



Analysis of Learning Motivation, Anxiety, and Metacognition Learning Awareness of Applications Derivative Function in Class XI IPA 1 Students of MAN Sorong City

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Abstract. This study intends to determine the relationship between learning motivation, anxiety, and the level of metacognition in learning the application of derivative functions in class XI IPA 1 MAN Sorong City in even semesters. This is a qualitative descriptive method. Data collection was carried out using interview guidelines and observations. In contrast, documentation is employed to discover and describe the findings in learning the application of derivative functions in class XI IPA 1 MAN Sorong City. The number of respondents is as many as 32 students. The results of the study revealed a relationship between learning motivation, anxiety, and metacognition level in learning the application of derivative functions in class XI IPA 1 MAN Sorong City. Students in the high category had high self-confidence and could solve problems. In the medium category, students were quite capable of solving problems, a little restless but still able to control themselves, and could follow the learning quite well. In the low category, students feel afraid of learning even before learning begins, students cannot control their minds, so they always feel restless throughout the learning process.

Keywords: Anxiety, Metacognition awareness, Motivation, Mathematics Learning

1 Introduction

Mathematics learning is learning that supports the creation of technology in the future because it emphasizes the ability to think logically, analytically, systematically, critically, and creatively [1]. The role of mathematics allows all aspects of life in this world to develop rapidly [2]. This makes mathematics have its place for people who like learning mathematics. In addition, mathematics will be considered scary and become one of the most challenging subjects for most students. Students who do not like learning mathematics assume that mathematics is the most avoided subject because it is difficult

to understand, so many students get low learning outcomes [3]. Mathematics is a subject that is difficult to understand, so students' learning activities in mathematics subjects decrease [4].

Students who feel unable to compete with other students in learning mathematics will find it difficult to concentrate and have difficulty following learning to the fullest [5]. This point of view will then weaken students' motivation to study mathematics. Motivation is a driving force in students who can generate enthusiasm, ensure continuity, and provide direction in achieving goals in learning activities [6].

Learning mathematics which is considered difficult, makes students feel anxious. The anxiety experienced by students when participating in mathematics learning is referred to as mathematical anxiety. Mathematical anxiety makes students unable to focus on the learning process, and students will find it difficult to understand what the teacher is saying [7]. Anxiety usually arises due to a lack of confidence, worry about rivals or other students, and not being confident in their abilities [8]. Lack of motivation can cause students to underachieve because they feel anxious and cannot direct all their abilities to the maximum [9].

Anxiety is not a problem because anxiety is needed in learning related to student motivation to a certain level. Students who experience anxiety tend to avoid conditions that feel threatened or depressed. Students who indicate mathematical anxiety will argue that mathematics is difficult to learn, and students do not like mathematics lessons, even to the point of skipping classes during math class hours [10].

Motivation and anxiety are internal factors that can affect the process of learning mathematics in schools. Motivation and anxiety levels that occur in students will raise awareness in students to continue to think and act. In this case, awareness means metacognitive awareness involving one's cognitive abilities [11]. Metacognition is essential in supporting students' success in solving mathematical problems. Metacognition helps students awareness to recognize their thinking processes [12]. This awareness will be realized when students can organize and manage their thinking activities.

Mathematics learning outcomes are often used to determine how well they understand and master the material. Student learning outcomes can be seen if the goals determined in learning have been achieved [13]. Based on the problems that arise when learning mathematics in schools described above regarding student learning motivation, learning anxiety, and metacognition. This study aims to provide an overview of how motivation, anxiety levels, and metacognition in learning the application of derivative functions in class XI IPA 1 MAN Sorong City.

2 Research Method

This type of research is descriptive qualitative research. Research that aims to gain an in-depth understanding of human and social problems emphasizes the meaning of the environment, which can affect behavior [14]. Respondents in this study were all students of class XI IPA 1 MAN Sorong City, totaling 32 students. The data collection techniques are questionnaires, interviews, observations, and documentation. Documen-

tation is employed to collect data in the form of the required math value. A questionnaire was used to collect data on motivation, anxiety, and metacognition awareness. The researchers employed a Likert scale to measure the instruments. The research results are described in descriptive qualitative form based on the data obtained in the field and from interviews with students and teachers.

3 Result and Discussion

The results of the research were conducted by distributing learning motivation questionnaires to all students of class XI IPA 1 MAN Sorong City which have been compiled based on the guidelines, and the results obtained are divided into three categories, namely high, medium, and low categories, which can be described in the following table.

Table 1. Distribution Results of Motivation Questionnaires

No	Category	Total Students
1	High	8
2	Medium	15
3	Low	9

Source: Processed Results of Research Data of 2022

Based on the distribution of the questionnaire, it was found that students who had high motivation to learn the application of derivative functions were obtained among as many as eight students. Students in the medium motivation category dominate with a total of 15 students. There are nine students in the low motivation category.

The results of learning the application of derivative functions in class XI IPA 1 MAN Sorong City can be grouped into three categories: high, medium, and low. The obtained results are as follows.

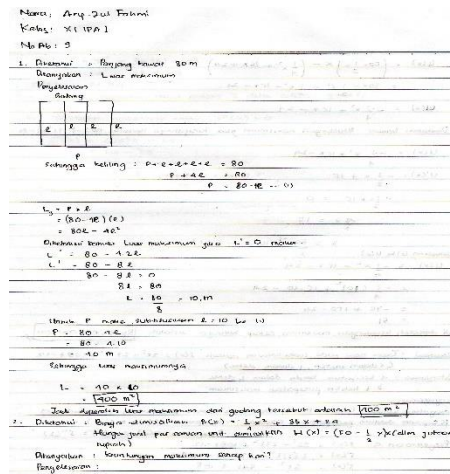


Fig. 1. High Category of Students' Learning Outcomes

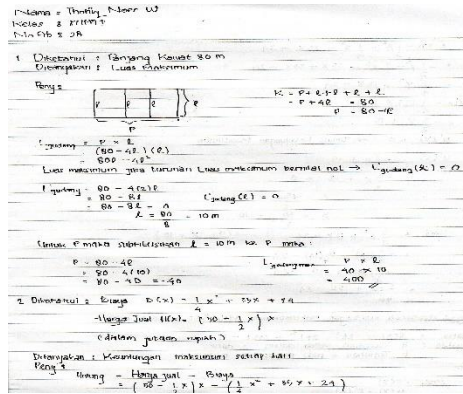


Fig. 2. Medium Category of Students' Learning Outcomes

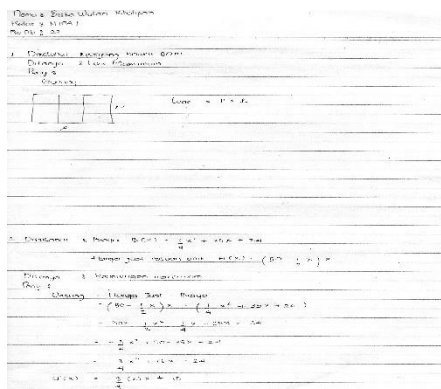


Fig. 3. Low Category of Students' Learning Outcomes

3.1 Discussion

Descriptive analysis of the questionnaire results.

The processed questionnaire then categorized the results into three parts: high, medium, and low. Students who were included in the high category were students who had high learning motivation toward learning-derived function applications. Students were not worried when given a problem, and we were confident in solving problems. According to Komara, self-confidence is a highly important basic investment of an individual's ability to self-actualize and increase the success rate in problem solving [15]. This was supported by the results of interviews with students who found that they had a high enthusiasm for learning and believed that by studying hard, they would get maximum learning outcomes. Students with high problem-solving skills will quickly achieve systematic steps and have confidence in solving mathematical problems [16].

The role of parents in supporting students to learn is maximal, such as providing good facilities and services. Parental attention can provide additional motivation for

students in the learning process at home [17]. In addition, the results of interviews with teachers indicate that students with high motivation in learning will be enthusiastic about participating in class learning. Students like math and feel confident. Students will quickly solve problems encountered in learning mathematics. Do not worry about existing problems, and face them with complete confidence that He can solve problems optimally. There was no feeling of restlessness, sweating, or cold hands. Students can relax following the learning of function derivative applications to the maximum.

The medium category showed that students had moderate learning motivation towards learning-derived function applications. Students were quite worried when given a problem but could solve and solve problems well. No excessive anxiety, no sweating, and hands were not too shaking. Some students seemed to have not relaxed in participating in learning [18]. Students are considered sufficient in managing their minds to control themselves well when facing problems. This follows the results of interviews with students in the medium category; it was found that students with low motivation to learn have sufficient readiness to participate in learning the application of derivative functions. Students followed the lesson well and did not think that mathematics was an annoying or boring lesson. The role of parents in supporting the learning process is good, such as in reminding students to learn and providing other services.

The results of interviews with teachers found that students in the medium category in the learning process were quite attentive, a little unsettled but still able to be conditioned, and did not feel so tense. Students in this category were quite able to control their minds in dealing with problems and were not too afraid if they were less precise in solving problems.

Students in the low category had low learning motivation toward learning-derived function applications. Students in this category felt very worried and nervous when faced with problems. Students feel complaints such as shaking, sweating, and cold sweaty hands. His mind cannot process this anxiety properly, so fear arises while learning mathematics. Students tend to want to leave class faster and dislike learning mathematics. Many students are not finished solving problems.

The interviews with students showed that the fear that occurred resulted from their thinking. Students felt unable to solve existing problems, were not confident that their learning outcomes could not achieve learning goals, and felt hopeless about learning mathematics. The role of parents in supporting the student learning process is very lacking. It is rarely provided with good services and facilities.

The results of interviews with teachers showed that many students were afraid before learning mathematics. Students always feel calm throughout the learning process, and many feel unable to solve existing problems. This happens because students cannot process their minds properly in learning the application of derivative functions, resulting in a high level of anxiety and a high sense of hopelessness in participating in learning which harms learning outcomes that are not as expected [7]. This is in line with the results of research showing that many students experience excessive mathematical anxiety due to low self-confidence, lack of students' mathematical abilities, and dislike of mathematics. Mathematics is an unpleasant subject [19].

4 Conclusion

Based on the results and discussion described above, it can be concluded that learning motivation and students' anxiety level in learning the application of derivative functions had an essential role in students' metacognitive awareness. Students in the high category had high self-confidence and could solve problems. In the medium category, students were quite capable of solving problems, a little restless but still able to control themselves and follow the learning quite well. In the low category, students feel afraid of learning even before learning begins, students cannot control their minds, so they always feel restless throughout the learning process.

Implications

Teachers should pay attention to students' mathematics learning anxiety because it could impact their motivation to study, and they should apply a metacognitive approach to learning so that students have strong metacognitive awareness, which has implications for improved learning outcomes. In Indonesia, indices of student learning outcomes are still governed by Bloom's cognitive taxonomy. The approach has implications for educator assessments of learning outcomes. Teachers primarily assess the cognitive abilities of its students. As a result, students do not make the best use of their strengths in grasping the subject matter given by the teacher. The value of metacognitive knowledge should be measured not only in terms of cognitive skills but also in terms of metacognitive abilities. Regarding other aspects that can affect students' metacognition knowledge and learning outcomes, such as teacher competence, desire in learning, parental attention, and so on.

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