

# Student Mathematical Anxiety In Integral Calculus Courses Through Online Learning

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**Abstract.** Integral calculus learning online has a significant impact on students' ability to understand the material. One of the impacts experienced by students is anxiety in dealing with integral calculus learning online. Some students are not used to learning integral calculus online, so when they get assignments they tend to be nervous and confused about completing them. This study aims to determine students' level of mathematical anxiety in online learning in integral calculus courses. The type of research used in this study is descriptive quantitative. The research was conducted at STKIP Pamane Talino. Mathematical anxiety indicators used are subjective emotional components, cognitive components, psychological reactions, behavioral responses. Based on the results of the study we can conclude that most students (26 out of 30 students) have moderate anxiety levels. Although it is quite affecting the academic ability of students, but it can be said that the level of anxiety of students is not in a worrying condition, this can be seen in the absence of students who have high levels of anxiety. By looking at 4 indicators (subjective emotional, cognitive, psychological reactions, and behavioral responses) it can be noted that some students who gave answers indicated high levels of anxiety. However, even so based on overall calculations remain predominantly answered with indications of moderate anxiety levels.

## INTRODUCTION

Mathematical anxiety over time is a response to stress in math classes, where exams are often pursued time, at home there is competition with siblings, or at work. [1]. Anxiety that when associated with mathematical learning includes state anxiety that is a temporary emotional state and reaction determined by a subjective feeling of tension arising in a particular situation that is perceived as a threat, thus causing discomfort and disrupting the mathematical health [2]. Mathematical anxiety is one of the behavioral and emotional factors that have attracted general attention in recent years. One of the first definitions is that mathematical anxiety is an emotional response syndrome to arithmetic and mathematics [3].

Overcoming math anxiety means checking how we teach maths in our classrooms [4]. Student anxiety found not only in school students but also students in college.[5]. Psychological problems experienced by students cause students' inability to regulate stimulus related to the learning process and learning outcomes [6]. Math anxiety is an uncomfortable feeling that arises when facing math problems [7] Mathematical anxiety is a feeling of tension, worry, and/or fear in situations related to mathematics. [8]

Math anxiety (MA) has been confirmed to decrease students' math performance [9]. Anxiety is the construction of omnibus, and under In its rubric, appears a number of subconstructions related to discrete situations. In academics, two of them stand out: exam anxiety and math anxiety [10]. Mathematical anxiety has been defined as

feelings of tension and anxiety that interfere with number manipulation and math problem solving in a regular assortment of life and academic situations [11] People can experience math anxiety in a formal setting, in a math classroom or when taking a high-risk standard math test, or in other everyday settings, for example when trying to balance a checkbook or looking for tips on restaurant bills when others are watching [12]

Mathematical anxiety is a multi-sided structure and is associated with the terms fear, worry and tension. As mentioned earlier, teachers and parents can do so by projecting their own fear of maths, giving mixed messages about maths, and by being high-expectations of children's math achievements. These factors may cause too much of a mathematically sensitive attitude [13]. The results showed that self-efficacy of mathematics played a large role in mathematical anxiety. Therefore, one of the potentials that can be taken from the results of the current study is that perhaps improving the math self-efficacy of students may also help in reducing math anxiety [14]. Math anxiety is a feeling of depression and anxiety when faced with a math problem. [15]

## METHODOLOGY

The method in the study is descriptive kuantitatif. The subjects in this study were second semester students in integral calculus courses in mathematics education courses. The samples in this study numbered 30 students. The variables in this study were mathematical anxiety in students which included the Subjective Emotional component, cognitive component and psychological reaction of students in attending lectures in Integral calculus courses. The method of data collection in this study is in the form of survey questionnaires given to students. In the survey questionnaire is given a question made by providing alternative answers that have been available, so that respondents just choose the answer that is in accordance with the actual conditions. Mathematical anxiety indicators used are subjective emotional components, cognitive components, psychological reactions, behavioral responses.

**TABLE 1. Mathematical Anxiety Indicators**

Indicators	Statement
Subjective Emotional Components	I tremble when the lecturer asks me to work on integral calculus courses online.
	I was hardly worried when I learned that there would be integral calculus course exams.
	I was nervous about the integral calculus course exams.
	When working on integral calculus courses I am optimistic that I can work on the integral calculus courses correctly
	I was less able to speak fluently when the lecturer asked oral questions during online learning.
Cognitive Components	I get nervous when my integral calculus courses are evaluated by friends.
	I felt very worried because I did not know how to learn to prepare for the exam of integral calculus courses online.
	There are so many integral calculus course materials that it's hard for me to understand.
	When I was in online class I understood the integral calculus course material, but when I returned to the room I forgot the material that had been studied before.
	I suddenly forgot what I had learned when facing an integral calculus course exam online.
Psychological Reactions	I can understand the integral calculus course materials described by the teacher well.
	It was too difficult for me to understand the integral calculus course material.
	I feel my heart beating rapidly when facing online exams integral calculus courses when compared to other courses.
	The integral calculus course was a difficult lesson and I felt deg-degan as soon as I heard the word integral calculus.
	My appetite increased when I thought an integral calculus course exam would take place
My appetite decreased when going to face integral calculus courses.	
	I was delighted when the lecturer asked me to work on an integral calculus

Indicators	Statement
	course online.
	My face was pale when the lecturer asked me to do an integral calculus course online.
	My stomach felt heartburn when the lecturer appointed me to work on integral calculus questions online.
Behavioral Responses	I am ashamed to show the results of online exams of my integral calculus courses to my friend's kepeda.
	I feel less confident when discussing integral calculus learning because I feel less competent.
	I feel that learning integral calculus online puts a lot of pressure on me.
	I was afraid to raise my hand when I wanted to answer a question from a lecturer
	I focus on learning integral calculus online
	Learning integral calculus online in my opinion is quite abstract (not concrete) so it is difficult for me to maintain concentration

## RESULTS AND DISCUSSION

Based on the results of calculations using SPSS application through questionnaires given to students in integral calculus course learning, the following levels of anxiety were found:

**TABLE 2. Student anxiety level profile**

Category	Total (student)	Percentage
High	0	0
Medium	26	86,67%
Low	4	13,33%

**TABLE 2** above explains that most students have moderate anxiety levels. This is enough to affect the academic ability of students. Based on the student's answer to the questionnaire, it is known that some students when working on the question do not feel optimistic answering correctly. In addition, students also state that integral calculus is an abstract course that is difficult for them to maintain concentration. But in general it can be concluded that student anxiety is not at an alarming level. This is proven in the absence of students who are at high levels of anxiety. On the other hand, the result suggests that some of students in medium level, have no idea how to use the math formulas or to proof them. This cause decreasing their ability to solve the exam. Thus, in accordance with Wondinu said that anxiety on learning math subject can affect student's mathematic ability and performance (Wondimu, Alexander, K, & V.D.W, 2012)

### Subjective Emotional Components

Out of 30 students, there were 2 students who answered shaking when the lecturer told to work on the problem in front. There are also 6 students who expressed worry when they learned that a replay would be held. In addition, there are 2 students who always feel nervous when their work must be corrected by their friends. Based on the calculations, on the perspective of subjective emotional indicators, there were 28 students who were at moderate anxiety levels and 2 students with low anxiety levels. So it can be concluded that based on subjective emotional, the student's anxiety level is at a moderate level.

### Cognitive Components

Out of 30 students, there is 1 student who is worried because they do not know how to learn to prepare for the exam. In addition, none of the students who prominently gave answers showed high levels of anxiety. Based on the calculations, on the perspective of cognitive components, there were 28 students who were at moderate anxiety

levels and 2 students with low anxiety levels. So it can be concluded that based on cognitive components, student anxiety levels are at moderate levels.

### **Psychological Reactions**

Out of 30 students, there are 3 students who feel their heart beating fast when facing a math exam. Then, there is 1 student who experiences decreased appetite when going to face the test. Based on the calculations, on the perspective of psychological reactions there were 24 students who were at moderate anxiety levels and 6 students with low anxiety levels. So it can be concluded that based on psychological reactions, the student's anxiety level is at a moderate level.

### **Behavioral Responses**

In the perspective of behavioral responses, out of 30 students there is 1 student who feels ashamed to show the results of his math test to a friend. Then, there is also 1 student who feels less confident when discussing math courses. There is one student who is afraid to raise their hands to answer questions. Lastly, there are 2 students who feel that integral calculus is an abstract course so they have difficulty maintaining concentration while studying. Based on the calculations, on the perspective of behavioral responses, there were 26 students who were at moderate anxiety levels and 4 students with low anxiety levels. So it can be concluded that based on behavioral responses, student anxiety levels are at moderate levels.

Based on the results of the study, it was shown that some students had different reactions to mathematical anxiety in learning integral calculus online. In the subjective emotional component indicators, students tremble when the lecturer asks them to work on integral calculus problems during online learning. This attitude of students is because students cannot focus on learning online, so students are appointed to work on questions. In addition to shaking reactions, I was also worried that when delivered there would be an integral calculus test online. This concern can happen that students are still not familiar with integral calculus tests online, so students prepare materials as well as technical training for online implementation. Students also feel that when their work is corrected by their theme, this happens because students are less confident with their work so that when their work is corrected.

In the cognitive component, there are students who feel worried because they do not know how to prepare for learning. Adaptation in online learning is felt by most students due to the COVID-19 pandemic. One solution that can be offered to prepare for learning is by taking notes and listening during online lectures. Students also experience psychological reactions when facing integral calculus tests online. This psychological reaction is in the form of a fast heart rate when he finds out that an integral calculus test will be held. One of the students showed responses such as embarrassed to show the test results and embarrassed to raise his hand to answer questions. This behavior is actually what they usually do during face-to-face learning, but are not used to switching online.

## **CONCLUSION**

Based on the results of discussions and discussions, we can conclude that most students (26 out of 30 students) have moderate anxiety levels. Although it is quite affecting the academic ability of students, but it can be said that the level of anxiety of students is not in a worrying condition, this can be seen in the absence of students who have high levels of anxiety. By looking at 4 indicators (subjective emotional, cognitive, psychological reactions, and behavioral responses) it can be noted that some students who gave answers indicated high levels of anxiety. However, even so based on overall calculations remain predominantly answered with indications of moderate anxiety levels.

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