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SYSTEMATIC LITERATURE REVIEW: MATHEMATICAL COMMUNICATION ABILITY THROUGH QUANTUM LEARNING MODEL BASED ON SELF EFFICACY

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ABSTRACT

Mathematical communication skills are fundamental skills in learning mathematics. Mathematical communication skills are also linked to self-efficacy. This study aimed to determine the improvement and relationship of students' mathematical communication skills using Quantum Learning and self-efficacy. This study used the Systematic Literature Review approach with the PRISMA method. The electronic literature search source used is Google Scholar through Publish or Perish 8, which collects 994 articles, using national and international articles published from 2018-2023, indexed by Sinta 1-4 and indexed by Scopus, categorized as proceedings and journal articles, has full access and is classified as a field of mathematics education. The results showed that self-efficacy affects mathematical communication skills and Quantum learning models, and there is a relationship between self-efficacy and mathematical communication skills with Quantum learning models.

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1. INTRODUCTION

Mathematics is a worldwide field of study that serves as the basis for today's technological advancements. In addition, mathematics is an important component of many disciplines and can aid in the development of critical thinking skills(Sarini, 2019).

Mathematics is a vital topic that can help people solve challenges in life(Hendri Prayogi, 2019). Mathematics is a scientific discipline that investigates the relationship between ideas and abstracts (Gökalp, 2020; Hermawan & Andrianto, 2018). This means that mathematics is a subject that thinks with of course requires logical thinking. Learning maths is more than just memorizing facts; It's also about understanding the process and tracking it when it's done. For this reason, mathematics needs to be taught from elementary school for them to succeed.

In accordance with Law no. 22 of 2006, learning objectives include: 1) using ideas correctly and appropriately in solving problems and understanding the relationship between concepts, as well as understanding the relationship between concepts. 2) Use mathematics to gather evidence, 3) solve problems by understanding them, design mathematical solutions, implement comprehensive solutions, and interpret results 4) Use symbols, tables, images, or other media to explain ideas that can help understand problems or challenges 5) realize the importance of mathematics in their lives, have curiosity, attention, and are attracted to master it, and are persistent and firm with their ability to solve the problem(Adetia & Adirakasiwi, 2022).

Students' abilities when learning mathematics include the ability to solve problems, make decisions, communicate, and solve problems(Sopian & Sabandar, 2018). When learning math, students must be able to communicate effectively. Communication is a process by which a person sends carefully selected information so that the recipient can understand the significance of the information (Luritawaty, 2019; Maulana & Sritresna, 2021). In the context of education, communication is one of the insurmountable obstacles(Syah & Sofyan, 2021). Because, in the field of education, information is disseminated through knowledge and understanding possessed by both teachers and students. When the process goes well, people's trust grows(Sulastri & Sofyan, 2022).

But in fact, mathematics education in Indonesia is still faced with many problems, one of which is the low mathematical communication skills of students. This ability is important for gaining a better understanding in solving mathematical problems, and also for improving students' social and cognitive skills. Therefore, it is necessary to improve students' mathematical communication skills, this aims to make students able to understand mathematics learning better.

Communication is the first step in understanding a subject(Widayanti & Anggraeni, 2019). Therefore, communication with peers is very important for learning mathematics. This shows that communication is important to develop, especially in learning(Luritawaty, 2019). The ability to communicate mathematically is the ability to understand and communicate designs, truths, and ideas in mathematics in a way that others can understand(Sopian & Sabandar, 2018). In addition to its ability to be understood by others, communication is also important in evaluating student learning outcomes. In the context of mathematics, students can evaluate their learning outcomes through interaction with teachers or peers. This allows students to identify and improve their learning outcomes(Sulastri & Sofyan, 2022). This means mathematical communication has important implications for mathematics education because it allows students to understand, write down, and develop ideas or concepts systematically and consistently(Fauziah et al., 2018).

In the field of mathematical communication, it was found that student’s ability to communicate mathematically was still lacking(Purnamasari & Afriansyah, 2021; Yanti & Novitasari, 2021). This implies that mathematical communication capacity among students is deteriorating(Nuraeni, 2018). Previous results were also influenced by the OECD PISA survey conducted in 2018. Indonesia has 379 senators and is ranked 73rd out of 79 countries. This estimate is based on PISA results from 2015 which showed an increase of 63 points from 76, with an average score of 386. In addition, according to the analysis of IEA TIMSS

data in 2015, Indonesia ranked 45th out of 50 countries. For this reason, understanding mathematics education is very important to understand mathematics communication skills in the classroom.

Based on the description above, students need to have a good mastery of mathematical communication skills, but in fact the level of students' mathematical communication skills is still relatively low. This is reinforced by previous research that has proven that students' mathematical communication skills are still relatively low, such as research conducted by Nufus (2017) which states that students are less able to read written mathematical representations, write symbols and precise mathematical notations and make mathematical models of the story problems presented. The level of an error made by students related to answering questions containing indicators of mathematical communication skills will vary according to the level of intelligence, in this case, represented by the level of school level. In fact, the low ability of these students is also influenced by the level of activity during their learning. Furthermore, research conducted by Nopiyani et al., (2018) shows that students' communication skills and responses to math problems are still relatively low. In addition, the results of research conducted by (Azmi, 2017) show that mathematical communication is not an easy thing because students' thought processes cannot be directly captured by the five senses but must be trained to communicate mathematically both orally and in writing and research still finds low mathematical communication skills of students, especially mathematical written communication.

Reinforced by the results of research conducted by Zaditania & Ruli, (2022) showed that the 4 points of mathematical communication questions given received results for question points number 2 and 4 included in the low category with a percentage of ≤ 33%, question item number 1 included the medium category with a percentage of >33% while question item number 3 was included in the high category with a percentage of >66%. This concludes that the mateamtic communication skills of junior high school students are still relatively low, where there are 2 out of 4 questions that are still in the low category. One of the causes of low mathematical communication skills is that the understanding of concepts in the set material is still fairly lacking, resulting in misunderstanding of what is asked on the problem.

Based on existing problems, a solution is needed to deal with this. The solution that researchers use in overcoming students' mathematical communication skills is to use the Quantum Learning learning model. Quantum Learning is a new approach and theory of learning that is evolving in schools and companies for all types of individuals and for all reasons(Rahayu et al., 2016) Quantum Learning features a systematic learning framework that includes: growth, experience, name, demonstrate, repeat, and celebrate(Dewi & Nuraeni, 2022). In addition, Quantum education can provide a fun learning environment for students by providing information on efficient and effective material handling(M. P. Ningsih et al., 2021). Learning is successful and meaningful when students connect with learning resources such as content, space, formed environments, and engaging learning activities accompanied by music.

In addition to the model used, to achieve maximum results in learning, a motivation is needed to build students' self-confidence or self-efficacy in following learning. Providing motivation in learning can be done by integrating with existing learning activities during the learning process. According to Nizham et al., (2017) Self efficacy is an individual's assessment of his ability to plan and take action to achieve goals. In addition, according to Malinauskas (2017) suggests that self-efficacy is an individual's confidence in his ability to complete certain tasks. This is in line with the opinion of Saptika et al., (2018) that students' thinking or mindset towards their abilities can affect their success in learning.

However, if students have a negative mindset, such as believing that abilities cannot be developed or that success is determined only by innate intelligence, then they may more easily feel discouraged or avoid challenges for fear of failure. These thoughts must also be repetitive and entrenched in students to have a significant influence on their success. This means that students must consistently practice and reinforce positive thinking about their abilities in order to become a habit and part of their broader mindset. However, students' mindset is not the only factor influencing their success. Other factors such as learning environment, social support, motivation, and opportunity can also play an important role in helping students achieve their academic and personal success.

Based on the description above, researchers hope that students are able to understand mathematics learning by mastering mathematical communication skills using quantum learning models and increase student self-efficacy.

1.1. Mathematical Communication Skills

Communication is the transfer of messages from one person to another to transmit information, ideas, or feelings(Astuti & Leonard, 2015). In communication, feedback is very important in the communication process because it shows whether or not the message was received by the intended recipient and how the message was received. If needed, feedback can assist the sender of the message in correcting or correcting the message sent. As a result, feedback is an important component of a good communication process. In mathematics learning there is mathematical communication.

Mathematical communication is the capacity of students to express mathematical proposals or designs, both orally and in writing, including the process of collecting, explaining, and drawing conclusions(Swasti et al., 2020). Mathematical communication skills can be examined from two perspectives: writing and speaking(R. M. Ningsih & Awalludin, 2021). Students' written mathematical communication can be demonstrated when they reveal their mathematical concepts to instructors or friends in group discussions. Simultaneously, communication skills are displayed when students answer problems using models, tables, graphs, or other mathematical symbols. To make mathematical communication skills important for students, almost all mathematical topics require the use of models, tables, diagrams, or other symbols(Asih et al., 2019).

Mathematical communication skills include: (1) describing mathematical ideas clearly and easily accessible; (2) making definitions of mathematical concepts and developing generalizations using discovery methods. (3) use words, symbols, concepts, or mathematical models to describe real-world shapes, diagrams, or events; (4) explain or clarify mathematical ideas, situations, or relationships in everyday language, orally or in writing; (5) interpret, explain, and update mathematical presentations; and (6) understand and use mathematical notation appropriately and precisely (Surya & Riska Rahayu, 2014)

Some indications of communication skills include the following: (1) associating real-world objects with drawings, diagrams, and mathematical concepts; (2) expressing mathematical concepts, statuses, and bonds orally or in writing using real-world mathematical objects, illustrations, diagrams, and symbols; (3) communicate everyday situations with mathematical language or representations (4) participate in discussions, give presentations, and write about mathematics; (5) reading perception of written mathematical representations; (6) create conjectures, formulate pretexts, and elaborate definitions and abstractions in mathematics; (7) describe and propose discussions on the mathematics topics studied(Astuti & Leonard, 2015).

There are many strategies that can optimize students' mathematical communication skills, including familiarizing them to present their ideas, listen, speak, read, and write(Yang

et al., 2016). Furthermore, teachers can request that students express their opinions orally or in writing. It helps students strengthen their ability to communicate and write numerically and allows instructors in understanding students' knowledge of the math topics taught

1.2. Self-Efficacy

Self-efficacy is a key aspect of a person's ability to complete various academic obligations at a certain level(A. A. Putri et al., 2022). Self-efficacy has an impact on academic motivation and learning motivation, as well as learning resilience(Masitoh & Fitriyani, 2018). Self-efficacy is defined as a person's confidence in his or her capacity to perform activities, achieve goals, and overcome problems(Nahdi, 2018). Self-efficacy is an evaluation of oneself whether a particular task can be completed according to one's needs or not. Self-efficacy refers to a person's belief in his or her ability to cope with a job. A person with high self-efficacy can (1) reduce stress, (2) accept responsibility for his success, (3) manage risk, and (4) recognize his or her potential. and weakness, (5) able to socialize with others, (6) persistent and unyielding

1.3. Quantum Learning

Quantum Learning is a new way of learning and philosophy for individuals and students in schools and businesses(Dewi & Nuraeni, 2022). Quantum learning is learning used in a comfortable learning environment where learning ability and communication skills can be improved(Sultan & Hajerina, 2020). The Quantum Learning model consists of guidance, mentoring, advice, and an overall learning process that can improve knowledge and memory while making learning satisfying and enjoyable(Anisa et al., 2019)

2. METHOD

2.1. Research Design

A systematic literature review (SLR) by using the Preferred Reporting Items for Systematic Reviews and Meta-analyses method or can be called the PRISMA method, this method is carried out systematically by following the research stages correctly. SLR is a strategy for identifying, assessing, evaluating, and interpreting previous research on a subject(Triandini et al., 2019). SLR research seeks to collect, analyze, and make conclusions from all research findings relevant to the research problem(Lame, 2019) The following stages are included in a systematic literature search: 1) asking questions to expand on previous research; 2) selection of criteria depending on the subject of study; 3) search related journals; 4) selecting relevant studies; and 5) whether the material is indexed with syntax or not(Fianingrum et al., 2023)

2.2. Literature Search Resources

The source of electronic literature search used is, Google Scholar through Publish or Perish 8 which collected 994 articles, using national and international articles published from 2018-2023, indexed by Sinta 1-4 and indexed by Scopus, categorized as proceedings and journal articles, has full access, and is categorized as a field of mathematics education. The keywords used are "Mathematical communication skills, self efficacy, and Quantum Learning Models". The following is an image attachment of literature search sources using google scholar through Publish or Perish 8 :

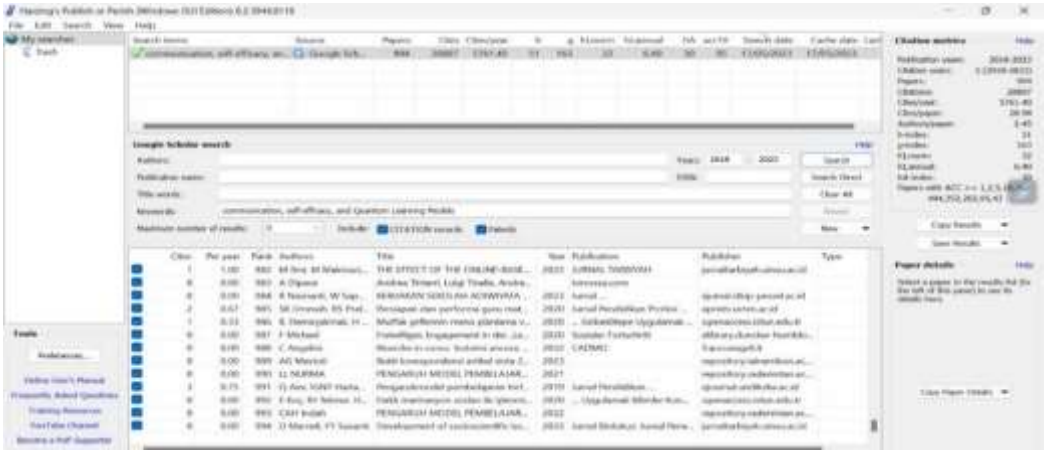

Figure 1. Google Scholar sourced Keyword Search using Publish or Perish 8

2.3. PRISMA Procedure

The literature study used in this study was 994 articles with year filtering starting from 2018-2023 and selection of titles from writing problems as many as 151 articles and carried out stage two selection according to the model that is often used, which is as many as 21 articles. Each literature study consists of journals that are relevant to the discussion of the problem. The selection process can be seen in Figure 2 :

2.4. Systematic Review Process

This process can be seen in Table 1 Explanation of Preparing Prtokol Review

Table 1. Explanation of the preparation of the Review stage

No	Process	Information
1	Data Search	Data Search in this study refers to Google Scholar which is official and uses keywords that are adjusted to the research title and abstract or can be adjusted to research questions that have been made previously
2	Data Skrinning	This process includes filtering or selecting data (research articles or journals) tailored to the topic or title, abstract and keywords of the research problem.
3	Data Quality Assessment (feasibility)	This process is based on data (research articles or journals) with full text that meet the inclusion and exclusion criteria shown in Table 2.
4	Data Search Results	All data (research articles or journals) that meet all requirements and criteria will be further analyzed

Table 2. Criteria *Inclusion* and *Exclusion*

Criteria	Inclusion	Exclusion
Types of literature studies	Journal/article	Blog, e-Book, Citation
Years	2018-2023	<2018
Field	Mathematics Education	Non Mathematics Education

3. RESULTS AND DISCUSSION

3.1. Results

The screening stage involves two steps: choosing literature works based on titles taken into consideration (n = 151) and based on the most popular learning model (n = 21) that is pertinent to the discussion of the topic. This phase is depicted in Figure 2

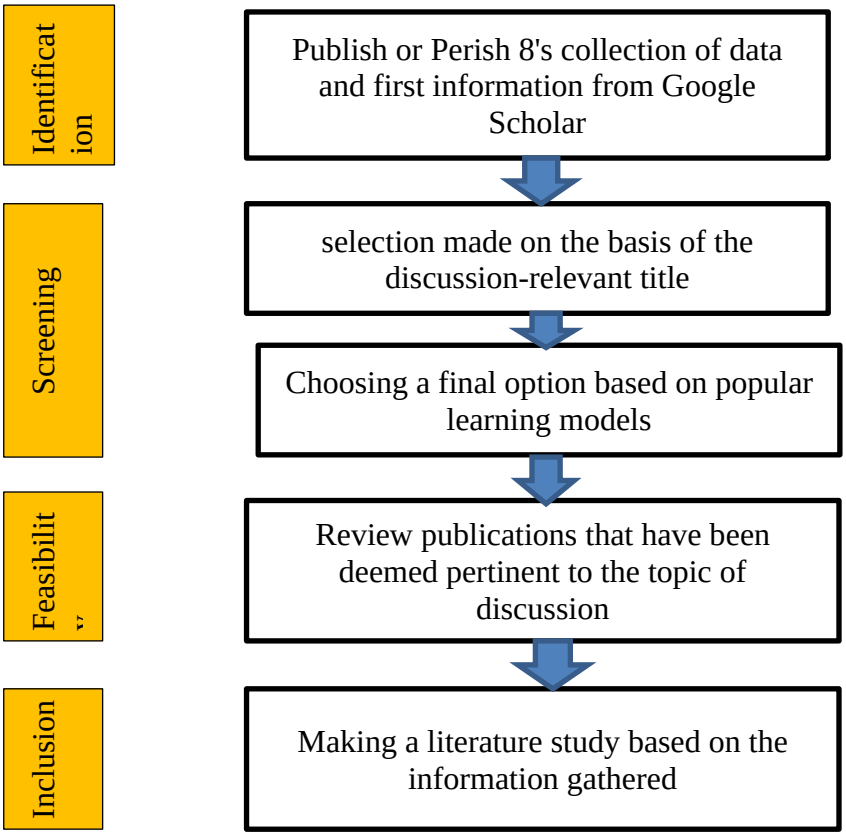

Figure 2. Prisma Flow Diagram.

The research data presented in this article is the result of journal research related to mathematical communication skills, self-efficacy, and Quantum Learning as many as 21 research documents in the 2018-2023 period. The number of published articles is presented in the figure below :

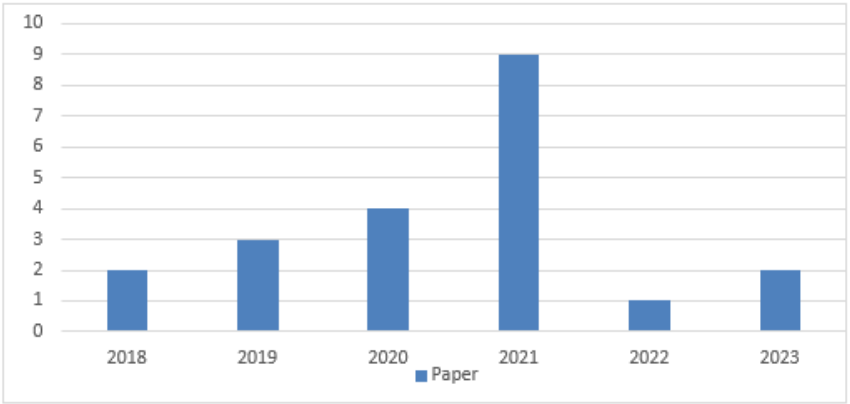

Figure 3. Total articles on mathematical communication skills reviewed self-efficacy with quantum learning in mathematics in 2018-2023 (n=21)

The number of papers per year is presented in Figure 3. wherein In 2018, there were 2 articles; In 2019, there are 3 articles; In 2020, there were 4 articles; In 2021, there are 9 articles; In 2022, there is 1 article; In 2023, there will be 2 article.

3.2. Discussion

The selected articles will be analyzed to determine the improvement and relationship of mathematical communication skills in terms of self-efficacy using quantum learning, as presented in Table 3 below :

Table 3. Journals that have been selected

No	Name and Year	Journal Name	Research Results
1	Siagian, (2021)	Basicedu Journal	Quantum learning and jigsaw development can improve math learning outcomes. A key finding of the study is that education can boost students' creativity. For example, using constructivist learning theory helps students generate new knowledge and understand new ideas
2	Indah Hafizhah et al., (2022)	Journal of Social Research, Humanities, and Education	The results of this study show that learning mathematics is more successful as the number of students increases, so they think more critically, forward, and passionately. understand the mathematical principles taught
3	Suji et al., (2023)	Journal of Sigma Learning and Mathematics (JPMS)	Students who employ the REACT technique have stronger mathematics communication abilities and self-efficacy than those who use traditional learning models. Students who used the REACT strategy had higher self-efficacy and mathematics communication skills than those who used traditional learning methods.
4	Yati et al., (2019)	Journal of Didactic Mathematics	According to this study, students' mathematical communication abilities are strongly influenced by the employment of constructivism and self-efficacy approaches, and there is no relationship between these skills and self-efficacy when utilizing the constructivism learning strategy.
5	Falco & Summers, (2019)	Journal of Career Development	The study's findings highlight the need for interventions in counseling that may be effective in improving STEM self-efficacy in older students.
6	Supriyati et al., (2021)	Journal of Mathematics Education Innovation (JIPM)	High self-efficacy students are able to communicate their mathematical reasoning in order to discover the best answer to a challenge. In converting mathematical ideas into mathematical symbols and models, they seem strong and confident. Weak pupils

			frequently have difficulty articulating mathematical concepts and resolving issues.
7	Syafina & Pujiastuti, (2020)	Advanced Journal	Based on the research findings, the level of mathematical communication skills of mathematics students when completing mathematical tasks using SPLDV material can be summarized as follows: very high performers score four mathematical communication indicators, high performers score three, high performers score two, and very weak players do not score. In SPLDV statistics, the average proportion of pupils with communication skills is 45%.
8	D. K. Putri & Rochmad, (2021)	PRISMA, Proceedings of the National Seminar on Mathematics	Subjects with high learning independence can answer three questions posed by completing six predetermined indicators of mathematical communication skills; subjects with moderate learning independence have different achievement indicators, namely subjects can meet five specified indicators of mathematical communication ability; And subjects with low learning independence had no achievement indicators. Underperforming can resolve two indications of mathematical communication skills.
9	Viki & Handayani (2020)	Transformation : Journal of Mathematics and Mathematics Education	In addition to being influenced by other factors, the mathematics communication skill of vocational students is affected by self-efficacy to the extent of 37.69%. Due to their low self-efficacy, SMKN 34 Jakarta students also have poor mathematics communication abilities. Because of the correlation between student self-efficacy and growth in mathematical communication abilities
10	Masitoh & Fitriyani, (2018)	Malikussaleh Journal of Mathematics Learning (MJML)	(1) PBL is used in learning by more than 85% of students, with cycle I reaching 97.368% and cycle II reaching 96.491%. (2) At the end of the first semester, 60% of students passed the performance exam with an average score of 68.46. This score increased to 77.14% of students who passed the proficiency exam in Cycle II, with an average of 77.86. (3) The students' mathematical self-efficacy forecast was maintained at an average of 89.77 after the period I. This finding was supported by conclusions in Cycle II when students' mathematical self-efficacy was high (average 93.31).

11	Nurhayati & Asikin (2021)	IJoIS: Indonesian Journal of Islamic Studies	The relevance of mathematical communication skills in mathematics learning, especially in problem-solving. This is done so that academics can take advantage of the findings of this research to conduct further research to improve mathematical communication skills related to self-efficacy and learning models to obtain the greatest prospective research results. Learning mathematical communication skills is not only applied in high school but also in elementary school and college.
12	Emiliana (2019)	Jurnal Prodi Pendidikan Matematika (JPPM)	(1) The average communication ability and mathematical problem-solving ability was 42.85 on the failure criterion and 50.89 on the poor criterion before using quantum learning models on bivariate linear equation system materials; (2) After using quantum learning models on materials involving bivariate linear equation systems, the average communication ability and mathematical problem-solving ability were 67.55 with sufficient criteria and 63.39 with sufficient criteria.
13	Noperlis & Neviyarni (2023)	Eductum: Jurnal Literasi Pendidikan	The Quantum Learning learning method is useful for improving student learning outcomes. Students can be active and creative and absorb the topics taught using this method.
14	Maulana & Sritresna, (2021)	FARABI: Journal of Mathematics and Mathematics Education	Mathematical communication abilities and self-efficiency among pupils are related. For mastering mathematical communication skills, students with high self-efficacy perform better than those with moderate and low self-efficacy.
15	Imanuel & Lambertus, (2021)	Journal of Mathematics Education Research	The Pearson correlation coefficient of 0.716 indicates a strong positive association between self-efficacy and mathematical communication abilities, and the coefficient of determination for this relationship is 0.512, or 51.2%. Therefore, there is a 51.2% substantial correlation between the independent variable self-efficacy and the dependent variable bound to mathematical communication. with the 2-tailed sig. = 0.00 0.05
16	Zaharah et al., (2021)	Journal of Scholar : Journal of Mathematics Education	On the basis of the N-Gain Test, a score of 0.51 was obtained on the medium criterion, and on the basis of the dependent t test (Paired Sample t Test), a significance value (2-tailed)

			was obtained, it was found that students in the medium group had improved their mathematical communication skills. 0.000 0.05 denotes a considerable change in students' mathematical communication abilities between learning mathematics with multimedia quantum learning and without it. Conclusion: Multimedia mathematics learning is effective and can help students' ability to communicate mathematically.
17	Pramudya et al. (2020)	Journal of Serunai Mathematics	Students in grade X at SMK Negeri 1 Stabat for the 2019–2020 academic year have improved their mathematics communication skills as a result of employing the quantum learning technique and teaching aids.
18	Simamora (2018)	Journal of Mathematics and Applied Education	The employment of quantum learning models versus conventional models in the Relations and Functions material in Class VIII SMP Negeri 2 Pematangiantar T.A 2017/2018 has a substantial impact on students' ability to communicate mathematically. The learning of the Quantum Learning model is more effectively used than the Conventional model in grade VIII SMP Negeri 2 Pematangsintar T.A 2017/2018, as evidenced by the fact that the average score of the Quantum Learning group is greater than the average score of the Conventional group.
19	Sauduran & Roulina (2021)	Attractive : Innovative Education Journal	The Quantum Learning Model increases a person's capacity to solve mathematical problems. As a result, because it can improve students' ability to solve mathematical problems during the learning process, the Quantum learning model is projected to be used as an alternative to traditional learning that stands alone.
20	Zaharah et al., (2021)	Journal of Scholar : Journal of Mathematics Education	Before and after utilizing multimedia mathematics learning based on Quantum learning, students' mathematical communication skills vary greatly.
21	Karlina et al., (2020)	JURING (Journal for Research in Mathematics Learning)	1) Students who use the Quantum model are different from students who do not use the Quantum model in their mathematical communication skills. 2) There is no contact with students to improve learning without a learning paradigm.

Mathematical Communication Capacity relates to a student's ability to articulate and explain mathematical proposals to others in a clear and orderly manner. Quantum learning is a method of learning where the interaction between teacher and student creates an exciting and successful learning place. Furthermore, self-efficacy refers to students' confidence in their ability to do something successfully. According to research, the quantum learning paradigm can help students with high self-efficacy improve their mathematical communication skills.

Among the factors that master self-efficacy, mathematical communication skills, and Quantum learning, there are several that stand out: 1) the learning environment, which makes the student more motivated to learn and more likely to actively participate in his studies. 2) The ability to manage emotions, significantly affects self-efficacy and interpersonal communication skills. When a person can overcome difficulties while communicating, he or she is more likely to accept themselves and communicate more effectively. 3) The sensitivity of the material, which may have an impact on the student's self-efficacy and mathematical communication skills. Material that is too easy or too difficult can be a source of low motivation in mathematical communication. 4) Learning style, as one factor, can improve self-efficacy, mathematical communication skills, and Quantum Learning. For example, students who enjoy visual learning will find it easier to understand the teacher's lesson plan and communicate with him. 5) Social networks, such as those provided by friends and family, can improve self-efficacy, mathematical communication skills, and quantum learning. Students who received help had higher self-efficacy and were more confident in speaking, whereas students who did not receive help had lower self-efficacy and were more afraid and anxious about speaking. Therefore, in Table 3 it is explained that students who have a high feeling of self-efficacy can fully utilize all mathematical communication markers. He can convey his mathematical reasoning in the form of mathematical communication to find the right answer to the problem, despite some mistakes. Students with high self-efficacy view challenging endeavors as challenges(Viki & Handayani (2020) This suggests that students with strong self-efficacy can effectively explain their ideas (Supriyati et al., 2021). This is also in accordance with the results of research from Masitoh & Fitriyani, (2018) where there was an increase of 85% of students, with cycle I reaching 97.368% and cycle II reaching 96.491% and at the end of the first semester, 60% of students passed the performance exam with an average score of 68.46. This score increased to 77.14% of students who passed the proficiency exam in Cycle II, with an average of 77.86. Finally, students' mathematical self-efficacy was maintained at an average of 89.77 after the period I. This finding was supported by conclusions in Cycle II, when students' mathematical self-efficacy was high (average 93.31). They seem eager to express their mathematical views. At the same time, students lacking self-efficacy struggled to explain their math concepts effectively. They remain difficult to solve difficulties and lack comprehensiveness. As a result, self-efficacy affects students' mathematical communication skills and Quantum learning paradigms. The higher one's self-efficacy, the greater one's mathematical communication skills.

Furthermore, the Quantum Learning Paradigm, as well as mathematical communication capabilities, are all connected. Student self-efficacy represents their belief in their capacity to complete a task or goal. Students with high self-efficacy tend to be more confident in expressing and explaining a learning topic, especially mathematics learning correctly and often, to others.

The capacity of students to communicate and explain mathematical topics to others clearly and regularly is called their mathematical communication skills. This ability is indispensable in the process of learning mathematics because it supports students in understanding ideas better and helps instructors in assessing students' knowledge. In addition

to these capabilities, the model used by instructors in learning is very significant. Quantum learning models were used in this study. Quantum Learning is a learning style that combines teachers and students interacting to create an engaging, peaceful, and productive learning environment. This learning paradigm uses interesting and entertaining strategies such as cooperative tactics, games, and visualization to assist students in increasing learning motivation and improving their mathematical communication skills. Therefore, according to Table 3, self-efficacy can affect mathematical communication and quantum learning models. This is supported by research findings that show differences in mathematical communication skills between students who use the Quantum Learning paradigm and those who do not (Karlina et al., 2020). In addition, several studies show differences in students' mathematical communication skills before and after using multimedia-based mathematics education based on Quantum Learning (Zaharah et al., 2021). This shows that self-efficacy can increase because it is influenced by mathematical communication skills and quantum learning models, meaning that the higher a person's level of self-efficacy, the more positive the person. A sense of positivity plays an important role in a person's self-efficacy. Someone who has a positive sense in him will also affect with positive communication skills as well. Conversely, a negative assessment of himself will make a person have low communication behavior As a result, it can be concluded that self-efficacy has a relationship with mathematical communication skills and Quantum Learning models.

4. CONCLUSION

The writing of this Literature Study is related to the improvement and relationship of mathematical communication skills through quantum learning based on self-efficacy published on Google Scholar. The first result revealed that related articles or journals presented from 2018 to 2023 show that an increase in communication skills can be done through quantum learning models and based on self-efficacy. The second result, there is a relationship between mathematical communication skills through quantum learning and self-efficacy. So it can be concluded that there is an improvement in mathematical communication skills through quantum learning models and self-efficacy and there is a relationship between mathematical communication skills, quantum learning models, and self-efficacy

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