Jurnal Derivat, Volume 11 No.2 Agustus 2024
ISSN: 2549-2616

Application Of Wingeom-Assisted Think Pair Share Model To Students' Mathematical Communication Skills

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Abstrak

Model pembelajaran koopertif tipe Think Pair Share berbantuan WinGeom memberikan ruang bagi siswa untuk mengembangkan kemampuan komunikasi matematis dalam proses pembelajaran. Penelitian ini bertujuan untuk mengetahui pengaruh penerapan model pembelajaran kooperatif Think Pair Share berbantuan WinGeom terhadap kemampuan komunikasi matematis pada siswa SMP materi Geometri. Penelitian ini menggunakan desain eksperimen semu dengan pretest-posttest 1, 2, dan 3. Populasi dalam penelitian ini adalah siswa kelas VIII di SMP Negeri 7 Kota Serang. Sampel yang dipilih adalah siswa dari kelas VIII-A dan VIII-B yang dipilih secara acak. Teknik pengumpulan data menggunakan tes kemampuan komunikasi matematis. Penelitian ini membandingkan Think Pair Share berbantuan WinGeom dengan pembelajaran konvensional. Uji ANOVA dipergunakan untuk menganalisis keefektifan kedua pembelajaran tersebut. Hasil uji ANOVA setiap posttest menunjukkan bahwa Think Pair Share berbantuan WinGeom memberikan pengaruh yang berbeda dengan pembelajaran konvensional. Hasil penelitian menunjukkan bahwa terdapat perbedaan signifikan antara rata-rata kemampuan komunikasi matematis siswa pada kelas eksperimen dengan kelas kontrol. Artinya model pembelajaran kooperatif Think Pair Share berbantuan WinGeom memiliki pengaruh terhadap kemampuan komunikasi matematis siswa SMP. Kedepannya, pembelajaran ini bisa menjadi solusi oleh para guru di seluruh dunia dalam meningkatkan prestasi belajar siswa khususnya kemampuan komunikasi matematis.

Kata Kunci: Model think pair share, WinGeom, Komunikasi Matematis, Kooperatif

Abstract

The cooperative learning model of Think Pair Share assisted by WinGeom provides an opportunity for students to develop their mathematical communication skills during the learning process. This study aims to determine the effect of implementing the Think Pair Share cooperative learning model assisted by WinGeom on mathematical communication skills among junior high school students in Geometry. The research uses a quasi-experimental design with pretest-posttest 1, 2, and 3. The population of this study consists of grade VIII students at SMP Negeri 7 Serang City. The sample includes students from classes VIII-A and VIII-B class was selected randomly. Data collection techniques used mathematical communication skills tests. This study compares Think Pair Share assisted by WinGeom with conventional learning methods. ANOVA was used to analyze the effectiveness of the two learning methods. ANOVA test results for each posttest indicate that Think Pair Share assisted by WinGeom has a different effect compared to conventional learning. The study results show a significant difference between the average mathematical communication skills of students in the experimental class and the control class. This means that the cooperative learning model of Think Pair Share assisted by WinGeom has an impact on junior high school students' mathematical communication skills. In the future, this learning method could be a solution for teachers worldwide to improve students' learning achievements, particularly in mathematical communication skills.

Keywords: *Think pair share model, WinGeom, Mathematical Communication, Cooperative*

1. INTRODUCTION

Teachers must be supervisors and facilitators of students in developing students' talents, especially in mathematics subjects. There needs to be interactive mathematics learning between teachers and students so that there are no things that make students feel inferior or will suspect that they feel worthless which will result in the success of their mathematics learning, especially in mathematical communication skills. Mathematical communication skills can be in the form of the ability to replace real/concrete problems with mathematical examples, convey inspiration or ideas in oral or written form such as tables, graphs, diagrams, algebra, language, and mathematical symbols, and make hypotheses and generalize conclusions from mathematical conflicts, as well as listening, discussing, and writing about mathematics. Mathematical communication skills can be supported with the right approach in the learning process. Teachers as educators must be able to find the right way of learning as an effort to improve students' mathematics learning outcomes. A factor that may affect mathematical communication is the student's self-esteem. How do students assess themselves with good things that can give rise to their confidence so that they are more motivated to learn mathematics and convey mathematical communication well (Aspriyani, 2020). If students' communication skills are not good, it will hinder the development of mathematics. Mathematical communication skills are seen as a basic skill that students and teachers in learning mathematics must possess. When students can communicate the results of their thoughts orally or in writing, they connect one idea to another through mathematical language (Riset & Pendidikan, 2024).

Observing education in Indonesia, we will see several phenomena and indications that are very unconducive in realizing Indonesia is a developed country in the field of education. Indonesia is a developing country, so it needs several factors to become a developed country. Natural and human resources are required to create a country into a developed one (Br. Sembiring & Siregar, 2020). To have an education, it is necessary to study hard. Learning is an activity that improves behavior, and it can be transmitted and impact others. One of the things that humans or students must learn is to learn mathematics. A person must have an education to train their mindset, skills, and habits in doing something. Education can come from anywhere, whether within yourself, others, or the surrounding environment (Suci Dela Roza et al., 2023). Education is one of the efforts to influence and support children in improving their knowledge. Mathematics lessons are one of the many subjects available at the high school level. Mathematics is the science of numbers, the correlation between numbers and the methods used in solving problems about numbers. Basically, the purpose of learning mathematics in school is to deliver students to be able to have all mathematical abilities to achieve optimal learning outcomes, and these skills can be used to solve problems in daily life (Harahap et al., 2022).

The majority of teachers who teach mathematics are less varied. The learning carried out is using the lecture method. Students take notes and assignments. Then, students work on the problem by following the teacher's example. This often causes mathematics learning to become less meaningful because learning is still teacher-centered. So that students only listen to the teacher's explanation and become passive. Students are not involved in classroom learning and are not allowed to rediscover and construct their mathematical ideas. The way teachers teach mathematics makes mathematics a less exciting subject for students. Students think that mathematics is a complex subject. So that students are not enthusiastic about answering the practice questions given by the teacher. In addition, the low level of understanding of counting in mathematics lessons makes it difficult for students to work on math problems (Kartini, 2019). Mathematics is one of the fields of study that exists at all

levels of education, from elementary school to tertiary level. Given the importance of mathematics in the national education curriculum, mathematics is one of the subjects that must be taught to students. In studying mathematics, students are not only required to understand the material being taught but also have mathematical skills valuable to face global challenges. Mathematics is a tool for developing how to solve a problem. In line with the opinion of La'ia & Harefa, mathematics is one of the disciplines of science that can improve thinking and argumentation skills, contribute to solving daily problems and in the world of work, and provide support in the development of science and technology (La'ia & Harefa, 2021).

Mathematics is a field of science that deals with numbers, shapes, arrangements, concepts, and others. Mathematics is an exact science related to calculations; that's why mathematics is considered the queen of science, as all sciences require mathematical calculations. Mathematics is a science arranged in an orderly manner. In mathematics learning, we learn from the easiest and continue to improve on the difficult. Mathematics education is an activity that teaches knowledge and skills about numbers, geometry, algebra, arrangements, patterns, formulas, and other calculations. Mathematics education is available at every level, from elementary to secondary school, high school, and college. We cannot be separated from mathematics education because it relates to our daily lives. Mathematics education is taught at every level to share mathematical knowledge, starting from the basics and continuing to challenging levels. If we do not understand the basic mathematics concepts, it will cause fatal mistakes in learning mathematics later (Suci Dela Roza et al., 2023).

Geometry is one of the fields in mathematics that studies points, lines, planes, and spaces and their properties, measurements, and relationships with each other (Hamidah et al., 2024). Based on the observations made by the author while teaching this subject and discussions with several other mathematics teachers, it turns out that there are still many students who have difficulties understanding the concept of geometry, especially in solving breaks and angles in space. As a result of the initial analysis, the students' weaknesses existed when investigating spatial geometry materials. This is the inability of students to understand the concepts conveyed by the teacher during the teaching and learning process. The lack of adequate media makes students have difficulty understanding abstract geometric concepts. In resolving conflicts related to mathematics, especially geometry, it is necessary to have good mathematical skills to understand them. This will later affect the learning achievement of students (Hidayat & Lestari, 2022).

In mathematics learning, especially for geometry, it turns out that spatial ability is essential. Strong spatial ability supports students' communication skills by allowing them to more clearly describe, explain, and discuss mathematical concepts, as well as facilitating better understanding and collaboration in mathematics learning. This is proven in the National Academy of Science research that every student must develop their spatial skills and senses, which are very useful in understanding the relationships and properties of geometry to solve daily life problems. Good spatial skills will result in students being able to detect correlations and changes in geometric shapes. One form of computer software in the form of a dynamic mathematics computer application (Dynamic Mathematics software) that can be used in learning geometry is the Wingeom application. Windows Geometry, or WinGeom, is widely used to compile geometry teaching materials, create flat building drawings, build spaces, and animate build spaces (Sutrisno & Atira, 2020). Research conducted by Nelly Roshida, namely "The use of the Wingeom program in mathematics learning to improve students' understanding of geometry," concluded that Wingeom developed in the process of

learning geometry assisted by Wingeom can share new thoughts and inspirations for students. Students participate more actively and can explore and analyze geometric objects using new methods. Almost the same research on Wingeom by Gusnidar (Sefriyanti, 2019).

By using Wingeom, students can create visual representations of mathematical ideas, such as building diagrams, charts, and animations of geometric shapes. This ability allows students to convey mathematical information more effectively and facilitates the communication of their ideas to classmates or teachers. The use of the Wingeom application has the potential to enhance students' mathematical communication skills by providing tools that facilitate visualization, representation, and discussion of mathematical concepts. This supports the development of students' communication skills in explaining, discussing, and presenting mathematical ideas more effectively. Therefore, the researcher is interested in using the WinGeom software to develop students' mathematical communication skills (Hidayat & Lestari, 2022).

There are five main standard competencies in mathematical skills recommended by the National Council of Teacher Mathematics (NCTM): problem-solving, communication, connection, reasoning, and representation(NCTM, 2000). Mathematical communication skills are the ability to state and interpret mathematical ideas orally and in writing through drawings, tables, diagrams, formulas, or demonstrations (Maryati et al., 2022). Communication is an interaction between teachers and students so that they get information. Communication skills can also make it easier for students to record information and present the results of discussions. Communication is essential in learning, especially in mathematics, because the communication process can encourage students to build an understanding of mathematical ideas. Multi-directional communication occurs when students and teachers interact actively, and students play an active role in learning, such as discussing, providing ideas, and making conclusions. Meanwhile, teachers convey opportunities for students to actively participate in learning (Janna et al., 2019).

Mathematical communication skills are essential to reflect mathematical abilities that are part of mathematical strength. Mathematical communication is the fundamental skill that high school students need. Some of the reasons underlying the statement of the importance of students' mathematical communication skills, include: (1) mathematical communication skills are listed in the curriculum and learning objectives of high school mathematics; (2) mathematical communication is the foundation for solving mathematical problems as well as exploring and investigating; and (3) mathematical communication is an area for interaction with friends to share thoughts and discoveries, express opinions, provide evaluations and strengthen inspiration to be conveyed to others (Solihah et al., 2021). Realizing the importance of mathematical communication skills for students, teachers must strive to learn by using approaches, methods, or learning models that can train and encourage students' mathematical communication skills. In mathematics learning, high-level thinking skills, high curiosity, and creativity are abilities that students need to have. With mathematical communication skills, students can gain knowledge, convey ideas they have, or express their concepts to solve a mathematical dilemma (Chotimah & Hamidah, 2016). Although mathematical communication skills are one of the skills that students must possess, the reality is that there are still many students who are not skilled in the field of mathematics related to communication skills. Many factors certainly cause students to have low mathematical communication skills. One of the factors causing this is that students are not accustomed to expressing opinions/ideas/inspiration in learning at school, even though students who can communicate their ideas either orally or in writing, will find more ways to solve a problem (Br. Sembiring & Siregar, 2020).

Learning with the think pair share model is based on class discussions with groups of students in pairs. The think-pair-share learning model is one of the cooperative learning models. Where the collaborative learning model requires participation and cooperation in the learning group. So, students no longer acquire that knowledge only from teachers but through group learning. A friend should give the other friend a chance to express their opinion by respecting the views of others, correcting each other's mistakes, and correcting each other. The steps of the Think Pair and Share type cooperative learning model are as follows:

1. Thinking: The teacher asks a question related to the lesson, and asks the student to spend a few minutes thinking for themselves.
2. Pairing The teacher asks students to pair up and discuss with other students to unite the answers they have obtained. Usually, teachers give no more than 4 or 5 minutes to pair.
3. Sharing The final step of the teacher asks the couples to share with the whole they have talked about. It is practical to go around the room from couple to couple and continue until about a part (Rosdiana, 2023).

At the thinking stage, students think for themselves to find ideas and solve a problem and then communicate those ideas when solving problems. The next stage is that the pair of students is trained again to communicate with their friends (in pairs) about the difficulties given by the teacher. Finally, in the sharing stage, students must also communicate their ideas to all their classmates (sharing). Therefore, the TPS-type Cooperative learning model is appropriate for helping students communicate mathematical ideas (Kartini, 2019). TPS-type cooperative learning is a cooperative learning method with a procedure set exclusively for students to think deeply about the material the teacher has given. This is very helpful for students in developing and relating information and concepts that have been produced in problem solving. TPS-type cooperative learning can encourage students to be more active and creative in the learning process and will encourage learning in the classroom to be more aphoristic because in this method they have to reveal the material they have learned to their friends.

This type of cooperative learning is suitable for subjects in the form of understanding material that contains introduction, understanding and application. Because in the TPS method, students express each other, in this way, it is hoped that students will understand faster, because their friends directly express themselves. In a simple concept, the stages of the Think Pair Share method can be described as the first step of thinking which means that students are given a conflict in the form of material or questions then students are given the opportunity to think about the answer, then the second step is a pair which is students are divided into pairs with their friends to discuss using the purpose of being able to solve problems for the problems that have been given, the last step is share, which means that students must mention and present both in their peers or friends in the class who are involved in learning as a result of which the atmosphere of the student learning process is more active. Using the think pair share method, students are more free to share their imagination to think and find solutions during the thinking phase and look for new material concepts using quickly. Listening to friends and sharing materials with friends makes existing concepts more solid and more memorable (Satria, 2021).

This Think Pair share (TPS) type cooperative learning model provides opportunities for students to share issues with each other using their friends, either using their own partners or with other partners. Through discussion activities, students can spread knowledge to each other, establish interaction between others so that there are no more students who are passive

in the learning process. The Think Pair Share (TPS) type cooperative learning model can be used and is even very suitable for use in mathematics learning, because the Thik Pair Share (TPS) type cooperative learning model or pair thinking is a type of cooperative learning designed to influence student interaction patterns (Larasati et al., 2022). The TPS cooperative learning model is able to provide more opportunities for students to think critically, creatively, in responding to a question. In his book, Huda states that this model introduces the idea of "wait or think time" in the interactive element of cooperative learning as one of the factors in increasing students' responses to questions. In addition, TPS-type cooperative learning involves students working in pairs to achieve a common goal. This learning aims to increase student participation and provide opportunities for students to interact and learn together in study groups (Kartini, 2019).

The TPS learning model consists of a thinking stage, where teachers give questions or problems to students. At this stage, students are given time to think for themselves first. Furthermore, in the pairing stage, students and their partners discuss the answers they get in the thinking stage. Then the sharing stage, where students share their answers in front of the class (Meilana et al., 2020). Conventional learning is a learning model commonly applied by teachers and generally consists of lecture methods, question and answer, and assignment assignments. The lecture method is a form of interaction through explanations and oral statements from teachers to their students in the form of explanations of concepts, principles, and information at the end of learning, which are closed with questions and answers between teachers and students. The question-and-answer method can be interpreted as the relationship between teachers and students through questioning activities carried out by teachers to get responses from students orally so that they can grow new knowledge in students. Questions are a motivational generator that can stimulate students to think. Through questions, students are encouraged to search and find the correct and satisfactory answer (Peranginangin et al., 2020).

The teaching and learning process in conventional learning generally takes place in one direction: the transfer of knowledge, information, norms, values, and others from a teacher to students. This kind of process is built on the assumption that students are like empty bottles or white papers based on the explanation above, the conventional approach can be understood as a more teacher-centered learning approach. Communication is more one-way from teacher to student, learning methods are more about mastering concepts rather than competencies. Not only that, students passively receive information, learning is very abstract and theoretical and does not rely on the reality of life, provides only a pile of diverse information to students, tends to focus on certain fields, students' learning time is mainly used to work on workbooks, listen to teacher lectures, and fill in exercises (individual work) (Fahrudin et al., 2021).

Based on some of the descriptions above, this study intends to see the improvement of mathematical communication skills of students who receive Think Pair Share learning with students who receive conventional learning. The conventional learning referred to in this study is learning using the lecture method. The data obtained in this study will share information about improving the mathematical communication skills of students who receive TPS learning and conventional learning. The formulation of the problem in this study is 1) is there a difference in the mathematical communication skills of students who are given learning with the Think Pair Share model assisted by the WinGeom application and those given by the conventional learning model?; 2) how to improve the mathematical communication skills of students who receive learning with the Think Pair Share model assisted by the WinGeom application with students who receive conventional learning?.

2. RESEARCH METHODS

This type of research is comparative research using a quantitative approach. The population in this study is grade VIII students of SMP Negeri 7 Serang city. The selected sample is students from classes VIII-A and VIII-B—class VIII.A is an experimental class that learns using the Think Pair Share learning model assisted by the WinGeom application, and class VIII-B is a control class that uses conventional learning. Researchers give a pretest to find out student competencies from an early age in the data collection process. Researchers treated the experimental class differently from the control class after collecting information about the students' initial skills. Researchers used the Think Pair Share cooperative learning model assisted by the WinGeom application to treat students in the experimental class.

In contrast, the conventional learning method was used in the control class. The last step is a posttest to determine the student's final ability. The data obtained will show the difference in the improvement of mathematical communication skills of students who receive learning with the Think Pair Share learning model assisted by the WinGeom application and students who receive conventional learning. Each model is tested for one month on geometric materials. Pretest is used to see the normality and class balance test (homogeneity). Pretest and Posttest-1, 2, and 3 questions are made in 25 multiple-choice tests. The instrument has been tested for validity, reliability, discriminating power, and difficulty level. The ANOVA test is used to analyze the effectiveness of this learning.

3. RESULTS AND DISCUSSION

Result

Based on the pretest data, the normality test concluded that the sample came from a normally distributed population, and the results of the homogeneity test showed that the two populations had the same variance. The following results describe the student's achievement in algebra material. The description of the average pretest and posttest of the experimental and control classes is presented in Table 1.

Table 1. Comparison of Average Pretest and Posttest Student Communication Skills

Learning Model	Pretest	Postest-1	Postest-2	Postest-3
Think Pair Share assisted by WinGeom	56.73	81.43	81.93	83.88
Conventional	62.31	70.13	71.44	76.47

Source: Output SPSS

Table 1 shows that the average initial ability of the two classes tends not to be much different. Then, after being allowed to learn, students can improve the average results of their mathematical communication ability test. The improvement of the abilities of both classes is also consistent based on the 1st to 3rd test. Table 1 shows that the mathematical communication skills of students in the experimental class, namely those who are given learning with the WinGeom-assisted Think Pair Share model, are higher than those in the control class. So, the following analysis will be carried out: a significance test to see the significant difference in the average results. Furthermore, the results of the ANOVA test on posttest 1, 2, and 3 are presented in tables 2, 3, and 4**.**

Table 2. ANOVA Posttest-1 Test Results

	Sum of Square	Df	Mean Square	F_{count}	F_{table}
SSb	568.7	1	570.92	5.4235	4.35
SSw	8412.5	89	103.75		
Total	8981.2	90			

Source: Output SPSS

Table 3. ANOVA Posttest-2 Test Results

	Sum of Square	Df	Mean Square	F_{count}	F_{table}
SSb	658.6	1	658.6	5.6235	4.35
SSw	9612.3	89	109.72		
Total	10270.9	90			

Source: Output SPSS

Table 4. ANOVA Posttest-3 Test Results

	Sum of Square	Df	Mean Square	F_{count}	F_{table}
SSb	708.7	1	708.7	7.023	4.35
SSw	9027.4	89	102.72		
Total	9736.1	90			

Source: Output SPSS

Table 1 shows that the average pretest of students from the control group is higher than that of students from the experimental group. Furthermore, the average posttest-1, posttest-2, and posttest-3 students from the experimental group were consistently higher than the average posttest students from the control group. On the other hand, on average, all posttests are consistent. This shows that students better understand geometry material using the Think Pair Share learning model assisted by the WinGeom application. Table 2 shows that the F test results show that the Think Pair Share learning model assisted by the WinGeom application influences students' mathematical communication skills. Table 1 provides information on students' diverse mathematical communication abilities in each class. Based on the results of posttest-1 in Table 1, it can be seen that the group treated using Think Pair Share assisted by the WinGeom application has a higher average than the group treated using the conventional model. Mathematical communication among students using traditional learning increased by 12.9%, while the number of students using Think Pair Share, assisted by the WinGeom application, increased by 45.4%. This shows that the mathematical communication skills of the Think Pair Share group, with the help of the WinGeom application, are better than those of the conventional model group.

Based on Table 3, it is known that the F value shows that the Think Pair Share learning model assisted by the WinGeom application influences students' mathematical communication skills. Table 1 provides information about the diverse mathematical communication of students in each model. Based on the results of posstest-2 in Table 1, it can be seen that the group treated using Think Pair Share assisted by the WinGeom application has a higher average than the group treated using conventional treatment. Mathematical communication skills using conventional learning increased by 14.7%, while students using Think Pair Share assisted by the WinGeom application increased by 45.4%. This shows that the mathematical communication of the Think Pair Share group assisted by the WinGeom application is better than the conventional model group.

Based on Table 4, it is known that the F value shows that the Think Pair Share learning model assisted by the WinGeom application has an influence on students' mathematical communication skills. Table 1 provides information on students' diverse mathematical communication abilities in each model. Based on the results of posstest-3 in Table 1, it can be seen that the group treated using Think Pair Share assisted by the WinGeom application has a higher average than the group treated using conventional use. Mathematical communication skills using traditional learning increased by 22.5%, while students who used Think Pair Share assisted by the WinGeom application increased by 48.2%. This shows that the mathematical communication of the Think-Pair-Share group students aided by the WinGeom application is better than the conventional model group.

Discussion

In this study, the sample used was two classes, one as an experimental group and the other as a control group. In the experimental group, treatment was carried out by being given the Think Pair Share cooperative learning model assisted by the WinGeom application. In contrast, conventional learning was shown in the control group. From the two classes, students in class VII-A were determined as the control group and class VII-B as the experimental group. The same teacher teaches both classes but gets different treatment. The experimental group used the Think Pair Share learning model assisted by the WinGeom application, and the control group with conventional learning.

The experimental group in class VII-A used WinGeom's Think Pair Share cooperative learning, where teachers asked the class questions or problems and allowed them to consider, answer, and support each other. To motivate students, the instructor begins the class by outlining the goals and cooperative learning model of the WinGeom app-assisted Think Pair Share style that will be used. Next, the instructor provides an overview and explains the content in a lecture and question-and-answer format. On the sidelines of presenting the material, the teacher can give questions or problems classically, after which the teacher performs think-pair-share type cooperative learning steps. Students are instructed to divide into pairs or small groups of two members each. Teachers organize groups so that each diverse group is made according to the abilities of each student.

With the conventional learning model, the learning process in the control group in class VII-B begins with being given the perception in the form of questions and answers related to geometry material. Then, the teacher explains geometry, and the students listen to the teacher's explanation and ask if there is any material they do not understand. Then, the teacher gave examples of and practice questions to the students. While working on the questions, the teacher goes around to check if there are students who have difficulties working on the questions. After completing the question, the teacher asked several murud to work on the problem in front of the class, and other students paid attention to the answer. Then the teacher together with the students corrected the results of the answer. The teacher will point to the correct answer if there is an incorrect answer.

Cooperative learning fosters critical thinking and collaborative skills, fostering positive relationships between individuals from different backgrounds. These relationships can build student motivation and ultimately impact student learning outcomes, which is why differences in learning outcomes are generally possible. Student engagement in the classroom has grown thanks to cooperative learning strategies such as WinGeom's app-assisted Think Pair Share. Because control group learning prioritizes the senses of sight and hearing, student

engagement is not the best. If this condition is repeated, it will cause boredom, which decreases students' motivation and, interest, and learning outcomes.

This think pair share can give students more time to consider so that they can inadvertently hone students' critical and creative skills, and this think pair share also allows students to solve problems in pairs and take responsibility for whether or not the members in the couple can solve problems. Starting from this situation, an exciting learning pattern that is not boring will be formed where students are not only allowed to help each other academically but also can practice social skills, as a result, participants can motivate each other to improve their learning outcomes. The TPS-type cooperative model is one of the practical learning to create a variety of classroom discussion patterns by giving students more time to construct and discuss ideas freely and share information with other friends (Sumarsya & Ahmad, 2020).

Think Pair Share (TPS) Type Cooperative Learning is one example of learning that prioritizes students playing an active role together with their group friends by discussing how to solve a problem. Students are guided to have individual responsibilities and responsibilities to their groups or partners. The procedure has been prepared and made in such a way that as a result it can give more time for students to be able to think and respond which will later arouse student participation. At the elementary level, students are students who need to be directed, developed, and bridged towards complex development. Therefore, education in elementary schools is essentially an education that is more directed and motivates students to learn. This is because elementary school students are unique children and need attention. The background of their uniqueness can be seen in the changes in various aspects of their behavior, motility, and intelligence so that, which hypnotizes their development (Amaliyah et al., 2019)

WinGeom's WinGeom-assisted Think Pair Share cooperative learning allows for face-to-face interaction among group members and the development of interpersonal bonds. It results in higher learning outcomes. Students will improve their cognitive and vocational skills with these learning strategies. Students' answers to questions and concerns, as well as opinions and sharing information with other groups in the class, help them develop their cognitive talents and prepare them for the workforce. Using this learning approach, students build confidence, build relationships with each other, and learn to be responsible in completing their assignments (Nida & Julianingsih, 2023). The Think Pair Share learning model, assisted by the WinGeom application, has been proven to influence students' mathematical communication skills regarding geometry materials after the learning model is given. The significant average difference between the pretest and posttest learning outcomes can be seen from using the Think Pair Share learning model, which is assisted by the WinGeom application on geometry materials. In other words, the Think Pair Share learning model, assisted by the WinGeom application, influences students' mathematical communication skills on geometry materials.

The learning model used by teachers in the classroom will influence student learning outcomes. The use of the Think Pair Share model is considered to help students become more active and independent, have a higher social spirit with friends, and impact the improvement that will occur in learning and student learning activities. The application of the Think Pair Share mode is also helpful for teachers, because apart from being a learning facilitator, teachers can also know the learning characteristics of students. Based on the description that will occur, it can be seen that the Think Pair Share model has an effect on student learning outcomes and activities, and is evaluated more effectively to stimulate students' enthusiasm for learning (Sholichah et al., 2022).

Learning in the classroom using the WinGeom application dramatically improves students' mathematical communication skills. The improvement in mathematical communication skills is due to the WinGeom application, which can help solve problems, and understand 2D and 3D images and their application in daily life. The use of the WinGeom application is constructive for teachers in explaining geometry material to students. The WinGeom application can visualize 3-dimensional shapes to be more natural. The WinGeom application can show the shapes of the space from all sides, namely the top, bottom, front and back (Hidayat & Lestari, 2022). Learning using the WinGeom application is felt to be more exciting and less monotonous, so the learning process becomes more enjoyable. Rudhito (2008) stated that the WinGeom application is better than conventional learning. In addition, learning using the WinGeom application is also more fun and more enjoyable for students.

The WinGeom application is one of the dynamic mathematical computer software to help solve geometric dilemmas. WinGeom was designed by Richard Parris. The program contains a 2-dim wingeom for two-dimensional geometry and a 3-dim wingeom for three-dimensional geometry. The program facilities on the WinGeom application are pretty complete, attractive, and practical to use. Three-dimensional geometric drawings can be rotated so that the visualization is obvious. Learning using the WinGeom application can help students visualize abstract 2-dimensional and 3-dimensional geometric shapes to be more authentic so that students can better understand the concept and image it in their minds (Amelia et al., 2021).

4. CONCLUSION

Based on the results of research and data analysis regarding the influence of the Think Pair Share learning model assisted by the WinGeom application on the mathematical communication skills of grade VIII students of SMP Negeri 7 Kota Serang, it was concluded that the Think Pair Share learning model assisted by the WinGeom application has a significant influence on improving students' mathematical communication skills. This is because the Think Pair Share learning model assisted by the WinGeom application has learning stages that are through collaboration in thinking, discussing with partners, and sharing understanding so that students become more skilled in explaining mathematical ideas clearly and convincingly. In contrast to classes where students only listen to the teacher explain the material in front of the class, in conventional learning students are not required to communicate with their peers during the learning process. It can also be seen from the average mathematical communication ability of students in the experimental class that it is higher than that of the control class, namely the average posttest score conducted in the experimental class. In addition, the study results show a significant influence of the Think Pair Share learning model, assisted by the WinGeom application, on students' mathematical communication skills.

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