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The Application of Visual, Auditory, Kinesthetic Learning Styles to Improve Numeracy Literacy of 5 Karangrowo Elementary School Students

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Abstract: The purpose of this study was to analyze the type of learning style, mathematical literacy ability, and the influence of both in mathematics learning activities in grade II students of SD 5 Karangrowo. The type of research used in this study is descriptive research with a qualitative approach. The instruments of this study are questionnaires of learning style tendencies, mathematical literacy ability tests with question criteria based on ability levels in TIMSS, and interview guidelines. The results showed that: 1) the type of learning style possessed by grade II students of SD 5 Karangrowo was mostly auditory learning style; 2) Students' mathematical literacy ability is obtained as a result of 85% of students being able to answer questions correctly. This shows that the mathematical literacy ability of grade II students of SD 5 Karangrowo is quite good. Judging from the learning style, the percentage of completion of the students' mathematical literacy ability test with visual learning style is 55%, students with auditory learning styles as much as 85%, and students with kinesthetic learning styles as much as 40% can answer questions correctly: 3) student learning styles affect mathematical literacy skills, students with audio learning styles have better mathematical literacy skills than students with visual and kinesthetic learning styles.

Keywords: Ability, Literacy, Numeration, Primary School

1. Introduction

Education is one of the most important elements in determining the success and welfare of a nation. Today, education is experiencing many challenges which are the impact of the rapid development of technology, especially in the 21st century. 21st century education is faced with the challenge of developing students' abilities so that they have global skills. Global skills according to Trilling & Fadel (2009) include life skills, information and communication technology (ICT) skills, learning skills (creative, critical, communication, collaboration) and various literacy skills. Literacy skills as a prerequisite for 21st century life skills are developed through integrated education in family, school and community environments. As part of literacy skills, numeracy literacy is important for everyone (Murnane et al., 2012). Numeracy literacy skills are needed to solve everyday problems using mathematical knowledge of both symbols and numbers. Numerical literacy requires logical thinking so that it makes it easier for someone to understand mathematics, so that having numerical skills will help someone both in understanding the material, analyzing problems, and solving problems. The benefits of numeracy literacy skills are to help solve problems in everyday life. However, not all humans can utilize numeracy literacy skills. In general, most people have mastered the basic concepts of mathematics, but the application is still far from expectations to solve math problems requires numeracy literacy skills (Chinn, 2020). Numeracy literacy is defined as the ability to apply number concepts and

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counting operation skills in everyday life and the ability to interpret quantitative information in the student's environment. Literacy culture in Indonesia is a very interesting issue to discuss. In Indonesia, books have never been a top priority, Indonesian people tend to prefer watching cellphones and following live broadcasts rather than reading (Suswandari, 2018; Heryanto, 2014).

Numeracy literacy is the knowledge and skills to (a) use various kinds of numbers and symbols related to basic mathematics to solve practical problems in a variety of daily life contexts and (b) analyze information displayed in various forms (graphs, tables, charts, etc.) and then use the interpretation of the results of the analysis to predict and make decisions. The Pandemic period has made us realize that we must not only be satisfied learning mathematics, but also be literate in mathematics, known as numeracy literacy (Dantes & Handayani, 2021).

Numeracy literacy consists of three aspects of counting, numeracy relations and arithmetic operations (Purpura, 2013). Numeracy is the ability to count objects verbally and the ability to identify the number of objects. Numeracy relates to the ability to distinguish the quantity of an object such as more, less, taller, or shorter. Meanwhile, arithmetic operations are the ability to perform basic mathematical operations such as addition and subtraction (Istomina & Arsalidou, 2024). The three aspects of numeracy literacy previously described are basic aspects of mathematics learning that are important to introduce from an early age until children enter the lower grades. Based on the existing problems regarding literacy and numeracy in low-grade elementary school students, the researcher has a goal, namely to explore numeracy literacy in elementary schools, namely due to the lack of a culture of literacy and numeracy, so that it greatly affects the very low learning scores (Astuti & AR, 2023). This is due to the lack of teacher habits in preparing and getting used to giving questions based on literacy and numeracy (Rachmaningtyas et al., 2022). Another factor is the lack of parental encouragement and monitoring (Cimon-Paquet et al., 2023). In this case, encouragement and monitoring means that at night children are encouraged to study with parental assistance, so that parents know the extent to which they understand the material taught by the teacher. The results of the research are expected to be able to provide an overview and information about numeracy literacy in low-grade elementary schools.

2. Methods

The method used is the emphasis on visual, auditory and kinesthetic learning styles. This study aims to describe the profile of numeracy literacy skills in low grades based on learning styles. This research was conducted in the low-grade class of SD 5 Karangrowo for one month. The researcher chose the low-grade group because children in this group are at the informal numeracy stage, where children can count in order and recognize the nature of objects. The subjects presented in this study are represented by a visual learning style student, an auditory learning style student and a kinesthetic learning style student. The three subjects were selected based on the results of the Learning Style Test analysis. Data collection used a pictorial numeracy test and interview. Interviews were conducted to reveal early childhood numeracy skills in doing. The interview instrument includes questions related to understanding the test commands, and objects on the test sheet. The data collection instruments in this research are the Learning Style Test and, the Picture Numeration Test.

3. Results

The results of this study show that low-grade elementary school students have a variety of learning styles. The identified learning styles include visual, auditory and kinesthetic styles. These learning styles are reflected in the way students respond to math materials and their learning process. Each type of learning style consists of 12 statements that must be answered by students according to their individual conditions. Based on the completion of the learning style questionnaire, the results are shown in Table 1.

Table 1. Results of the learning style questionnaire of second-grade students of SD 5 Karangrowo

Learning Style	Visual	Auditory	Kinesthetic
2nd Grade Students	9	7	4

Second grade students of SD 5 Karangrowo consist of 20 students. Based on the results of filling out the questionnaire, it is known that 9 students (45%) have a visual learning style tendency, 7 students (35%) with an audio learning style, and 4 students with a kinesthetic learning style (20%). Thus, it can be seen that the learning style most owned by low-grade students of SD 5 Karangrowo is a visual learning style.

The results of this study are in line with research conducted by which shows that the visual learning style conducted by (Sakinah & Avip, 2021) students dominates the results of the study, the results obtained are 38% of students have a visual learning style, 25% of students with an audio learning style, 27% with a kinesthetic learning style. Another study that showed

dominance results was conducted by (Waluyo & Pujiastuti, 2023). There were 8 students with visual learning styles, 4 students had auditory learning styles and 6 students had kinesthetic learning styles. However, in this study using source triangulation so that only two student subjects were selected in each learning style both from visual, auditory and kinesthetic learning styles to be analyzed for literacy and numeracy skills.

Furthermore, the mathematical literacy test was given to measure the level of students' ability to reason mathematically. The number of items in the mathematical literacy test is 15 items. The form of questions presented in the form of 10 multiple choice questions with 4 answer choices and 5 forms of constructed response questions (fill-in and description). The scoring procedure in this test is for multiple choice questions with the correct answer getting a score of 5 and the wrong answer getting a score of 0. In the fill-in and description questions, the correct and complete answer gets a score of 5, and the wrong answer gets a score of 0.

Through tests in the form of multiple choice and fill-in questions, researchers can identify students' mathematical literacy skills in the form of students' ability to use mathematical concepts, facts, and tools to describe, explain, and predict a problem presented. The results obtained by second grade students of SD 5 Karangrowo are as follows in Table 2.

Table 2. Results of mathematical literacy skills of second grade students of SD 5 Karangrowo

Students	Multiple choice question answer scores	Score for answer to description question	Score
AW	6	5	80
BL	9	4	85
CN	4	5	70
DZ	5	3	55
AAK	7	2	55
OJ	7	3	65
MBS	8	3	70
NW	6	4	70
JIL	7	3	65
KME	9	3	75
MLH	10	4	90
DM	5	4	65
SPL	8	5	90
SY	10	5	100
PI	5	5	75
WW	7	4	75
ALS	6	2	50
BG	6	3	60
SYO	8	5	90
MR	9	3	75

From the results of the math literacy test presented in Table 2, it is known that the average score of the test results achieved by grade II students is 87%, with details of 10 students (50%) getting scores above the average and as many as 10 students (50%) getting scores below the average. The results of mathematics literacy skills in terms of learning styles of second-grade students of SD 5 Karangrowo are observed in Table 3.

Table 3. Presentation of learning styles of second-grade students of SD 5 Karangrowo

LEARNING STYLE	PERCENTAGE
Visual	55%
Auditory	85%
Kineshetic	40%

Based on the results of data analysis, it was found that the percentage of mathematical literacy test completeness of students with visual learning styles was 55%, students with auditory learning styles were 85%, and students with kinesthetic learning styles were 40% able to answer the questions correctly. Based on this data, students with auditory learning styles have the highest scores when compared to visual and kinesthetic learning styles.

Based on the results of the interview, it is known that students with visual learning styles, do not experience difficulties in translating questions in the form of images, students present answers briefly because they have difficulty in choosing the right words to pour into answers that require explanation, audio learning styles obtained the fact that, students find it difficult to visualize answers in the form of images, on the other hand students are able to explain answers systematically without experiencing difficulties when pouring these answers into the answer sheet, and learning styles of students with kinesthetic learning style types, showing active behavior during interviews and during the implementation of mathematical literacy test activities. Based on the results of the interview, students admitted to feeling bored and saturated during math learning activities, students revealed that they preferred learning activities that involved physical activities such as drawing practices or outdoor sports activities.

4. Discussion

Research conducted by Nasamu, (2021) with the title "Influence of teaching styles and learning styles on pupils' academic performance in numeracy in Ilorin Kwara State" which explains that learning style is one of the factors supporting numeracy literacy skills that can facilitate the learning and communication process. Each child has their own learning style and cannot be forced to use a uniform learning style, so that children's numeracy skills are also different. numeracy literacy skills of children with visual learning styles when given a pictorial test question, immediately respond quickly and the answers given are complete. While children with auditory learning styles do not respond immediately, this type of learning style children feel insecure. While children with kinesthetic learning styles are not happy if given a pictorial test question, they are more mobile and move around, so the answers they produce are incomplete (Abdur-Rahim, 2011).

5. Conclusion

The conclusion of this study is that the type of learning style owned by second grade students of SD 5 Karangrowo is mostly visual learning style. Students' mathematical literacy skills obtained the results of 50% of students being able to answer questions correctly with a scale above KKM 75. This shows that the mathematical literacy skills of grade II students of SD 5 Karangrowo are quite good. In terms of learning styles, the percentage of math literacy test completeness of students with visual learning styles is 55%, students with learning styles as much as 80%, and students with kinesthetic learning styles as much as 40% can answer questions correctly. It is important to understand the role of learning styles in students' numeracy literacy skills. With a better understanding of individual learning preferences, educators at SD 5 Karangrowo can design more effective learning approaches and support better math development for students in their grade 2 class. This is an important step in improving the quality of education in Karangrowo village. Based on the data, it is known that students' learning styles have an effect on math literacy skills, students with audio learning styles have better math literacy skills than students with visual and kinesthetic learning styles.

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