

The Influence of Mathematical Disposition on The Mathematical Problem-Solving Ability of Fifth-Grade Elementary School Students

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Abstract. This research is based on the importance of mathematical disposition to problem-solving abilities. Learning mathematics's objectives include cognitive aspects seen in mathematical problem-solving. Mathematical dispositions can show abilities and affective aspects. Problem-solving skills are challenging tasks that require critical and creative thinking, which require a combination of knowledge and skills. Teachers must be able to stimulate students in Learning mathematics by trying to improve mathematical disposition with the material of spatial shapes, namely cubes, and cuboids. This literature review uses an integrative review design to determine the influence of mathematical disposition on problem-solving abilities. A mathematical disposition is a propensity for optimistic thought and behavior. In order to solve challenges, students must be persistent. Students with a high mathematical disposition will be more confident in solving problems. This attitude is an indicator of mathematical disposition. The steps of problem-solving are understanding the problem and planning problem-solving, creating a problem-solving process, and explaining or interpreting the results according to the initial problem. Thus, mathematical disposition can be used to solve students' mathematical problems.

Keywords: Mathematical Disposition, Problem-Solving Ability.

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INTRODUCTION

Perhaps the most important things is training aspects of existence to improve along with develop human potential and become a quality human resource. The creation of quality human resources is one of the goals of national education, efforts for which are continuously made at every degree of education.

Among the fundamental strategies to enhance called quality of national education can be seen in teaching and learning activities in schools because schools are one of the educational tools. Mathematics is a subject that contains basic knowledge that students must master as a provision in life or to be able to master the sciences related to mathematics itself. The knowledge of maths is beneficial in resolving a variety of issues in daily life that are related to calculations or related matters of numbers, as well as various kinds of problems that require skills to solve them. (Susanto in (Irawan & Lasha, 2021). So, with this mastery of mathematics, a student will master other sciences and possess the ability to apply these concepts to resolve the mathematical issues he will encounter. (Kusuma in Irawan & Lasha, 2021)

Mathematics learning not only aims to develop students' cognitive abilities, such as problem-solving skills, but also aims to form a cheerful mathematical disposition. Both are complementary and essential aspects in achieving the goals of learning mathematics. However, according to (Carr in Trisnowali, 2015), disposition and ability are two different thing

A student can show an exceptional talent for mathematics but lacking the necessary skills or knowing regarding the material's contents. Nevertheless, it is thought that two kids will exhibit distinct talents if they have different traits but the same potential. Student Thus making it easy for these trainees to be more conversant than the ones who fail to exhibit such habits. Pupils with high dispositions will be more tenacious and motivated to try new things. This allows these students to have more knowledge than students who do not exhibit such behavior. Pupils possess particular skills as a result of these facts.

A student's mathematical disposition is considered decent as the student likes issues causing challenging to actively participate in identifying and resolving issues. Additionally, while they finish an assignment, pupils sense as though themselves are going through an effort to learn. Pupils experience the growth of optimism and a belief during their journey, as well as recall that arises in the learning process. (Trisnowali, 2015)

It can be a strong foundation for facing the challenges of problem-solving, so focus on problem-solving as recommended by The National Council of Teachers of Mathematics (1989), which states believes the main emphasis of the mathematics curriculum should be on problem-solving believes the main he focus of the mathematics curriculum need to be on solving problems. Thus, problem-solving becomes the primary goal of all mathematics learning. (Asimtot & Irmina, 2019). Problem-solving is vital to the study of maths since it lets pupils to practice applying their existing abilities and expertise to solve queries in novel contextual settings.

Students' success in numerous mental variables pertaining to how pupils feel toward the course of study might also aid in problem-solving. In addition to problem-solving skills, mathematics learning also shows affective aspects such as mathematical dispositions pertaining to how pupils view and resolve issues, namely self-assurance, tenacity, enthusiasm, and adaptability in thought to consider different solutions to problems-solving strategies. Mathematical disposition is among the elements that affect pupils' learning success. (Yuliawati in Yulia & Hendricks, 2024) This demonstrates that pupils' capacity for resolving issues in the learning process, lack of mastery of mathematical concepts, and difficulty in solving various problems given by teachers (Yulia & Hendricks, 2024).

Research conducted by (Asimtot and Irmina, 2019), previous researchers on "The Influence of Mathematical Disposition on Mathematical Problem Solving Ability," the results of the regression test calculations showed a significant influence between aptitude for tackling inquiries in mathematics and a mathematics inclination. Then, in the research conducted by (Lestari and Andinny, 2023) entitled "Mathematical Problem Solving Ability Through Disposition in Mathematics," the results of multiple regression calculations showed that

mathematics temperament has an impact on the ability to solve problems in mathematics ability. Furthermore, research conducted by (Dewi, 2018) entitled "Analysis of the Influence of Mathematical Disposition on the Mathematical Problem-Solving Ability of Junior High School Students" with the results of the correlation calculation of this study showed that students' mathematical disposition positively influences problem-solving abilities.

Considering the findings of the surveys with Mrs. Nurul Maulidiyah, as a class teacher at SDN 2 Salawu, students' mathematical dispositions can be seen that there are still few who research mathematical dispositions towards problem solving, especially among elementary school students. Apart from that, previous research mostly examined middle school or high school students and apart from other factors that could potentially influence problem solving abilities were not studied in the research variables. Such as learning motivation factors, school facilities and discipline in learning

Based on earlier studies, researchers sought to understand The connection among mathematics temperament and mathematical The ability to solve issues. Moreover, other factors that previous researchers have not studied. Based on the description, The writer is eager to learn more about "The Influence of Mathematical Disposition on the Mathematical Problem-Solving Ability of Grade V Elementary School Students.

METHODOLOGY

The literature review for this study was conducted through a systematic search of academic sources using specific keywords relevant to the research theme to ensure the inclusion of appropriate studies. Inclusion criteria were established to prioritize high-quality, methodologically robust research that aligned with the study's objectives. The selected literature was carefully analyzed to extract key theories, methodologies, findings, and research gaps. A thematic approach was applied to synthesize information from various studies, categorizing the literature based on recurring themes and trends. This approach helped identify conceptual frameworks, theoretical perspectives, and empirical evidence that support the study.

RESULT OF LITERATUR RIVIEW

Mathematical Disposition

Difficulty A lethargic attitude, reluctance, lack of assurance, difficulty focusing, inactivity, and pessimism are characteristics of mathematical learning difficulties. As a result, students are already disinterested when they discover difficulties to solve. Additionally, students express distaste for mathematics, indicating a low mathematical propensity. The primary cause, as determined by the researchers' investigation, was their inability to understand the information

being given to them by the teacher. The lessons that have been taught thus far have not placed a strong emphasis on developing students' abilities in understanding the content concepts in the lesson material. (Dwinta, 2018)

Mathematics education in schools plays a crucial part in creating students' critical, logical, and analytical thinking skills. Mathematical disposition includes attitudes, interests, and beliefs toward Mathematics, becoming an essential foundation during the educational process. An excellent mathematical disposition will create a positive setting to learn in, support the understanding of mathematical concepts, and stimulate students' motivation to participate in learning actively. Sumarmo believes that it is essential to improve mathematical disposition in mathematics learning because students must have the ability to see the usefulness of mathematics, have a curiosity about mathematics, and enjoy learning mathematics. (Kencana Putri & Rahmadeni, 2024). Mathematical disposition is reflected in self-confidence, curiosity in seeking alternatives, perseverance, being challenged by problems, and pupils' propensity to consider how they behave when studying mathematics. Thinking back on what has been done in the past or considering what has just been learned is called reflection. Considering can be a reaction to activities, experiences, or new information. Reflection can be a reaction to activities, experiences, or new information. (Sofiyah, 2021). Students' mathematical disposition can develop when they study other aspects of competence. For instance, while pupils reason to resolve unusual issues, their mindsets and convictions will improve. Based on consideration of indicators that can directly influence student learning outcomes (Pusi et al., 2022)

Mathematical disposition is a propensity to act and believe positively, namely viewing The ability to comprehend mathematics and the perception of math as a concept valuable and beneficial, believing that consistent and hard work in the field of math will produce results, and acting as an effective student and mathematics worker. (Irawan & Isha, 2021). Therefore, One of the elements that affects how well kids learn is their aptitude for mathematics. They must possess the following qualities: a mindset that recognizes the value of mathematics in life, curiosity, focus, and interest in learning it; a mindset of perseverance and self-assurance in solving problems; and the ability to take responsibility for their education and form positive mathematical habits. mathematical problems. (Ridha, 2024)

Mathematical disposition is an interest in and respect for mathematics, specifically the propensity for positive thought and behavior, such as self-assurance, tenacity, excitement for learning, tenacity in solving difficulties, adaptability, readiness to contribute, and reflection in mathematical endeavors. Both inside and outside of the classroom, mathematical disposition is believed to have the power to positively impact pupils' problem-solving abilities. This aligns

with the BSNP's learning objectives for the classroom, which include being curious, persistent in learning math, and confident in one's ability to solve issues. so that in classroom learning, there will be positive behavioral changes in students in their lives.(Rozi & Afriansyah, 2022)

Thus, the mathematical disposition is a propensity for optimistic thinking and behavior, such as self-assurance, tenacity, excitement for learning, dedication, problem-solving skills, adaptability, readiness to contribute, and introspection in math-related activities. Mathematical disposition is manifested in choosing an approach to completing tasks with attitudes and actions. In addition, it is believed that children who possess a mathematical temperament are better able to solve difficulties in and out of the classroom. This aligns with what has been learned objectives at school, according to BSNP.

Disposition is the personality or character that a person needs to be successful. To persevere in the face of difficulties, take ownership of their education, and form productive work habits in math, pupils require a mathematical disposition. According to (NCTM in Yusmin & Nursangaji, 2017), There are several markers of aptitude for mathematics, including (a) Self-confidence in using mathematics, resolving issues and sharing concepts, and expressing reasons. Self-Confidence is the attitude of believing that one can achieve all of one's goals and aspirations. Students must possess the virtue of self-assurance because it will be difficult to attain the best possible learning outcomes without it. (b) Adaptability in exploring mathematical concepts and attempting to identify other ideas when solving problems. Flexibility is an essential strategy in problem-solving activities, as it involves carrying out various mathematical manipulations to find various appropriate and best solutions to the problems or questions faced. (c) Actively doing math assignments (d) High interest, curiosity, and finding answers when carrying out mathematical tasks. Curiosity is also an important character to be instilled in students as people who are learning and seeking knowledge) A persistent attitude shows a strong-willed nature. According to KBBI, persistence is the firmness of holding an opinion (or defending a position) and perseverance (in trying). (f) Tend to monitor and evaluate their performance and reasoning. (g) Examine how mathematics is used to many situations in different domains and in day-to-day situations. (h) Recognize the importance of mathematics as a tool and a language, as well as its function in culture.. (Yusmin & Nursangaji, 2017)

The inclination to see mathematics as something that can be recognized, to believe that it is useful, to think that hard work and perseverance will pay off, and to act as an effective learner and actor of mathematics itself is known as mathematical disposition. In the context of mathematics, disposition is pertaining to how pupils resolve problems with mathematics, whether they are confident, persistent, interested, and think flexibly to explore various alternative solutions to problems Mathematical dispositions have to do with how students pose

questions, respond to queries, explain mathematical concepts, collaborate with others, and resolve mathematical issues. The aforementioned explanation of mathematical disposition leads one to the conclusion that students with this disposition have a high propensity to engage in a variety of mathematical activities in order to successfully and efficiently solve mathematical issues. (Erni, 2017)

Solution to problem

The word ability in the Big Indonesian Dictionary means skill and strength. Ability means the ability or being able to do something. Being able to solve problems is a fundamental thing to be mastered by every student in the learning process. Skills for addressing problems are the primary abilities skills that must be developed in 21st-century learning practices, in addition to critical thinking skills, communication, and collaboration skills. (Bao & Koeing, in Yuliyanto, 2024).

Problem-solving ability is the process of individual independent thinking that determines the efforts made to overcome problems with appropriate solutions. Problem-solving skills are the ability to understand, to comprehend and organize methods for solving, implement the selected tactics, and re-test these problem-solving strategies to create answers systematically, which cannot be separated from the correct representation of the problem. (Chao & Huang; Murni, Sabandar, Kusumah, & Kartasmita; Polya in Yuliyanto An, 2024). Visualization, association, abstraction, comprehension, manipulation, reasoning, analysis, synthesis, and generalization are all steps in the process of developing basic problem-solving abilities, and they are all organized and coordinated procedurally (Rufaida & Nurdiyanti in Yuliyanto, 2024). People with problem-solving skills abilities are seen as prosperous people who are aware of the causes of issues, are methodical and persistent, use diverse decision-making methodologies and generate different alternatives to problems. (Esen-aygun in Yuliyanto, 2024)

Thus, in modern education, problem-solving, communication, collaboration, and critical thinking skills are essential skills. Ability to solve problems is defined as an individual's capacity to think independently and determine the efforts made to overcome problems with appropriate solutions. Problem-solving skills include the ability to comprehend and organize methods for solving problems, implement the tactics selected, and re-test these strategies to create answers in a systematic manner that cannot be separated from the correct representation of the problem. The processes of understanding manipulation, association, abstraction, reasoning, analysis, synthesis, and generalization are components of basic problem-solving skills, each of which is arranged and coordinated procedurally and is an essential initial step in providing students with problem-solving skills, as according to NCTM (2000), five objectives are the

focus of mathematics learning skills, namely 1) problem-solving skills, 2) reasoning 3) connection skills, 4) communication abilities, 5) representation skills, and proof skills. Problems are questions that must be answered well. The questions asked can be routine questions or non-routine questions. Through problems, students are invited to think and find the reasons why the problem arises. (Syahlan, 2017)

The reason why problem-solving skills are included in high-level thinking skills, such as critical and creative thinking skills, is that problem-solving is an activity that is not easy to do because it requires strong thinking that comes from other knowledge to accept and solve problems (Husniah, Maulana, & Isrok'atun in Yuliyanto, 2024). Yuliyanto, 2024). Critical and creative thinking are constantly linked to problem-solving abilities, therefore convergent or divergent thinking strategies are needed to get the best solution (Rufaida & Nurdiyanti in Yuliyanto, 2024). Without problem-solving skills, the value and strenght of mathematical ideas, knowledge, and skills will be limited. (National Council of Teachers of Mathematics, in Yuliyanto, 2024)

Low student problem-solving can also be caused by teacher-dominated learning and lack of Regarding students' participation in the process of teaching and learning. In this instance, learning is not imparted to the students strategies that can teach children how to think, learn, and inspire themselves, even though these components are essential for learning achievement. In line with that, (Trianto in Ramdoni, 2023) stated, "Based on the results of research on the low learning outcomes of students, this is caused by the learning process being dominated by traditional learning. The classroom environment under this learning style is typically teacher-centered, which makes pupils docile. In order to solve mathematical issues, one must possess Solving mathematical puzzles skills that they face by applying their knowledge and experience and using steps that can be accounted for . (Ramdoni, 2023)

Thus, problem-solving is a challenging task that requires critical and creative thinking, which requires a combination of knowledge and skills. The effectiveness of problem-solving can be caused by teacher-led learning and a lack of student involvement in the learning process. Therefore, students should not only learn strategies that help them understand and solve problems but also be motivated to learn.

As for the steps to solve the problem, Polya (Yustiana et al., 2021) stated that four steps can be taken to solve a problem, namely recognizing the issue, preparing a strategy for resolving issues, putting the problem-solving strategy into practice and verifying again. The phase in which the issue is understood in this research is the phase in which the individual is ability to comprehend the meaning of the issue. One of the indicators of to comprehend a situation, one must be able to ascertain what is known and what is being inquired about. The phase of

preparing a solving problems strategy necessitates a thorough comprehension of the material idea because this will influence decisions in determining the stage of problem-solving. The stage of implementing the problem-solving plan is a continuation of the previous stage. At this point, having experience addressing problems is crucial, given that previously prepared Plans will proceed in light of the findings provided the last phase is the period of reflection or re-checking the responses. At this point, students are capable when they recalculate to ensure or look at the correctness of the responses. Every student solves problems in a unique way.

In detail, the aspects of problem-solving skills are explained, including identification, making summaries of facts, and even concise problems that are reviewed repeatedly to be understood thoroughly. In determining problem-solving strategies, each problem-solving solution is detailed according to the problem. Students are required to have experience in solving problems to be applied in problem-solving strategies. Complete problem-solving strategies so that the solutions sought are in accordance with the desired answers and problem-solving strategies are implemented carefully. (Yuliyanto, 2024). The problem-solving indicators from this research are recognizing the issue and planning solving problems, creating a solving problems process, explaining or interpreting the outcomes based on the initial issue, and verifying the correctness of the answers or results

DISCUSSION

Human daily life is inseparable from problems. In solving problems, a specific ability is needed, namely problem-solving ability, but students' problem-solving ability is not yet optimal, as can be seen from the results of TIMSS and PISA. The results of TIMSS (Trends in International Mathematics and Science Study) show that the problem-solving abilities of Indonesian students are still not optimal. In contrast, the results of the PISA (Programme for International Student Assessment) show that the number of students who are able to implement procedures and strategies in problem-solving is fewer than the quantity of pupils capable of working on them. (Amanda, 2016)

According to (Sumarmo in Zulaiha 2021), Mathematical disposition is an optimistic approach to solve mathematical issues, which can manifest as a high level of attentiveness and perseverance as well as the confidence that comes from using mathematics. Students with diverse mathematical dispositions but similar problem-solving skills may not always get the same learning outcomes. This is due to the fact that pupils with a strong mathematical propensity are more resilient when it comes to resolving mathematical issues. Pupils with a strong mathematical disposition are not always those who seem to like mathematics.

The a study was carried out. (Dewi, 2018) within a junior high In Bandung City with the aim of analyzing how much influence mathematical disposition has on the aptitude for solving problems in mathematics of 35 Students in junior high. Overall, this study concludes that students' mathematical disposition positively influences ability to solve issues by 70.4%, and other elements have a 29.6% impact. The following research was conducted by (Lomri & Dasari, 2024). Twenty-five seventh-grade students from the city's junior high school Bandung participated in the study, which sought to determine the association between the students' aptitude for solving problems and their mathematical disposition throughout the 2019–2020 school year. The study's findings demonstrated that students' problem-solving skills and mathematical temperament were positively correlated, with a significant degree of association found in the responses to the questionnaire given to the students.

In addition, research was conducted in class VII of junior high school by (Mayaratih 2019) with the aim of determining the impact of students' aptitude for mathematics on students' aptitude for solving mathematical puzzles in class VII of junior high school A well-developed aptitude for mathematics will follow from a well-developed problem-solving aptitude. Students who comprehend the issue have well-trained self-confidence. When students start working on questions, students express their respective opinions so that students' self-confidence and perseverance in solving problems can be constructed. Thus, it can be concluded that mathematical disposition influences the junior high school kids in class VIIA's aptitude for solving mathematical problems.

Meanwhile, research conducted by (Hirmaliza Hertin and Sucipto, 2024), "Analysis of Ability to Solve Problems According to a review of junior high school pupils. mathematical dispositions in math classes, students who possess strong mathematical dispositions are also capable of solving problems because they can meet the four requirements of Polya's theory of problem-solving: comprehending the issue, formulating a solution, solving the problem, and double-checking. Because they meet the three criteria for problem-solving in Polya's theory—understanding the problem, solving the problem, and re-checking—students with a moderate mathematical disposition also have moderate ability to solve problems. According to Polya's hypothesis, children with poor mathematical dispositions only meet two problem-solving indications, which means they have poor problem-solving skills, namely problem-solving and re-checking.

Meanwhile, to determine the extent of the impact of students' mathematics attitude toward mathematics problem solving skills of kindergarten pupils in the fifth level, it can be seen through a correlation test of greater than 0.59, which implies that mathematical disposition pupils' aptitude at solving mathematical puzzles. The findings of this study indicate that

students' aptitude for solving mathematical problems is influenced by their mathematical disposition. This is consistent with Dewi's research, which found that pupils' capacity to solve mathematical issues is influenced by their favorable mathematics disposition. Additionally, this supports Zulaiha's research findings. on mathematical disposition, attitude in solving problems. This is due to the fact that students who possess a strong mathematical inclination are more resilient when it comes to tackling mathematical issues.

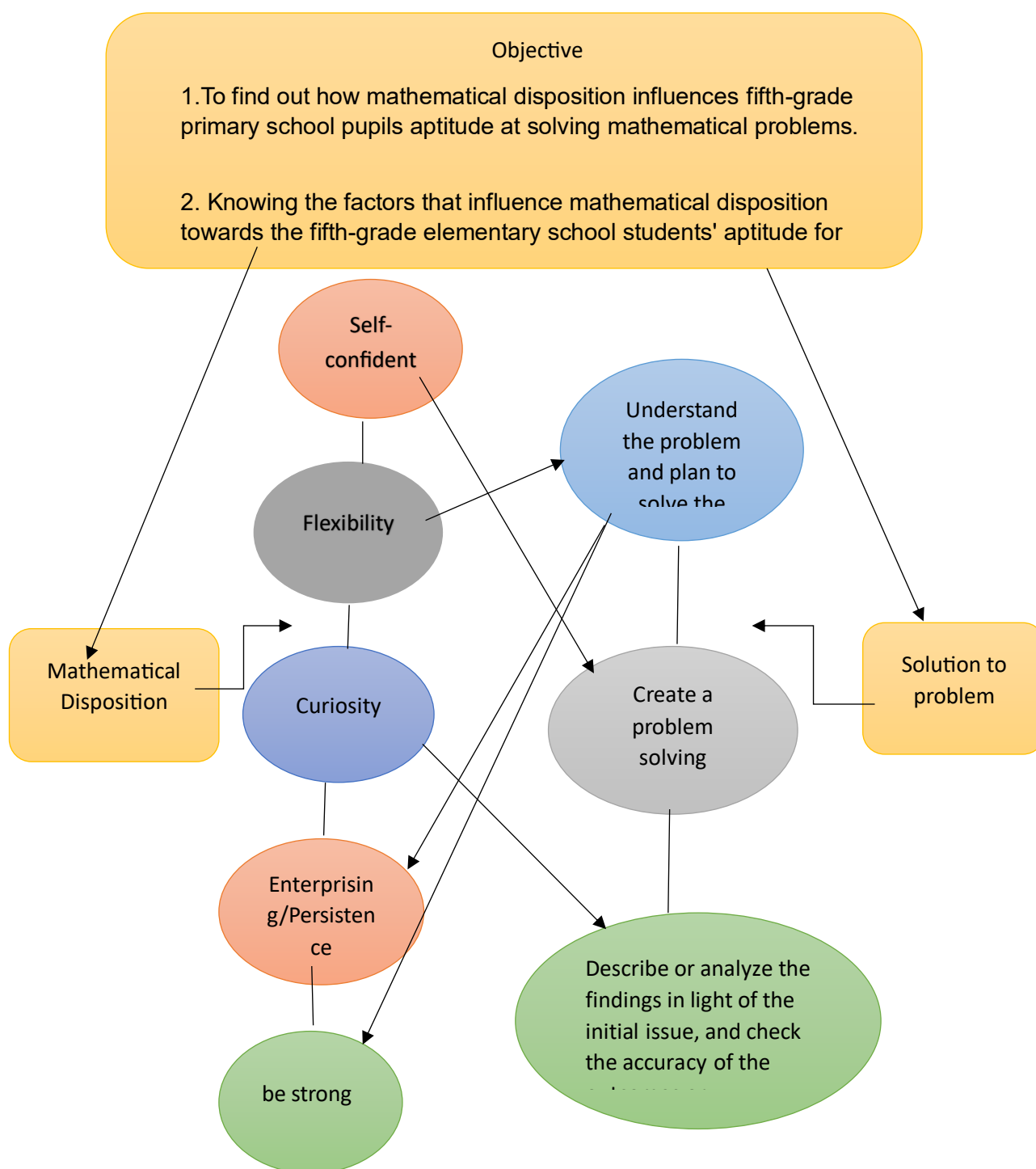


Figure 1. Graph of Mathematical Disposition Towards Problem-Solving

Mathematical disposition has several indicators, namely self-confidence, flexibility, curiosity, perseverance and strong determination. Self-confidence influences the process of solving a problem, flexibility, perseverance and strong determination influence the process of understanding problems and planning, and curiosity indicators influence indicators of explaining or interpreting results according to the initial problem, as well as re-examining problem solving.

CONCLUSION

From the research conducted, It might be concluded that scholars mathematical disposition has a significant influence on their capacity to solve mathematical problems. Students with a strong mathematical disposition—which is defined by optimism, self-assurance, and tenacity—may be more willing to take on obstacles when learning the subject. Teachers interview results indicate that children interest in mathematics serves a crucial part in their getting knowledge process. Learners who have high interest likely to be more enthusiastic and quick in resolving issues, while less interested students have difficulty. Research also confirms that factors such as the ease of the material and the way the teacher delivers the learning greatly influence students' disposition and problem-solving abilities. Therefore, there needs to be a more interactive learning approach that facilitates students in developing their mathematical dispositions so that they can improve their overall problem-solving abilities. Thus, to raise the standard of instruction in mathematics, needs to focus on and cultivate students numerical dispositions as one among the keys to success in the learning process.

Meanwhile, to determine the extent of the impact of students mathematical attitude toward the mathematical problem solving skills of elementary school pupils in the fifth grade, it can be seen through a correlation test of greater than 0.59, which implies that mathematical disposition influences the ability of students to solve mathematical problems. This research shows the results that pupils' mathematical aptitude is influenced by their mathematical temperament problem solving abilities. This is consistent with Dewi's research which revealed that the influence of positive mathematical mindset on pupils' mathematical problem solving abilities. This also agrees with the outcomes of Zulaiha's research on mathematical disposition, attitude in solving problems. This is due to the fact that students who possess a strong mathematical inclination are more resilient when it comes to tackling mathematical issues.

In order to achieve progress and success in activities in the learning process, the author provides suggestions for teachers to always provide motivation to students in learning mathematics, including by conveying the benefits of the material studied in everyday life so

that it can pique pupils' curiosity and positive attitudes in education mathematics. Apart from that, teachers are expected to always train students' mathematical problem-solving skills by giving them practice questions in the form of stories or non-routine questions

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