CHAPTER I
INTRODUCTION

1.1 Background of The Problem

According to Maryunah, et al (2019: 234), education is a crucial element in the formation and development of the quality of human resources needed to deal with the current situation. As stated in National Education System Law No. 1 of 2003, education is defined as: "A conscious and planned effort to create a learning environment and learning process so that students effectively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills needed himself, the people of the nation, and the state. According to article 4, students are members of society who work to realize their potential through learning processes that are accessible through specific educational paths, levels, and types. The low quality of education at every level of the educational system is one of the issues Indonesians have with education. As a result, better human resources are generated the higher the quality of education. Whereas improving the quality of human resources depends heavily on education quality.

The purpose of education is to produce people who have faith in and are devoted to God Almighty, who are healthy, intelligent, have feelings, are willing, and are able to work; who are able to meet a variety of needs naturally; who are able to control their passions; who are personality, social, and cultured, according to Law No. 20 of 2003. The implication is that education must help people realize (develop) their varied potentials in the context of diversity, morality, individuality/personality, sociality, and culture as a whole. In order to demonstrate how Indonesian national education prioritizes attitudes toward development, character, and changes in the philosophical ideals of the Indonesian state, the educational goals that have been stated. This attempts to strengthen nationalism and prepare for worldwide competition.

There are numerous issues in the area of education. The learning process in the classroom in Indonesia is still overly dominated by the instructor (teacher centered), as mentioned (Gultom, 2017: 101). In this lesson, the teacher only explains the material, then gives examples of questions, then gives practice questions that must be completed in a manner similar to the sample questions, and finally gives home assignments at the conclusion of the lesson. As a result, students only learn how to solve routine questions, which means that their ability to communicate with one another is also less developed. Along with the reasoning process behind information acquisition, the introduction, understanding, and training of methods or ways of functioning are equally crucial concepts to teach in the teaching and learning process (Siahaan, 2014: 36). Therefore, the core of the entire educational process is the teaching and learning process. While students are encouraged to participate in learning activities, teachers have obligations, responsibilities, and teaching efforts.

The teaching process is a step that the teacher takes with the pupils and has a big impact on how they develop. Students will feel at ease and engaged in their study if the procedure runs well. In contrast, if the learning process is repetitive, pupils are more likely to become apathetic and bored (Sembiring et al. 2020: 53). Along with the reasoning process behind information acquisition, the introduction, understanding, and training of methods or ways of functioning are key topics to teach in the teaching-learning process (Siahaan, 2014: 36). Therefore, the learning process needs to be carried out optimally in all subjects, including in learning mathematics.

The science of mathematics has contributed significantly to the advancement of contemporary technology and is still expanding. Therefore, as stated in the Education Unit Level Curriculum (Curriculum 2006), mathematics is one of the requirements that must be satisfied in order to grasp advanced technology in the world of education. Mathematics is a universal science that serves as the foundation for the development of modern technology, has a crucial role in various scientific fields, and accelerates human thought. The current advancements in mathematics in the areas of number theory, algebra, probability, and discrete theory are the foundation for the quick development of information and telecommunications technology. Future technological design and mastery require strong mathematical

foundations from a young age. Fowler contends that because mathematics is an abstract subject, teachers need to be able to find the most effective approach based on their students' degree of mental maturity (Yuhasriati, 2012: 82).

The significance of teaching pupils maths, in accordance with According to Cockroft, pupils should learn mathematics for the following reasons: (1) It is always applied to real-world situations; (2) It is necessary for success in all academic fields; (3) It is a powerful, succinct, and understandable tool; (4) It can be used to present information in a variety of ways; (5) It enhances one's capacity for accurate reasoning and spatial awareness; and (6) It provides satisfaction for one's efforts to solve difficult problems. Even though teachers frequently give students questions that differ greatly from the examples of questions they have previously been taught, many students still believe that mathematics is difficult, despite how important it is for them to learn (Abdurrahman, 2018: 254). Martin asserted that although though math is thought to be highly tough, everyone has to understand it because it may be used to address difficulties in daily life. In order to solve these issues, one must have information, understanding of sizes and forms, counting skills, and most importantly, the capacity to recognize and apply preexisting correlations (Sundayana, 2014: 2).

According to Sholeh et al. (2021: 1783) Indonesia continues to rank 49 out of 53 TIMSS participants, while in the 2015 Program for International Students Assessment (PISA) report, the country is ranked 63 out of 70 countries for mathematics, with a score of 386 out of a total of 540,000 students. This demonstrates that Indonesia still has relatively low math success levels. The 2013 Curriculum's goals for math education are for pupils to be able to observe, inquire, experiment, reason, present/communicate, and create. Students must therefore master three areas, namely cognitive, affective, and psychomotor, in order to attain the aims of studying mathematics.

As stated by NCTM (2000: 60), "Mathematical communication is a way for students to express mathematical ideas both orally, in writing, drawing diagrams, using objects, presenting them in algebraic form, or using mathematical symbols." In order to solve practical issues that are directly tied to mathematical symbols that are crucial to understand, mathematical communication is crucial. Students'

mathematical communication abilities can be acquired through the educational process at school, one of which is the process of studying mathematics (Hodiyanto 2017: 11). Mathematical communication ability is the ability of students to explain mathematical ideas both orally and in writing.

Baroody (in Kadir, in Hodiyanto 2017: 11–12) cites two key justifications for why communication is one of the main areas of study in mathematics: (1) The language of mathematics is fundamentally mathematics itself. Mathematics is a cognitive tool that assists us in identifying patterns, solving problems, and drawing conclusions. It also aids in the clear, exact, and concise communication of our views about a variety of topics. In reality, mathematics is seen as a language that is universal and has its own symbols and patterns. It can be used by everyone in the globe to convey mathematical information, regardless of their original tongue. (2) Teachers and students are at least two of the participants in the social activity of learning and teaching mathematics. It is crucial to use language to communicate such thoughts and ideas to others during the learning and teaching processes. This sharing of knowledge and experiences is essentially a teaching and learning process. Naturally, speaking with peers helps one improve communication skills necessary for learning to think like a mathematician and successfully solve brand-new problems.

Based on the above data, in fact many students experience difficulties in learning mathematics. Student's experience difficulties in communicating mathematical problems in the language of mathematics. Even students who are capable of learning mathematics are often less able to convey their thoughts. As if they do not want to share knowledge with others. If this is continuously allowed or ignored, students will be less able to communicate using mathematics (Ramellan et al, 2012: 3). According to Kadir (in Hodiyanto 2017: 13) explains that to reveal student's abilities in various aspects of communication, it can be done by looking at student's abilities in discussing problems and making mathematical expressions in writing either pictures, mathematical models, or symbols or their own language. In fact, the measurement of student's mathematical communication abilities is carried out by giving a score to student's ability to provide answers to questions by

drawing (drawing), making mathematical expressions (mathematical expression), and writing answers in their own language (written texts).

According to Firdaus research (in Sritresna, T., 2017: 422), more than half of the students received a score for their ability to communicate mathematically that was less than 60% of the optimum score, indicating that their ability to communicate mathematically was not of a good quality. Students will be less able to communicate using mathematics if this is permitted to continue (Sritresna, 2017: 419). Time and national boundaries are no longer an obstacle, especially with the current highly rapid growth of science and technology (Science and Technology), which allows information that occurs in any area of the world to be instantaneously known. Learning mathematics is regarded to foster the growth of science and technology as well as the development of problem-solving, critical thinking, creative, and communication abilities (Situmorang et al., 2018: 2).

The Foundation in Technology for All Teachers: Foundation Standard was recommended by the International Society for Technology in Education (ISTE) in 1999. According to this requirement, teachers must: (1) Possess a general understanding and technological proficiency. (2) Having the ability to use technology to enhance skills in both the professional and personal spheres. (3) Must have the ability to successfully incorporate technology into the curriculum (Lowther et al. 2000: 132).

According to the aforementioned research, it takes work from subject teachers to adopt cooperative learning and make students more engaged in learning, communicating, and developing their own self-confidence. Small groups of students work together in cooperative learning to make the most of teaching and learning conventions. The ability of pupils to communicate mathematically is another benefit of cooperative learning. In this approach, students are required to form groups and dare to express their own viewpoints.

The Think Pair Share learning paradigm is one of numerous cooperative learning strategies that can be applied to the learning of mathematics. Frank Lyman and associates at the University of Maryland created the Think Pair Share Learning Model for the first time in 1981 (Kaddoura, 2013: 4). In a cooperative learning strategy called "Think Pair Share," students independently evaluate the problems

the instructor presents, then talk about the problems with a partner and offer their conclusions to their classmates (Sunita, 2014: 62). Because communication skills will be more motivated in the Think Pair Share learning model and because using this learning model will make students more open to communicating with their peers because they won't feel as awkward with the teacher when discussing with friends, this learning model can help students find and understand mathematics learning materials. Students will have the chance to debate with others and with themselves thanks to Think Pair Share. This method shines at assisting pupils in identifying their critical thinking abilities and capacity to support friends when they discuss a topic. Giving pupils the chance to talk to one another will provide them the space they need to disclose their struggles and the knowledge they need to assist those in need. Students will benefit from this situation in order to better understand the subject matter. The Think Pair Share model can provide students more time to think, respond, and assist one another while also identifying patterns of student interaction (Trianto, 2011: 81). Students won't become confused in class as a result of short-cut learning procedures, which will make it simpler for the teacher to place them in the appropriate groups and prevent confusion among the students. TPS is incredibly useful when used in learning, as demonstrated by this practice.

The learning process that allows explore students' mathematical communication skills but also provides a large scope for the students themselves in managing and managing themselves will be more fun and effective because students have scope for themselves and then refined with the results of discussions with friends. Help obtained from peers will help students at the right time. The knowledge of the students' buddies will cover their gaps in understanding, and if this duo is unable to do so, a bigger discussion—namely, the class—is available and will be able to address their issues. Students will learn about this incident through the Think Pair Share learning technique, which will make it simpler for them to comprehend the mathematical concepts that the teacher is teaching. Students must make an effort to comprehend the concepts on their own and find solutions to the challenges they encounter during the stages of the think pair share learning approach. And then share with a group of friends, and try in each group to find a solution, and if there are obstacles that are difficult for them to face, the teacher provides assistance to

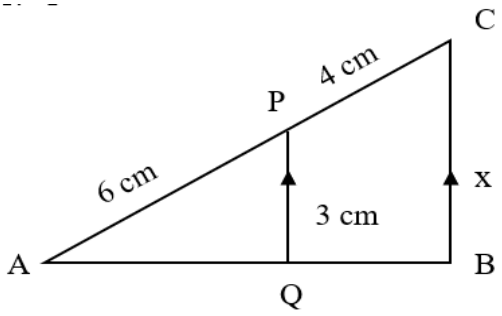
students. A scientific approach will help students to work more on their own abilities, and regulate their own abilities and improve their ability to communicate with the challenges they face. Students will find it simpler to recall procedures like this because they typically come up with their own answers to problems.

Another way for teachers to plan and use is to use technology. The type of technology that will be used is with the help of the Wingeom Software. Pratiwi and Septia (2016: 100) describe Wingeom Software as a dynamic mathematics program made specifically for studying geometry. Both the Wingeom-2 dim program for geometry in two dimensions and the Wingeom-3 dim program for geometry in three dimensions are included in the program. Students can investigate, observe, create form animation, and present dimensional geometry material using the Wingeom application. Meanwhile, Wingeom is software designed exclusively to depict geometric materials, according to Rhosyida (2015: 196). Therefore, using the Wingeom program to learn geometry and solve geometry-related problems is a possibility. This application is particularly useful for creating 2D geometry lessons that are interactive and allow for student exploration. To put it another way, students use the Wingeom application as Mindtools (thinking aids) to create their own knowledge. Wingeom's benefits (Rhosyida 2015: 196) in dynamically presenting geometric shapes in two and three dimensions are anticipated to be able to assist students in gaining a more thorough and practical grasp of geometry.

Based on preliminary findings from a diagnostic exam administered to 32 students in class VII–5 at SMP Negeri 35 in Medan T.A. 2022–2023 and a description of the questions that were answered by employing the following mathematical communication techniques:

The initial ability test given by the researcher, namely:

1. Look at the following picture!

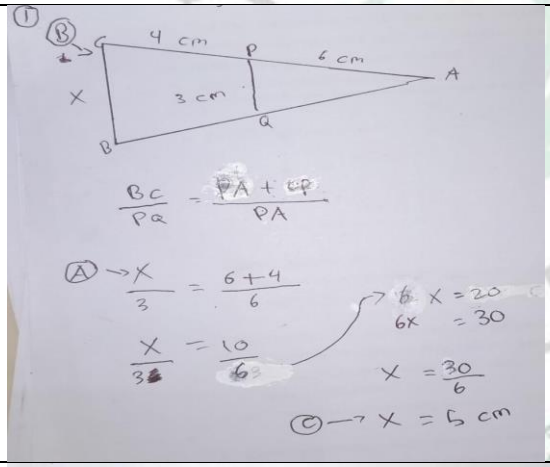
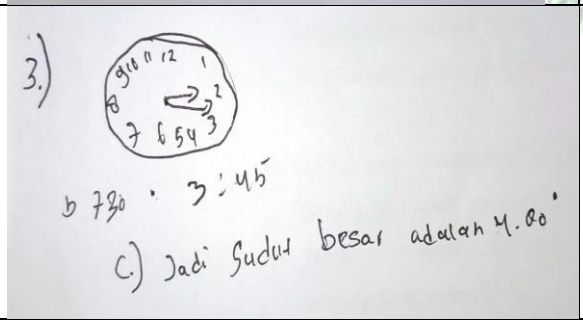


a. Determine the value of x!
b. Draw triangles ABC and triangle AQP with each side length!
c. Make a conclusion that you get using your own language!

2. A wall clock with hour hand and minute hand showing 02.35.
   a. Draw a clock shape that shows 02.35!
   b. Determine the size of the angle formed by the hour hand and minute hand when the hand shows 02.35!
   c. Make a conclusion that you get using your own language!

The following table shows the outcomes of correcting different student errors in answering the questions about the aforementioned description:

Table 1.1 Results of Mathematical Communication Ability Observation Sheet

No.	Student Work Results	Error Analysis
1		As seen in the picture next to it, students are unable to accurately draw a triangular form in accordance with the requirements of the challenge. Additionally, students are well aware of what the situation entails. The comparison formula used by students demonstrates this. Simply said, the method through which students respond is unclear. In other words, students' thoughts cannot be fully expressed in writing. Additionally, when students write down their replies, they do not include their conclusions in their language.
2		Students have not been able to understand the questions seen students unable to write down the answers correctly. So that students are not able to describe the shape of the wall clock that is informed of the questions, are not able to describe the process of answering questions and students have not written the conclusions of the answers in full

With a class average score of 31,93 the findings of the initial observation exam, which was given to 32 students in class VII-5 at SMP Negeri 35 Medan, revealed that the pupils' mathematical communication skills fell into the extremely poor category. where 5 out of 32 students, or as much as 15,62%, of the class have completed all of the required coursework.

According to the findings of interviews done by researchers with math teachers at SMP Negeri 35 Medan, learning generally occurs utilizing traditional learning paradigms, which are still student-centered. The student's active participation is still low in terms of asking directly to the teacher, responding to questions, expressing opinions or ideas, and discussing with other students. Learning models that are still lacking in the learning process, particularly learning processes that do not use technology or mathematical software, are also still lacking.

According to the definition given above, a study with the following title must be conducted by the researcher: **"The Effect of Think Pair Share Learning Model Assisted by Wingeom Software on Student's Mathematical Communication Ability in SMP Negeri 35 Medan**".

1.2 Identification of problems

The problem in this study has been identified based on the background information mentioned above as follows:

1. Because students still struggle to communicate mathematical ideas in clear and understandable ways, it is challenging for them to develop mathematical models.
2. The teacher's learning technique hasn't been able to pique pupils' enthusiasm in taking part in the learning process.
3. The absence of student engagement in the learning process, which results in many students choosing to be passive in discussions and few students daring to explain to their classmates about teacher queries.
4. Not using educational resources, such as the right technology for learning.

1.3 Scope of problem

In accordance with the background of the problem and problem identification above, it is necessary to limit the problem so that this research is more focused and directed. The problem in this research is limited, namely "The Effect of Think Pair

Share Learning Model Assisted by Wingeom Software on Student's Mathematical Communication Ability of Grade VII SMP".

1.4 Formulation of the problem

The following issues are the primary emphasis of this study's concerns in light of the backdrop of those issues: **"**Is there an effect of the Think Pair Share learning model assisted by Wingeom software on student's mathematical communication ability in SMP Negeri 35 Medan?"

1.5 The Purpose of the Research

The purpose of this study is to ascertain the following, based on the formulation of the problem previously described: "To identify whether there is an effect of the Think Pair Share model assisted by Wingeom software on the mathematical communication abilities of students at SMP Negeri 35 Medan."

1.6 The Benefit of the Research

The facts and expertise gained through this research are anticipated to be advantageous. The advantages of this study are:

1. **Theoretically**

   The outcomes of this study can be utilized as a reading list for subsequent studies that examine how junior high school students communicate mathematically using the Think Pair Share paradigm.

2. **Practically**
   a. It can help students' mathematical communication abilities and their capacity for interpersonal interaction in math study groups.
   b. For Teachers, as input material and as a substitute in selecting a variety to be utilized in learning mathematics to increase students' mathematical communication abilities and make the teaching and learning process more effective, efficient, and meaningful.
   c. For use by school leaders as research material to raise standards of instruction, particularly in the area of mathematics studies.

d. For researchers, offer insight when creating scientific work educational assignments and be able to understand and apply it later on when instructing.
e. For Readers, As reading material for people who want to learn about research or for other researchers who want to do study.