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Analysis of Students' Mathematics Learning Difficulties in Arithmetic Rows and Series Materials

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ABSTRACT

This research is a type of qualitative research that is descriptive. The subject of this study is grade XI students of SMK New Merpati Nusantara Sihepeng 1, Siabu District, Kabuaten Mandailing Natal, North Sumatra 22976 which has a total of 72 students. The source of this research there are two primary data sources, namely the students of SMK New Merpati Nusantara Sihepeng which are not completed totaling 54 students, the source of the data is Skunder is a teacher in the field of mathematics studies. The sample used is Purposive sampling. The data collection instrument in this study is the observation of data collection through direct observation of the object to be researched, an interview is a conversation with a certain intention carried out by two parties, namely the interviewer and the interviewee. Documentation of the data sources used to complete the research is in the form of photos. Based on the results of the analysis of the mathematics test of grade XI students of SMK New Merpati Nusanta Sihepeng on the arrhythmic row and series material and interviews conducted there are three types of difficulties: Conceptual Difficulties, Principle Difficulties, and Verbal Difficulties.

INTRODUCTION

Education is one of the most important needs for life. Education plays an important role in human life because education is a vehicle to improve human resources. Especially in this modern era. Education is not only needed by a person but even the state needs it. A student who takes education is the forerunner who will realize the country's goal, which is to educate. National education states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality intelligence, noble morals, and skills needed by themselves, the people of the nation and the state. So Education is an effort to build and improve the quality of students. Learning is a process where teaching and learning activities are carried out by teachers and students who interact and exchange information with each other in order to obtain knowledge and form students' attitudes and confidence. Learning is an overall educational process with educators as guides in providing learning and motivation to students. So that teaching and learning activities take place well. The use of the wrong strategy in the learning process will have a very bad effect on the motivation and

learning activity of students in the material delivered by the teacher. Mathematics is a field of study that is studied from kindergarten to college.

This is in line with Jamalma's opinion, one of the subjects taught at every school level. Meanwhile, according to Sitepu, mathematics is a field that has an important role in education. The purpose of mathematics learning is to improve students' ability to develop, starting from comprehension skills to reasoning skills. Mathematics is one of the most important sciences.

Almost every discipline uses mathematics. From the lowest to the highest level, from elementary school students to college students, almost all of them study mathematics. One of the levels that study mathematics is Vocational High School (SMK). Although vocational schools prioritize practice over theory, mathematics is a very important subject. Therefore, mathematics is one of the subjects that is widely used for calculation and multiplication. Learning difficulties are a condition of a person who is unable to learn well. A person's inability is caused by disturbances. The disorder can come from within a person (Internal) or from outside (External). This Trend Factor is limited by a person's intelligence factor, while the External Factor comes from the person's environment (family environment, place of study, and so on). This is strengthened by Van Steenbrugge's opinion which states that learning difficulties can be divided into two types, namely: learning disabilities that lie in the cognitive development of the learner themselves and learning difficulties caused by factors outside the learner or other problems. Furthermore, this learning difficulty can result in low student learning achievement.

This must be considered and a solution is found because if left unchecked, it will be a threat to the future of the nation, considering that if many students experience learning difficulties, student learning achievement will also be lower. Learning difficulties can be experienced by every student which can certainly have an impact on students' ability to achieve learning goals. The term learning difficulties when associated with academics indicates the failure of students in achieving academic achievement as stated in competency standards, basic competencies, and indicators of success. The existence of learning difficulties in students can be detected by student mistakes or students' inability to do assignments and test questions. Learning difficulties can cause a difficult situation and may lead to a decision that forces students to stop trying to learn. Difficulty learning mathematics is one type of learning difficulty that needs attention from the Indonesian government because the ability to master mathematics in Indonesia is relatively low.

This is shown by the results of the mathematics ability survey conducted by PISA (Program For I Terasioan Student Assessment) in 2015 where Indonesia is in the 64th position out of 72 international countries, namely 494. This low ability to master mathematics is also shown by the average results of the national exam in mathematics subjects in 2019 at the vocational school level, which is 35.26. This shows that students' mathematics achievement at the vocational school level at the national level is still quite low, which indicates that there are difficulties in learning mathematics in students. Difficulties in learning mathematics are also experienced by students of SMK New Merpati Nusantara Sihepeng, where the average score of the odd mid-semester exam for the 2023/2024 academic year is still relatively low. The difficulties experienced by students can be analyzed in detail so that the difficulties experienced can be minimized and solutions can be provided. Students who have learning difficulties are generally less likely to master concepts, principles, or operations. Learning difficulties are not only experienced by students with

below-average abilities (lack of understanding) but can also be experienced by students with any level of ability from any circle or group.

Based on the results of the researcher's interview at SMK New Merpati Nusantara Sihepeng, the researcher found that mathematics is one of the compulsory subjects that is less in demand by students. There are also many students who think mathematics is a difficult subject. It is proven by students who often make mistakes in doing the Questions. Mistakes made by students indicate that the student has difficulty in understanding how to solve the existing problem. This is due to the lack of students' understanding of the mathematics lesson. So that it causes students to be lazy to learn it. Students can only memorize formulas without knowing the understanding of the concepts of the material that has been learned, lack of mastery of the material, and errors in the calculation of operations. In addition, as seen in the work on the questions, there are still many things wrong. The student's mistakes require an analysis to find out what difficulties many students experience. It can be concluded from the results of the Researcher's observation above that the lack of ability of students to solve mathematics problems is caused by factors from within the student who consider mathematics to be a difficult subject. The mindset of students here needs to be considered so as not to think that mathematics is a difficult subject.

METHODE

This research will be carried out at SMK New Merpati Nusantara Sihepeng 1, Siabu District, Mandailing Natal Regency, North Sumatra 22976. While the time for this research was carried out from June 11, 2024 to June 15, 2024, the type of research conducted in this study is qualitative research that is descriptive. The purpose of qualitative research is data collected not in the form of numbers but observations, interviews and documentationThe research subject or research informant, which is a source to obtain information or information needed by the researcher, related to the research being conducted. The subject of this study is grade XI students of SMK New Merpati Nusantara Sihepeng 1, Siibu District, Mandailing Natal Regency, North Sumatra 22976 which totals 72 students whose reason the researcher is studying class XI is because the material of rows and arithmetic series is studied in class XI.

The primary data sources are the actors and parties directly involved with the object of the research. The primary data source is the students of SMK New Merpati Nusantara Sihepeng who are not completed totaling 54 students, the secondary data source is a teacher in the field of mathematics study Then, the sampling technique used is purposeve sampling is a sampling technique of data sources with certain considerations by interviewing teachers in the field of mathematics studies. The data collection techniques used were interviews, documentation and observation. Data processing and analysis techniques for data collection, data reduction, data presentation and conclusion examination.

RESULT AND DISCUSSION

Based on the results of the analysis of students' mathematics test results on arithmetic row and series materials at SMK New Merpati Nusantara Sihepeng. The researcher conducted interviews with teachers and students, interviews were conducted by researchers in the field, three types of difficulties in learning mathematics were obtained for students, including conceptual difficulties, principle difficulties, and verbal difficulties. Students' ability to learn varies greatly. Students with high abilities usually do not face difficulties in learning, while

students with low abilities often experience difficulties. This situation often occurs in math learning. Mathematics is a subject that emphasizes understanding concepts and structures, as well as training rational, critical, logical, analytical, and systematic thinking skills. Therefore, mathematics teachers need to make various efforts to make learning mathematics more fun and interesting, so that it can be a lesson that students like and understand. This research was carried out in grade XI class of SMK New Merpati Nusantara Sihepeng. The researcher only took 5 samples from the recommendation of the mathematics teacher to be tested and interviewed. The sample is students who have low mathematical ability. After students take the test, the researcher analyzes their answers and from the analysis, the researcher can identify various difficulties experienced by students in solving problems in arithmetic row and series material. The following are the three types of difficulties experienced by students.

Based on the results of the observation that the researcher got, when the teacher explained that the arithmetic rows were 2,4,6,8,10 had an equal difference of 2, the student (Abdul Azis) could not work on the problem that had a difference, especially the difference of 2. Then, students have difficulty in doing problems that involve calculations because they do not really understand what calculations are. Concept understanding is the ability to grasp understandings such as being able to express a material presented in a more understood form, being able to provide interpretation and being able to apply it. Meanwhile, students here do not understand or have difficulty in understanding the concept of the questions they want to do.

Based on the results of the observations made by the researcher to the students, when given a question such as 3 (2 + 4), students do not understand that they have to multiply 3 by 2 and 3 by 4 so that they get a result of 18. As a result, students make mistakes by directly adding the numbers in parentheses first and then multiplying them. Principles in mathematics express the relationship of two or more. Principles in mathematics can be learned through inquiry processes, guided discovery, group discussions, the use of strategies, problem-solving and demonstrations. To understand a principle, one must first know how to understand the concepts covered in the principle in question. Based on the results of observations made by the researcher on students, when the teacher makes a new question with different symbols, students are confused and do not know how to do it because most students still have minimal knowledge about mathematical symbols. The student may have an easier time understanding the material if they are given a written or visual explanation.

Based on the results of interviews with teachers and students, the factors that affect students in learning difficulties consist of internal and external factors. Internal factors include motivation, interest and self-confidence. Meanwhile, external factors include the family environment and the school environment. In addition to internal and external factors, there are also factors that cause difficulties from concepts, principles, and verbal.

The inability to remember one or more conditions necessary for an object to be expressed in terms that represent it. The inability to remember a condition sufficient for an object to be expressed in terms that represent the concept. It is not possible to inflate an object as an example of a concept from an object that is not an example. Inability to infer information from a given concept. Factors causing difficulties of the principle of arithmetic row and series calculation. The student's inability determines the relevant factors. As a result, they are unable to abstract patterns. Students can state a principle but have difficulty expressing its meaning and applying the principle. Difficulty in carrying out discovery activities about something, not being careful to do the factors that cause verbal difficulties. In

accordance with the observations made by researchers at SMK New Merpati Nusantara Sihepeng, there are several strategies for teachers in teaching, including.

Before starting learning, teachers first make sure that students are ready to learn mathematics. This is also supported by interviews conducted by researchers with mathematics teachers. Media is a tool used in the learning process to provide information in the form of teaching materials so that students can more easily understand the material that will be presented. This problem is used so that students can quickly grasp the material taught by the teacher. This is also related to interviews conducted by researchers with teachers. Provide practice questions to students in each meeting with various questions, so that there is an equal between students who understand the material quickly and students who are slow in understanding. Giving homework directly aims to hone students' memory so that they do not immediately forget the material that has just been taught by the teacher.

Based on the results of the analysis of the mathematics test of grade XI students of SMK New Merpati Nusantara Sihepeng on the arithmetic row and series material and interviews conducted, it was found that three types of learning difficulties experienced by students were found: conceptual difficulties, principle difficulties, and verbal difficulties. Conceptual difficulties occur because students do not understand the basics of arithmetic rows and sequences, as seen from their inability to identify important information from the problem and turn the story problem into mathematical symbols. Principle difficulties are detected when students misapply mathematical principles, such as in algebraic operations, where they incorrectly sum algebraic expressions or use improper formulas. Verbal difficulties arise when students have difficulty understanding the language of mathematics and relating it to concepts that have already been learned, so that they can only work on problems similar to the examples given. The ability of grade XI students of SMK New Merpati Nusantara Sihepeng in learning mathematics varies greatly, but students with low abilities often experience various difficulties. Mathematics that emphasizes understanding concepts, structure, and logical thinking skills requires in-depth understanding and consistent practice. Students' learning difficulties are influenced by internal and external factors. Internal factors include motivation, interest, and self-confidence. Students with low motivation tend to find math difficult and boring, so they are less enthusiastic about learning. Lack of interest causes them not to make a serious effort to understand the material. In addition, low self-confidence makes them reluctant to ask questions or actively participate in learning, even though they are actually able to understand the material. External factors include the school and family environment. A less supportive learning environment, such as inadequate facilities and peer interference, interferes with students' concentration. The lack of supervision and encouragement from parents to study at home causes students to not be optimal in learning.

These findings show that many students have difficulty understanding mathematical concepts and principles and relating the language of mathematics to the concepts they have learned. Therefore, teachers need to make math learning more enjoyable and engaging through contextual learning methods, provide varied exercises, and increase students' motivation and confidence. To overcome these difficulties, it is important to improve the quality of mathematics teaching with a more interactive and contextual approach, as well as to encourage students to learn optimally at home with parental supervision and support.

CONCLUSION

Based on the results of the research. There are three types of learning difficulties experienced by grade XI students of SMK New Merpati Nusantara Sihepeng, namely

conceptual difficulties, principle difficulties, and verbal difficulties. Difficulty Concepts are found because students do not understand the basics of arithmetic rows and series. This can be seen from their inability to identify important information from the questions and turn the story problems into mathematical symbols. Principle difficulties occur when students misapply mathematical principles, such as in algebraic operations. Verbal difficulties arise when students have difficulty understanding mathematical language and relating it to the concepts they have learned, so they can only work on problems similar to the examples given. The factors that affect the difficulty of learning mathematics for grade XI students of SMK New Merpati Nusantara Sihepeng consist of internal and external factors. Internal Factors include motivation, interest, and confidence. Low motivation causes students to find math difficult and boring, so they are less enthusiastic about learning. Low interest makes them not try to understand.

Material in earnest. Lack of confidence prevents grade XI students of SMK New Merpati Nusantara Sihepeng from asking questions or actively participating in learning, even though they are actually able to understand the material. External factors include the school and family environment. A less supportive learning environment, such as inadequate facilities and peer distractions, can interfere with students' concentration. The lack of supervision and encouragement from parents to study at home also causes students to not be optimal in learning. Teachers' strategies in overcoming the difficulties of learning mathematics include: ensuring students' readiness to learn mathematics, using learning media, the material provided is related to daily life, and providing practice questions (homework).

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