

RESEARCH ARTICLE | APRIL 29 2024

Preface: The 5th International Seminar of Innovation in Mathematics and Mathematics Education (5th ISIMMED) and the 7th International Seminar on Science Education (7th ISSE) **FREE**



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**Preface: The 5th International Seminar of Innovation in
Mathematics and Mathematics Education (5th ISIMMED) and
the 7th International Seminar on Science Education (7th ISSE)**

The honorable presenters and participants on behalf of the Organizing Committee, we would like to extend our hearty welcome to the virtual Joint-Seminar ISIMMED-ISSE 2021. The 5th international seminar of innovation in mathematics and mathematics education (5th ISIMMED) and 7th International Seminar on Science Education (7th ISSE) conducted by the Faculty of Mathematics and Science, Universitas Negeri Yogyakarta, Indonesia is held today on November, 19–20, 2021. “Technological pedagogical content knowledge (TPACK) in the current trend of science technology engineering mathematics (STEM) Education” -the theme of this seminar- provides a practical solution to a variety of issues that teachers face while introducing technology into their classrooms. The benefits of implementing TPACK in the STEM education are increasing students' learning motivation, helping students associate concepts with students' prior knowledge, helping teachers create a different learning atmosphere which is visual, concrete, fun, and interesting.

Moreover, through this Joint-seminar, I encourage researchers, lecturers, students, and academics to actively discuss and exchange opinions, share experiences about mathematics, mathematics education, and science education. I hope this forum can be a good platform to collaborate among academics, scientists, and practitioners in education. This seminar has accepted 186 papers and 145 participants from Indonesia and Philippines. There are approximately 127 selected papers that are published by AIP Publisher under the Scopus Index, while the rest of the papers will be published on Regular ISIMMED-ISSE Proceeding I would like to extend my gratitude to distinguished guests, ladies and gentlemen from various countries. First of all, please allow me to express my sincere appreciation for keynote speakers:

Prof. Dr. Niwat Srisawasdi from Khon Khaen University, Thailand. and invited speakers

1. Prof. Dr. Michael Phillips Ph.D from Monash University, Australia
2. Dr. Sun Jin from The Education University of Hong Kong, Hong Kong
3. Prof. Dr. Anna Permanasari, M.Si from Universitas Pendidikan Indonesia, Indonesia
4. Prof. Dr. Sugiman, M.Si from Universitas Negeri Yogyakarta, Indonesia

Lastly, let me express my deepest gratitude and highest appreciation for all seminar organizers, all of the reviewers, as well as the authors, committee members and steering committee who have been working really hard for making the success of this Joint- seminar. Enjoy the seminar. We wish you have insightful discussions, meaningful sharing, and have more academic connections.

Endah Retnowati
Antuni Wiyarsi
Peta White
Ng Khar Thoe

Syukrul Hamdi
Fika Fauzi
Wipsar Sunu Brams Dwandaru

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How is the problem-solving ability and scientific attitude of students in mathematics learning seen from the teacher's perspective? **FREE**

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How is the Problem-Solving Ability and Scientific Attitude of Students in Mathematics Learning Seen from the Teacher's Perspective?

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Abstract. One of the main goals of learning mathematics is problem solving ability, which are important for every student to mastered. In addition, there is a domain of attitude that also supports problem-solving abilities, namely the scientific attitude. The important role of teachers is needed in training students' problem-solving skills and scientific attitudes especially in learning mathematics. This study aims to describe how students' mathematical problem-solving abilities and students' scientific attitudes in the mathematics learning process based on teacher perceptions. This research is a qualitative with the type of phenomenology. Data were collected using online questionnaires and interviews with 10 mathematics teachers in Jambi province. Data analysis was carried out using the Milles & Huberman stage, which divided the steps of data analysis activities into several parts, there are data collection, data reduction, data display, and conclusion or verification. The results showed that the problem-solving ability and scientific attitude of students in learning mathematics based on the teacher's perspective are not optimal, this happened not only because of factors from the students themselves but also exist big contribution by a teacher.

INTRODUCTION

The goal of a mathematics learning program is to enable children using mathematics through exploration, discovery, and meaningful problem solving [1]. Moreover, according to the paradigm of students learning mathematics is from easy knowledge to difficult knowledge. Children are taught mathematics initially from simple knowledge and basic skills first, and the next step learn more complex problems. To learn more complex problems children really need to have the ability to see patterns and relationships and then children should have ability to choices and make decisions from a wider variety of possibilities.

One that relates to the condition is problem solving skills. According to NCTM which is being standard of the mathematics learning curriculum, there are five goals of mathematical program that should have achieved by students, one of there is problem solving. Problem solving is defined as a way of thinking that leads to an answer to a problem that involves forming and selecting existing concepts and providing new alternatives [2]. This definition corresponding to the principles of problem solving by [3], he said that the essence of problem solving is remembering the same situation from the past and using that experience to solve current problems. In other words, problem solving is an activity to remembering concepts that have been studied previously and then using these concepts to solve a new problem. This statement is also reinforced by the statement from [1], state that in the problem-solving process, children adapted and polished their knowledge in their own way. Problem solving starts from the initial situation or first statement of a problem (known as the initial state of the problem). Based on the problem situation and previous knowledge, a solution must be found. When the solution has been reached, it is said

that the goal of solving the problem has been achieved [4]. So, it is important for students to develop problem solving skills, especially in learning mathematics.

To achieve the goal of problem solving, need a commitment that is not only from the students themselves but also requires collaboration from the teacher as a motivator as well as a person who plays main role so that students are actively involved in learning, especially in problem solving process. Expert states that to get students actively involved in problem solving, one way is to ask them to formulate and solve their own problems or ask them to rewrite the problem [5].

In learning mathematics, collaboration between educators and students is needed. Because how students learn about mathematics depends on how teacher teaches it to students. This is related to the state from Bredekamp [1], he states that "Young children learn mathematics when there is a match between how they learn mathematical content and how adults help them to learn the content". Recently, mathematics educators have accepted the idea that in teaching mathematics should pay special attention to developing students' problem-solving abilities, this statement is appropriate with [6] which states that "educators accepted the idea that the development of problem-solving abilities" deserves special attention". In line with this opinion, [3] also states that problem solving is placed as a topic that requires special attention.

Special attention here is needed because as it is known that students' problem-solving abilities are still low, especially in learning mathematics. This indirectly indicates that practicing problem-solving skills on students is not easy, moreover problem-solving skills are essentially higher-order thinking skills. In addition, the abilities of students also different from one and another.

Aside from the realm of knowledge and skills, there is an attitude domain that is no less important to support other competencies. Attitudes are psychological constructs, or latent variables that are inferred from observable responses to stimulate that are assumed to mediate the consistency and coherence among those responses. In the curriculum in Indonesia itself, there are many attitude competencies that students must have in mathematics content, some of them are Demonstrate logical, critical attitude Have curiosity, have an open attitude, be objective in group interactions and in daily activities. The whole attitude is an aspect of the scientific attitude.

Furthermore, according to [7] scientific attitude is a logical thinking, and rational without being based on a prejudice that does not have clear evidence. Scientific attitudes should be taught during the formal education process and that scientific attitudes are important not only for teaching and learning science but also for other fields because scientific attitudes facilitate learning in all subjects.

Therefore, that is important for students to hone their problem-solving skills and scientific attitude. The important role of teachers is needed in order to create learning that can train students' problem-solving skills and scientific attitudes. However, whether so far teachers have trained students' problem-solving skills and scientific attitudes in learning mathematics and how exactly are students' problem-solving abilities and scientific attitudes based on teachers' perceptions.

Based on the urgency, this study aims to describe how the problem-solving ability and scientific attitude of students in learning mathematics based on teacher perceptions and what are the challenges of teachers in practicing problem solving skills and scientific attitudes of students in learning mathematics.

METHOD

This research is an explorative descriptive study, by describing how teacher's perspective on problem solving abilities and students' scientific attitudes in learning mathematics. This study uses a qualitative approach to the type of phenomenology.

Data on how the teacher trains students' mathematical problem-solving skills were collected using interview and questionnaire techniques. The data sources were 10 high school mathematics teachers from Jambi Province. Data collection is done by providing an online questionnaire that must be filled out by the teacher and then conducting interviews. The data from the questionnaire that has been filled out by the teacher is then analyzed and described in accordance with the indicators of problem-solving abilities and indicators of students' scientific attitudes that have been prepared previously. The results of this description are then concluded to explain how the problem-solving ability and scientific attitude of students in learning mathematics.

Data analysis was carried out using the Milles & Huberman stage, which divided the steps in data analysis activities into several parts, namely data collection (data collection), data reduction (data reduction), data presentation (data display), and conclusion drawing or verification (conclusions). The questionnaire instrument used in this study refers to the ideal conditions of problem solving and students' scientific attitudes as shown in Table 1 and Table 2 below.

TABLE 1. Indicators and questions about problem solving skills

Indicator	Questions
1. Identifying adequacy data to solve the problem	<ol style="list-style-type: none"> 1. In your opinion, are students able to choose/determine what data is needed to solve the problem? 2. How do you deal with your students who have not able to choose/determine what data is needed to solve the problem? 3. What is your opinion, what is the biggest obstacle for students to identifying the adequacy of data to solve problems? 4. In your opinion, what is the biggest obstacle for students in identifying the adequacy of data to solve problems? and how to solve it?
2. Making a mathematical model from a situation or daily problem and try to solve it	<ol style="list-style-type: none"> 1. Have you introduced/taught students about mathematical models? 2. According to you, how are the students' abilities in making mathematical models? 3. According to you, are students able to solve problems related to mathematical models? 4. If not, what is the biggest obstacle for students in making mathematical models of the given problems? How do you deal with this?
3. Choose and apply strategies to solve math problems or another problem	<ol style="list-style-type: none"> 1. Have you introduced problem solving strategies to students? 2. How have you introduced problem solving strategies to students? 3. According to your opinion, how are the students' abilities in choosing strategies to solve the given math problems? 4. In your opinion, how are the students' abilities in applying the strategies to solve the given math problems? 5. According to you, what strategies are most used by students in solving the given math problems?
4. Explaining or interpreting the results according to the original problem, and checking the correctness of the results or answers.	<ol style="list-style-type: none"> 1. In your opinion, how are the student's ability in explain or interpret the results according to the original problem given? 2. Does each student re-examine the answers they have written? If not how to solve it?
5. Applying mathematics meaningfully	<ol style="list-style-type: none"> 1. According to you, have the students understood the existing concepts, or are they just memorizing? 2. According to you, how is the student's ability to relate the information obtained to relevant new concepts? 3. According to you, how is the student's ability to solve problems different with examples given?

TABLE 2. Indicators and questions about scientific attitude

Scientific attitude aspect	Indicator	Questions
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Scientific attitude aspect	Indicator	Questions
Curiosity	<ol style="list-style-type: none"> 1. Enthusiastic listening the teacher's explanation about the teaching material 2. Enthusiastic in asking questions and looking for the answer 3. Enthusiastic to seek the answers of the given problems by the teacher 4. Enthusiastic reading any information which contained in the teaching materials 	<ol style="list-style-type: none"> 1. In your opinion, how are the attitude of the students when you give an explanation about the material being taught? If not, what do you do? 2. Do the students heedily and listen carefully to the explanation from the teacher? If not, what do you do? 3. Are students asking question about given problems by the teacher actively? 4. Are students seeking answers to the given problems by the teacher actively? how do they find the answers to these problems? 5. Do students read every information in the existing teaching materials? if yes, how did the teacher find out and if not, what did you do to overcome it?
Sceptic	<ol style="list-style-type: none"> 1. Do not believe in the information obtained immediately 2. Asking to every change or new things about the thought problem 3. Looking for the proof to support existing information 	<ol style="list-style-type: none"> 1. In your opinion, do students accept any information provided immediately? if yes, explain why and if not, what did you do to solve it? 2. In your opinion, did students seek additional evidence from the information they found? For example, looking for other reference sources?
Open-minded and cooperated	<ol style="list-style-type: none"> 1. Do not always feel right 2. Dare to changing opinions if the data found is lacking 3. Having tolerance or attitude highly 4. Participating in groups actively 	<ol style="list-style-type: none"> 1. In your opinion, did students want to listen the opinions of their friends? If yes, explain why, and if not, what did you do to overcome it? 2. In your opinion, what is the attitude of students in expressing their opinion if it turns out that their opinion is wrong? 3. In your opinion, did students participate in working on group assignments actively?
Optimistic	<ol style="list-style-type: none"> 1. Not give up in the face of any problem easily 2. Be confident in the face of a problem or situation 	<ol style="list-style-type: none"> 1. In your opinion, did students asking for help if they can't answer the given problem? If yes, how are you helping him? 2. When student be given an assignment, did the student answer all the questions? What are the results of their answers? 3. In your opinion, how did the attitude of students when asked to present the results of their work in front of the class?

RESULTS AND DISCUSSION

Teaching problem solving skills to students in mathematical learning is the biggest challenge for teachers. Students' problem-solving abilities can be seen from how students' ability to apply problem-solving steps from a problem their face [8]. The steps for solving the problem are understanding the problem, making a mathematical model of a problem, selecting, and implementing strategies to solve the problem, explaining/interpreting the results according to the original problem.

Understand the Problem

In solving a problem, especially a mathematical problem, the first step that must be done is to understand the problem. At the stage of understanding the problem, the ability to understand the problem is very decisive in the problem-solving process because if this stage students cannot understand the problem correctly, then they will have difficulty in the next step in the problem-solving process [4].

In this study, it was found that the activity of understanding the problem, in the opinion of the teacher, students still had difficulty in writing down what information was on the issue, this was based on information submitted by several teachers who stated that students still had difficulty in determining what information was known. and asked in the questions given. Examples of teacher statements about student difficulties at the stage of identifying the adequacy of data to solve problems are as follows.

Teacher 8 said that students confused about how to solve the problem and they don't know what data they need to solve the given problem. Then, according to teacher 6 that most students are lazy to read given problem so that student difficulties to understand the problem and Teacher 7's opinions that student's abilities to understanding the question still low.

This happens because students' ability to understand the problem is still lacking and also because students are lazy to read information from the question as a whole. This is in accordance with Glaser's statement [4] which states that students' understanding abilities and knowledge affect the process of understanding a problem. In addition, this fact can also occur because students in the learning process usually only remember not understanding concepts, so if they are asked to connect information on questions with possible concepts, students become confused [9]. The teacher's way of dealing with this is that the teacher provides examples of similar questions to train students' understanding and re-explains what is not yet known.

Make a Mathematical Model of a Problem

Creating / compiling a mathematical model of a problem is also called Representing the problem. This term can be interpreted as a translation or presentation of a problem in the form of a mathematical expression using appropriate mathematical notation and terms. Representing a problem is one of the important aspects that need to be considered in evaluating problem solving abilities because accuracy in representing problems is directly related to the ease of operation and finding solutions to a problem [10].

Then in the activity of making a mathematical model of a problem, based on information obtained from the teacher as a respondent, there are also have not able to make a mathematical model of a problem. The following is the teacher's statement from the question of how students' abilities in making mathematical models of given problem.

In the opinion of Teacher 3 and 7, student sometime difficulted in making mathematical models from the given problem. Contrary to them opinion, teachers 2, 4, and 6 say that students are pretty good in making mathematical models of the problems given, same as the opinion from teacher 1 and 5.

This condition happens because students do not understand at large what a mathematical model is. so that students have difficulty to making a mathematical model. This condition also occurs because teachers have not explained or taught about mathematical models to their students, so that information about a mathematical model which students received was not enough. Plus, students are also not very active in seeking additional information apart from the information they get from their teachers as a result. Students will have difficulty in solving problems related to mathematical modeling. The following is the teacher's response to the question of whether students are able to solve problems related to math problems.

Based on opinion from teacher 1, student be able to solve problems related to math problems but need some help in completing it. Almost the same as this opinion, teacher 2 said that students are able to solve the problem if they

trained continuously. Moreover, based on teacher 4's opinion, he said it's difficult to student be able to solve problems.

Choose and Implement a Strategy to Solve a Problem

After understanding the problem and making a mathematical model of a problem, the next step is to choose and apply a strategy to solve the problem. There are various strategies in solving problems, the strategies chosen and applied must be adapted to the problems to be solved.

Furthermore, in the activity of selecting and implementing strategies to solve a problem, it is also known that students are still difficult in choosing and determining problem solving strategies. The following is the teacher's statement about students' difficulties in choosing and implementing strategies to solve a problem.

Teacher 6 said: "Most of the students still have difficulty in choosing problem solving strategies for the given math problems". Same as this opinion, teacher 1 said that students are still having trouble to determine what problem-solving strategies will be used to solve given math problem.

This condition can occur because the teacher has not introduced to students any strategies in solving a problem, especially in learning mathematics, the teacher also has not taught how to choose the right solution strategy when faced with a certain type of problem. This can be seen from the teacher's statement about how they introduce problem solving strategies to students.

Teachers 1 and 3 said that the way they used is introducing step by step from problem solving strategies. In teacher 2 and teacher 4 opinion, they gave an example, then asking student to try another problem. Then, according to teacher 5 opinion, that his trying to teach the child slowly. Not much different from the previous opinion, teacher 6 said that her introduce the steps first and apply in solving problem.

In addition, the difficulty of students in choosing and implementing this strategy is because students still do not understand the problem and also do not understand the solution procedure [11]. However, before teaching students about problem-solving strategies, teachers must know and understand in advance about these strategies, because based on the results of trials, information is obtained that there are still many teachers who are not familiar with mathematical problem-solving strategies. The following is the teacher's answer to the question about what strategies are most used by students in solving the given math problems which indicates that the teacher still has not mastered the problem-solving strategies.

According to teacher 1, student answer the question directly without understanding the problem. In opinion from teacher 7 and 8, student making discussion. Based on teacher 10 opinion, says: "student solve simpler and similar problems, and teacher 6 said that students determining what they known and asking to them teacher.

Most of the answers the teacher gave were about the problem-solving process, and not the strategies used in solving a problem in mathematics.

Explain/Interpret the Results According to the Original Problem

At the last stage in a problem solving, namely explaining/interpreting the results according to the original problem. Based on the information obtained, it is known that there are also students who do not know how to explain the results obtained or in other words there are still many students who are wrong in concluding the answers to the problems they are working on. The following is an example of a teacher's statement about the ability of students to explain or interpret the results according to the original problem and check the correctness of the results or answers.

Teacher 1 explain that students are a little hard to explain the result according to original problem. Different opinion to teacher 4, which say that student pretty good to interpret the result. Forthemore students still can't explain in his own words. The explanation from teacher 9, student often misinterpret the result according to original problem.

This condition can occur because students are still not careful in reading information from the questions given and also the level of knowledge possessed by students is still low so that they have difficulty in providing solutions or interpreting the results according to the existing problems. This is in accordance with research conducted [12] where the results of the research state that a person's level of knowledge determines the ease of understanding problems, providing solutions from the settlement plans they make, and providing final conclusions from the problem-solving process. In addition, the low accuracy of students' mathematical calculations can also cause students to misinterpret the results they get because if students are wrong in their calculations, the answers they get will also be wrong [13]

In addition to the cognitive domain, namely problem-solving ability, there is an attitude domain that also plays an important role in achieving the objectives of learning mathematics. From several previous studies conducted on the domain of attitudes, it was found that there was a positive relationship between attitudes and students' cognitive abilities. In other words, this attitude domain is a supporter in developing students' cognitive abilities, especially in supporting students' problem-solving abilities. One aspect of attitude that is needed in supporting students' problem-solving abilities is scientific attitude. This scientific attitude consists of various aspects of attitude, but in this study only some aspects of attitude that are relevant to problem solving abilities are taken. The aspects of these attitudes are curiosity, skepticism, open-mindedness and cooperation, and optimistic attitude.

Curious Attitude

From the results of questionnaires and interviews with teachers, information was obtained that when the teacher explained the material in front of the class, not all students paid close attention to the teacher's explanation. Most of them are still indifferent to their teacher's explanation. so that when the teacher asks them to ask a question only a few of them ask. The following is a statement from the teacher about students' curiosity.

Teacher 9 describe that there are students who are listening, and some are not listening, if they don't listen, the teacher reprimand them by calling the student. In teacher 5's opinion, student partly listening to the teacher. Afterwards, in teacher 4 perception, students are less active when asked and answered the given question. Last, teacher 3's opinion that some students do not read the overall information from the teaching materials, so they have difficulty in answering questions.

The teacher occasionally reprimands the student and asks to pay close attention to the teacher's explanation. Then when the teacher asked most of them could not answer. In addition, when the teacher gives assignments to be done by students, not all students can do this, this happens because the students are less active in finding information to answer the problem, this fact is because students do not read all the information in the teaching materials.

This curious attitude is very important for students to have, because having this attitude can lead students to explore new ideas that will later assist in the problem-solving process [14].

Skeptic Attitude

Skepticism is a cautious attitude, which does not immediately believe in the opinions of others if there is not enough evidence to support the statement. Skepticism is needed by students so that students not only accept the information they hear, but they will find out what data supports the truth of the information. Based on the results of the study, it is known that there are still many students who take the teacher's explanation for granted, without asking further about what is conveyed by their teacher. The following is the teacher's statement about students' skepticism.

Teacher 2 quoth that Most students get the point what their teacher say for granted. Whit that teacher 4 said that student doesn't give any question again because students accept it. Same as the opinion from teacher 6 that say that student just accepted their explanation. This can happen because students really understand and understand the teacher's explanation, or because they pretend to understand even though they do not fully understand their teacher's explanation.

Open-Minded Attitude and Cooperation

In a classroom learning activity, students are not always asked by the teacher to do a task individually, there are times when the task must be completed by students in groups, the purpose of working in groups is to train students' ability to convey and receive opinions in a group, and also to train the cooperative ability of each member to solve the problems given by the teacher.

Working in groups is very important because it can help students be more diligent in solving problems than they work individually [14]. However, not all students are able to work in groups. Because everyone in a group has their own thoughts and characteristics. The differences in thinking and the nature of everyone must be overcome so that the function of the group can be carried out properly. The following is the teacher's explanation regarding the open-minded attitude and cooperation of their students.

In opinion from Teacher 1 and 10, students want to listen to their friends' opinions because they often study with peer tutors. A little different to teacher 1 and 10 opinion, teacher 2 speak that some students want to listen the ir

friend's opinions during group work, because they have been taught by them before. Teacher 6 quoth that when a student is wrong in expressing his opinion, the student feels embarrassed and does not want to contribute anymore in the group. Teacher 3 speak about the activity of students in groups, sometimes some students are just involved but not actively helping other group friends. Then, in teacher 4 opinion, there are students who are active in their groups and some only accept the opinions of other group. Teacher 8 talk that not all students active in groups, the way to overcome this is by randomly selecting students to present the results of their group work. Differently opinion from teacher 7, 5 and 9, they said that students are active in their groups.

Based on the results of the study, it was found that there were still many students who did not play an active role in doing their group assignments, this indicated that the students' cooperative attitude was still lacking. Whereas within a group, success in solving problems is that the group can build their representation to design domain-general and/or domain-specific strategies, develop solutions, and support them with quantitative and qualitative arguments [14]. For an open-minded attitude, almost all teacher responses indicate that the students' open-minded attitude is good enough because they are able to accept if their opinion is wrong and do not impose their own will.

Optimistic Attitude

Optimism is an attitude of always thinking positively in doing a job, confident and not giving up easily. So that by having this attitude, students do not easily give up in dealing with a problem and make it easy to give up in doing a job. An optimistic attitude is needed in the problem-solving process, especially in learning mathematics. Because by having this attitude, even difficult jobs will feel easier. This is in accordance with the opinion [15], which says that an individual must have self-confidence, not give up easily, and have a strong belief to be able to solve a problem. Based on the information obtained from the teacher, there are still students who lack an optimistic attitude in doing the tasks given by the teacher. This can be seen from the following teacher statement.

Teacher 1 describe that when students are given assignments, not all students answer the questions and when students put their worked in front of the class, they feel less confident and still shy. Forthemore, from teacher 6 explanation, when students feel confused about the questions given, they leave the questions or not answer the question. In teacher 3 opinion, students answer all the questions even though sometimes the answers are not always correct. Last, in perception from teacher 5, 7, and 8, some students answered all the questions given, and the results were quite good, the teacher and they were very confident when asked to present their work.

Based on the results obtained, that when students were given an assignment, there were still students who did not do all the questions, because the questions were difficult, so they gave up on doing them. This is in accordance with the statement that in the process of solving a problem there are two types of students, namely students who try to solve problems until they can and there are students who easily give up in solving problems. Then when students were asked to write down their answers in front of the class, there were still students who were not brave enough to convey their work, because they still felt embarrassed.

One way that teachers can use to practice problem-solving skills is by using various learning methods, especially by taking contexts that are close to the daily lives of students so that mathematics learning can be more meaningful [16]. As for the scientific attitude itself, it can be built by tendencies, adaptability, appreciation and expected values as highlighted by scientists in carrying out their duties [17].

CONCLUSION

Based on the results and discussions that have been described previously, it can be concluded that the problem-solving ability and scientific attitude of students in learning mathematics is still low, this happens not only because of factors from students themselves but also from teachers as educators. Factors from students themselves are in the form of lack of awareness and desire of students to learn, especially in seeking additional information or reading complete information to support their problem-solving abilities. While the factors that come from the teacher as an educator, before teaching students about problem solving and scientific attitudes to students, the teacher must first really understand everything related to the problem-solving ability itself and be able to find the right way to train it to their students. The teacher can use various learning methods which can make mathematics learning more meaningful. So that it can indirectly develop students' problem-solving abilities and scientific attitudes.

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