International Journal on Science and Technology (IJSAT)
E-ISSN: 2229-7677 ● Website: www.ijsat.org ● Email: editor@ijsat.org

Profile of Students' Critical Thinking Skills in Solving Mathematical Problems Reviewed from the Learning Style of Grade IV Students of SD InpresTeamate, Pattallassang District, Gowa Regency

Nurlaila Karim[1], Sukmawati[2], Siti Fitriani Saleh[3]

[1, 2, 3]Master of Elemtary Education Universitas Muhammadiyah Makassar

Abstract

This study aims to describe the critical thinking skills of grade IV students from auditory, visual, and kinesthetic learning styles in mathematics problem solving at SD InpresTeamate. This study adopts a qualitative approach with a descriptive type of research. The population of this study is grade IV students consisting of 30 people who will be grouped based on their teaching style, each learning style is represented by 1 student, so that the research subject is 3 students. The data collection techniques used are questionnaires, tests, interviews, and documentation which start from giving learning style questionnaires to 30 students then selecting 1 person each representing audio, visual, and kinesthetic learning styles to be given a critical thinking test. The data analysis techniques used are condensation, data presentation, and verification. Based on the data analysis, it was concluded: 1) the critical thinking ability of students with auditory learning styles is able to meet the indicators of interpretation, analysis, evaluation, inference and explanation well; 2) the critical thinking ability of students with visual learning styles is able to meet the indicators of interpretation, analysis, evaluation, inference and explanatory very well; 3) the critical thinking ability of students with a kinesthetic learning style is less able to meet the indicators of interpretation, evaluation and explanatory but less able to meet the indicators of analysis and inference.

Keywords: Learning Style, Critical Thinking Skills, Mathematical Problem Solving

1. Introduction

Indonesia experienced an increase in its ranking in the Programme for International Student Assessment (PISA) study in 2022, with an increase in positions in education for reading, mathematics and science skills. However, despite the increase in position, the achievement score in mathematics decreased by 13 points compared to 2018. Indonesia's mathematics score in 2022 was recorded at 366, lower than 379 in 2018.

Education in Indonesia aims to create a learning atmosphere that allows students to develop religious strength, self-discipline, morals, intelligence, and skills that are beneficial to themselves,

society, and the country. Mathematics learning should be designed to help students learn logically and honestly, and encourage them to learn more actively so that mathematics becomes easier to understand.

However, learning mathematics in school is still not able to motivate students optimally. Teacher-centered learning methods tend to make students dependent on teachers and do not develop independent thinking. The desired learning is learning that is able to hone students' critical and creative thinking skills in solving problems.

Although students are required to be active and intelligent, many of them still have difficulty in completing the exam questions and exercises given by the teacher. This happens because students tend to memorize formulas and theorems without understanding the underlying concepts. As a result, they have difficulty when faced with problems that require critical thinking and problem solving.

The thought process is an important aspect of education. Thinking involves using the intellect to consider things, which includes a variety of mental activities such as evaluation, creativity, problem-solving, and decision-making. In the context of education, critical thinking is needed so that students are able to solve problems better and more deeply.

Critical thinking is a skill that involves analysis, evaluation, and decision-making. Ennis (2011) proposed six criteria for critical thinking, namely Focus, Reason, Inference, Situation, Clarity, and Overview, which is abbreviated as FRISCO. In addition, Facione (2011) also explains six critical thinking processes in solving problems, namely Interpretation, Analysis, Evaluation, Inference, Explanation, and Self-Regulation.

Problem-solving is another important skill for students. This process involves steps such as problem identification, planning, resource allocation, and outcome evaluation. Polya (in Mawaddah&Anisah, 2015) proposed four main steps in problem solving, namely understanding the problem, developing a solution plan, implementing the plan, and re-examining.

Understanding students' learning styles is also very important in the learning process. Each student has a different learning style, such as visual, auditory, or kinesthetic. By understanding students' learning styles, teachers can adjust more effective learning methods, so that students can more easily absorb and understand the subject matter, including mathematics.

Previous research has shown that students' learning styles affect their ability to solve math problems. Students with visual learning styles tend to excel in solving mathematical problems compared to students who have auditory or kinesthetic learning styles. This study shows the importance of considering learning styles in designing learning.

An interview with a teacher at a school in Gowa Regency revealed that students at the school were quite good at solving math comprehension problems, but had difficulty in critical thinking. This shows that there is a need to improve students' critical thinking skills in the context of mathematical problem solving.

Further research was carried out by distributing a learning style questionnaire to 30 fourth grade students of SD InpresTeamate, Gowa Regency. The results showed that most students had auditory and visual learning styles, with a small proportion having kinesthetic or combination learning styles. Based on these results, the study aims to analyze the profile of students' critical thinking ability in solving mathematical problems, reviewed from their learning style.

B. Research Methods

1) Research Approach

This study uses a descriptive qualitative approach to describe students' critical thinking skills in solving mathematical problems based on their learning style. Data were obtained through observation, questionnaires, and written tests, which were analyzed using an inductive approach. This research focuses on the analysis of critical thinking processes and the relationships between observed phenomena.

2) Location and Time of Research

The research was carried out at SD InpresTeamate, Pattallassang District, Gowa Regency in July 2024. The selection of this location is based on the findings of variations in students' learning styles, the absence of similar research, and support from schools for educational reform.

3) Research Subject

The subject of this study is the fourth grade students of SD InpresTeamate who are grouped based on their learning style. Three students were selected to be the research subjects after grouping based on a learning style questionnaire filled out by 30 grade IV students.

4) Data Collection Techniques

Data collection techniques include questionnaires to identify students' learning styles, tests to describe students' critical thinking skills in solving mathematical problems, interviews to deepen students' understanding, and documentation to support research results.

5) Data Analysis Techniques

Data analysis is carried out continuously using data triangulation. The analysis process includes data condensation, presentation of data in narrative form, and verification to draw credible conclusions. This analysis aims to provide a deep understanding of students' critical thinking skills.

6) Checking the Validity of Findings

The validity of the data was checked using the observation extension technique, increasing diligence, triangulation, and peer examination. These techniques ensure that the data obtained are accurate and valid, and support the conclusions obtained from the research.

C. Research Results and Discussion

1. Students' Critical Thinking Skills with *Auditory Learning Styles*

NAH subjects with *auditory* learning styles in this study have been able to solve problems 1 and 2. Even though there are answers that are not right, overall he can understand the problems given. Children who have an *auditory* learning style have not been able to solve problems with regular and orderly steps. based on the opinion of Rudi Hartono who revealed that the characteristics of children who have *an auditory* learning style find it difficult to write.

As a result of the analysis of the data obtained by the author, the subject was stated to be able to understand the problem given in problem 1 and problem 2 of the NAH subject was able to understand, explain and give meaning or information from the existing problem. This also agrees with Rasiman's statement that the subject is said to understand any problem, is able to identify the facts in a logical and clear mathematical problem, and is able to formulate the main points of the problem correctly. In solving problem 1 and problem 2, the subject is able to identify relationships and information used to express thoughts and opinions. This is in agreement with what Rasiman said that the subject is said to be able to plan the solution of any subject at the stage of identifying the steps of the solution plan without experiencing obstacles or problems in implementing the plan, in problem 1 and problem 2 the subject is able to work on the problem

according to the plan to test the truth of the information. This agrees with Rasiman that the subject is said to be able to carry out the plan if the subject is able to choose a method or reveal the theorem can be done appropriately and logical consideration. In re-examining in question 1 and problem 2, the subject looked back at the answers in accordance with the initial plan and was able to draw a clear conclusion. This is in line with Rasiman's opinion that students are said to be able to re-check, namely by evaluating the steps in completion. So it can be concluded that the subject of NAH meets all the indicators of critical thinking according to Facione.

2. **Students' critical thinking skills with kinesthetic learning styles.**

AZA subjects who have a Kinesthetic learning style in this study have not been able to solve problem 1 but are able to solve problem 2. In question 1 there is still an answer that is not appropriate, but overall understand the explanation given. Children who have a Kinesthetic learning style have a distinctive characteristic, when interviewed they find it difficult to be silent. This is in line with Rudi Hartono's opinion who revealed that the characteristics of individuals who have a Kinesthetic learning style are always physically oriented and move a lot.

In accordance with the analysis of the data obtained in the understanding of problem 1 and problem 2, AZA subjects are able to understand the main problems that exist. In solving problem 1 it is not able to identify the relationship and information used, while in problem 2 it is able to determine identifying the relationship and information used, knowing all the information that can be used or not. In carrying out the plan, in problem 1 because it was wrong in planning so that in the implementation it was still wrong, while in problem 2 it was able to work on the problem according to the original plan. In re-examining the answers, in question 1 they could not conclude clearly, while in question 2 they were able to see and re-examine the answers and were able to draw clear conclusions. Because the subject of AZA is only able to solve 1 math problem, according to the researcher, the subject of AZA has not met the indicators of critical thinking according to Facione as a whole.

3. **Students' critical thinking skills with visual learning styles.**

MAF subjects with visual learning styles in this study, have been able to solve problem 1 and problem 2.although there are still insufficient answers, but overall they are able to understand the problems given. The solution of the flat building problem not only pays attention to the final answer of the calculation, but the completion process must also be considered. Students are expected to solve the problem through a step-by-step process so that their line of thought can be seen. From the results of written tests and interviews, students with a visual learning style are able to solve problems neatly, the process is systematic and thorough in answering. In accordance with Rudi Hartono's opinion who said that the characteristics of children who have a visual learning style always look neat in any matter and meticulous.

In accordance with the analysis of the data obtained by the researcher in understanding the problem, in problem 1 and problem 2 the MAF subject was able to understand, explain and give meaning or information from the existing problem. In determining the solution plan in problem 1 and problem 2, it is able to identify relationships and information used to express thoughts or opinions. In carrying out the plan, in problem 1 and problem 2 they were able to work on the questions according to the plan to test the correctness of the information. In re-examining the answers, in question 1 they could not conclude clearly, while in question 2 they

checked the answers according to the initial plan and were able to draw clear conclusions. Thus the MAF subject meets all the indicators of critical thinking according to Facione.

D. Conclusion

Based on the results of the study entitled "Profile of Students' Critical Thinking Ability in Solving Mathematical Problems Reviewed from the Learning Style of Grade IV Students of SD InpresTeamate, Pattallassang District, Gowa Regency", the author can draw several conclusions related to students' critical thinking skills based on their learning style.

First, students with auditory learning styles are able to meet the interpretation indicators even though they are not completely complete, but they are less able to meet the analysis indicators. Nevertheless, these students have been able to meet the indicators of evaluation, inference, and explanatory well. Second, students with kinesthetic learning styles are able to meet the indicators of interpretation, evaluation, and explanatory, but they are still not able to meet the indicators of analysis and inference well.

Third, students with visual learning styles show excellent critical thinking skills, able to meet the indicators of interpretation, analysis, evaluation, inference, and explanatory very well. This shows that visual learning style contributes significantly to students' critical thinking ability in solving mathematical problems.

DAFTAR PUSTAKA

1. Abdullah, IH. (2013). *Critical Thinking in Mathematics*. Ternate: Mathematics Education Study Program, FKIP Khairun University.
2. Abidin, *Y*. (2014). *Learning System Design in the Context of the 2013 Curriculum*. Bandung: PT RefikaAdit
3. Adler, Alfred (transliteration, Mely Septiana). (2004). *What Life Should Mean ToYou*, Yogyakarta Alenia
4. Afifah, E.P, Wahyudi, Setiawan. W. (2019). *The Effectiveness of Problem Based Learning and Problemolving on the Critical Thinking Ability of Class V Students in Mathematics Learning*. Journal Of Mathematics Education, Science & Technology, 4(1). https://journal.umsurabaya.ac.id/index.php/matematika/article/view/2822
5. Amir, T. (2015). Designing Questionnaires: Concepts and Guidelines for Attitude, Personality, and Behavior Research. Jakarta: Kencana.
6. Apriza, B. (2019). Critical Thinking Skills Through Mathematics Learning with Problem Based Learning. Exponents, 9(1), 55–66. https://doi.org/10.47637/eksponen.v9i1.133
7. Arikunto, Suharsimi. (2010). *Research Procedure of a Practical Approach*, Jakarta: PT RinekaCipta.
8. Fatmawati, Harlinda, Mardiyana&Triyanto. (2014). Analysis *of Students' Critical Thinking in Solving Mathematical Problems Based on Polya on the Subject of Quadratic Equations for Class X Students at SMK Muhammadiyah 1 Sragen Academic Year 2013/2014.* Surakarta: Electronic Journal of Mathematics Learning Vol. 2 No. 9.
9. Firdaus, A. M. (2023). *Profile of Teachers' Creative Thinking Ability in Developing Junior High School Mathematics Learning Media*. Pedagogy: Journal of Mathematics Education, 8(1), 336-352. https://doi.org/10.30605/pedagogy.v8i1.2639

10. Hartono, Rudi. (2013). *A Variety of Teaching Models That Are Easily Accepted by Students*. Jogjakarta: Diva Press.
11. Jacob, S. M & Sam, H. K. (2008) Critical thinking skills in online mathematics discussion forums and mathematical achievement. *In Proceedings of the 13th Asian Technology Conference in Mathematics* (ATCM 2008). *Thailand* (pp. 15-19).
12. Marjan, Johari. (2014). *The Effect of Scientific Approach Learning on Biology Learning Outcomes and Science Process Skills of MA Mu'allimat NW PancorSelong Students, East Lombok Regency, West Nusa Tenggara*. e-Journal, UNDIKSHA Postgraduate Program. Science Study Program, Volume 4 of 2014.
13. Maulidya, A. (2018). Thinking and problem solving. Ihya Al-Arabiyah: Journal of Arabic Language and Literature Education, 4(1). https://core.ac.uk/download/pdf/266976448.pdf
14. Masykur, M. & Abdul Halim Fathoni. 2008. Mathematical Intelligence: An Intelligent Way to Train the Brain and Overcome Learning Difficulties. Yogyakarta: ArRuzz Media.
15. Mawaddah.S., &Anisah.H. (2015). Students' Mathematical Problem Solving Ability in Mathematics Learning Using Generative Learning Models in Junior High School. *Journal of Mathematics Education* 3(2):166-175. https://ppjp.ulm.ac.id
16. Pramana, F.H. (2023). *The Influence of Learning Style and Learning Motivation on the Learning Outcomes of PAI Subjects in Grade IV Students of SDIT Al-Istiqomah.* Undergraduate (S1) thesis, IAIN Kediri. https://etheses.iainkediri.ac.id/7758/
17. Putri, D. F.P. (2022). *Student's Analogous Reasoning Profile in Mathematical Problem Solving Reviewed from the learning style*. Scientific journalspendidikanmatematika, 11(1), 134-144. https://ejournal.unesa.ac.id/index.php/mathedunesa/article/ view/44223
18. Rachmadtullah, R. (2015) *Critical Thinking Ability and Self-Concept with Learning Outcomes of Civic Education for Grade V Elementary School Students.* Journal of Basic Education, 6(2), 287-298. https://journal.unj.ac.id/unj/index.php/jpd/article/view/493
19. Rakhmasari, Rifa. 2010. The Effect of Handson Activity in Mathematics Learning with a Contextual Approach as an Effort to Improve Critical Thinking Skills. (http://thsumantri. blogspot.com/2014/05/ kemampuan-siswa-indikatorberpikir.html, accessed 9 February 2015).
20. Rasiman. (2012) Exploration *of Critical Thinking Process in Solving Mathematics Problems for Students with High Mathematics Ability*, in e-journal Mathematics and Mathematics Education Vol 3 no.1/March (2012)
21. Rohana, Syarifuddin, &Mutmainnah. (2021) *Analysis of Students' Mathematical Critical Thinking Skills on Triangle and Quadrilateral Flat Building Materials.* Jurnal Pendidik Indonesia, 4(2), 54-69. http://jurnal.intancendekia.org/index.php/JPIn/article/view/171/152
22. Supriyanti, A. (2020). *Prediction of the Number of Prospective New Students Using the Double Exponential Smoothing Method from Brown (Case Study: SD Islam Al-Musyarrofah Jakarta*). Lebesgue Journal : Scientific Journal of Mathematics, Mathematics and Statistics Education, 1(1), 56–62. https://doi.org/10.46306/lb.v1i1