

ANALYSIS OF STUDENTS' MATHEMATICAL PROBLEM SOLVING ABILITY IN VIEW FROM SELF CONFIDENCE IN SPLDV MATERIAL ONLINE LEARNING

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ABSTRACT

This research is motivated by the achievement of students' mathematical problem solving abilities in schools which have not been achieved by all students and are classified as low. This study aims to determine how students' mathematical problem solving abilities are viewed from self-confidence in online learning in class VIII-7 SMP Negeri 2 Parung with SPLDV material. This research is a descriptive qualitative research. Data was collected using questionnaires, tests and interviews. The self-confidence categorization is based on the results of the student's self-confidence questionnaire and is categorized into three categories, namely students with high self-confidence, moderate self-confidence and low self-confidence. Meanwhile, to determine the students' mathematical problem solving ability is based on the results of tests and interviews. The research subjects were taken using purposive sampling technique and 3 research subjects were selected representing each category of self-confidence. Subject T with high self-confidence can follow indicators of mathematical problem-solving ability well, subject S with moderate self-confidence can follow indicators of mathematical problem-solving ability quite well and subject R with low self-confidence cannot follow indicators of mathematical problem-solving ability well. The conclusion of this study is that subject T with high self-confidence has excellent mathematical problem-solving abilities, subject S with moderate self-confidence has sufficient mathematical problem-solving abilities and subject R with low self-confidence has poor mathematical problem-solving abilities.

Keywords: Mathematical Problem Solving Ability, Self Confidence, Online Learning, SPLDV.

INTRODUCTION

In the life of every individual will be faced with a challenge, especially to achieve success. Every individual is required to be able to complete every challenge, even though it is not an easy thing. Learning mathematics has its own challenges for students and teachers. In the 4.0 era, with rapid technological advances, it can support abstract mathematics learning. Technology can provide students with interesting and accessible learning experiences anytime, anywhere.

The use of technology in teaching and learning activities has been increasingly used since the letter issued by the Minister of Education and Culture number 4 of 2020 concerning policies for implementing education during the emergency spread of Covid-19. Implementation of teaching and learning activities changed from at school to at home. Currently students are doing online learning (Pohan, 2020).

Even though mathematics learning is currently carried out online, you still have to pay attention to the goals of learning mathematics. One of the objectives of learning mathematics is to equip students with problem-solving skills which include the ability to understand problems, design mathematical models, complete models and interpret solutions obtained (Permendiknas Number 22 of 2006). It can be concluded that in learning mathematics students are equipped with problem solving abilities which are important things and the purpose of learning mathematics.

This research was conducted at Parung 2 Public Middle School, which is located at Jalan Balai Desa Jabon Mekar, Parung District, Bogor Regency, in the even semester of the 2021/2022 academic year. More precisely on March 21-May 18 2022. The research was conducted in class VIII-7 with a total of 42 students. The mathematics subject matter used in this research is a system of two-variable linear equations in class VIII of the odd semester.

This research uses descriptive qualitative research, namely research data in the form of words, pictures and not in the form of numbers and is presented in the form of words according to the original (Abdussamad, 2021: 84). Research on Analysis of Students' Mathematical Problem Solving Ability in terms of Self Confidence in Online Learning SPLDV material is relevant using descriptive qualitative research because it fits the characteristics of qualitative research, especially in terms of in-depth data disclosure.

There are several stages in conducting research, namely the researcher distributes self-confidence questionnaires to students in class VIII-7. From the self-confidence questionnaire, researchers will categorize class VIII-7 students into three categories, namely students with high self-confidence, students with moderate self-confidence and students with low self-confidence. Furthermore, the researchers chose research subjects by purposive sampling to take 1 subject from each category of self-confidence (Andayani dan Amir, 2019). The 3 students who were the subject of the study were given a test of their mathematical problem-solving ability in the form of 5 descriptive questions and were then interviewed by the researcher.

Data collection techniques in this study used questionnaires, tests, interviews, and documentation. Researchers use the triangulation method to get data that is truly valid. Triangulation techniques were used in this study, which means that researchers used different data collection techniques to obtain data from the same source (Sujarweni, 2014).

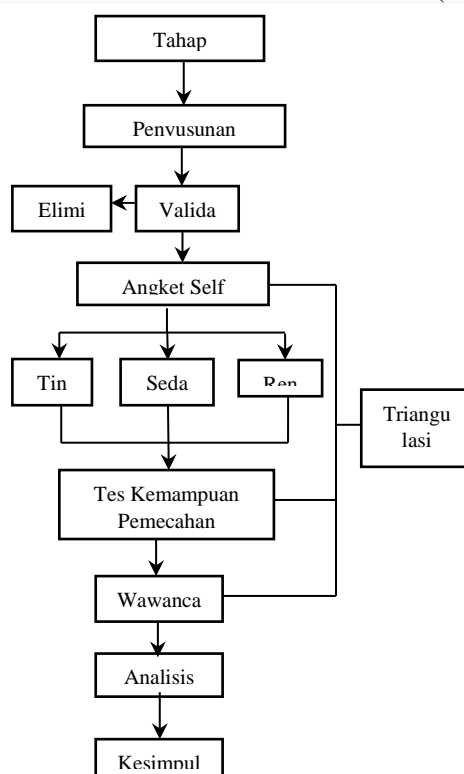


Figure 1. Research Design

THEORITICAL REVIEW

Problem solving is a planned process that needs to be implemented in order to obtain a certain solution to a problem that may not be obtained immediately (Saad and Ghani, 2008). Several definitions of problem solving can be summed up as follows:

1. Problem solving ability is a common goal of teaching mathematics, even as the heart of mathematics.
2. Problem solving includes methods, procedures, and strategies which are the main and core processes in the mathematics curriculum.
3. Problem solving is a basic ability in learning mathematics. When solving math problems, students are faced with several challenges such as difficulties in understanding the problem. This is because the problems faced are not problems students have faced before.

There are four stages of problem solving namely:

1. understand the problem,

The first stage in problem solving is understanding the problem. Students need to identify what is known, what is there, amounts, relationships and related values and what they are looking for. Some suggestions that can help students understand complex problems: (1) ask questions about what is known and sought, (2) explain the problem according to their own sentences, (3) relate it to other similar problems, (4) focus on the part important part of the problem, (5) develop models, and (6) draw diagrams.

2. plan the solution,

Students need to identify the operations involved as well as the strategies needed to solve a given problem. This can be done by students in ways such as: (1) guessing, (2) developing a model, (3) sketching diagrams, (4) simplifying problems, (5) identifying patterns, (6) making tables, (7) experiments and simulation, (8) working in reverse, (9) testing all possibilities, (10) identifying sub-objectives, (11) making analogies, and (12) sequencing data/information.

3. implement the plan,

What is implemented obviously depends on what has been planned beforehand and also includes the following: (1) interpreting the information given in a mathematical form; and (2) implement the strategy during the ongoing process and calculations. In general, at this stage students need to maintain the plan that has been chosen. If such a plan cannot be carried out, then students can choose another method or plan.

4. check again

The following aspects need to be considered when re-checking the steps that were previously involved in solving the problem, namely: (1) re-checking all the important information that has been identified; (2) check all calculations that have been involved; (3) consider whether the solution is logical; (4) see other alternative solutions; and (5) read the questions again and ask yourself whether the questions have actually been answered. (Polya, 1973:5).

Meanwhile, according to Krulik and Rudnick (Saad and Ghani, 2005), there are five stages that can be carried out in solving the problem, namely as follows:

1. Read. Activities carried out by students at this stage are to record key words, ask other students what is being asked in the problem, or restate the problem in language that is easier to understand.
2. Exploring. This process includes searching for patterns to determine the concept or principle of the problem. At this stage students identify the problem given, present the problem in an easy-to-understand way. The question used at this stage is, "what kind of problem is this"? At this stage drawing or making tables is usually carried out.
3. Choose a strategy. At this stage, students draw conclusions or make hypotheses about how to solve the problems encountered based on what has been obtained in the first two stages.

4. Solve the problem. At this stage all mathematical skills such as counting are carried out to find an answer.
5. Review and discuss. At this stage, students check their answers again and see variations of how to solve the problem.

Giv Meanwhile, Dewey (Saad and Ghani, 2005) states the level of problem solving is as follows:

1. Confront problem, that is feeling a difficulty. This process can include realizing the unknown, and being frustrated at the ambiguity of the situation.
2. Define problem, namely clarifying the characteristics of the situation. This stage includes activities of specifying what is known and what is unknown, finding goals, and identifying standard and extreme conditions.
3. Inventory of several solutions, namely finding a solution. This stage can include activities to pay attention to patterns, identify steps in planning, and choose or find algorithms.
4. Conjecture consequence of solution), namely making a plan based on the alleged solution. Such as using existing algorithms, collecting additional data, conducting needs analysis, reformulating the problem, trying out similar situations, and getting results (answers).
5. Test concequences), namely testing whether the definition of the problem fits the situation. This stage may include evaluating whether the hypotheses are appropriate?, are the data used correct?, is the analysis used appropriate?, is the analysis appropriate to the type of data that exists?, are the results reasonable?, and are the plans used applicable? in another matter?

The importance of mathematical problem solving skills which are the goals of learning mathematics, these goals have not been achieved properly. This can be seen in the initial observation activities when interviewing a class VIII mathematics teacher at SMP Negeri 2 Parung. The implementation of learning at SMP Negeri 2 Parung uses online learning which is considered by the teacher to be not as effective as face-to-face learning. The researcher found that class VIII students had difficulty with the SPLDV material. Students feel that SPLDV material is difficult, so students feel confused when working on questions and the achievement of students' mathematical problem solving abilities in SPLDV material has not been achieved by all students.

Research by Putra, Putri, Fitriana, and Andayani (2018) found results for 35 students in one of the junior high schools who were given a test of mathematical problem solving abilities, indicating that students' mathematical problem solving abilities were still low. The percentage of errors that students make at the stage of understanding the problem is 60% and is included in the very high criteria.

Self-confidence is a belief that someone has that can be seen from behavior, emotions and even from beliefs. God created man with common sense. Humans have the greatest asset, namely the brain. Where in the brain has an extraordinary control system. When the brain is able to be processed properly, it will bring positive changes to its owner and to other people. Humans have the ability to process information. The ability to "process" is what will give birth to many forms. One of them gave birth to perception (defining/interpreting/assuming). There are also many results of perception, one of which is self-confidence. To cultivate mathematical problem-solving abilities, a student must have self-confidence and believe in one's own competence, so that one is free from anxiety and doubt. One of the competencies in learning mathematics that students need to achieve is having curiosity, enthusiasm for continuous learning, self-confidence, and interest in mathematics and having confidence in the power and usefulness of mathematics, which is formed through learning experiences (Permendikbud Number 21 of 2016).

According to Lauster (Andayani and Amar, 2019), self-confidence is the confidence that a person has in his abilities, talents, potential, without worrying and worrying about other people. Where people who have self-confidence will carry out activities and desires freely and take full responsibility for what they do.

So it can be concluded that self-confidence is a feeling of confidence in one's own abilities which includes a good assessment and acceptance of oneself as a whole, acting in accordance with what is expected of others so that individuals can be accepted by other people and their environment. This acceptance includes physical and psychological acceptance. Behavior that demonstrates a belief in one's abilities and self-assessment that often appears in a variety of situations to produce superior performance.

Daring is the meaning of the term online. Conversely, the term offline in Indonesian is offline. These two terms have recently been widely heard. Especially to mention whether an activity is carried out in person or virtually. The term online is often used after the onset of the COVID-19 pandemic. This article will explain more fully what online is and what are the differences from offline learning. According to the Central Ministry of Education and Culture's KKBI, online learning is a learning activity that is connected to the internet network. Learning activities, teaching, collecting assignments, and teacher-student interactions take place without face to face.

In this case the competency that students need to have is self confidence. If the student's self-confidence is good, the student will be successful in mathematics. The goal to be achieved in this study is to describe how students' mathematical problem-solving abilities are viewed from self-confidence in online learning SPLDV material.

DISCUSSION

The research was conducted at Parung 2 Public Middle School with online learning. The researcher determined class VIII-7 for the 2021/2022 academic year even semester as a research class. The number of students in class VIII-7 is 42, with 21 boys and 21 girls. The research implementation went through three stages, the first stage was giving a self-confidence questionnaire to find out and categorize students' self-confidence.

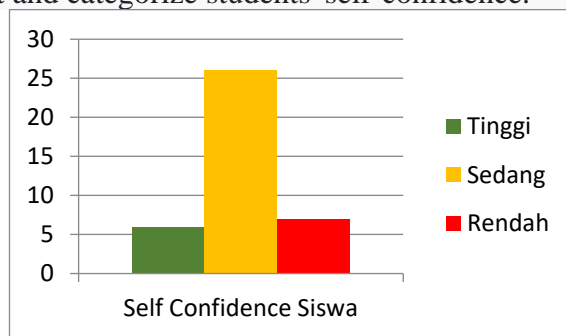


Figure 2. Data on students' self-confidence questionnaire results.

Of the 42 students in class VIII-7, only 39 students filled out the self-confidence questionnaire. High self-confidence of 6 students, moderate self-confidence of 26 students and low self-confidence of 7 students. From the three categories of self confidence, 1 student will be taken from each category by means of purposive sampling to work on a test of mathematical problem solving ability in SPLDV material (Salamah, 2019).

Table 1. Category of student self-confidence assessment

Kategori	Keterangan
$x \geq (\bar{x} + SD)$	Tinggi

$(\underline{x} - SD) < x < (\underline{x} + SD)$	Sedang
$x \leq (\underline{x} - SD)$	Rendah

Table 2. List of research subjects

No	Nama	Skor	Nilai	Kategori
1.	ARRS	67	83,75	Tinggi
2.	LS	53	66,25	Sedang
3.	AS	47	58,75	Rendah

The next stage is filling out the mathematical problem solving ability test, each subject is given certain codes. Subjects who have high self-confidence are represented by code T, subjects who have moderate self-confidence are represented by code S, and subjects who have low self-confidence are represented by code R.

Table 3. Mathematical problem solving ability test grid

Indikator Kemampuan Pemecahan Masalah Matematis	Indikator Pencapaian Kompetensi	No Soal
Mengidentifikasi unsur-unsur yang diketahui, ditanyakan, dan kecukupan unsur yang diperlukan	Mengidentifikasi sistem persamaan linear dua variabel. Menyelesaikan masalah yang berkaitan dengan sistem persamaan linear dua variable	1
Merumuskan masalah matematis atau menyusun model matematis.	Membuat model matematika yang berkaitan dengan SPLDV. Menyelesaikan masalah yang berkaitan dengan sistem persamaan linear dua variable	2
Memilih dan menerapkan strategi untuk menyelesaikan masalah matematika atau diluar matematika.	Menentukan selesaian SPLDV dengan grafik, substitusi, dan eliminasi. Menyelesaikan masalah yang berkaitan dengan sistem persamaan linear dua variabel	3
Menjelaskan atau menginterpretasi hasil sesuai permasalahan asal serta memeriksa kebenaran hasil atau jawaban.	Menyelesaikan masalah yang berkaitan dengan sistem persamaan linear dua variabel.	4
Menerapkan matematika secara bermakna.	Menyelesaikan masalah yang berkaitan dengan sistem persamaan linear dua variabel	5

Table 4. Mathematical problem-solving ability test questions

No	Soal
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- 1 Diketahui keliling sebuah tempat pensil yang berbentuk persegi panjang sama dengan 64 cm. Jika lebar tempat pensil tersebut adalah 14 cm lebih pendek dari panjang tempat pensil tersebut, maka berapakah panjang dan lebar tempat pensil tersebut.
- 2 Di dalam sebuah kandang peternakan milik Pak Budi terdapat sapi dan ayam, total jumlah kaki kedua hewan tersebut adalah 52. Jika total jumlah sapi dan ayam sebanyak 18 ekor di kandang tersebut. Berapakah jumlah masing-masing sapi dan ayam milik Pak Budi?
- 3 Pak Ahmad memiliki seorang anak perempuan. Umur Pak Ahmad dan anak perempuannya selisih 35 tahun, sedangkan lima tahun yang lalu jumlah umur keduanya adalah 45 tahun. Hitunglah umur Pak Ahmad dan anak perempuannya tiga tahun yang akan datang.
- 4 Reza dan Taufiq bekerja di sebuah toko furnitur, dalam sehari Reza dapat membuat 4 buah meja dalam sejam dan Taufiq dapat membuat 3 buah meja dalam sejam. Jumlah jam kerja Reza dan Taufiq adalah 16 jam sehari dengan jumlah meja yang dibuat oleh keduanya adalah 55 meja. Jika jam kerja keduanya berbeda, tentukan jam kerja mereka masing-masing.
- 5 Tarif tiket masuk ke tempat wisata pantai Anyer di Banten untuk dua orang dewasa dan tiga orang anak-anak adalah Rp28.000,00 dan untuk tiga orang dewasa dan empat orang anak-anak adalah Rp40.000,00. Jika sepasang suami istri dan dua orang anaknya akan berpergian ke tempat wisata pantai Anyer, berapakah total harga tiket yang harus mereka bayar?

In the last stage the researcher conducted interviews with the research subjects. Interviews were conducted via WhatsApp and Zoom. This is due to the condition of the research subject's telephone network. The researcher submitted interview questions in accordance with the interview guidelines and used non-formal language. This was intended so that the research subjects could be communicative and the researcher could find out more information about students' mathematical solving abilities in online learning SPLDV material. The following is a discussion of students' mathematical problem solving abilities.

1. Students with high self confidence

- a. Subject T was able to identify the elements in the question well. Every time you work on subject T, you always start by identifying the problem. Subject T wrote down the information contained in the question.
- b. Subject T constructs a mathematical model by first making an example (writing down an algebraic form) from the elements in the question. Next, subject T made a system of two-variable linear equations.
- c. Subject T chooses and implements a strategy by estimating from the problem, it is easier to use what strategy to solve it. Subject T was able to solve all the questions correctly, because subject T worked on the questions according to the method applied and was careful when calculating.
- d. From the results of interviews subject T can explain the completion steps to researchers. After finishing answering the questions, subject T re-checked his answers by glancing at them and there were several questions that subject T recalculated.
- e. Subject T can relate the knowledge that subject T already has to solve some new problems.

2. Students with moderate self-confidence

- a. Subject S started the first step of answering the questions by identifying the elements in the questions. However, subject S cannot include the elements contained in the question properly. Because subject S incorrectly entered the data in the question and did not include all the information in the question.
 - b. At this stage subject S formulates a mathematical problem by making an example by writing an algebraic form. Next, subject S makes the SPLDV from the example. At this stage there are several questions that have not been formulated correctly by subject S. Subject S was not careful when working on the questions and did not write down the data in the questions properly.
 - c. Subject S could not explain the reason why he chose and applied a method to do the problem. Subject S did not complete all the questions correctly, because there were incorrect answers. Subject S worked on the questions according to the method applied. However, it is less precise, such as writing wrong calculation operations and calculating wrongly.
 - d. Subject S can explain the steps for solving it to the researcher, even though it is halting. After finishing answering the questions, subject S only rechecked some of his answers by recalculating and looking back at his answers.
 - e. At this stage subject S tends not to remember whether this test item has anything to do with what subject S has learned. However, subject S remembered that in the previous lesson he had learned to make an analogy (write down an algebraic form) and connected it with a test item.
3. Students with low self-confidence
- a. Subject R did not follow the first indicator, namely identifying the elements that were known, asked and the adequacy of the elements needed.
 - b. Subject R begins work on the problem by formulating a mathematical problem. However, the formulation of the problem made by subject R is not all correct.
 - c. Subject R tends to choose and apply the substitution method to work on the questions.
 - d. Subject R could not explain the completion steps to the researcher. After finishing answering the questions, subject R did not prove the answer. Subject R did not understand SPLDV material, so subject R had difficulty getting solutions to these problems.
 - e. At this stage subject R does not know whether this test item has anything to do with what subject R has learned.

Table 5. The test results of the research subject's mathematical problem solving abilities

Nama	Kode	Total Skor	Nilai	Kategori
ARRS	T	49	98	Sangat Baik
AS	R	12	24	Rendah
LS	S	29	58	Cukup

Table 6. Categories of Mathematical Problem Solving Ability

Nilai	Kategori
81-100	Sangat Baik
61-80	Baik
41-60	Cukup
0-40	Kurang

Sumber : Modifikasi Arikunto dalam Mariani dan Susanti (2019:18)

CONCLUSION AND CLOSING

Subject T with high self-confidence category is able to work on all the questions with correct and coherent answers following the indicators of mathematical problem-solving ability. Subject T has very good mathematical problem solving abilities. Subject S with moderate self-confidence has adequate mathematical problem-solving skills and is quite good at following indicators of mathematical problem-solving abilities. R subjects with low self-confidence have less ability to solve mathematical problems. Subject R is lacking in following indicators of mathematical problem solving ability. Because subject R does not believe in his abilities and tends to work on questions that are not optimal.

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