Journal of Mathematics Education
Website: http://usnsj.id/index.php/JME
Email: pengelolajme@gmail.com
p-ISSN 2528-2468; e–ISSN 2528-2026

DOI: https://doi.org/10.31327/jme.v8i2.1969

SPLDV QUESTION SOLUTION PROFILE OF MTs AL-KHAIRAT TOMINI STUDENTS BASED ON STUDENT LEARNING STYLE

Raiyan*[1], Sukayasa[2], Anggraini[3], I Nyoman Murdiana[4]
[1,4] Universitas Tadulako

Article Info

Article history:

Received Jun 23, 2023
Revised Aug 14, 2023
Accepted Dec 24, 2023

Keywords:

Profile
Problem Solving,
System of Linear Equations in Two Variables

ABSTRACT

This research aims to obtain a description of the problem-solving profile of two-variable linear equation systems of MTs Al-Khairat Tomini students based on the student's learning styles. This type of research is qualitative. The subjects of this research were three students in class VIII B MTs Al-Khairat tomini, each consisting of one student with visual, auditory, and kinesthetic learning styles. Data on student problem-solving was obtained from written tests and interviews. This research shows that the subject (IN) carries out the problem-solving plan by the solution plan questions, and the subject did not recheck the problem-solving because he did not understand how to do it. The subject (MA) carries out the problem-solving plan by the problem-solving plan, and the subject can check and solve questions by checking the written answers again.

Corresponding Author:

Raiyan
Departement of Mathematics Education,
Universitas Tadulako, Indonesia
Email: raiyanisran36@gmail.com
Phone Number: 081356412296

How to Cite:

Raiyan, etc.. (2023). SPLDV Question Solution Profile of MTS Al-Khairat Tomini Students Based on Student Learning Style. JME:Journal of Mathematics Education, ***8***(2), 250-259

1. INTRODUCTION

Mathematics is a branch of science that plays an important role in human life, both in knowledge and technological development. Therefore, mathematics is one of the subjects that must be taught at every level of education, from elementary school, middle school, high school to college. (Suningsih & Istiani, 2021)revealed that the skills resulting from studying

mathematics create skills for systematic logical thinking, innovation, creativity, etc. which are the basis for creating innovations in the development of science and technology.

One of the objectives of learning mathematics in the 2013 Curriculum as contained in the Attachment to Minister of National Education Regulation No. 58 of 2014 in the mathematics subject guidelines is to understand mathematical concepts, which is a competency in explaining the relationship between concepts and using concepts and algorithms in a flexible, accurate, efficient and precise manner in solving problem.

In line with the general learning objectives, the National Council of Teacher Mathematics or abbreviated as NCTM in(Ihsanudin & Rafianti, 2022)stated that there are 5 process standards in learning mathematics, in these five standards, namely mathematical connections, mathematical communication reasoning, mathematical proof, and problem solving. This statement makes it clear that someone who solves questions or problems is very necessary for a mathematics learning goal.

There are several experts who put forward problem solving steps, one of which, according to Krulik and Rudnick, is (1) reading; (2) explore; (3) choosing a strategy; (4) Completion; (5) review and discuss. Krulik and Rudnick are deep (Budiarti & Lestariningsih, 2018) stated that problem solving is a method that someone uses knowledge, skills and understanding to meet the demands of students who do not routinely. Indicators for solving mathematics problems according to Sumarmo (2003) are: (a) identifying the elements that are known, what is being asked and the adequacy of the elements required; (b) formulate mathematical solutions or construct mathematical models; (c) apply strategies to solve various problems (similar and new problems) within or outside mathematics; (d) explain or interpret the results of solutions using mathematics in a meaningful way.

Based on the results of research conducted by Andreas in(Budiarti & Lestariningsih, 2018),When students solved math problems, it was found that there were students who showed very good abilities in solving math problems, there were students who showed mediocre abilities and there were students who experienced difficulties, especially in the material on systems of linear equations in two variables.In the opinion of Andreas (2013), most students write down systematic steps to solve questions, namely starting by writing down what is known, asking questions and then solving the problem. Even though they show similarities in writing down the steps in solving systematic problems, they are seen in terms of identifying things that are known and asked about a problem which have implications for differences in solving problems.

Ruseffendi in(Budiarti & Lestariningsih, 2018) posing a question is a question for students who have the knowledge and ability to solve it. On another occasion Ruseffendi was in(Budiarti & Lestariningsih, 2018)also stated that a problem is a problem for students if first, the problem is unknown to them. Second, students must be able to solve it, both in mental readiness and knowledge, regardless of whether the student finally arrives at the answer or not. Third, something is a solution to the problem for him, if the student has the intention to solve it.

Based on the explanation above put forward by experts, it can be concluded that by looking at the problem solving, researchers can find out how students work on questions using the knowledge, skills and understanding possessed by students and by looking at problem solving, researchers do not only see the results obtained by students but also see the students' steps in answering the question.

Students as unique individuals certainly have their own characteristics. Because one another has differences in various aspects, especially in the learning process. One of them is the difference in ability to understand, absorb and process information. According to De Porter in(Zagoto, et al, 2019)A person's learning style is a combination of these abilities.

With so many student learning styles, it should be a reference for a teacher to develop students' thinking abilities so that the learning provided is appropriate to the students' conditions. As stated by Martinez-pons (2001: 7) in the psychology of teaching and learning, in a lesson the teacher must carry out the initial phase of learning, namely the stage where a teacher knows and understands the initial abilities possessed by his students. One of the initial abilities here is knowing the student's learning style so that the teacher can know the right learning strategy to overcome the mistakes made by students in solving problems on systems of linear equations in two variables in terms of their learning style.

Based on the results of information with one of the mathematics teachers at MTs Al-Khairat Tomini, it was revealed that students still experienced difficulties when deciphering the form of the problem so they had difficulty finding the solution. This makes student learning outcomes lower. With the various learning styles that students have and the varied ways of solving questions by students, a more detailed description of how to solve questions by students from various learning styles is needed.

2. METHOD

This research approach method is a qualitative descriptive approach. This research was carried out at MTs Al-Khairat Tomini, Tomini sub-district, Parigi Moutong district, Central Sulawesi province. This research was carried out in the even semester of the 2022/2023 academic year. The selection of subjects in this research was based on the results of the student learning style questionnaire given by the researcher. The questionnaire is given to find out what type of learning style the students have. In the learning style questionnaire there are 20 illustrations with three answer choices, where answer choice A shows the visual learning style type, answer choice B shows the auditory learning style type and answer choice C shows the kinesthetic learning style type.

Based on the results of the learning style questionnaire for class VIII B students at MTs Al-Khairat Tomini with a total of 22 students, it was found that there were 15 students with a visual learning style, 3 students with an auditory learning style and 4 students with a kinesthetic learning style. Next, the researcher took one subject from each student's learning style by asking for advice from the Mathematics teacher of the class to be studied.

Based on joint considerations with the mathematics teacher, 3 research subjects were obtained with each learning style presented in

Table 1. Research subject

Student Name Initials	Types of Learning Styles
IN	Visual
M.A	Auditory
MR	Kinesthetic

After determining the research subject, the researcher then carried out data collection. Data collection was carried out in the teacher's office where questions were given and completed, then continued with interviews. And test data credibility using time triangulation. Time triangulation was carried out by giving two tests, namely problem 1 and problem 2at different times to research subjects. To check the data, this was done by re-administering the problem-solving test with the same type of questions and using the same interview. Then the data for problem 1 and problem 2 were compared to see the subject's consistency in answering the questions that had been given.

3. RESULTS AND DISCUSSION

3.1. Results

Based on the description of the research results, the problem-solving profile of a system of linear equations in two variables of MTs Al-khairat Tomini students is discussed based onstudent learning styles. The questions used in this research are as follows:

1. Anisa bought notebooks and pencils, it is known that the price of 4 notebooks and 2 pencils was IDR 13,000.00, while the price of 3 notebooks and a pencil was IDR 9,000.00. What is the price if Anisa buys 5 notebooks and 2 pencils?
2. Alya bought an eraser and ruler, it is known that the price of 2 erasers and 3 rulers was Rp. 6,000.00, while the price of 4 erasers and 2 rulers was Rp. 8,000.00. What is the price if Alya buys 3 erasers and 2 rulers?

Figure 1. Student Work Result (IN)

Based on the presentation of answers and interview results at the stage of understanding the questions, a description was obtained that IN stated in writing the information known from the question (Figure 1), IN stated verbally the information understood from the question, IN explained the information that was known and was asked, IN stated the existing information enough to answer what is asked in the question.

Based on the presentation of IN's interview results at the planning stage for solving the problem, a description was obtained that IN made an example with the symbols x and y to show "price", IN made a mathematical model for the equation based on what was known from the problem, and IN wanted to solve the problem using a combined method (elimination and substitution)

Based on the presentation of IN's answers and interview results at the stage of implementing the problem solving plan, a description was obtained that IN implemented the problem solving plan in accordance with the planning stage for solving the questions. Namely making examples, creating mathematical models in the form of equations, eliminating and substituting.

Based on the presentation of IN's interview results at the stage of re-checking the problem solving, it was obtained that IN was sure of his answer, IN looked again at the answer that had been written, IN did not understand how to prove or double-check whether

his answer was correct, and IN concluded that the price of 5 notebooks and price for 2 pencils 15,500.

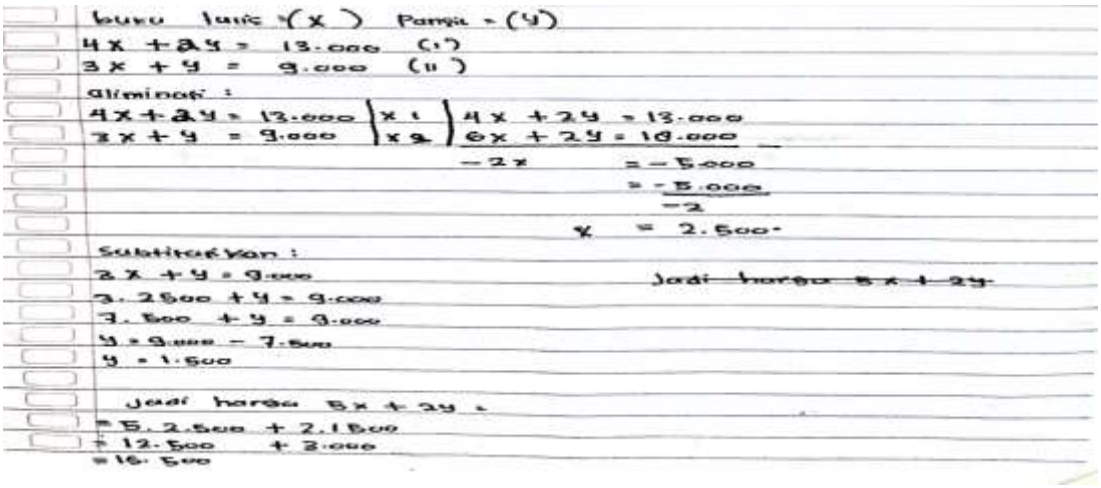

Figure 2. Student Work Result (MA)

Based on the presentation of the results of MA's interview at the stage of understanding the question, a description was obtained that MA stated verbally the information understood from the question, MA stated verbally the information asked about in the question, and MA stated that the information was sufficient to answer what was asked in the question.

Based on the presentation of the results of MA's interview at the planning stage for solving the problem, a description was obtained that MA wanted to make an example by using x and y to show "price", MA wanted to make a mathematical model in the form of an equation, and MA wanted to solve the problem using a combined method.

Based on the explanation of the answers and results of the MA interview at the stage of implementing the problem solving plan, a description was obtained that the MA was carrying out the problem solving plan in accordance with the planning stage for solving the questions. Namely making examples, creating mathematical models in the form of equations, eliminating and substituting.

Based on the presentation of the results of MA's interview at the stage of re-checking the problem solving, a description was obtained that MA was confident in his answer, MA knew how to prove or check whether his answer was correct, and MA concluded that the price of 5 notebooks and 2 pencils was 15,500.

Figure 3. Student Work Result (IN)

Based on the presentation of MR's interview results at the stage of understanding the questions, a description was obtained that MR stated verbally the information he understood from the questions, and MR stated that the information was sufficient to answer what was asked in the questions.

Based on the presentation of MR's interview results at the planning stage for solving the problem, a description was obtained that MR wanted to make an example using x and y symbols, MR wanted to make a mathematical model in the form of an equation, and MR wanted to solve the problem using mixed methods.

Based on the presentation of MR's answers and interview results at the stage of implementing the problem solving plan, a description was obtained that MR implemented the problem solving plan in accordance with the planning stage for solving the questions. Namely making examples, creating mathematical models in the form of equations, eliminating and substituting.

Based on the presentation of MR's interview results at the stage of re-checking the problem solving, a description was obtained that MR was sure of his answer, MR looked again at the answer he wrote, MR knew how to prove or check whether his answer was correct, and MR concluded that the price of 4 notebooks and 2 pencils was 13,000, and the price of 3 notebooks and a pencil costs 9,000, and the price of 5 notebooks and 2 pencils costs 15,500.

3.2.Discussion

Below we will discuss the results of the research previously explained regarding students' SPLDV problem solving profiles in terms of students' learning styles. The discussion can be explained as follows.

1. Visual Learning Style (IN) Subject Problem Solving Profile

At the stage of understanding the question, the visual learning style (IN) subject states in writing on the answer sheet the information known from the question, states the information orally the information understood from the question, explains the information known and is asked about from the question, states that the information from the question is sufficient to answer the question. This shows that students with a visual learning style (IN) can understand the questions given. This is in line with opinionUlfiana (2023) that students who have a visual learning style can write down the information they know and are asked about from the questions in a neat and orderly manner and can explain the information contained in the questions completely. And (Boneva & Mihova, 2011)states that visual people have characteristics, one of which is attention to detail. This means that visual students are careful about what they are doing so that when working on problems, visual students are able to understand the concepts written down by rewriting what they know and asking questions.

At the planning stage of solving visual learning style (IN) subject questions, you want to create an example with the symbols x and y to create a mathematical model in the form of an equation based on what is known from the problem given, then use a combined method (elimination-substitution) to obtain the values of x and y. This is in line with the opinion (Rahmatica. et al, 2022)that students are able to sort information. This is as stated by (Boneva & Mihova, 2011), one of the characteristics of students with a visual learning style is good planning, which allows students with a visual learning style to be able to make good solution plans.

At the stage of implementing the problem solving plan, visual learning style (IN) subjects carry out the problem solving plan in accordance with the problem solving planning

stage. IN's steps at the stage of implementing the problem solving plan are as follows: (1) Make an example with x and y symbols to create a mathematical model in the form of an equation and write it on the answer sheet; (2) Create a mathematical model in the form of an equation based on what is known and write it on the answer sheet; (3) Create two new equations by multiplying equation (1) by number 1 and equation (2) by number 2 to obtain a new equation. From the two new equations IN eliminates the variable y by subtracting the two new equations to obtain the value of the variable x, and write it on the answer sheet; (4) Substitute the value of the variable x into equation (2) to obtain the y value and write it on the answer sheet.

At the stage of re-checking the problem solving, the visual learning style (IN) subject is sure of the answer by looking back at the written answer, does not re-check the answer because he does not understand how to prove or check whether the answer is correct, and can conclude the final result obtained. This is in line with opinion(Satria S, U, & Budiono, 2022) that subjects with a visual learning style can only go through three stages, namely the stage of understanding the problem, making a problem solving plan, and carrying out problem solving, in the fourth stage, namely checking again. The subject only works according to the plan he has planned without double-checking the steps he has taken.

2. Problem Solving Profile for Auditory Learning Style Subjects (MA)

At the stage of understanding the question, the auditory learning style (MA) subject verbally states the information understood from the question, states the information asked for in the question, and states that the information from the question is sufficient to answer the question. This shows that MA can understand the questions given. This is in line with the opinion of Ulfiana (2023) that students can explain well and completely the information they know and are asked about from the question, however, they do not write it on the answer sheet.

At the planning stage for solving problems in the auditory learning style (MA) subject, you want to make an example with x and y symbols to create a mathematical model in the form of an equation and use a combined method (elimination-substitution) to solve the problem. This is in line with opinion (Rahmatica. et al, 2022) that students are able to sort information.

At the stage of implementing the problem-solving plan, auditory learning style (MA) subjects carry out the problem-solving plan in accordance with the problem-solving planning stage. MA's steps at the stage of implementing the problem-solving plan are as follows: (1) Make an example with x and y symbols and write them on the answer sheet; (2) Create a mathematical model in the form of an equation based on information from the question, and write it on the answer sheet; (3) Create two new equations by multiplying equation (1) by number 1 and equation (2) by number 2 to obtain a new equation. From the two new equations MA eliminates the variable y by subtracting the two new equations to obtain the value of the variable x, and write it on the answer sheet; (4) Substitute the value of the variable x into equation (2) to obtain the y value and write it on the answer sheet.

At the stage of re-checking the problem solving, the auditory learning style subject (MA) is sure of the answer by looking back at the written answer, (MA) knows how to prove whether the answer is correct by re-checking the answer, and can conclude the final results obtained. This is in line with opinionJannah (2022)in his research stated that when re-checking the answers, students can conclude the answers to the questions given and are confident that the answers they get are correct based on repeated and as good re-checking as possible.

3. Problem Solving Profile for Kinesthetic Learning Style (MR) Subjects

At the stage of understanding the problem, the kinesthetic learning style (MR) subject verbally states the information understood from the problem, states the information asked for from the question, and states that the information from the question is sufficient to answer the question. This shows that MR can understand the questions given. This is in line with the opinion of Ulfiana (2023) that students are able to explain well and completely the information they know and are asked about from the question, however, they do not write it on the answer sheet.

At the planning stage for solving problems in the kinesthetic learning style (MR) subject, you want to make an example with x and y symbols to create a mathematical model in the form of an equation and use a combined method (elimination-substitution) to solve the problem. This is in line with the opinion (Rahmatika. et al., 2022) that students are able to sort information.

At the stage of implementing the problem-solving plan, kinesthetic learning style (MR) subjects carry out the problem-solving plan in accordance with the problem solving planning stage. MR's steps at the stage of implementing the problem-solving plan are as follows: (1) Make an example with x and y symbols and write them on the answer sheet; (2) Create a mathematical model in the form of an equation based on information from the question, and write it on the answer sheet; (3) Create two new equations by multiplying equation (1) by number 1 and equation (2) by number 2 to obtain a new equation. From the two new equations MR eliminates the variable y by subtracting the two new equations to obtain the value of the variable x, and write it on the answer sheet; (4) Substitute the value of the variable x into equation (2) to obtain the y value and write it on the answer sheet.

At the stage of re-checking the problem solving, the kinesthetic learning style subject (MR) is sure of the answer by looking back at the written answer, (MR) knows how to prove whether the answer is correct by re-checking the answer, and can conclude the final result obtained.This is in line with opinion Jannah (2022)in his research stated that when re-checking the answers, students can conclude the answers to the questions given and are confident that the answers they get are correct based on repeated and as good re-checking as possible.

4. CONCLUSION

Based on the results of research conducted by researchers regarding the Profile of Solving Problems for Systems of Linear Equations in Two Variables for MTs Al-Khairat Tomini Students Based on Student Learning Styles. So the following conclusions are drawn:

1.Based on the research results, visual learning style problem solving can state orally or in writing the information contained in the problem given, the subject can prepare a problem-solving plan by making examples to create a mathematical model in the form of an equation and solve it using a combined method, the subject carries out the plan in accordance with the problem-solving plan, and the subject did not recheck the problem solving because he did not understand how.

2.Based on the results of the research, the problem-solving subject in the auditory learning style can verbally state the information contained in the problem given, the subject can prepare a problem-solving plan by making examples to create a mathematical model in the form of an equation and solve it using a combined method, the subject carries out the problem-solving plan according to the problem solving plan, and the subject can check the solution again.

3. Based on the research results, the kinesthetic learning style problem solving subject can verbally state the information contained in the problem given, the subject can prepare a problem-solving plan by making an example to create a mathematical model in the form of an equation and solve it using a combined method, the subject carries out the plan problem solving is in accordance with the problem-solving plan, and the subject can check the solution again.

Suggestions for further research based on the conclusions that have been presented can utilize the results of this research with the aim of being able to use them in the learning process well.

ACKNOWLEDGE

Praise be to the presence of Allah SWT who has given health, blessings and guidance so that the author can complete this research well, the author also does not forget to give prayers and greetings to the lord of the great prophet Muhammad shallaullahu alaihi wassalam, along with his family and friends who until now have always was on his way.

REFERENCES

Andreas, D. (2013). High School Students' Thinking Process in Solving Mathematical Problems Derived Material Viewed from Field Independent and Field Dependent Cognitive Styles. Journal. Faculty of Teacher Training and Education, Pattimura University.

Boneva, D., Mihova, E. 2012. Learning Styles and Learning Preferences. Bulgaria: Dyslexia Association.

Budiarti, Vina. Lestariningsih. 2018. "Profile of Trigonometry Problem Solving in View of Mathematical Ability." Mosharafa: Journal of Mathematics Education 7 (2): 273–84.

Ihsanudin, Isna, R. 2022. "Students' Mathematical Representation Abilities in Solving Program For International Student Assessment Questions in ReviewReflective-Impulsive Cognitive Style." Scholar's Journal: Journal of Mathematics Education 6(1): 248–58.

Jannah, Sitti Raehanil. 2022. "Profile of Mathematical Problem Solving of Students at SMA Negeri 1 Kasimbar on Opportunity Material in View of Learning Style."

Krulik, Stephen and Rudnick, Jesse A. (1995). The New Source Book For Teaching Reasoning And Problem Solving In Elementary School Massachusetts Allyn & Balcon.

Martinez-pons, M. 2001. The Psychology of Teaching and Learning. London : British Library Cataloging.

Rahmatica, Krairiani. Nurul Akmal. 2022. "Analysis of Mathematical Problem Solving Ability Reviewed." Ar-Riyadhiyyat: Journal of Mathematics Education 3 (1): 10–19.

Satria S. U, et al. 2022. "Mathematics Problem Solving Ability Profile Based on Polya Steps in Trigonometry Material Seen from the Learning Style of Students at SMAN 1 Magetan," no. 6: 248–59.

Sumarmo, U. (2003).Mathematical Power and Disposition: What, Why and How are Developed in Elementary and Middle School Students. Paper presented at a one-day seminar at the ITB Mathematics Department, October 2003.

Suningsih, Ari. Ana, Istiani. 2021. "Analysis of Students' Mathematical Representation Ability." Mosharafa: Journal of Mathematics Education 10(2): 225–34.

Ulfiana, Goddess. 2023. "Algebra Form Problem Solving Profile of Class VII C Students of SMP Negeri 1 Toribulu in View of Learning Style."

Zagoto, et al. 2019. "Individual differences in learning styles and their implications for learning." Journal of Education and Teaching Review 2 (2): 259-65.