V Grade
ES students

VI Grade
ES students

Research Subject

VII Grade
JHS students

VIII Grade
JHS students

IX Grade
JHS students

X Grade SHS
students

XI Grade
SHS students

XII Grade
SHS students

Research Subject

Undergraduate
students

Literature
Review

Unidentified

Data analysis Methods

mean

percentage

N-gain

t-test

ANOVA

Data analysis Methods

ANCOVA

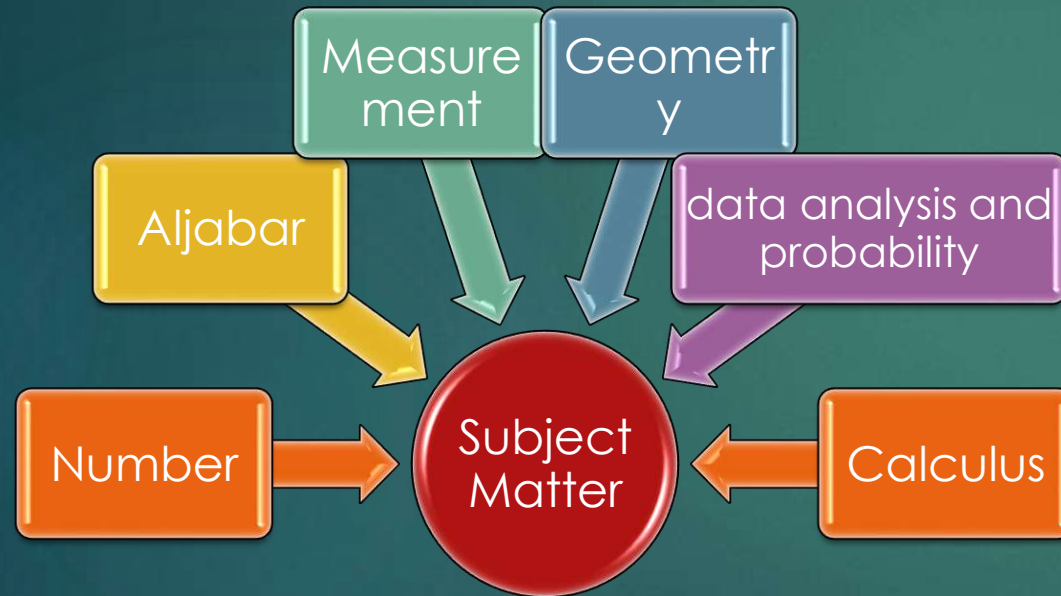
MANOVA

Mann Whitney Test

Regression

Unidentified

Subject Matter



According to NCTM (2000:29)

There are five standards for mathematics content, namely:

- (1) numbers and the operation;
- (2) algebra;
- (3) geometry;
- (4) measurement;
- (5) data analysis and probability.

According to Program Merdeka Belajar there are five standards for mathematics content, namely:

- (1) numbers;
- (2) algebra;
- (3) geometry;
- (4) measurement;
- (5) data analysis and probability.
- (6) Calculus

Technology

Related to Technology

Not related to Technology

Data Analysis

- ▶ Each of articles was classified into specific category based on certain aspect that met the defined category. The decision was based on information that was shared by the authors in abstract, method, and discussion parts. Further, the data that had been collected were presented in a form of bar chart.

The Improvement Trend of the Number of Educational Researches with **Mathematical Representational Ability** as the Main Concern in Indonesia in 9 Years



Figure 1

Alluding to the graph shown in figure 1, the articles that reviewed **Mathematical Representational Ability** could be found since 2014. No specific pattern of shift occurred to the number of publications from year to year. However, if you refer to Figure 1, the number of publications decreased sharply in 2017 and experienced a significant increase in 2018.

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- ▶ The improvement trend on the number of publications about **Mathematical Representational Ability** indicated that there was a significant increase in the number of researchers who were fervent to investigate **Mathematical Representational Ability** .

Types of research

The Distribution of Researches with **Mathematical Representational Ability** as the Main Concern based on Types of Research.

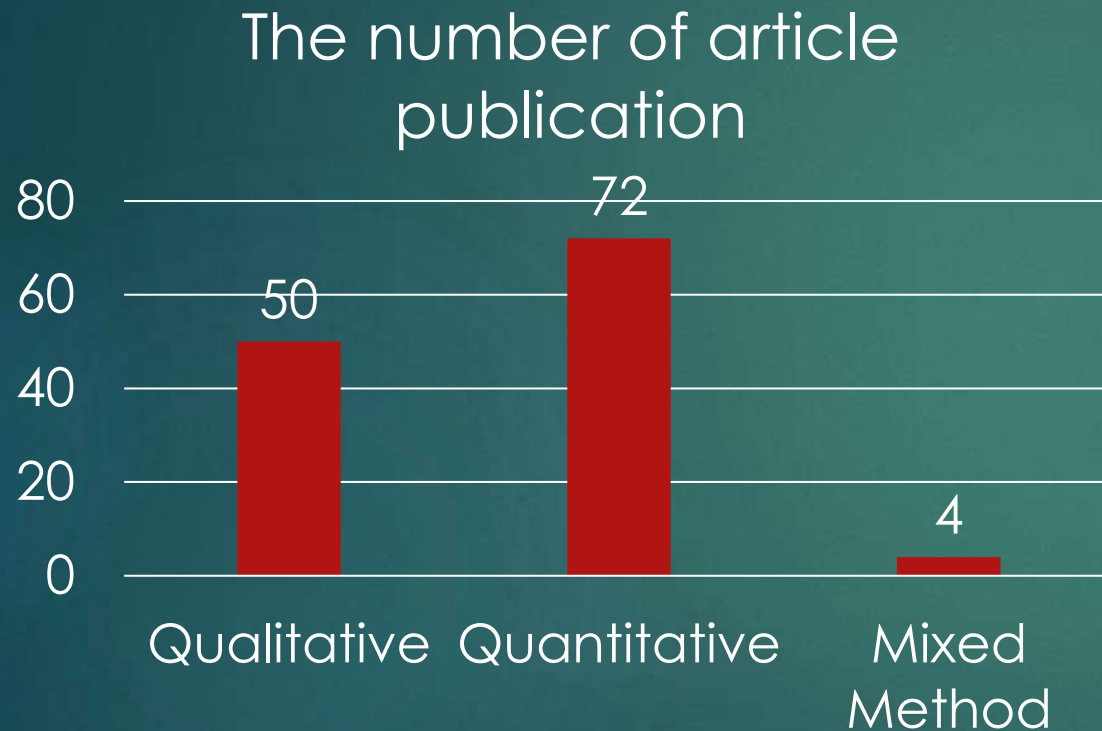


Figure 2

Types and designs of research determine the focus of a study. Based on Figure 2, quantitative research constituted the most dominant design the researchers employed to investigate **Mathematical Representational Ability**.

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- ▶ The higher number of quantitative researches than other types of research is in line with some previous studies reporting that the researchers preferred quantitative research design to conduct research in education, instead of qualitative one (Goktas et al., 2012; Uzunboylu & Asiksoy, 2014, Susetyarini, 2020).
 - ▶ However, the trend of qualitative design has been shown to start increasing (Shakouri, 2014) and have targeted social researches, including some issues of education (Mohajan, 2018).(Susetyarini, 2020).

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- ▶ Such a condition was closely interlinked to the advantage of qualitative approach to define a phenomenon in detailed and comprehensively. For that reason, the lack of qualitative research existence has been a good chance for further researchers to make use of qualitative design and focus their researches on **Mathematical Representational Ability**.

Research Subject

The Distribution of Research Subjects in Some Educational Researches with **Mathematical Representational Ability** as the Main Concern in Indonesia



Figure 3

Based on Figure 3, the most selected research subjects were students of junior high school, consecutively followed by students of higher education, junior high school and elementary school. Meanwhile, only 1 article out of all did not include the class under study.

Data analysis Methods

The Distribution of Data Analysis Method Selection in Some Educational Researches with **Mathematical Representational Ability** as the Main Concern in Indonesia

The accuracy of method selection for data analysis would determine the level of validity of a research.

Figure 4 shows that percentage was data analysis method the researchers used the most.

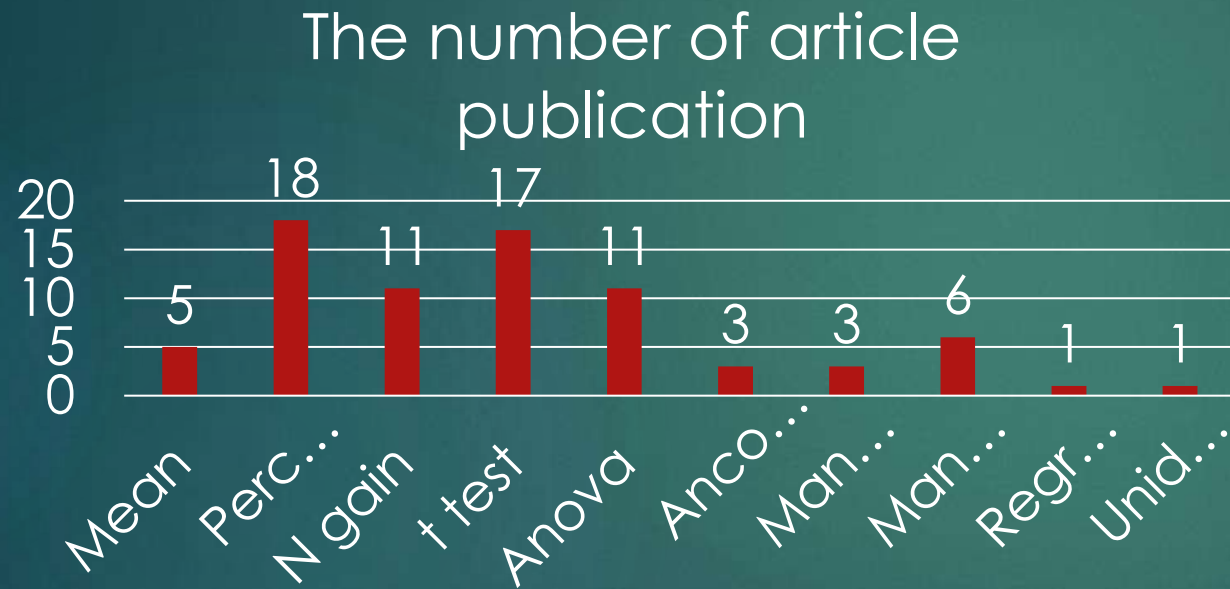


Figure 4

Subject Matter

Mathematics Topics Mostly Selected in Educational Researches with **Mathematical Representational Ability** as the Main Concern in Indonesia

The number of article publication



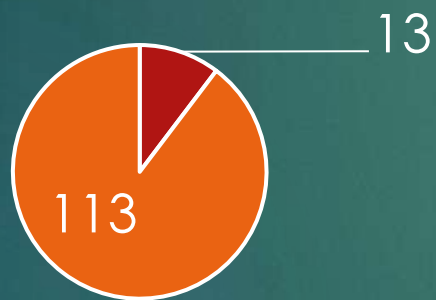
Figure 5

Based on figure 5, some topics were chosen by the researchers to pilot their to pilot their researches in all levels. Specifically, geometry was the most commonly selected topic for conducting the researches. The topic of numbers was a topic that was of little interest in research related to mathematical representation abilities

Using Technology

The Types of Using Technology in Educational Researches with **Mathematical Representational Ability** as the Main Concern in Indonesia

The number of article publication



- Related to Technology
- Not related to Technology

Based on Figure 6, most of the research conducted does not use technology. The use of technology is more likely to be used during Covid, namely from the last 2 years this research was conducted.

Figure 6

Support SDG's

- ▶ None of the articles reviewed outlined the content of their articles with Sustainable Development Goals.
- ▶ Nothing in the article described the Sustainable Development Goals directly. However, in essence, providing new approaches and methods in learning mathematics that are more relevant and can be applied in everyday life can help achieve SDG number 4, namely quality education.

Conclusion

- ▶ In this current study, articles that highlighted **Mathematical Representational Ability** and were published in Mathematics education journals across Indonesia from 2014 to 2022 have been reviewed. The trend has been found that there was an increase in the number of publications with **Mathematical Representational Ability** as the main concern in the past four years. Among hundreds of publications, quantitative researches were mostly found. In addition, the twelveth graders of yunior high school were mostly chosen as the research subjects; while geometry material constituted the most chosen topic. percentage were the most commonly used instruments for data collection and analysis.

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- ▶ Alluding to the findings of this study, some recommendations have been set up for further researches. Firstly, it is of necessity to raise the frequency of conducting qualitative research to investigate **Mathematical Representational Ability** development. The second, it is important for researchers to outline how mathematics researchers contribute to SDGs.



Thank You Very Much