**DESCRIPTION OF MATHEMATICS PROBLEM-SOLVING CAPABILITY IN TERMS OF LEARNING STYLE IN EIGHT-GRADE STUDENTS FROM JUNIOR HIGH SCHOOL OF BULUKUMBA**

**Ahmad Syamsuadi1), A. Aspar2), Andi Alim Syahri3)**

1,2,3Muhammadiyah University of Makassar

1,2,3Sultan Alauddin Street, No. 259 Makassar

Email: ahmadsyamsudi36@gmail.com1, andialims@unismuh.ac.id 3

**Abstract:**

This study aims to describe and determine the student's capability in math problem-solving reviewed visual learning style and auditory learning style. Subjects are students with grade eight from junior high school in bulukumba district. This research is descriptive, data collected by using questionnaires, tests, and interviews. Using the questionnaire describes visual learning style and auditory learning style. Two numbers of the test determine math problem-solving capability in Polya's step, and interviews confirm math problem-solving capability in comparison. The data analysis by reduction, presentation, and verification. Based on the results, the first subject with a visual learning style can fulfill all the indicators of Polya's step, but another one is just three indicators. The first subject with an auditory learning style can meet all Polya's, but the other can fulfill three indicators.

**Keywords:** Problem-solving capability, visual learning style, auditory learning style, comparison materials

**INTRODUCTION**

E

ducation is a need that exists in the life of society, nation, and homeland. Quality and targeted education be used to improve the quality of human resources in a country. Education is a forum for activities that can be seen as a printer of high-quality human resources.

The education system is a strategy or method used in the teaching and learning process to achieve the goal so that students can actively develop the potential that exists within themselves. These abilities are needed by students to be able to obtain, manage, and utilize information to survive in changing, uncertain and competitive conditions.

Thinking is an internal process that occurs in a person's mind that involves processes, namely perception, attention, memory, language, problem-solving, reasoning, and decision making (Mairing, 2018: 34). Problem-solving capability is a very important part of the mathematics curriculum because, in the learning and completion process, students are possible to gain experience using the knowledge and skills they already have to be applied to non-routine problem-solving.

According to Polya (Mairing, 2018: 42), the stages of solving mathematical problems include (1) understanding the problem, (2) making a settlement plan, (3) implementing the plan, and (4) re-examining. This is intended so that students are more skilled in solving mathematical problems, namely skilled in carrying out procedures in solving problems quickly and carefully.

Problem-solving is important in the purpose of mathematics education because in everyday life humans can never be separated from problems. Problem-solving activity can be considered a basic human activity. Problems must be found a way out by humans themselves if they don't want to be defeated by life.

In the learning process using any model, there are always factors that influence it. One of the factors that influence the progress of the learning process is learning style.

Learning styles are key to developing performance at work, at school, and in interpersonal situations. When you realize that how a person absorbs and processes information, learning and communicating become something easy and fun.

It should be realized that not everyone has the same learning style. Even if they are in school or even sitting in the same class. A person's ability to understand and absorb lessons is definitely on a different level. Some are fast, medium and some are very slow. Therefore, they often have to take different ways to understand the same information or lesson.

One of the factors that influence student learning is perception, namely how he or she derives meaning from the environment. Perception begins with the five senses: hearing, seeing, tasting, smelling, and feeling. In the world of education, the term learning style refers specifically to sight, hearing, and kinesthetic. Visual learning styles involve vision and mental imagery. Auditory learning style refers to listening and speaking. Kinesthetic learning styles refer to large and small movements.

By understanding student learning styles means that it will make students happier because the teacher's response to his needs is right, thus the information given to him will be more easily absorbed.

Based on the description above, the researcher wants to conduct a study entitled "Description of Comparative Mathematical Problem Solving Ability Viewed from Learning Styles in Class VIII Students of MTs Negeri 2 Bulukumba".

**METHODS**

The approach used in this research is descriptive. This research was conducted at MTs Negeri 2 Bulukumba on Jl. Education, Jawijawi sub-district, Bulukumpa sub-district, Bulukumba district. The subjects in this study were students of class VIII.1 MTS Negeri 2 Bulukumba among 12 students according to the direction of the school, in this research four students were assigned from one class with details: two students have a visual learning style, and two students have an auditory learning style, which is then given a problem-solving ability test to four subjects in the form of descriptions and conducting interviews. Furthermore, all the data that has been collected were analyzed using qualitative data analysis techniques. The analysis technique is used to determine problem-solving abilities in terms of learning styles in class VIII MTs Negeri 2 Bulukumba.

**RESULTS AND DISCUSSION**

This research was conducted at MTs Negeri 2 Bulukumba class VIII.1, on comparative material. Learning style questionnaires and problem-solving ability tests were conducted in class VIII.1

The implementation process began with observations and interviews by teachers at MTs Negeri 2 Bulukumba on September 17, 2020. Then on March 16, 2021, the researchers gave a learning style questionnaire to students in class VIII.1. The results of the learning style questionnaire on the subject can be seen in the table below.

Table 1. Student Learning Style Scores

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Initials | Visual | Auditory |
| 1. | MH | 7 | 8 |
| 2. | AFR | 10 | 5 |
| 3. | WW | 8 | 7 |
| 4. | NAP | 8 | 7 |
| 5. | NI | 6 | 9 |
| 6. | APR | 5 | 10 |
| 7. | WA | 4 | 11 |
| 8. | NM | 6 | 9 |
| 9. | MN | 9 | 6 |
| 10. | NA | 11 | 4 |
| 11. | PN | 7 | 8 |
| 12. | HH | 6 | 9 |

From table 1, it's found that the students who filled out the learning style questionnaire were 12 students who were allowed to come from the school to the researchers. Next, two subjects were selected for each learning style. The choice of this subject refers to the score obtained, the students as subjects must have points or scores of more than or equal to ten, be able to communicate well when expressing opinions/ideas orally or in writing, and be willing to participate in the whole process of collecting data in this study. The selected research subjects are presented in Table 2.

Table 2. Selected Research Subjects

|  |  |  |
| --- | --- | --- |
| Type of Learning Style | Initials | Code |
| Visual learning style | AFR | SV1 |
| NA | SV2 |
| Auditori learning style | APR | SA1 |
| WA | SA2 |

To make it easier in data analysis, each answer and dialogue or chat is assigned a certain code. The interviewer's dialogue excerpt is coded "P", while the subject's dialogue except is coded for the first two digits which are the subject's learning style. Furthermore, each dialogue after one digit is the first and second subject code, the two digits behind both the interviewer and the subject are the code number of the questions discussed. For example, for the interviewer, "P-01" means the code of the question from the interviewer for the first question. Likewise with the subject, "SV1-02" means the symbol of the question from the visual learning style subject for the first subject in the second question.

The following describes the mathematical problem-solving capability of comparative material in terms of visual and auditory learning styles in class VIII students of MTs Negeri 2 Bulukumba.

1. **Mathematical Problem-Solving Capability Viewed from Visual Learning Style**

Based on the results from tests and interviews on SV1 subjects, it shows that the subject understands the problem by reading the question once and immediately knowing and writing down the initial information that is known and asked in the question. Information is written sequentially and systematically so that it is easy to understand and determine the next steps. At the stage of compiling a plan for the completion of the subject, for example, what is known to form a mathematical model, when confirmed through interviews, the subject admits that he understands better if it is assumed and a mathematical model is formed. So that in the stage of implementing the subject plan, it is no longer difficult to solve the problems in the questions asked. At the stage of evaluating the subject is reworked by checking if there are known variables so that other variables can be obtained and the subject is sure of the answers he gets.

Based on the exposure of the test results and interviews on the subject of SV2, it shows that the subject understands the problem well by repeating the questions so that they get information that is known and asked about the questions. At the stage of compiling a plan, the subject still assumes what is known in the problem and makes a mathematical model, making it easier to solve the problem. In carrying out the plan, the subject experienced doubts in solving the problem so that students could not explain in detail what he was doing. So that students do not check or re-evaluate the answers that have been written.

From research Umrana, et al. (2019) explained that the visual subject is Polya's first indicator that the visual subject can express and write down what is known, able to present what is being asked. Visual subjects can make representations in the form of images, even though the images made are not complete enough when viewed by others in both problem 1 and problem 2.

At the stage of making a problem-solving plan, initially, the visual subject was not able to reveal all the formulas that would be used to solve the problem, but after a follow-up interview, the visual subject was able to plan all the formulas that would be used in solving the problem. Several factors influence, among others, the researcher's lack of understanding of the intent of the visual subject, as well as the influence of the learning style character possessed by the visual subject, namely forgetting to convey verbal messages to others unless written or read directly.

Visual subjects were able to carry out all the steps that had been planned, even though there was a calculation error in operating the formula in the first interview problem. This error is not because the visual subject is less able to operate multiplication and division but because he is not careful in carrying out calculations, which can be seen in the ability of the visual subject to solve other problems being able to perform calculations according to the formula used correctly.

Visual subjects were able to re-examine the results of problem-solving obtained. The method used by the visual subject to re-examine the answers obtained is to re-examine by clawing from the beginning to the end.

1. **Mathematical Problem-Solving Capability Viewed from Auditory Learning Style**

Based on the result of the test and interview, for questions number one and two on the subject of SA1, it can be seen that the subject reads the questions first several times, especially when there are -words that they do not understand. The SA1 can mention the things that are known in the problem, then the subject can mention the things that are asked in the problem. This shows that the subject understands the problem first before making plans. After understanding the problem, the subject can determine the solution that will be used in solving the problem. SA1 subjects were able to explain the known completion steps to find the final answer. SA1 subjects believe that the answers they get are correct, after evaluating the answers by re-reading their work.

Based on the exposure of test and interview results for questions number 1 and 2 on the subject of SA2, it can be seen that the subject reads the questions first, then writes down what is known and asked in the questions. This shows that the subject understands the problem first before making plans. After understanding the problem, the subject can determine the solution that will be used in solving the problem. The SA2 subject was still unsure of what to do due to a lack of understanding of the material provided, but the SA2 subject believed that the answers obtained were correct, but did not re-check the answers that had been obtained.

From research Umrana, et al. (2019) explained on the auditory subject that Polya's first indicator was that SA was able to understand the problem very well, including being able to express and write down things that were known, able to present the things being asked, SA, able to make representations in the form of images, even though the images were made by SA. not complete enough to be seen by others in both problem 1 and problem 2

SA can plan problem-solving well. Able to plan what steps are important and mutually supportive to be able to solve the problems encountered correctly and able to plan the formula that will be used in solving the problem, but there is an incorrect formula planned in problem 2. being on the edge of the garden which means using the concept of the circumference of a circle. SA in implementing the problem-solving plan.

At the stage of implementing the problem-solving plan, the SA can carry out all the steps that are important and mutually supportive to solve the problems encountered following what has been planned and written down step by step. SA can perform calculations well according to the formula used, but there is an incorrect formula written in problem 2, causing the calculation results to be wrong and the desired answer is wrong. This error is caused by wrong planning.

SA's concentration is often disturbed when researchers hold questions and answers while working on questions, where the character of SA's learning style is easily disturbed by noise, so to anticipate this the results obtained are scratched repeatedly by SA. SA can re-examine the results of problem-solving obtained by scratching from beginning to end. In addition to this method, SA is also able to prove the final results obtained by pulling back the flow (stage) of the process. In this case, the formula used is modified or pushed back until the values contained in the given problem are obtained. This method was known by SA without direct explanation from the teacher.

Table 3. Result Description of Mathematical Problem-Solving Capability Subjects with Visual and Auditory Learning Styles

|  |  |  |
| --- | --- | --- |
| Problem-Solving Indicator | Subject with Visual Learning Style | Subject with Auditory Learning Style |
| Understanding problem | Can write down what information is known and asked properly and accurately, both SV1 and SV2 subjects. | Can write down what information is known and asked properly and precisely, both SA1 and SA2 subjects. |
| Making a plan | Can identify and develop mathematical models well, subjects SV1 and SV2 | Can identify and develop mathematical models well, subjects SV1 and SV2 |
| Executing the plan | SV1 subjects can use the right strategy and are confident with the answers that have been done, while SV2 uses the right strategies, but are not sure about the answers that have been done. | Subjects SA1 can use the right strategy and are confident with the answers that have been done, while SA2 using the right strategy, but not sure about the answer that has been done |
| Re-evaluate | On the subject of SV1 can make conclusions and evaluate the answers obtained, while SV2 cannot make conclusions and evaluate the answers obtained | On the subject of SA1 can make conclusions and evaluate the answers obtained, while SA2 cannot make conclusions and evaluate the answers obtained |

**CONCLUSION**

The capability to solve mathematical problems based on visual learning styles shows that SV1 subjects can meet four indicators of problem-solving abilities according to Polya's steps, namely understanding the problem, making plans, implementing plans, and re-evaluating. While the subject of SV2 is only able to meet three indicators of problem-solving ability, that is understanding the problem, making plans, and implementing plans. The capability to solve mathematical problems based on the auditory learning style shows that the SA1 subject can fulfill four indicators of problem-solving abilities according to Polya's steps, namely understanding the problem, making plans, implementing plans, and re-evaluating. While the subject of SA2 is only able to meet three indicators of problem-solving ability that is understanding the problem, making plans, and implementing plans.

**REFERENCES**

Agustan, S. (2017). Proses Berpikir Reflektif Mahasiswa Calon Guru dalam Pemecahan Masalah Matematika Berdasarkan Gaya Kognitif dan Gender. *Disertasi tidak diterbitkan*. Universitas Negeri Surabaya, Surabaya, Indonesia.

Amam. (2017). Penilaian Kemampuan Pemecahan Masalah Matematis Siswa SMP. *Teorema: Teori dan Riset Matematika*, 2(1).

Bernard. (2018). Analisis Kemampuan Pemecahan Masalah Matematis Siswa SMP Kelas IX Pada Materi Bangun Datar. *Supremum Journal of Mathematics Education*, 2(2).

Deporter, Bobbi & Mike, H. (2016). *Quantum Learning: Membiasakan Belajar Nyaman dan Menyenangkan*. Bandung: Kaifa.

Mairing, Jackon, P. (2018). *Pemecahan Masalah Matematika Cara Siswa Memperoleh Jalan untuk Berpikir Kreatif dan Sikap Positif*. Bandung: Alfabeta.

Mardhiah & Ainal. (2017). Pengaruh Desain Metodologi Pembelajaran PAI Berbasis Gaya Belajar Visual Terhadap Prestasi Belajar Mahasisswa. *Jurnal Mudarrisuna*, 7(2).

Papilaya, Jeanete, O., & Neleke, H. (2016). Identifikasi Gaya Belajar Mahasiswa. *Jurnal Psikologi Undip*, 15(1).

Roebyanto, Goenawan & Sri. (2017). *Pemecahan Masalah Matematika Untuk PGSD*. Bandung: PT. Remaja Rosdakarya.

Rusman. (2015). *Belajar dan pembelajaran berbasis komputer mengembangkan profesionalisme guru abad 21*. Bandung: Alfabeta.

Sugiyono. (2018). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta

Santoso, Sonya Eki. (2016). Analisis Kemampuan Pemecahan Masalah Berdasarkan Gaya Belajar Melalui Pembelajaran Problem Based Learning (PBL) Berbasis Quantum Learning. Semarang: Universitas Negeri Semarang.

Trilisetiyowati. (2018). Karakteristik Gaya Belajar Tipe Visual dalam Menyelesaikan Masalah Matematika. *Ekuivalen Jurnal Pendidikan Matematika*, 31(2).

Umrana, Cahyono, E, & Sudia, M. (2019). Analisis Kemampuan Pemecahan Masalah Matematis Ditinjau dari Gaya Belajar Siswa. *Jurnal Pembelajaran Berpikir Matematiika*, 4(1).