Hipotenusa: Journal of Mathematical Society
Volume 06 Issue 01 Year 2024
ISSN: 2716-3156
Website: https://hipotenusa.iainsalatiga.ac.id/index.php/hipotenusa/index

Mathematical Anxiety Profile of New Mathematics Education Students

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DOI: 10.18326/hipotenusa.v6i1.1809

Article submitted: Februari 5, 2024
Article reviewed: May 21, 2024
Article published: June 27, 2024

Abstract

This research is a descriptive qualitative study which aims to describe the mathematical anxiety of new students of the Mathematics Education Study Program at Palangka Raya University both classically and in terms of gender. The subjects of this research were 34 Mathematics Education students at Palangka Raya University, consisting of 21 female students and 13 male students who were selected based on a saturated sampling technique. The technique for collecting data in this research is using a questionnaire. The results of this research can be classically concluded that the majority of new students in the Mathematics Education Study Program at Palangka Raya University have mathematical anxiety. When viewed from gender, the average percentage of mathematical anxiety between female students is greater than that of male students.

Keywords: gender, mathematic anxiety, new students

INTRODUCTION

New students is a term used for first-year students who have just entered the world of college after previously being in high school or vocational school. Of course, the world of school and college is very different, both in terms of the learning process, the environment, and the problems faced. The world of lectures is certainly more complex because there are more variables that influence, unlike in school, so new students have many demands to be address and deal with the problems that exist in lectures. For example, new students must be more mature, more independent, wiser, and other demands which certainly put a lot of pressure and burden on new students.

In addition to the demands that provide a heavy burden, new students also usually find problems during the beginning of college, such as the difficulty of adapting to a new environment. The college and school environment is certainly different, both in terms of meeting new people, different regional origins, to more diverse characters and personalities, so new students must be more extra in adapting. In addition, of course, there are also problems related to learning. Such as different learning times and techniques

between college and school, learning methods that must also be different, to learning materials that are certainly more difficult than at school. Simanjuntak & Amir (2024) stated that new students feel changes in the environment, friends, lifestyle, and ways of learning, causing pressure.

As stated by Nguyen (Fahrianti & Nurmina, 2021) that new students meet new ways of learning in lectures so that they need more adaptation to be able to apply these new ways of learning, besides that there are problems such as the material that students must master more, demands for academic grades, and the tasks given by lecturers in large numbers. This, if it becomes a protracted problem, can cause disturbance or anxiety for new students. In Wong et al's research (Fahrianti & Nurmina, 2021), it is stated that new students are very at risk of feeling stress to anxiety so that new students will be more irritable, depressed by the situation at hand, withdraw, and feel restless.

Anxiety is a normal reaction that arises due to an event in everyday life which is an early warning to prepare for threats and dangers (Christianto et al., 2020). Hayat (2014) states that people who experience anxiety will feel themselves confined and far from freedom, so in order to feel free, they must get out of anxiety or at least control the anxiety. Controlling anxiety is necessary so that it does not interfere with personality and can be used as a source of motivation to move forward in a better direction. Anxiety can be experienced by anyone and caused by anything, including new students who are feeling various kinds of pressures and demands. For new students in the Mathematics Education Study Program, one of the pressures felt can come from grades or academics, even the subject of learning itself, namely mathematics. Anxiety towards mathematics is known as mathematical anxiety.

Mathematical anxiety is anxiety experienced when facing mathematical problems, feelings of tension and fear when facing mathematical problem solving, such as faster heartbeats, beliefs of inability to solve mathematical problems, and even avoiding math lessons (Auliya 2016). Luo et al (2009) stated that mathematical anxiety is an unhealthy mood when meeting with mathematical problems, such as panic, depression, resignation, anxiety, fear, and accompanied by psychological reactions such as sweating, clenching hands, vomiting, lips and pallor. So if students of the Mathematics Education Study Program experience disturbances such as anxiety, fear, sweating, cold hands, and panic because they are carrying out lectures, it can be considered that these students experience mathematical anxiety.

Many things cause someone to experience mathematical anxiety. Mathematical anxiety can be caused by unfavorable experiences during math learning, but it can also be due to learning styles, lack of confidence, lack of trust from teachers and parents (Ramda et al., 2021). Anxiety generally begins with an embarrassing experience either with math or when learning math and the experience worsens so that it affects when understanding and participating in math learning (Kusmaryono & Aulia. 2020). Moreover, if the teacher who teaches math is strict or tends to be fierce, it can make learning math unpleasant and further exacerbate the level of mathematical anxiety.

The perceived mathematical anxiety certainly has an impact on achievement. Someone who has normal mathematical anxiety tends to feel challenged when faced with math problems and will continue to try to solve the problem, but those with high

mathematical anxiety will tend to think about the problem constantly and eventually give up on solving it (Supriatna & Zulkarnaen, 2019). From the results of research by Diana et al (2020), it was also found that students who have low anxiety levels have higher mathematical concept understanding abilities than students with moderate and high levels of mathematical anxiety, and students who have moderate anxiety levels have higher concept understanding abilities than students with high anxiety levels.

Because the level of mathematical anxiety greatly affects learning achievement, it is important to measure the level of mathematical anxiety and find out the factors that cause it and solutions to overcome it. To measure mathematical anxiety can use indicators of mathematical anxiety. One of them is according to Mahmood & Khatoon (Santoso, 2021), indicators of mathematical anxiety, namely avoiding math class; feeling afraid, sick, and dizzy while learning math; difficult when ordered to do math problems; and unable to solve math problems. The level of mathematical anxiety is also influenced by gender. The level of mathematical anxiety of men is usually different from that of women. Women are more easily anxious when facing challenges than men (Yuliati & Zahrah, 2023). Furthermore, it is also mentioned that women have different mathematical anxiety than men so that they have different ways to solve problems and control their anxiety, but women's mathematical anxiety levels tend to be higher than men (Sari et al., 2021).

To minimize the level of mathematical anxiety, according to Freedman (Wicaksono & Saufi, 2013) can be done in a way: 1) Providing a rational explanation of why math must be learned, 2) Instilling a sense of confidence in mathematics, which can be done by increasing practice problems, 3) Discarding bad prejudices about mathematics, namely by knowing the usefulness of mathematics, 4) Learning mathematics with a variety of models that suit learning styles, 5) Not learning mathematics by relying on memorization, 6) When learning mathematics, make the class comfortable and fun, 7) Do not hesitate to talk about mathematics anywhere with anyone, 8) Instill a sense of responsibility for success. These ways can be tried to be done in learning so that it can reduce the level of mathematical anxiety.

According to Fadilah & Munandar (2019) mathematical anxiety needs to be studied because in an effort to improve the quality of learning, especially mathematics learning, it is necessary to know what problems are experienced and how much severity, one of which is mathematical anxiety, so that appropriate motivation and handling actions can be given. From the results of Purba's research (2023), it was found that out of 20 Mathematics Education students, 70% or as many as 14 students indicated experiencing mathematical anxiety, namely 9 students experiencing mild anxiety and 5 students experiencing moderate anxiety. Then it also states that of 32 Mathematics Education students randomly selected from 3 semester levels, a very high level of mathematical anxiety was obtained at 6%, a high level of mathematical anxiety at 31%, a moderate level of mathematical anxiety at 34%, and a low level of mathematical anxiety at 28% (Ramda et al., 2021). From these results, it can be seen that students of the Mathematics Education Study Program who study mathematics daily can also experience mathematical anxiety, then what about the mathematical anxiety of new students who choose to study in the Mathematics Education Study Program?

Therefore, this research will look at how the level of mathematical anxiety of new students in the Mathematics Education Study Program at Palangka Raya University both classically and by gender. It is hoped that by knowing the level of mathematical anxiety of new students in the Mathematics Education Study Program at Palangka Raya University can be the basis for understanding how students feel and anxiety related to mathematics and knowing the factors that cause students to experience mathematical anxiety so that later the right solution can be found to overcome this mathematical anxiety.

METHODS

This type of research is descriptive qualitative research. The research subjects were 34 new students of the Mathematics Education Study Program at Palangka Raya University, consisting of 21 female students and 13 male students. The research subjects were taken with saturated sampling technique, where all members of the population were used as samples (Sugiyono, 2010). In this study, the data collection method used was a non-test method, namely through a questionnaire. Questionnaire is a data collection technique by giving a number of written questions to be answered by respondents (Sugiyono, 2010). The questionnaire used to collect data is a questionnaire to measure mathematical anxiety which is adjusted to the indicators of mathematical anxiety. The data analysis used is:

Calculating the average percentage of student answers per statement item is determined by the formula:

$$\overline{P_i} = \frac{\sum f_i P_i}{n} \times 100\%$$

Description:

$\overline{P_i}$ = the average percentage of student answers for the i-th statement item

f_i = frequency of student answer choices for the i-th statement item

P_i = percentage of student answer choices for the i-th statement item

n = number of students

Calculating the average percentage of student answers per indicator and overall is determined by the formula:

$$\overline{P_T} = \frac{\sum \overline{P_i}}{k} \times 100\%$$

Keterangan:

$\overline{P_T}$ = the average percentage of student answers per indicator or overall

$\overline{P_i}$ = the average percentage of student answers for the i-th statement item

k = number of statement items

Table 1. Criteria for Interpreting the Percentage of Questionnaire Answers

Criteria	Interpretation
$\overline{P_T} = 0\%$	No one
$0\% < \overline{P_T} < 25\%$	A small part
$25\% \leq \overline{P_T} < 50\%$	Almost half
$\overline{P_T} = 50\%$	Half
$50\% < \overline{P_T} < 75\%$	Most
$75\% \leq \overline{P_T} < 100\%$	Almost entirely
$\overline{P_T} = 100\%$	The whole

(Lestari & Yudhanegara, 2017)

RESULTS AND DISCUSSION

The results of research data processing regarding student mathematical anxiety in mathematics learning in semester 2 of the mathematics education study program at Palangka Raya University. After obtaining data from the questionnaire results, then the data is processed in the form of a descriptive percentage table.

Classically

Classically, from the questionnaire data consisting of 14 statement items given to 2nd semester students of the Mathematics Education Study Program at Palangka Raya University consisting of 34 students, the overall average percentage of answers is 50.88%. From the results it can be concluded that most new students have mathematical anxiety in learning mathematics. To see the results of the percentage of mathematical anxiety based on indicators can be done by analyzing student answers for each indicator of mathematical anxiety. Mathematical anxiety in learning mathematics is measured using a questionnaire based on 4 indicators. The results of the percentage analysis per each indicator can be seen in Table 2.

Based on student answers on the first indicator, namely it is difficult to be ordered to do math, the average percentage is 58.43%. It can be concluded that most new students are difficult to order to do tasks or problems in learning mathematics. For the second indicator, namely avoiding math, an average of 48.82% was obtained. It can be concluded that almost half of the freshmen avoid learning math. For the third indicator, namely feeling physical pain, dizziness, fear, and panic when learning math, an average of 47.06% was obtained. It can be concluded that almost half of all new students feel physical pain, dizziness, fear, and panic when learning math. For the last indicator, namely not being able to do math test questions, an average percentage of 49.22% was obtained. It can be concluded that almost half of the new students cannot do math test questions. Overall, when viewed from each indicator, it can be concluded that most of the new students of the Mathematics Education Study Program at Palangka Raya University have mathematical anxiety.

Table 2. Percentage Results of Mathematical Anxiety Indicators

No.	Indicator	Average (%)	Interpretation
1	Difficult to command to do math	58,43	Most
2	Avoiding math	48,82	Almost half
3	Feeling physical pain, dizziness, fear, and Panic	47,06	Almost half
4	Unable to do math test questions	49,22	Almost half

When students experience mathematical anxiety, it will be very difficult to be able to enjoy learning math, being given math assignments, and even solving math problems or problems. In accordance with the opinion of Anita who states that people who experience anxiety in learning mathematics can cause difficulties in solving mathematical problems and following mathematics learning (Hidayat & Ayudia, 2019). Therefore, from the questionnaire results, it was found that most of the new students were difficult to ask to do math problems or assignments and almost half of the new students could not complete the math test because of the mathematical anxiety they felt.

Most new students in the Mathematics Education Study Program experience mathematical anxiety due to several things, one of which is feeling insecure about their mathematical abilities, so that when given a mathematical problem they feel less able to solve the problem. This is in accordance with the conclusions of research from Dina et al (2022) that the factors that can affect mathematical anxiety are personality, namely feeling afraid and not confident in their abilities to low motivation to learn mathematics because of unpleasant experiences when learning mathematics. To be able to increase students' self-confidence when learning mathematics, of course, it cannot be done by the students themselves but also requires support from the parents of lecturers who give lectures in class. Parents can provide attention and motivation when the student feels down in learning mathematics while lecturers can design interesting and motivating math lessons so that students become happy to learn mathematics and are more confident when solving math problems.

Based on gender

Brandon explained that gender differences affect mathematics learning, it is also explained that men are more interested in learning math than women so that women feel more anxious when learning math than men (Mz, 2013). When based on gender, from the questionnaire data given to male 2nd semester students of the Mathematics Education Study Program at Palangka Raya University consisting of 13 students, the overall average percentage of answers is 49.71%. It can be concluded that almost half of the second semester students of the Mathematics Education Study Program at Palangka Raya University who are male have mathematical anxiety. For female students consisting of 21 students, the average percentage of overall answers is 51.57%. It can be concluded that most of the second semester students of Mathematics Education Study Program of Palangka Raya University who are female have mathematical anxiety. When compared between the average percentage of mathematical anxiety of female students is greater

than male students (51.57%>49.71%) so it can be concluded that the mathematical anxiety of semester 2 students of Mathematics Education Study Program of Palangka Raya University who are female is greater than the mathematical anxiety of male students in mathematics learning. This result is also supported by Kusumawati & Nayazik's research (2017) which concluded that female students' mathematical anxiety is higher than male students' mathematical anxiety.

As for the average percentage of male students' answers per each indicator can be seen in Table 3.

Table 3. Percentage Results of Mathematical Anxiety Indicators of Male Students

No.	Indicator	Average (%)	Interpretation
1	Difficult to command to do math	58,46	Most
2	Avoiding math	50,00	Half
3	Feeling physical pain, dizziness, fear, and Panic	42,69	Almost half
4	Unable to do math test questions	47,69	Almost half

Based on the answers of male students on the first indicator, namely it is difficult to be orderedto do math, the average percentage is 58.46%. It can be concluded that most male students find it difficult to be ordered to do problems or assignments in learning mathematics. For the secondindicator, namely avoiding math, an average of 50% was obtained. It can be concluded that halfof male students avoid learning math. For the third indicator, namely feeling physical pain, dizziness, fear, and panic, an average of 42.69% was obtained. It can be concluded that almosthalf of all male students feel physical pain, dizziness, fear, and panic when learning math. For the last indicator, namely not being able to do math test questions, an average percentage of 47.69% was obtained. It can be concluded that almost half of male students cannot do math testquestions. Overall, when viewed from each indicator, it can be concluded that almost half of the new male students in the Mathematics Education Study Program at Palangka Raya University have mathematical anxiety.

Men have better math skills than women, but it does not rule out the possibility that malestudents also feel mathematical anxiety like female students. The more dominant factor causingmale students to have mathematical anxiety is environmental factors, for example the male students' socialization, or it could also be from the methods and ways of teaching lecturers in lectures that are not in accordance with students' learning styles. It is explained that environmental factors can cause mathematical anxiety, namely related to the conditions and atmosphere of learning tense or boring math (Sari et al, 2021) and the personality of the teacherwho teaches math (Syafri, 2017). The solution that can be done if environmental factors are theproblem of the emergence of mathematical anxiety is to create a relaxed and fun math learningenvironment.

Meanwhile, the average percentage of female students' answers per each indicator can beseen in Table 4.

Table 4. Percentage Results of Female Students' Mathematical Anxiety Indicators

No.	Indicator	Average (%)	Interpretation
1	Difficult to command to do math	59,05	Most
2	Avoiding math	48,81	Almost half
3	Feeling physical pain, dizziness, fear, and Panic	43,81	Almost half
4	Unable to do math test questions	54,60	Most

Based on the answers of female students on the first indicator, namely it is difficult to be orderedto do math, the average percentage is 59.05%. It can be concluded that most female students find it difficult to be ordered to do problems or assignments in learning mathematics. For the second indicator, namely avoiding math, an average of 48.81% was obtained. It can be concluded that almost half of female students avoid learning math. For the third indicator, namely feeling physical pain, dizziness, fear, and panic, an average of 43.81% was obtained. Itcan be concluded that almost half of all female students feel physical pain, dizziness, fear, andpanic. For the last indicator, namely not being able to do math test questions, an average percentage of 54.60% was obtained. It can be concluded that most female students cannot do math test questions. Overall, when viewed from each indicator, it can be concluded that most of the new students with female gender in the Mathematics Education Study Program at Palangka Raya University have mathematical anxiety.

The greater mathematical anxiety of female students than men can be caused by the less self-confidence of female students than men. Judging from personality factors, women have more shyness and low self-confidence and lack of confidence because they see the ability of men who are more proficient in mathematics (Astiati & Ilham, 2023). This can be the cause ofhigher mathematical anxiety of female students. The solution that can be done is to create a learning atmosphere that is not tense and provides threats to students, especially female students, and by forming cooperative groups in learning or solving problems so that they can discuss with each other, increase self-confidence, and provide a sense of security that other friends are experiencing the same problem.

CONCLUSION

Classically, it can be concluded that most of the new students of the Mathematics Education Study Program at Palangka Raya University have mathematical anxiety. It can be seen from the questionnaire results which show the average percentage of overall answers of 50.88%. One of the factors that cause mathematical anxiety in students is a feeling of lack of confidence in their mathematical abilities. The solution to increase students' self-confidence isthe support and motivation from parents and also lecturers who provide courses to overcome students' lack of confidence in mathematics. When viewed from gender, the comparison of theaverage percentage of mathematical anxiety of female students is greater than male students (51.57%>49.71%) so it can be concluded that the mathematical anxiety of new students of the Mathematics Education Study Program at Palangka Raya University who are female is greaterthan the mathematical anxiety of male students in mathematics learning. The more dominant factor causing

male students to have mathematical anxiety is environmental factors, while for women it is due to personality factors and lack of self-confidence. The solution to overcome is by creating a relaxed and fun math learning environment and by forming discussion groups in learning to solve problems so that it can increase self-confidence and provide a sense of security that other friends are experiencing the same problem.

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