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Ability to Interpret Concentration of Statistical Data in the Form of Diagrams in Class VII Students of SMP Negeri 1 Boyan Tanjung

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ABSTRACT

The aim of this studyto explain and analyze the ability to interpret the concentration of statistical data in the form of diagrams in class VIII students at SMP Negeri 1 Boyan Tanjung.This study used descriptive qualitative method.The subjects in this research were 3 class VIII students at SMP Negeri 1 Boyan Tanjung. These 3 students were selected based on the results of a test on their ability to interpret the concentration of statistical data in diagram form and on the recommendation of the mathematics teacher at SMP Negeri 1 Boyan Tanjung.Students do not have difficulty understanding the data or statistical information provided, this is shown in questions 1 and question 2 which are from the test resultsIt shows that on questions 1 and 2 as many as 30 students (100%) could do well.Many students are inaccurate in changing information from problems into other forms, this is shown in question 3 where the test results areon question 3, 10 students (33.33%) worked on the question using the average formula with correct results.Many students cannot determine the solution or outcome of the problem, this is shown from question 4 as many as 7 students (23.33%) worked on questions using the median formula with correct results.

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INTRODUCTION

Indonesian education continues to improve, ultimately producing quality products or results. Currently, it is absolutely necessary and cannot be delayed to improve the level of education, especially in the education system. Human resources are needed who have high levels of intellectual abilities, including problem-solving reasoning abilities logical and systematic, in order to face the increasingly rapid development of science and technology. So that students actively develop their potential, education is an effort planned to create an environment and learning process. Students' personalities and attitudes can be formed through the learning process if they are able to think critically, creatively, innovatively, independently and confidently.

The process of introducing students to their environment so they can interact with it in an effort to improve their own abilities is called learning. Cognitive abilities, such as the ability to hone, affective abilities, such as sensitivity to feelings, and psychomotor abilities, such as skills in using physical strength or power, are some of the abilities developed during the learning process.This ability is intended to equip students when they are outside of school. Learning can also develop students to think logically, critically and orderly according to existing problems. Learning activities teach students to analyze problems before determining a solution to the problem. This can be found in mathematics learning.

Mathematics learning study materials are based on deductive reasoning and have abstract objects. Strong and clear proof of the truth of a concept using deductive reasoning is a logical result obtained between mathematical concepts. Mathematics is a universal scientific field that is fundamental to the development of modern technology and plays an important role in

communication and various fields. Numbers, algebra, analysis, probability, and discrete theory are just some of the other areas on which mathematical advances are based. Therefore, a strong understanding of mathematics is necessary to master and create the technology of the future. Mathematics is a way of thinking, organizing and proving things logically. Concepts are carefully, clearly, and precisely defined in mathematics. Symbols are used to represent them, and are used to represent ideas in great detail. To advance science and technology, it is necessary to study mathematics. The ideas created in arithmetic can support overcoming problems in areas of life, including financial problems, business, and others.

In the field of education, mathematics is a science related to how the human mind reads and understands natural quantities. To understand proportions and relationships in Heruman, mathematics uses deductive symbols that utilize regular patterns and directional concepts. Mathematical concepts and their significance for scientific understanding are very important. Teaching materials, learning environment, media and resources, as well as the teacher's role as facilitator are factors that influence student learning outcomes, according to Mudjiono (1999).

Mathematics learning in primary, secondary and higher education has its own priorities and more time allocation than other subjects. This is because science and technology really require mathematics. Apart from that, the concepts built in mathematics learning are also used in solving problems in various fields of life which are supporting factors in the pace of development and competition in various fields. Mathematics is one of the subjects that students find difficult, resulting in a lack of students' ability to analyze mathematical problems. This problem can occur due to the way of learning delivered by teachers in the field of study, including inappropriate learning methods and models, learning that tends to use text books, learning only focuses on formulas and solving questions according to examples in books. This causes students to feel bored and results in the achievement of learning outcomes not being optimal. The lack of interest in the learning process which only goes in one direction causes students' low interest in learning mathematics. Students are passive and only listen to the teacher's explanation. This is because the learning strategy is less interesting and still uses conventional learning models. Teachers tend to explain material without any interaction with students so that the learning situation becomes less effective.

Observations of class VIII students at SMP Negeri 1 Boyan Tanjung obtained information that the mathematics learning process was still centered on the teacher in control of learning. Students are less active and bored so that students' ability to think logically is less honed. Mathematics learning is less meaningful, students' responses are slow. Students find it difficult to learn mathematics in solving statistical problems, one of which is solving the mean, median and mode.

Statistics is a branch of mathematics that has very broad applications and is used by humans in everyday life Riasari (2018). The study of how to plan, collect, analyze, interpret and present data is known as statistics. Andriani (2016) states that statistical summaries, graphical representations, and interpretation of data sets are examples of statistical reasoning. The ability to use statistical concepts to interpret, summarize, and interpret a set of data to draw conclusions based on that data is known as statistical reasoning ability.

Because there is not a lot of information and the formulas used are easy to understand, statistics material in class VIII is easy for students to understand. Staristics learning in junior high school is limited to interpreting data in the form of tables and graphs. This is done to see the distribution resulting from the data. Students must be able to interpret and conclude the data obtained in order to understand its meaning well. This ability is part of the higher level thinking abilities they need. The ability to interpret is very important because it helps students make the right choices. This is because students who have been trained to think at a higher level will find it easier to make decisions and will be able to formulate and interpret mathematics in various contexts (Safitri, 2016). Observations carried out by researchers on March 7 2022, showed that when given

questions about statistical material, namely finding the mean, median and mode, there were still many students who were not correct in determining the mean, median and mode from data that had been presented in tabular form. frequency distribution. According to the Mathematics Teacher at SMP Negeri 1 Boyan Tanjung, students still experience difficulties in understanding and solving data-based mathematics problems. Students only look at existing sources without knowing how to solve the problem and do not pay special attention to the problem. Students are also used to remembering formulas so that when they have to be expressed in the form of data, students have difficulty interpreting them. Students who sometimes do not concentrate when learning takes place, make students not understand the material taught by the teacher. Students tend to be negligent in studying because they lack interest in learning. Student involvement in the mathematics learning process shows that the learning process is always centered on the teacher. This means that students simply absorb and listen to the teacher's discussion without asking what is important about the material.

The research conclusions regarding the analysis of mistakes of class IX middle school students in statistics material are based on the findings of previous research conducted at West Bandung Middle School by Sari and Bernard (2020). Conceptual errors reached 37.1% and procedural errors reached 34.9 percent of the data. The analysis revealed the following: 1) Students made conceptual errors when they did not write formulas or when they found and used formulas inappropriately. 2) When students forget the formula or formulas to use, they have difficulty solving problems. One of the reasons why students are less interested in statistics according to Fitri (2011) is that learning statistics is only theoretical and not related to real world situations. As a result, students' interest in learning decreased in statistics material.

Meanwhile, Amalia (2020) conducted research which found that students had difficulty solving questions because they were not careful in checking the statistics questions given, because they were in a hurry and forgot the formulas that had to be used, and because they did not work on the questions. don't understand the material. Students are required to be able to interpret the size of the concentration of statistical data in diagrams because of these problems. Students must be able to interpret and conclude the data obtained so that students truly understand its meaning.

METHOD

The approach taken in this research is descriptive research. One of the most basic types of research is descriptive research. intended to describe or depict existing natural phenomena, as well as human engineering and natural phenomena. Do not provide treatment, manipulation, or changes to independent variables in descriptive research; rather it describes the conditions as they are in Sudjana. Therefore, it can be concluded that descriptive research is research that is used to describe ongoing real-world phenomena.

Determining the research location is a very important stage in research because it will make it easier for researchers to carry out their research. Research location is the place or area where research is conducted. The exploration area chosen by the expert was SMP Negeri 1 in Boyan Tanjung Village, Kapuas Hulu Regency, West Kalimantan. Researchers choose this location or area because the researcher comes from that area and wants to know the state of educational development in the area that is the focus of the research.

The subjects in this research were 3 class VIII students at SMP Negeri 1 Boyan Tanjung. These 3 students were selected based on the results of a test on their ability to interpret the concentration of statistical data in diagram form and on the recommendation of a mathematics teacher who teaches at SMP Negeri 1 Boyan Tanjung. Determining the subject of this research is based on the consideration that the student is the one who understands and knows the information needed in this research.

Data collection techniques in this research are tests and interviews. The test questions will be given face to face, to all class VIII students at SMP Negeri 1 Boyan Tanjung. Test questions are completed by students according to their abilities. The time given to complete the questions is 120 minutes. After students work on the questions and check their answers, interviews are held the next day. The interview used is an interview. When conducting field interviews, researchers can add questions from the interview guide if information on the research subject is deemed insufficient.

The main instruments used in collecting data for this research were the researchers themselves, as well as supporting instruments such as test sheets, interview guides, and recording equipment. The data analysis technique used in this research is qualitative data analysis, with the theory of Miles and Huberman (2018), which divides the steps in data analysis activities into several parts, namely data collection, data reduction, presentation. data (data display), and drawing conclusions or verification (conclusions)

RESULTS AND DISCUSSION

The students selected to be research participants consisted of 3 (three) students based on recommendations from mathematics subject teachers at SMP Negeri 1 Boyan Tanjung. The following is the percentage level of ability to interpret statistical questions for class VIII students at SMP Negeri 1 Boyan Tanjung which is presented in Table 1.

Table 1. Mathematics Ability of Class VIII Students of SMP Negeri 1 Boyan Tanjung in Interpreting Statistical Questions

No	Intervals	Frequency	Percentage (%)	Category
1	0 – 40	0	0	Very less
2	41 – 56	0	0	Not enough
3	57 – 66	7	23.33	Enough
4	67 – 80	12	40.00	Good
5	81 - 100	11	36.67	Very good
Amount		**30**	**100**	

Source: Riduwan 2010

Table 1 shows the number of class VIII students at SMP Negeri 1 Boyan Tanjung interpreting statistical questions based on categories. These results show that as many as 7 students (23.33%) are in the fair category, 12 students (40.00%) are in the good category and 11 students (36.67%) are in the very good category. In this case, it can be said that the ability of class VIII students at SMP Negeri 1 Boyan Tanjung in interpreting statistical questions is in the good category.

Table 2. Mathematics Ability of Class VIII Students of SMP Negeri 1 Boyan Tanjung in Interpreting Statistical Questions

Question No	Average Score	Achievement Criteria
1	100	Very well
2	100	Very well
3	56.67	Not enough
4	61.67	Enough

Table 2 shows the ability of class VIII students at SMP Negeri 1 Boyan Tanjung in interpreting statistical questions. These results show that students' ability to interpret question number 1 is in the very good category, question number 2 is in the very good category, question number 3 is in the poor category and question number 4 is in the sufficient category.

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Data Description and Analysis Statistical Interpretation

In describing the results of learning to interpret statistical questions worked on by class VIII students at SMP Negeri 1 Boyan Tanjung, this was not done for all the questions. However, this was only done on question number 3 and question number 4. This was because in working on questions number 1 and 2 the students did not experience any difficulties, whereas on questions number 3 and question number 4 the students still had difficulty using the correct formula to do it.

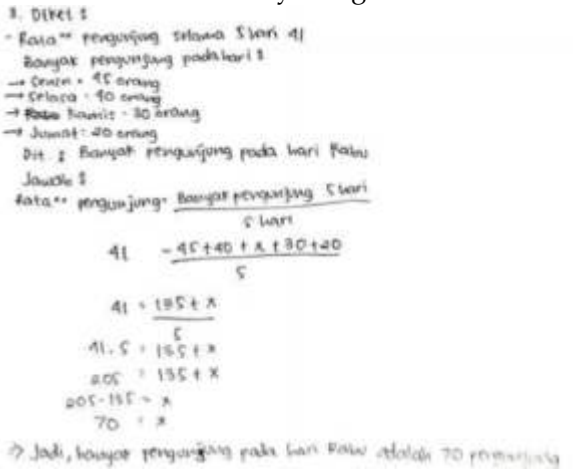

Figure 1. Answer to Subject 1 Number 3

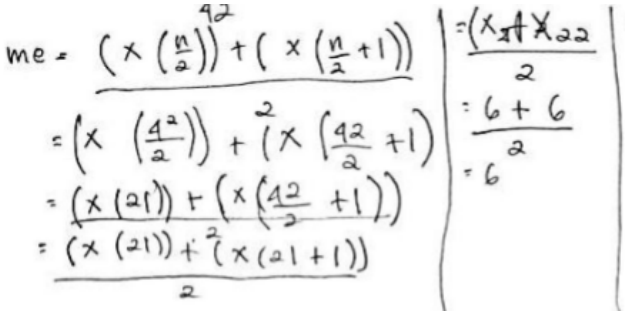

Figure 2. Subject Answer 1 Number 4b

The results of interviews with undergraduate subjects that researchers conducted revealed that overall undergraduate subjects were able to understand data and statistical information. S1 subjects have no difficulty identifying data in the form of diagrams, graphs or tables by paying close attention to the source of the information or data presented. This is an important aspect of understanding data. S1 subjects can explain what is known and what is asked in the question, identify data and read the data in the question. S1 subjects can also state the desired solution to the problem and state the reasons.

In terms of interpreting data and statistical information, subject S1 is able to explain the data from the tables presented in sufficient detail and quite clearly. This can be seen when subject S1 explains the difference between the concepts of median and mode based on their understanding. Apart from that, subject S1 also explained calculations to support his answer and provided conclusions on the results he obtained.

In the aspect of communicating data or statistical information, S1 subjects are able to explain how to solve existing problems well and clearly. Subject S1 explains the steps in solving the problem with great confidence and confidence. Apart from that, subject S1 was able to state the reasons for

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using the median formula in working on question number 4 and had confidence that the answer was correct. In changing table number 4, subject S1 preferred to change it into a bar diagram because it was easier to describe and easier to read the results on the diagram.

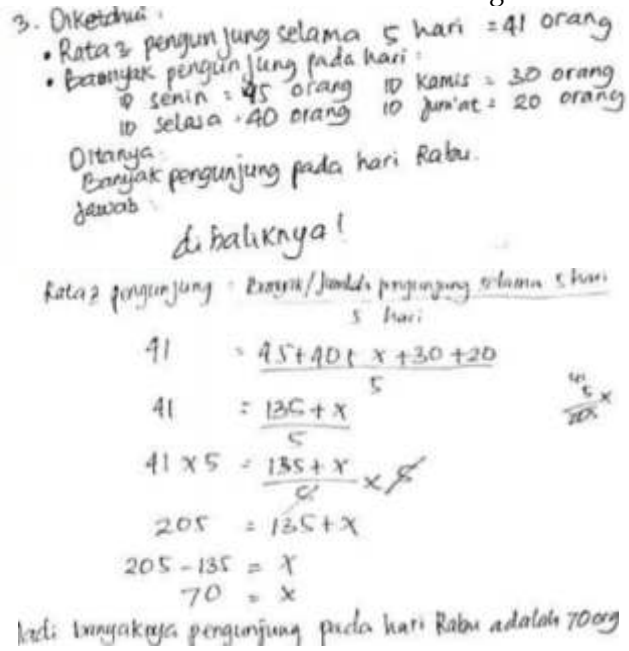

Figure 3. Answer to Subject 2 Number 3

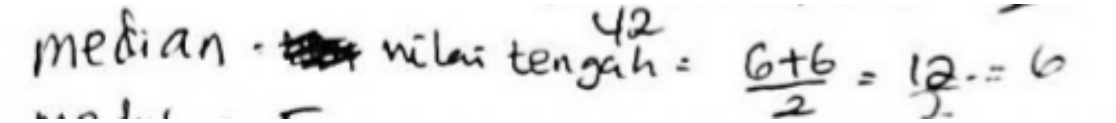

Figure 4. Answer to Subject 2 Number 4b

Interviews conducted by researchers with S2 subjects revealed that overall S2 subjects were able to understand the data and statistical information presented in questions 3 and 4. S2 subjects were able to identify data in the form of tables, graphs or diagrams when it came to understanding statistical data. Subject S2 can express information from the data presented in the questions without experiencing difficulty. S2 subjects can read the diagram given along with the reasons

In the aspect of interpreting data and statistical information, S2 subjects are able to explain the data presented in tables. Subject S2 can also mention the difference between mean and median using their definitions. Apart from that, subject S2 can state that there are more children who get scores below the average compared to children who get scores above the average which is related to the average score that was previously sought. Then, S2 can conclude the data from the information presented and carry out clear calculations to strengthen the answer.

In the aspect of communicating data and statistical information, S2 subjects are able to explain the process of solving the problems presented in the questions. S2 subjects work on and explain the process of solving problems on questions with confidence. Subject S2 also believed that the answer he presented was correct. In presenting in the form of graphs and diagrams, S2 subjects prefer presentations in graphic form. S2 subjects will choose to change tables in graphic form compared to diagrams. Apart from being easier to read data, it is also easier to create.

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Figure 5. Answer to Subject 3 Number 3

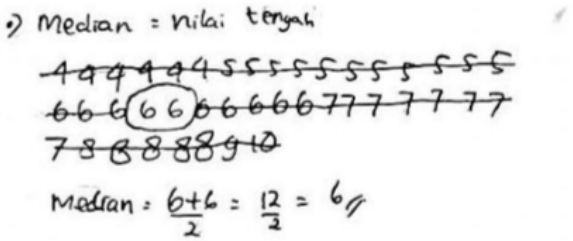

Figure 6. Subject Answer Number 4b

S3 subjects' overall understanding of the data and statistical information presented in questions 3 and 4 is demonstrated by the findings of the interviews the researcher conducted with them. S3 subjects are able to identify data presented in the form of tables, diagrams or graphs in understanding statistical data and information. Data presented in the form of graphs and diagrams can also be read by S3 Subjects.

The S3 subject was able to explain very clearly the data from the tables presented in the aspects of data interpretation and statistical information. Apart from that, subject S3 was able to explain the difference in meaning of median and average even though they have the same value. S3 subjects were able to conclude data from the information presented through calculations to strengthen their answers and explanations.

In the aspect of communicating data and statistical information, S3 subjects are able to explain the process of solving existing problems with confidence. S3 subjects also have confidence that the steps used in working on the questions are correct. In presenting data, S3 subjects prefer presenting data in the form of graphs and diagrams. The reason is that data presented in the form of graphs and diagrams will be easy to understand and easy to create.

Solving statistics questions in class VIII is measured using several indicators, including the ability to understand data, the ability to interpret data and the ability to communicate data. This indicator is used as a measure to measure students' ability to solve statistical problems.

1. Ability to Understand Statistical Data

In understanding the statistical data presented in question number 3 and question number 4, the result was that students were able to identify data in the form of diagrams, graphs or tables by looking at the data source and had no difficulty. Apart from that, students are also able to read data or information presented in tables, graphs or diagrams and do not experience difficulties.

In the aspect of understanding data, the results showed that students were able to identify the data and information presented in the questions by stating the information known and the information being asked. Students do not experience difficulties when expressing and explaining information presented orally using their own language. Phonapochat (2014) states that students who do not experience difficulties in solving mathematical problems will influence the problem solving process.

The ability to identify data can be influenced by the student's ability to solve the problems presented. According to Rosmawati (2012), in solving mathematical problems students must be able to find the information contained in the problem so that students will find it easy to solve them without having to determine the information they know and the information they ask for. Students must also be able to verbally express important data and information in an effort to express previous knowledge. This can make it easier for students to plan to solve problems very well and write in detail what they know and what is asked in the question.

Apart from that, in this aspect students are able to read data and information clearly and provide reasons. Students who are able to identify data well tend to have high abilities in analyzing questions mathematically, so they do not have difficulty reading the questions. In mathematical learning, identifying and reading data is a basic ability that students must have when solving problems in questions. Students are required to be able to read the questions and understand the information contained in the questions well Padmawati (2021).

In solving mathematical problems given, students are able to explain information using their own language, both written and verbal. Students' ability to express data and statistical information presented in questions can be known when students are able to express it using their own words, Setiani (2021).

2. Ability to Interpret Statistical Data

In interpreting the statistical data presented in question number 3 and question number 4, the result was that students were able to explain the data presented in the questions quite well and clearly, although there were some students who were only able to explain in general terms. Apart from that, students are able to conclude data based on the information presented by including calculations to support the explanation.

In the aspect of interpreting data and statistical information, it states that students have been able to explain the information presented in the questions quite well. In interpreting data and statistical information, students first make simple calculations to support their explanation. Statistical data is seen as numbers related to context which is a source of meaning and a basis for interpreting the results to be obtained.

Apart from that, in this aspect students are also able to draw conclusions based on the information in the question. Students present information on questions by presenting data in tables and diagrams, then draw conclusions from the available information. According to Gal (2022), students have statistical knowledge if students are able to draw conclusions from the data presented.

3. Ability to Communicate Statistical Data

In understanding the statistical data presented in question number 3 and question number 4, the result was that students were able to explain the process of solving the problems presented in

the question. Apart from that, students prefer presenting data using diagrams and graphs, apart from being easier to understand and understanding, presentation in the form of diagrams and graphs is easier to create and depicts actual data. In the aspect of communicating statistical data, the results showed that students were able to explain the results of the answers they obtained verbally and in writing. Students are able to explain step by step in solving problems without experiencing confusion. This is because students have accuracy in analyzing questions from the start so that when solving the questions, students are able to solve them well.

In solving statistics questions, students are required to be able to create and communicate data well Ardiana (2022). Students who have an understanding of data in the form of graphs and diagrams will find it easy to solve the questions given. Apart from that, presenting data in the form of graphs and diagrams will be easier to read and understand compared to using tables. This makes it easier for students to express the information in the question. Students who can read and interpret diagrams, graphs or tables become a fairly complete skill that can improve their ability to interpret data so that students can solve statistical problems better.

CONCLUSION

Students have no difficulty understanding the data or statistical information provided, this is shown in question 1 and question 2 which are from the test resultsIt shows that on questions 1 and 2 as many as 30 students (100%) could do well. Many students are inaccurate in changing information from problems into other forms, this is shown in question 3 where the test results areon question 3, 10 students (33.33%) worked on the question using the average formula with correct results. Many students can'tdetermine the answer or result of the problem given, this is shown in question 4, as many as 7 students (23.33%) worked on the question using the median formula with the correct results.

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