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SYSTEMATIC LITERATURE REVIEW : IMPROVING CONNECTION SKILLS STUDENT MATHEMATICS USING REACT STRATEGY

Nabilah Aulia Shafira[1)], Budi Waluya[2)]
Universitas Negeri Semarang, Gunung Pati, Semarang, 50229, Indonesia
*Email Address : nabilahauliashafira@students.unnes.ac.id

Abstract (English)
One of the main or basic abilities for students in the process of learning mathematics is the ability of mathematical connections. The purpose of this study is to find out the effect of improving students' mathematical connection skills with the REACT strategy from 2015 to 2024. The research method uses Systematic Literature Review (SLR) using the PRISMA method on all research articles based on Google Scholar and SCIMAGOJR The search procedure uses selection criteria and includes the influence of variables, namely year of publication, level of education, and research material. The results showed that there was an increase in students' mathematical connection skills with the REACT strategy.

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Kata Kunci
Mathematical Connection Skills, REACT Strategy, SLR

1. INTRODUCTION

Mathematics is the science of logic and calculation that is part of the curriculum at all levels of education, from elementary, junior high, high school to university. The process of learning mathematics is a variety of important activities in order to help students understand concepts. Effective mathematics learning is when students are able to understand mathematical concepts well, and are able to relate mathematical concepts to other sciences (outside of mathematics) in solving a problem. According to (NCTM, 2014) the problem in learning mathematics today is that students are unable to relate the mathematical concepts that students learn at school to their daily experiences or lives. Basically, mathematics learning activities carried out by teachers aim to explain concepts using the lecture method, given example problems, and provided practice problems. Under these circumstances, learners do not have the opportunity to gain and develop their own knowledge. Learners only get what the teacher has provided. As a result, when students work on problems that have not been discussed, students will often have difficulty in solving them. (Hutneriana et al., 2022).

According to (Utami & Effendi, 2020) NCTM suggests five skills that students must have when learning mathematics are (1) problem solving skills, (2) representation skills, (3) communication skills, (4) reasoning skills, and (5) mathematical connection skills. One of the fundamental mathematical skills that must be accomplished is mathematical connection skills or abilities Mathematical connection ability is the ability or skill that students have to view mathematics as interconnected science. Indicators of mathematical connection ability are (1) finding and understanding links between various representations of concepts and procedures, (2) understanding links between subjects in mathematics, (3) applying mathematics to other fields and real life, (4) understanding equivalent representations of the same concepts and procedures, (5) finding links berween processes to other processes in equivalent representations, (6) utilizing links between subjects in mathematics, as well as between mathematics subjects and other subjects. (Apipah & Kartono, 2017).

Mathematical connection skills involve linking concepts in one math topic or using material in other topics Learners who have mathematical connection ability are able to understand mathematical concepts and connect subjects in the field of mathematics Garcia-Garcia and Dolores-Flores (2018, p. 230) define mathematical connection ability as the cognitive process of learners linking two or more ideas, concepts, definitions, steps, representations and their values to each other, using other fields of study or using daily

activities. (Muhdiyanto et al, 2022). This is the ability of mathematical connections not only related to connections between subjects or only mathematical material, but related to mathematical material in other fields of study and application to everyday life. The hope for students to have mathematical connection skills is so that the targets in the learning process can be carried out properly and correctly, as a result students can overcome a problem shared by the teacher and can find solutions to the problems given (Zulfa, 2018) The absence of students mathematical connection skills will get difficulties when studying mathematics (Nenta & Edy, 2020).

One way to improve students' mathematical connection skills is to choose the right and effective learning strategy or learning model. This helps students in building information, ideas, and mindsets to achieve learning goals. So that it can improve students' ability to solve problems, optimize students' activities, and create mathematics learning to be meaningful and fun. The strategy is the REACT strategy (Relating, Experiencing. Applying, Cooperating, and Transferring). The steps in the REACT strategy according to the abbreviation, namely Relating (connecting) is connecting previous knowledge that is related to daily activities, Experiencing (experiencing) is trying to develop knowledge that is already owned, Applying (applying) is an application activity that aims to enable students to build their own knowledge, Cooperating (grouping) is the cooperation of students given the opportunity to discuss, contribute, share, and communicate with their peers, Transferring (transferring) is an activity of working on problem exercises that aims to analyze the security of the material that has been taught (Rachmawati et al., 2019). According to Solikhah (2017: 53) the REACT strategy is effectively applied in improving students' mathematical connection skills (A'dadiyyah & Malasari, 2023).

From this explanation, the target of this study is to review and combine results based on available empirical research to provide a more in-depth explanation of improving mathematical connection skills with the REACT strategy based on related literature.

2. METHODS

2.1 Systematic Literature Review

In this study, researchers used the Systematic Literature Review (SLR) method, this SLR method is a research method involving the process of identifying, analyzing, evaluating and interpreting all previous research outputs or results that have been found by researchers. The results of previous research, followed by a review by the researcher, by systematically reviewing and identifying the selected research articles. If the researcher wants to use the SLR method, the researcher must identify and review several journals that are carried out systematically and apply procedures that are consistent with the use of the SLR method. (Triandını et al, 2019). Databases on electronic devices used by researchers include Google Scholar, Publish or parish 8, and Mendeley. All articles were screened and only relevant articles that met the inclusion criteria were selected for review.

2.2 Inclusion Criteria

The inclusion criteria applied were:

(1) The article analyzes mathematical connection ability.
(2) The article analyzes the application of REACT strategy with mathematical connection ability.
(3) Articles were published between 2014-2024.

2.3 Research Instruments

The research instruments applied are provisions related to the inclusion criteria. This instrument may take the form of an observation form. These criteria refer to the year of

publication, the level of education, and the material applied. The provisions applied to SLR are PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyzes). According to Liberati, the evaluation steps carried out are related to the 4 stages of PRISMA, namely identification, screening, eligibility, and covering (Ridho et al., 2022).

2.4 Population and Sample

The population in this study were all articles on mathematical connection skills using the REACT strategy published in national and international journals. From the inclusion criteria, a total sample of 18 articles was obtained. Consisting of 4 quantitative assessment articles, 3 qualitative assessment articles, 1 class action research article, 3 mix method assessment articles, 5 quasi experiment assessment articles, 1 Plomp development assessment article, and 1 True Experimental Design assessment article that are relevant and suitable for systematic review.

3. RESULTS AND DISCUSSION

3.1 Studies Based on Year of Publication

Articles were collected using the inclusion criteria, and 18 relevant articles were obtained for analysis of the relevant data, published from 2015 to 2024. Below is a diagram of the distribution of major studies from 2015 to 2024.

Figure 1. Research Data Based on Year of Publication

Based on Figure 1, it can be concluded that the frequency of studies on improving students' mathematical connection skills with the REACT strategy published from 2015 to 2024 has increased in 2018-2019 although it has decreased in 2017-2018, 2019-2021, and 2022-2023. Studies on qualitative methods regarding mathematical connection skills were mostly published in 2019, there were 4 articles consisting of 1 quantitative approach article, 1 quasi experiment approach article, 1 mix method approach article and 1 article with a True Experimental Design approach. The number of publications that increased in 2015-2019 can be interpreted that research on improving mathematical connection skills using the REACT strategy is considered important. Fadhila et al., (2014) which suggests that "there is a change in students' mathematical connection skills in a positive direction after learning with the REACT strategy". Students immediately want to know every connection contained in mathematics learning when they have mathematical connection skills.

3.2 Study by Education Level

Mathematical connection is an important ability to be dominated by all students. Research on mathematical connection skills is conducted at every level of education, especially to see the improvement of students mathematical connection skills applying the REACT strategy in

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mathematics learning. The number of studies at each level of education is listed in the following graph.

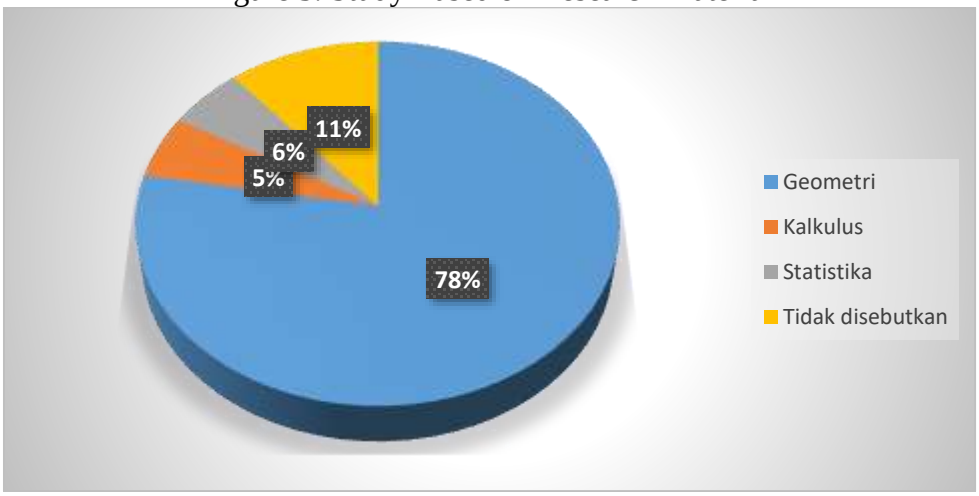
Figure 2. Studies by Education Level

Based on Figure 2, it can be seen that the improvement of students' mathematical connection skills applying the REACT strategy is mostly studied at the Junior High School (SMP) level in 10 studies. As for the Senior High School (SMA) level, there are 5 studies and the least at the Elementary School (SD) level there are 3 studies. The improvement of students' mathematical connection skills applying the REACT strategy is more often studied at the junior high school level because it has a good impact on mathematics learning and the need for the REACT strategy to improve students' connection skills. In line with research at SMP N 47 Jakarta, students who were taught using the REACT strategy method showed an increase in mathematical connection skills compared to conventional learning methods. (Aini et al, 2017).

3.3 Studies Based on Research Materials

According to the research material, this literature study which consists of 3 materials is geometry, calculus, statistics and there are articles that do not include the research material. Below is the percentage based on research material shown in Figure 3.

Figure 3. Study Based on Research Material



From Figure 3, it can be concluded that research related to improving students' mathematical connection skills applying the REACT strategy is dominated by geometry material as much as 78%. While the least material statistics and calculus are 6% and 5%. Geometry is a research material that is often studied because geometry develops problem solving skills and logical thinking Geometry is a major element in the mathematics learning

process that students need to understand, because geometry concepts are related to situations in daily activities (Panaoura, 2014; Rofii, Sunardi, & Irvan, 2018).

4. RESULTS AND DISCUSSION

Based on the literature study that has been analyzed, it is found that after implementing learning using the REACT strategy, students already have mathematical connection skills. (Putri & Aziza, 2020). Improving Mathematical Connections in Geometric Transformation Material with REACT Learning Strategy Assisted by Batik Motif Media for Class XI IPS 1 SMA Negeri 7 Yogyakarta which was researched by (Ida Lydiati, 2020).. The results showed that the application of learning with the REACT strategy assisted by batik motif media increased the average value of the final test of each cycle. At the end of each cycle, tests were carried out by all students totaling 32 students. The test results at the end of cycle 1 there were 21 students completed and there were 11 students who were not complete. There was an increase in the percentage of completeness based on the test results at the end of cycle 2. This means that 27 students are complete and 5 students are not complete. The results at the end of cycle 2 achieved the goal of 75% of students being complete.

Based on research with the title Implementation of the REACT Model (Relating, Experiencing, Applying, Cooperating, Transferring) Based on Ethnomathematics of the Holy Tower to Improve Mathematical Connection Skills of Junior High School Students studied by (A'dadıyyah & Malasarı, 2023). The results showed that the implementation of the mathematics learning process with the REACT strategy was able to improve students' mathematical connection skills, this was evidenced by the mean N-Gain (%) value of the experimental class of 91.10 at a standard deviation of 10.249, but the mean N-Gain (%) value of the control class was 53.50 at a standard deviation of 20.503. From the results of the analysis listed, it shows that the mean N-Gain (%) value of the experimental class is greater than the mean N-Gain (%) value of the control class. This can be proven using students who are active in the learning process, where students can work together in groups to discuss and solve problems gradually with the REACT strategy based on the Holy Tower ethnomathematics given by the researcher on the LKS. In addition to this, the involvement or enthusiasm of students is able to develop the potential of students to identify and connect mathematical concepts with other fields. (Sulistyaningsih & Prihaswati, 2015). Therefore, it can make it easier for students to develop mathematical connection skills.

5. CONCLUSIONS

From the results and discussion using the SLR method, it is concluded that the publication regarding the improvement of students' mathematical connection skills applying the REACT strategy has increased or increased in 2018-2019 and has decreased in 2017-2018, 2019-2021, and 2022-2023. This increase is in line with the increasing importance of mathematical connection skills in the school curriculum. This study was mostly conducted at the junior high school level. Therefore, according to Piaget, mathematical connection ability is related to the cognitive development of students such as at the junior high school level so that students are able to build mathematical relationships with other sciences and in everyday life. Geometry material is the most researched material because it is an important foundation in mathematics and has many applications in various fields of science and everyday life.

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