Mathematics Anxiety: How It Affects Learning Motivation During The Pandemic

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Mathematics Anxiety: How It Affects Learning Motivation During The Pandemic

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Abstract

The COVID-19 pandemic is causing a change in the field of education where learning is currently becoming online. This affects the psychology of the students. The purpose of this study is to analyze the mathematics anxiety and learning motivation of secondary students based on gender during the pandemic. The participants in this study were 451 8th grade students of State Secondary School in South Jakarta. The instrument used was a questionnaire. It consisted of 45 statements belonging to 22 items of mathematics anxiety, and 23 items of student learning motivation. The data analysis applied was descriptive, Mann-Whitney test, and correlation analysis. The results found out that students' mathematics anxiety during the COVID-19 pandemic was in the moderate category ($\bar{x}$ = 2.85). Meanwhile students' learning motivation was in the high category ($\bar{x}$ = 3.83). In addition, there were significant differences (z_{count} = -2.90) in mathematics anxiety levels between male and female students. However, in the motivation of learning mathematics students, there was no significant difference (z_{count} = -1.46). The correlation between mathematics anxiety and learning motivation indicated a negative relationship.

Keywords: anxiety; gender; learning; mathematics; motivation

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Introduction

The emergence of Coronavirus Disease (COVID-19) causes an alteration in the education system (Syauqi et al., 2020). The virus spreads so quickly and has become a global epidemic (Fitria & Ifdil, 2020). It is able to provide pressure on the individual and the society (Choi et al., 2020). As Zhang et al. (2020) stated, this pandemic reduces sleep quality, thereby increasing anxiety and stress. This reconstructs the education system from learning face to face at school to learn from home by online learning. The online learning policy brings new challenges for all educational institutions. The entire series of instructions have moved into the house and all of the exercises have been converted into homework. As a result, students must become accustomed to online learning. However, a study of 238 college students found that 52.5 percent of the participants disliked studying online since they couldn't talk to the teacher directly and freely, also had a lot of homework (Hermanto et al., 2021). Students are concerned about the new education system because the materials or tasks assigned would be difficult to be comprehended as a whole, particularly in mathematics. Students are becoming increasingly anxious as a result of this learning system (Christiansen, 2021). It can have an impact on their mental health (Mendoza et al., 2021). students' anxiety in learning mathematics can begin in elementary and junior high schools (Zakaria & Nordin, 2008). When a fear of mathematics emerges in elementary school, it will carry over to the next level of education. Students' learning outcomes could be harmed by mathematics anxiety(Devine et al., 2012; Sahin Kesici & Ahmed Erdogan, 2010; Erdoğan et al., 2020). According to Keshavarzi & Ahmadi (2013) research, students' learning outcomes tend to decrease when they are anxious. While, another study said that students with little or no mathematical anxiety perform better than students with mathematical anxiety (Tapia & Marsh, 2004). Furthermore, the students' mathematical performance is influenced by his/her motivation to learn mathematics (Albool, 2012; Tapia & Marsh, 2004; Zakaria & Nordin, 2008).

Motivation can be classified into two types: intrinsic and extrinsic factors. Intrinsic factors are those that exist within the student, whereas extrinsic factors come from parents, teachers, and the surrounding environment (Sengodan & Iksan, 2012). The motivation provided by the teachers has a significant impact on students' learning desires. Self-motivation is also critical; if students are not interested in and enjoy learning, they will tend to disregard it. Furthermore, Hidi and Harackiewicz asserted that as children grow older, their interests in learning, particularly mathematics, fade away (Otoo et al., 2018).

In addition, Suren & Ali Kandemir (2020) revealed that learning outcomes can also be influenced by gender differences. Leder & Forgasz (2002) showed that boys did not comprehend the mathematics subject. While Keshavarzi & Ahmadi (2013) found contrasting phenomena, where half of the male students in their research said they love mathematics and they performed better in math than the other subjects. This is supported by Tapia & Marsh (2004), in which they found that gender influences students' motivation and level of mathematical anxiety. This implies that a person's cognitive and learning psychology can depend on their sexes. As a result, depending on their personalities, boys and girls learn mathematics in very different ways. Since the 1970s, researchers have been studying the

relationship between mathematics learning and gender and found that men are better suited to mathematics than women, according to history (Leder & Forgasz, 2002).

Research on mathematics anxiety and learning motivation based on gender is not a new case. It is yet unanswered, however, on that study during the COVID-19 pandemic as it took place for the first time. Based on the background above, this study aims to analyze the anxiety of mathematics and motivation to learn mathematics based on gender during the COVID-19 pandemic.

Methods

A data collection for this study employed a survey method by using a questionnaire with a 5-point Likert scale. The questionnaire was adopted from previous research studied by Suren & Ali Kandemir (2020). It was classified into two parts: assessing for mathematics anxiety and learning motivation toward mathematics. There were 22 items in the section on mathematics anxiety. It was broken down into five indicators which were attitude (4 statements), confidence (5 statements), mathematics content knowledge (4 statements), learning activities (4 statements), and examination (5 statements). Respondents could select one out of five answers including never anxious (1), a little anxious (2), occasionally anxious (3), frequently anxious (4), and very anxious (5).

For the students' learning motivational section, there were 23 statements. All of these were divided into five indicators. They were intrinsic goal orientation (3 statements), extrinsic goal orientation (4 statements), task value (5 statements), beliefs (5 statements), and self-efficacy (6 statements). Respondents could select one of five answer options including strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). Table 1 showed questionnaire interpretation of mathematics anxiety and motivation of learning mathematics (Suren & Ali Kandemir, 2020).

Table 1. Questionnaire Interpretation

Mean	Interpretation
1.00 - 1.79	Very Low
1.80 - 2.59	Low
2.60 - 3.39	Moderate
3.40 - 4.19	High
4.20 - 5.00	Very high

Regardless, these instruments were modified by the researchers to fit in the current COVID-19 pandemic learning condition. Before being distributed, the questionnaire was translated into Bahasa Indonesia and validated by one mathematics expert and a linguist. Improvisation was carried out in several items as the validators' suggestions. After adjustment, the instrument was compiled in Google Form and distributed online to schools.

Participants in this study were eighth-grade students from secondary state schools in Southern Jakarta during the 2020/2021 academic year. The researchers were not able to obtain the exact number of eighth-grade students. According to Statistics Indonesia, the number of secondary students studying at state schools in Southern Jakarta is 50,206 during the 2020/2021 academic year (BPS, 2020). Therefore, the researchers approximated the number of eighth-

grade students by dividing it into three degrees of secondary school in Indonesia. To acquire a minimum sample size of them, Nevitte Cowa's Estok formula was applied (Karami, 2018).

$$n = \frac{Z_{\frac{\alpha}{2}}^2[P(1-P)]N}{Z_{\frac{\alpha}{2}}^2[P(1-P)] + (N-1)E^2}$$

With population number of eight-grade students (N) was approximated to be 16,736; the standard value of the normal distribution $(Z_{\frac{\alpha}{2}})$ was 1.96 at the .05 significance level; and the proportion of population (P) was .3333 with bound of error (E) .05. Hence, a minimum sample size (n) of 335 was required to gain a portraying the population.

Simple random sampling was applied as a sampling technique. From 11th February 2021 to 27th March 2021, 508 students completed the online questionnaire. The sorting data was then carried out to exclude the invalid data. It was discovered students who filled the questionnaire more than once and some did not complete the identity as directed. The sorting result displayed 451 students involved in this study. Table 2 shows the percentages of male and female students.

Table 2. Sample Count and Percentage

Gender	N	%
Male (m)	187	41.46
Female (f)	264	58.54
Total	451	100

This study's data analysis included a descriptive, the Mann-Whitney test, and correlation analysis. The descriptive was used to assess students' levels of mathematics anxiety and motivation. It displayed the mean score, skewness, and kurtosis values for each item. The Mann-Whitney test showed the differences between two data groups which were normally not distributed either or both. Following a prerequisite test and obtaining data that were not normally distributed, a non-parametric test, the Mann-Whitney test, was performed in this study. The Mann-Whitney test was applied to examine the differences between mathematics anxiety and students' motivation based on gender. Correlation analysis was used to determine the association between mathematics anxiety and students' motivation. It also revealed whether there was a strong relationship between mathematics anxiety and students' learning motivation. The correlation value has a value between -1 and 1. Correlation between variables is considered strong when the value of correlation (r) approaches the 1 or -1, while the correlation will be weaker when the value of r is close to 0 (Susanto, 2018). If the calculation result is obtained $r_{count} > r_{table}$, then mathematics anxiety and learning motivation are considered to have a linkage, whereas if the results $r_{count} < r_{table}$ then the mathematics anxiety and motivation of students are considered to have no linkage (Yudihartanti, 2018). If the value of the correlation is negative, then the two variables have an inversely proportional relationship (Susanto, 2018). This means that the higher the student's mathematics anxiety score, the smaller the motivational score would be. All data analysis in this study was calculated by using Microsoft Excel 2016 software.

Results

This study focuses on the gender-based variables of mathematics anxiety and motivation to learn mathematics. The following sections explain the findings and discussions.

Descriptive Analysis

Finding out the level of mathematics anxiety was carried out by performing statistical analysis on the data set. Table 3 displays the descriptive analysis results of the mathematics anxiety questionnaire for each item.

Table 3. Descriptive Analysis of Mathematics Anxiety

Item	Statement	Gender	$\bar{x}$	Skewness	Kurtosis
1	When a mathematics teacher sends you a link to an online math class.	m	2.04	.83	.06
		f	2.03	.70	-.30
2	On the first day of school, I see new math book.	m	1.88	1.28	.94
		f	1.93	1.16	.53
3	When I grab a mathematics notebook.	m	1.61	1.68	2.89
		f	1.70	1.63	2.01
4	When having discussions about mathematics.	m	2.28	.73	-.22
		f	2.54	.45	-.45
5	When I tell my classmates about my mathematical abilities.	m	2.51	.42	-.82
		f	2.57	.40	-.95
6	When listening to a mathematics teacher's voice through a laptop or mobile speaker while participating in online learning.	m	1.87	1.30	.86
		f	2.04	1.01	.02
7	When the teacher inquires about math lessons or problems.	m	2.82	.21	-.80
		f	3.33	-.07	-1.09
8	During online learning, I am asked to explain mathematics problems directly.	m	3.45	-.44	-.95
		f	3.70	-.50	-.89
9	When someone inquires me about mathematics.	m	2.61	.24	-.81
		f	2.82	.25	-.88
10	When I look at the mathematics problem of geometric shapes.	m	2.58	.37	-.82
		f	2.82	.32	-.74
11	When I look at the graphs in the mathematics book.	m	2.35	.53	-.53
		f	2.53	.57	-.32
12	When I see a page containing mathematical rules.	m	2.25	.58	-.47
		f	2.34	.76	-.29
13	When I look at the page with mathematical formulas.	m	2.32	.56	-.40
		f	2.60	.41	-.96
14	When I am unable to solve a mathematical problem.	m	3.71	-.65	-.61
		f	4.18	-1.05	.04
15	When I am stuck on math problems and do not know where to begin.	m	3.31	-.17	-.95
		f	3.59	-.28	-.93
16	When I am unable to recall the mathematics material that I have learned.	m	3.74	-.59	-.51
		f	3.94	-.74	-.54
17	When I am unable to comprehend the materials taught during online learning.	m	3.59	-.43	-.79
		f	3.86	-.68	-.71
18	Once the date of the mathematics exam has been set.	m	2.72	.37	-.92
		f	3.07	.00	-1.16

19	When I see a mathematics question in an exam.	m	2.75	.28	-.91
		f	3.01	.11	-.90
20	When I practice answering math problems before exams.	m	2.03	.90	.15
		f	2.28	.67	-.37
21	When the results of the mathematics exam are announced.	m	3.40	-.31	-1.19
		f	3.86	-.69	-.73
22	When my parents find out my mathematics test scores are low.	m	3.93	-.95	-.40
		f	3.99	-1.04	-.17
MA. Overall	Overall Mathematics Anxiety	m	2.72	.29	-1.12
		f	2.93	.12	-1.26

Item no 22 had the highest mean score for male students' ($\bar{x} = 3.93$) referring to Table 3. It was stated that "when my parents found out my mathematics test scores" which fell into the high mathematics anxiety category as seen in Table 2. This category is similar among the highest mean score female students ($\bar{x} = 4.18$) but the item was "when I am unable to solve a mathematical problem". Overall, the mathematics anxiety during the pandemic show that female students ($\bar{x} = 2.93$) were more anxious than male students ($\bar{x} = 2.72$). The level of math anxiety for both genders, however, was moderate.

Table 4 shows the descriptive analysis results of learning motivation of eighth-grade students in South Jakarta.

Table 4. Descriptive Analysis of Learning Motivation

Item	Statement	Gender	$\bar{x}$	Skewness	Kurtosis
1	I love learning topics I like in mathematics lessons, even though they are difficult.	m	3.29	.04	-.41
		f	3.52	-.08	-.18
2	Learning mathematics makes me very happy	m	3.01	.05	.09
		f	2.98	-.15	.33
3	I do mathematics homework to get knowledge not just for good grades	m	3.92	-.71	.00
		f	4.06	-.68	-.26
4	I love getting good grades in mathematics lessons	m	4.50	-1.94	4.27
		f	4.77	-3.02	12.58
5	I want to get a good test score	m	4.67	-2.86	9.48
		f	4.86	-2.90	8.22
6	I want to get higher mathematics scores than my friends	m	4.40	-1.58	2.09
		f	4.56	-1.72	2.56
7	I want to show my friends and family that I can succeed in mathematics lessons	m	4.23	-1.29	1.40
		f	4.54	-1.92	3.73
8	I can apply mathematics to other lessons	m	3.50	-.18	-.42
		f	3.64	.03	-.65
9	For me, mathematics is important to learn	m	3.81	-.56	-.14
		f	4.05	-.70	.55
10	Mathematics lessons caught my attention	m	3.17	-.22	.03
		f	3.15	.02	.15
11	Mathematics lessons are very useful for me	m	3.71	-.38	.01
		f	3.80	-.31	-.28
12	I love mathematics lessons	m	3.06	-.04	-.18
		f	3.05	-.05	.03
13	Understanding mathematics lessons is very important to me	m	3.71	-.38	-.21
		f	3.89	-.43	-.13

14	If I learn well, I can sure understand mathematics	m	4.38	-1.59	3.10
		f	4.49	-1.27	1.39
15	I realize if I fail the mathematics lesson, then it is my fault	m	4.12	-.81	.22
		f	4.12	-.89	.90
16	If I study seriously, I am sure I can understand mathematics	m	4.43	-1.70	3.40
		f	4.56	-1.50	3.02
17	If I do not understand mathematics subjects, this is because I do not learn seriously	m	4.03	-.71	-.16
		f	4.08	-.98	.95
18	If I study mathematics, then I get good grades	m	4.24	-1.30	2.10
		f	4.20	-.55	-.82
19	I can understand mathematics subjects even most difficult topics	m	2.99	.12	-.40
		f	2.77	.23	.06
20	I can understand the lessons taught in mathematics lessons	m	3.44	-.05	-.25
		f	3.21	-.12	.24
21	I can understand the most difficult mathematics lessons described by teachers in the classroom	m	2.87	.06	-.39
		f	2.69	.10	-.10
22	I will get high scores for assignments and mathematics exams	m	3.78	-.15	-.44
		f	3.81	-.35	-.45
23	I will succeed in mathematics lessons	m	3.85	-.57	-.11
		f	4.09	-.36	-1.09
Mo. Overall	Overall Learning Motivation	m	3.79	-.57	-.37
		f	3.89	-.61	-.33

According to the Table 4, both genders had highest mean score (male $\bar{x} = 4.67$; female ($\bar{x} = 4.86$) in the same item which was "I want to get a good test score". Based on Table 1, this corresponded to a very high level of learning motivation. As we can see for all indicators, students were eager to learn mathematics. Overall, female students ($\bar{x} = 3.89$) were more encouraged than male students ($\bar{x} = 3.79$) to learn mathematics during the pandemic.

Normality Test

Kim (2013) states that skewness and kurtosis are an alternative way determining the normality test when the number of data is large ($N > 300$). Hence, according to Table 3 and Table 4, it can be seen that the data was not normally distributed. The data is said to be normal if skewness and kurtosis scores are in the range of ±2 (Suren & Ali Kandemir, 2020). Therefore, a non-parametric test, the Mann-Whitney test, was employed instead of a t-test as a parametric test.

Mann-Whitney Test

The Mann-Whitney rank test aims to examine the similarity of two independent populations (Yanti, 2007). In this study, the Mann-Whitney test was conducted to determine whether there were differences in students' mathematics anxiety and learning motivation level based on gender by perceiving the indicators of each variable. The results of the Mann-Whitney test

calculation using a two parties test and a significance level of .05 obtained a value of $z_{table} = z_{0.5(1-0.05)} = z_{0.0475} = 1.96$ are listed in Table 5.

Table 5. Mann-Whitney Test

Indicators	Gender	N	$\bar{x}$	z
Attitude	m	187	1.95	-1.35
	f	264	2.05	
Confidence	m	187	2.65	-2.49
	f	264	2.89	
Mathematics Content Knowledge	m	187	2.38	-1.84
	f	264	2.57	
Learning Activities	m	187	3.59	-3.28
	f	264	3.89	
Examination	m	187	2.97	-2.93
	f	264	3.24	
Overall Mathematics Anxiety	m	187	2.72	-2.90
	f	264	2.93	
Intrinsic Purpose Orientation	m	187	3.41	-1.92
	f	264	3.52	
Extrinsic Purpose Orientation	m	187	4.45	-3.82
	f	264	4.68	
Task Value	m	187	3.45	-1.54
	f	264	3.54	
Beliefs	m	187	4.13	-1.11
	f	264	4.23	
Self-Efficacy	m	187	3.53	1.04
	f	264	3.46	
Overall Learning Motivation	m	187	3.79	-1.46
	f	264	3.89	

According to Sundayana (2014) H_0's acceptance criteria are $-z_{table} < z_{count} < z_{table}$. Based on Table 5, in the results of mathematics anxiety on attitude indicators (z_{count} = -1.35) and knowledge of mathematics content (z_{count} = -1.84), there were no significant differences from mathematics anxiety between male and female students. Meanwhile, in the indicators of confidence (z_{count} = -2.49), learning activities (z_{count} = -3.28) and exams (z_{count} = -2.93), there were significant differences. The calculation results for the overall mathematics anxiety (z_{count} = -2.90) showed that there was a significant difference in mathematics anxiety between male and female students.

The calculation results in Table 5 for learning motivation on extrinsic goal orientation indicators (z_{count} = -3.82) demonstrated that there were significant differences in the motivation of learning mathematics between male and female students. In the meantime, in the intrinsic goal orientation indicator (z_{count} -1.92), task value (z_{count} = -1.54), beliefs (z_{count} = -1.11), and self-efficacy (z_{count} = 1.04), there was no significant difference in the motivation of learning mathematics between male and female students. In the calculation results for the overall motivation of learning mathematics z_{count} = -1.46, it was demonstrated that there was

no significant difference in the motivation of learning mathematics between male and female students.

Correlation Analysis

The connection between mathematics anxiety and motivation to learn mathematics was identified using Person Product Moment correlation analysis. A Pearson Product Moment coefficient (r_{count}) represents the strength of both variables when likened to an r_{table}. The $r_{table} = .09$ was obtained with a significance level of $.05$ and the number of samples was (N) 451. The results of the correlation analysis computation are seen in Table 6.

Table 6. Correlation Analysis Results between Mathematics Anxiety and Mathematics Learning Motivation

Indicator	MA. A	MA. C	MA. MCK	MA. LA	MA. E	MA. Overall
Mo. In	-.28	-.38	-.33	-.11	-.25	-.32
Mo. Ex	.04	.06	.04	.22	.13	.12
Mo. TV	-.24	-.33	-.30	-.08	-.20	-.28
Mo. B	-.10	-.12	-.12	.11	-.01	-.06
Mo. SE	-.28	-.33	-.30	-.11	-.20	-.29
Mo. Overall	-.23	-.30	-.27	-.01	-.15	-.23

When the absolute value of $r_{count} > r_{table}$, then the variables correlate. The direction of the connection between variables was indicated by the sign of positive and negative. Table 7 explains how to interpret correlation coefficient values (Nikmatun & Waspada, 2019).

Table 7. Interpretation of Correlation Coefficient Values

Correlation Coefficient Interval	Correlation Level
.00 - .19	Very Low
.20 - .39	Low
.40 - .59	Medium
.60 - .79	Strong
.80 - 1.00	Very Strong

Table 6 shows that the indicator of attitude had a negative correlation with all indicators of mathematics learning motivation, with the exception of extrinsic goal orientation, which did not correlate ($r_{count} = .04$). This implies that when students exhibit more anxiety through gestures, their eagerness to learn mathematics in terms of intrinsic goal orientation, task value, beliefs, and self-efficacy were lower. The strength of the correlation between these variables, however, was weak but the beliefs indicator ($r_{count} = -.10$) was very low.

A similar correlation is shown for the indicator of confidence and mathematics content knowledge. Both did not correlate with extrinsic goal orientation.($r_{count} = .06$; $r_{count} = .04$). This expresses that whether a nervous students' confidence level or mathematics content knowledge was high or low had no effect on extrinsic goal orientation. The highest correlation value was found at this link, which connects the confidence indicator to the intrinsic goal orientation ($r_{count} = -.38$). However, this correlation remained in the low range.

In addition, indicator of learning anxiety had positive correlation with the extrinsic goal orientation indicator ($r_{count} = .22$) and the beliefs indicator ($r_{count} = .11$). The strength of the relationship was low and very low, respectively. Meanwhile, the correlation between the learning anxiety and the intrinsic goal orientation had negative relationship with very low category ($r_{count} = -.11$). The indicator of self-efficacy was likewise. Computation shows that there was no correlation between the indicator of learning anxiety and the indicator of task value ($r_{count} = -.08$).

Another correlation is for the indicator of examination. It is seen that the examination indicator had negative correlation with three of four indicators of motivation learning. They were the intrinsic goal orientation ($r_{count} = -.25$), the task value ($r_{count} = -.20$), and the self-efficacy ($r_{count} = -.20$). According to Suardana & Simarmata (2013), The strength of correlation in these indicators belongs to the low level category. Simultaneously, the examination had positive correlation with very low level in the relationship with the extrinsic goal orientation ($r_{count} = .13$). For the correlation between the examination and the beliefs, there was no relationship between them ($r_{count} = -.01$).

Overall, mathematics anxiety had a low relationship with mathematics learning motivation in the pandemic period. Its Pearson correlation value was $-.24$ and it had a negative correlation. This was in line with the research of (Widodo et al., 2017) dan (Suardana & Simarmata, 2013).

Discussion

In this study, gender differences were used as a variable to investigate students' anxiety about mathematics and learning motivation during the pandemic. The study confirms that female students outperform male students in the overall mathematics anxiety result and all sub-dimensions. This is aligned with previous studies (Devine, Fawcett, Szucs, et al., 2012; Goetz et al., 2013; Amani et al., 2011). In this pandemic period, both genders experience moderate levels of mathematics anxiety as in accordance with a recent study carried out by Lailiyah et al. (2021). Khesht-Masjedi et al., (2019) declare that anxiety is always associated with adolescence, which could explain why there is no statistically significant difference in anxiety levels across ages. Yet, it is unclear in this study why females frequently report feeling more anxious towards mathematics than males. The possible reason could be explained by Biaggio & Nielsen (1976) which reveal that women are more likely than men to express their anxiety openly. Besides, Batchelor et al., (2017) say that male and female students respond differently; male students may reply based on how they truly feel, whereas female students may respond based on how they believe they should feel.

Another finding of this study is that students were eager to learn mathematics during the pandemic as seen in the overall value of motivation score. This is a good starting point for students to learn because one study found that the success or failure of online learning is determined by the student's motivation to learn (Samir Abou El-Seoud et al., 2014). In terms of level, the motivation of female students outnumber male students. However, their highest mean score was located in the same item which was they would like to achieve the best score for

mathematics subject. This item belongs to the sub-dimension of extrinsic goal orientation. According to goal orientation theories, this sub-dimension refers to the subconscious purpose in learning, which leads to performance goals of doing better than others do and avoiding appearing dumb (Cook & Artino, 2016).

Since gender was concentrated as the variable, the study discovered a significant difference in overall mathematics anxiety between girls and boys in the implementation of online learning. Confidence, learning activities, and tests were the sub-dimensions with significant differences for both genders. According to various research, boys surpass girls in terms of confidence (Fennema & Hart, 2020; Sherman, 1980). While girls experienced more exam anxiety than boys (Devine, Fawcett, Szucs, et al., 2012).

On the other hand, it was discovered that there was no significant difference in overall learning desire for both genders when it came to mathematics. When the data were analyzed further, it was discovered that there was a significant difference in a sub-dimension of learning motivation, and it was in the extrinsic goal orientation.

In addition, findings revealed that the examination indicator had a negative correlation with overall learning motivation. It stated that students who were anxious had a low desire to learn mathematics and vice versa. This contradicts one study, which found that students who were undervalued by their teachers and had a low rank in math performance were more anxious in test anxiety sub-dimensions, despite having a high level of motivation (Urhahne et al., 2011). Individual personality differences may necessitate the use of various psychological strategies for dealing with academic anxiety. Overall, the correlation between mathematics anxiety and learning motivation towards mathematics revealed a weak negative relationship. Previous studies have found that when students are engaged in and enjoy what they are learning, they learn more effectively (Mata et al., 2012; Nicolaidou & Philippou, 1997). This implies that when students are in unpleasant situations, are worried, or do not feel passionate about learning, their desire to learn decreases.

Conclusion

According to descriptive analysis, the overall calculation of students' mathematics anxiety during the COVID-19 pandemic is moderate. This is certainly a sign that online learning activities are still less effective because students experience high mathematics difficulties and anxiety due to ignorance of the materials or problems given. The results of descriptive analysis of learning motivation show that from the overall calculation, it is in the high category. This is good because high learning motivation can make students more diligent to learn and improve their school performance.

Referring to the overall calculation of the Mann-Whitney test, it can be concluded that during the COVID-19 pandemic, there were significant differences in mathematics anxiety between male and female students. This is contrary to the motivation of learning which has no significant difference. In the analysis of correlations, it was said that between mathematics anxiety and student motivation there was a low association with the motivation of learning student mathematics.

These findings may assist teachers and parents in advancing the mathematical-learning process for boys and girls students in comprehending mathematics. Furthermore, it can provide insights into the search for a teaching method for reducing mathematics anxiety.

1
Conflicts of Interest

The authors declare that no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely by the authors.

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