

Dian Ratna Puspananda

by Dian Ratna Puspananda

Submission date: 09-Nov-2020 03:52AM (UTC-0800)

Submission ID: 1440714726

File name: 14836-Dian_Ratna_Puspananda_Turnitin.docx (1.94M)

Word count: 2984

Character count: 17521

The influence of mathematics anxiety and emotional quotient on English language education students' statistics learning outcomes

Dian Ratna Puspananda¹, Oktha Ika Rahmawati²

^{1,2} IKIP PGRI Bojonegoro. Jalan Panglima Polim no. 46 Kabupaten Bojonegoro, Indonesia.

E-mail: ¹dian.ratna@ikipgribojonegoro.ac.id, ²oktha_ika@ikipgribojonegoro.ac.id

Article received : 11 September 2020,

Article revised : 21 oktober 2020,

Article Accepted : 4 november 2020

* Korespondensi Penulis.

Abstract: The internal factors (characteristics) of students are assumed to have an impact on the learning process. Internal factors of students include motivation, creativity, intelligence, emotional intelligence, anxiety, etc. Most English language education students still worry about statistics course, which contains numbers and different calculation process types. However, the 'statistics' course is a compulsory subject that students must study, particularly at IKIP PGRI Bojonegoro, which is very useful to complete final and daily assignments. Statistics is a part of mathematics that studies how to access, analyze, and interpret data. Most English language education students find numbers-related topics difficult. Anxiety in subjects related to numbers is assumed to affect student's psychological state, especially emotional states, which is an important factor that leads to achievement. This study aimed to determine the effect of mathematics anxiety and emotional quotient on English language education students' statistics learning outcomes at IKIP PGRI Bojonegoro. The subjects in this study were the third-year students of English language education in 2019/2020. The technique of data analysis used was the Multiple Regression Analysis. The data were obtained from questionnaires and documentation. The results showed that mathematical anxiety and emotional quotient affect English Language Education students' statistics learning outcomes at IKIP PGRI Bojonegoro. This is evidenced by the value of $F_{count} = 69,992$ higher than $F_{table} = 1,607$. Mathematical anxiety and emotional quotient affect the statistics learning outcomes by 74.9% (strong category).

Keywords: Mathematics Anxiety, Emotional Quotient, statistics learning outcomes

INTRODUCTION

Feeling nervous or anxious about something is often encountered in people's daily lives. Anxiety is a psychological factor that defines a person's state of feeling, emotional state, restlessness, uncertainty, or fear of reality when confronted with reality or events in his or her life. Anxiety, according to Freud, is an unpleasant feeling and can cause emotional distress. Tang defines anxiety as an emotional state when there is fear, anxious and uneasy passions associated with a fear of something (M. & S. Z., 2016).

There is also anxiety in the academic sphere. Sometimes students are anxious and depressed about a specific topic. Based on the author's observations since the beginning of 2018, most students in the English language education program worry about numerical topics and a long process of calculation so that they can influence their learning outcomes. Number anxiety and all sorts of calculations are often referred to as mathematical anxiety.

Richardson and Suinn (in Fitriza, 2020) report mathematical anxiety as a feeling of tension and anxiety that interfaces when someone is experiencing mathematical problems in real and academic life. Lyons and Beylock (in Istikomah & Wahyuni, 2018) asserted that mathematics anxiety has similar symptoms with those suffered by the body for other causes. ¹ Because of the posterior insula, a part of the brain that perceives pain in the body becomes an active part of the brain on the subject with mathematics anxiety, particularly subjects with high mathematics anxiety.

Mathematical anxiety is a form of students' emotional response in 'exact' courses when resolving numerical problems and discussing solutions. Suppose anxiety about numbers predominates in the mind of a person. In that case, it will be difficult for him to think about exact courses that students ultimately refuse to learn and tend to stay away from these. Moreover, if students are anxious about mathematics, this will affect the learning process and the achievement of learning goals. The high level of mathematics anxiety interferes with students thinking processes in solving the mathematics problem (Udil et al., 2017).

Emotional intelligence is often referred to as the emotional quotient. Every person has a different emotional intelligence level. It is considered that emotional intelligence can influence a person in resolving problems. Differences in individual emotional intelligence can contribute ⁶ to a better understanding of the implications of effective policy changes that occur in an organization. Individuals ⁵ with poor emotional control would react negatively toward the proposed changes. In contrast, individuals with the ability to use emotions appropriately, optimistic and often also take the initiative, in general, decided ⁵ to reframe their perceptions of the program of change recently introduced and looked at it as an exciting challenge (Ali et al., 2018).

According to Mayer and Salovey (1990), Emotional quotient refers to an ability to understand our emotions and others. The emotional quotient gives a sense of empathy and motivation in confronting reality, including motivation for academic activities that affect learning. When we can process emotions, motivation will grow to improve learning outcomes.

In the English language education program, statistics is the subject that deals with the number and sometimes makes students feel nervous and frustrated and incapable of adequately processing emotional intelligence in the face of statistical problems. They are also thought to affect learning performance. Statistics courses obtained are essential, on the one hand. Statistical courses, however, are essential in order to deepen further and comprehensive research. In that statistical skills can promote understanding of research methods appropriate (Idris, 2013).

Many studies investigated the effect of emotional intelligence on students' learning outcomes. From those studies, it was revealed that, in general, emotional intelligence has positive effects on students' learning outcomes. Septian (2016) investigated the influence of emotional intelligence on learning outcomes in the

Economic education program of Sebelas Maret University. His study found that the $t_{count} > t_{table}$ ($5.381 > 1.97$) with p -value < 0.05 ($0.000 < 0.05$), so that H_0 is rejected and H_1 is accepted. This means that there is a positive and significant impact of emotional intelligence on the students' academic achievement.

Another study conducted by (Rawa & Mastika Yasa, 2019) reveals that the level of students' mathematics anxiety in primary school teachers education program at STKIP Citra Bakti, East Nusa Tenggara was that there were 29 students (90.63%) indicated to experience anxiety, 12 students (37%) experienced severe anxiety, 9 students (28.12%) experienced moderate anxiety, and 8 students (25%) experienced light anxiety. Meanwhile, only 3 students (9.38%) were not indicated to have mathematics anxiety.

Further, research carried out by (Setiadi, 2018) conclude that the contribution of self-concept, emotional intelligence, and anxiety to the statistics learning outcomes is 59.50%. Thus, the STIS students' statistical learning outcome is determined by these three variables: self-concept, emotional intelligence, and anxiety.

Based on the elaboration above, this study was intended to know the effect of mathematics anxiety and emotional quotient on solving statistical problems. Thus, this study was entitled '*The influence of mathematics anxiety and emotional quotient on English language education students' statistics learning outcomes.*'

RESEARCH METHOD

The subjects of this study were the third-year students of the English language education program in 2019/2020. There were two variables in this study, i.e., independent and dependent variables. The independent variables of this study were *mathematics anxiety* and *emotional quotient*. Meanwhile, the dependent variable of this study was students' learning outcomes of a statistics course.

This study's population was all of the third-year students of the English language education program at IKIP PGRI Bojonegoro in 2019/2020. The sample of this study was taken from the whole population so that the sampling technique used was saturation sampling.

The data in this study were gathered through questionnaires and documentation methods. A questionnaire method was used to measure students' mathematics anxiety and emotional quotient. There were two types of questionnaires in this study, i.e., *mathematic anxiety* and *emotional quotient questionnaires*. Meanwhile, the students' learning outcomes of the statistics course was taken from the documentation method.

The questionnaire of mathematics anxiety was presented in 'Google Form' through this link <https://forms.gle/aGpnvnsisEATbyFDs9>, and the students filled it out online. Two experts validated the mathematics anxiety questionnaire instrument. The instrument validity values ranged from 0.301 to 0.562. Based on the *r product moment*

table, if the sample size is 32 with a significance level of 5%, the *r table* value is 0.349. Thus, the calculated *r-value* (0.384-0.730) is higher than the *r table* (0.349) so that the instrument is valid. The instrument reliability value was 0.858. According to (Budiyono, 2011), if the reliability value is more than 0.70, the instrument is reliable. The mathematics anxiety questionnaire instrument was adopted from (Husnul, 2016), with the questionnaire indicators as follows.

Table 1. The Indicators of *Math Anxiety* Questionnaire

Variable	Operational Definition	Indicators	Parameter
<i>Math anxiety</i>	<p>Fear or anxiety, restlessness, helplessness when facing learning or math exams are shown by the following attitudes:</p> <ol style="list-style-type: none"> 1. Restless 2. Heart palpitations 3. High blood pressure (easy emotions) 4. Cold sweat on the palms 5. Tense 6. Cannot sleep 7. Quickly surprised 8. Insecurity 9. Sleep disorders 10. Nervous 	<ol style="list-style-type: none"> 1. Cognitive 2. Affective 3. Psychomotor 4. Somatic 	<ol style="list-style-type: none"> 1.1 Students can understand mathematics learning materials 1.2 Students can answer mathematics test 2.1 Students can raise the hand before answering the question 2.2 Students can compete with their peers 2.3 Students can focus their mind during mathematics learning 3.1 Students dare to do the mathematics task in front of the class (on the board) 3.2 Students can accept criticism from friends 3.3 Students can speak fluently when the teacher raises questions orally 4.1 do not experience muscle disorders when facing math tests, such as: <ol style="list-style-type: none"> a. The heart beats faster b. Decreased appetite c. Stomach cramps d. Hands turn cold e. Face turns pale

Another instrument was the *emotional quotient* questionnaire. It was adopted from (Setiyawan, 2013) with the following indicators.

Table 2. The Indicators of *Emotional Quotient* Questionnaire

Variable	Factor	Indicator
Emotional Quotient	1. Recognizing self-emotion	1.1 Recognizing and feeling self-emotion
		1.2 Understanding the causes of emotion
		1.3 Recognizing the influence of feeling on action
	2. Managing emotion	2.1 Being tolerant of frustration
		2.2 Being able to express anger appropriately
		2.3 Being able to control aggressive behaviour which can damage oneself and others
		2.4 Being able to manage stress
	3. Self-motivation	3.1 Having a good self-control
		3.2 Being optimistic in facing problems
		3.3 Being able to focus on a given task
	4. Recognizing other's emotion	4.1 Being able to accept others' opinion
		4.2 Having empathy or sensitivity to others
		4.3 Being able to listen to others
	5. Having a relationship	5.1 Understanding the importance of having a relationship with others
		5.2 Being able to resolve conflicts with others
		5.3 Having good communication skills with others
		5.4 Having a friendly nature
		5.5 Having a deep concern for others' interests
5.6 Being able to live harmoniously with others		
5.7 Being happy to sharing and collaboration		
5.8 Being mature and tolerant		

The questionnaire was presented in 'Google form' with the link <https://forms.gle/7disZnAQWVDBNVE19>, and the students filled it out online. Two experts validated the emotional quotient questionnaire instrument. The instrument validity values ranged from 0.301 to 0.562. Based on the *r product moment* table, if the sample size is 50 with a significance level of 5%, the *r table* value is 0.279. Thus, the calculated r-value (0,301-0,562) is higher than the r table (0,279) to validate the instrument. The instrument reliability value was 0,724. According to (Budiyono, 2011), if the reliability value is more than 0.70, the instrument is reliable.

The data analysis used was the classical assumption test, which includes the normality test, multicollinearity test, and heteroscedasticity test. After fulfilling the classical assumption test, multiple regression analysis was carried out. All data analysis was done through the SPSS 22 application.

RESULTS AND DISCUSSION

The normality test results are carried out by looking at the Normal Probability Plot graph, which can be seen in the following figure.



Figure 1. Normality Test

Figure 1 above shows that the data spread around the diagonal line and follows the diagonal line's direction so that the regression model meets the assumption of normality.

The multicollinearity test results are presented in the following figure.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	91.987	35.116		2.620	.012		
	Mathematic Anxiety	-.859	.192	-.583	-4.465	.000	.313	3.192
	Emotional quotient	.321	.132	.318	2.432	.019	.313	3.192

a. Dependent Variable: Prestasi

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Mathematic Anxiety	Emotional quotient
1	1	2.989	1.000	.00	.00	.00
	2	.010	17.080	.00	.12	.05
	3	.000	99.901	1.00	.88	.95

a. Dependent Variable: Prestasi

Figure 2. Multicollinearity Test

From the figure above, it can be explained that in this multicollinearity test, the tolerance value for each independent variable is 0.313, which value is less than 0.5, while the VIF value of each independent variable is 3.192. The value is less than 10 so that it can be concluded that the regression model does not have multicollinearity.

The next general assumption test is the heteroscedasticity test. The test results can be seen in the following figure.

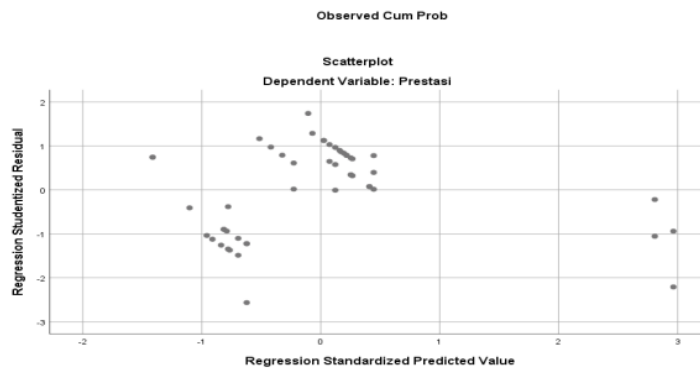


Figure 3. Heteroscedasticity Test

Figure 3 above shows the scatter plots between the predicted value of the dependent variable and its residual value spread below and above the 0 value on the Y axis, so there is no heteroscedasticity.

After the general assumption test has been fulfilled, the multiple regression analysis will be carried out. Multiple regression analysis in this study also used SPSS 22. The results of multiple regression analyses are presented in the following figure.

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.865 ^a	.749	.738	5.29214		

a. Predictors: (Constant), Emotional Quotient, Mathematic Anxiety

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3920.501	2	1960.250	69.992	.000 ^b
	Residual	1316.319	47	28.007		
	Total	5236.820	49			

a. Dependent Variable: Prestasi Mahasiswa
b. Predictors: (Constant), Emotional Quotient, Mathematic Anxiety

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	91.987	35.116		2.620	.012
	Mathematic Anxiety	-.859	.192	-.583	-4.465	.000
	Emotional Quotient	.321	.132	.318	2.432	.019

a. Dependent Variable: Prestasi Mahasiswa

Figure 4. Multiple Regression Coefficient Test and Determination Coefficient

The significance value (P -value) for each of the independent variables, mathematics anxiety and emotional quotient, is $P < 0.05$, while the value of $t_{\text{count}} = -4,465 < t_{\text{tabel}} = -2,312$ for the mathematics anxiety variable and $t_{\text{count}} = 2,432 > t_{\text{tabel}} = 2,312$ for the emotional quotient variable. The critical area of the t test is, $DK = \{t \mid t < -2,312 \text{ or } t > 2,312\}$. From this explanation, it can be concluded that the two variables, mathematics anxiety and emotional quotient, affect the dependent variable, students' statistics learning outcomes.

In Figure 4, the value of $F_{\text{count}} = 69.992 > F_{\text{tabel}} = 3.195$ and the significance value is < 0.05 , so it can be concluded that mathematics anxiety and emotional quotient variables simultaneously affect students' statistics learning outcomes.

From Figure 4 above, it can be seen that the coefficient of determination is 0.749. The mathematics anxiety and emotional quotient affect students' statistics learning outcomes by 74.9% and is included in the strong category, meaning that the two independent variables strongly influence the dependent variable. The regression equation from the above analysis is:

$$\hat{Y} = 91,987 - 0,859X_1 + 0,321X_2$$

For example, what is the student's statistics learning outcome if the mathematics anxiety score is 80, and the emotional quotient is 150?

Then the predictive value is:

$$\hat{Y} = 91,987 - 0,859(80) + 0,321(150) = 71,417$$

Individually, the influence of mathematics anxiety and emotional quotient variables is presented in the following figure.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	174.708	9.171		19.050	.000
	MA	-1.247	.113	-.847	-11.028	.000

a. Dependent Variable: Hasil Belajar Statistika

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	MA ^b	.	Enter

a. Dependent Variable: Hasil Belajar Statistika

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.847 ^a	.717	.711	5.55648

a. Predictors: (Constant), MA

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3754.843	1	3754.843	121.616	.000
	Residual	1481.977	48	30.875		
	Total	5236.820	49			

a. Dependent Variable: Hasil Belajar Statistika

b. Predictors: (Constant), MA

Figure 5. MA Regression Analysis of Statistics Learning Outcomes

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-55.625	13.993		-3.975	.000
	EQ	.809	.087	.801	9.278	.000

a. Dependent Variable: Hasil Belajar Statistika

Variables Entered/Removed ^a			
Model	Variables Entered	Variables Removed	Method
1	EQ ^b	.	Enter

a. Dependent Variable: Hasil Belajar Statistika
b. All requested variables entered.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.801 ^a	.642	.635	6.24963

a. Predictors: (Constant), EQ

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3362.042	1	3362.042	86.078	.000 ^b
	Residual	1874.778	48	39.058		
	Total	5236.820	49			

a. Dependent Variable: Hasil Belajar Statistika
b. Predictors: (Constant), EQ

Figure 6. EQ Regression Analysis of Statistics Learning Outcomes

Based on figures 5 and 6 above, mathematics anxiety affects students' statistics learning outcomes by 71.7%, while emotional quotient affects students' statistics learning outcomes by 64.2%.

This study's results are in line with research conducted by (Purwati & Hasanah, 2016). The study reveals an effect of emotional intelligence on students' achievement in mathematics education at the University of Papua, with the regression equation $Y = 3.239 + 0.032X$. The emotional intelligence aspect that most influences students' learning achievement is self-regulation, with a significant value of 0.025, and social skills with a significant value of 0.026. This is the same as the research conducted by (Pamungkas et al., 2014). This study concludes that there is a positive relationship between self-concept and mathematics anxiety on students' learning outcomes. The mentioned studies reinforce that mathematics anxiety is an internal factor affecting the students' learning outcomes. Mathematics anxiety occurs because it is influenced by many factors, as revealed by (Yuberta et al., 2019), such as internal and external factors. An example of external factors is the environment around students, and the examples of internal factors are gender, psychological and emotional differences in students. Through these factors, the teacher or lecturer must balance students' abilities, both mentally and knowledge. Students' mathematics anxiety does not interfere with understanding learning material because high anxiety can interfere academic success. Ilmiah et al., (2020) state that high levels of anxiety can disrupt concentration and memory, critical to academic success.

In this study, the emotional quotient also has a significant influence on students' statistics learning outcomes. Pasaribu et al. (2018) conducted a study on the influence of spiritual quotient and emotional quotient on internal audit judgment. The study concludes that emotional intelligence has a more significant impact than spiritual intelligence on internal audit judgment. Besides, Fauziah (2015) conducted a study on the relationship between emotional intelligence and students' achievement. The study

concludes that there was a significant relationship between emotional intelligence and learning achievement, as evidenced by p -value of $0.001 < 0.05$. From the elaboration above, it can be seen that the emotional quotient has a large percentage of influencing students' learning outcomes. The emotional quotient factor needs to be trained to have excellent emotional quotient because forming good emotional intelligence requires a process. Islam & Alauddin (2019) state that emotional quotient cannot be possessed instantly by someone. However, it takes a process in which the environment becomes one of the quotient aspects.

There are several essential principles for training the emotional intelligence of students. Uin et al. (2017) assert that training children's emotional intelligence is good principles, good parenting, interactional communication patterns, applying supportive communication patterns, and accepting reality realistically. Good emotional intelligence will positively impact individuals and the environment, both on attitudes and performance. Rahmatullah and Irianto (2018) state that someone who has an excellent emotional quotient considers more comprehensive and leads up more ethical behaviour. Emotional quotient has a vital role in getting satisfaction regarding the compensation and how someone can realize working procedures' vitality.

CONCLUSION

Simultaneously, mathematic anxiety and emotional quotient affect the statistics learning outcomes of English language education students at IKIP PGRI Bojonegoro by 74.9%. Meanwhile, 25.1% is influenced by other factors. Individually, mathematics anxiety affects students' statistics learning outcomes by 71.7%, while emotional quotient affects students' statistics learning outcomes by 64.2%. When students' internal factors such as mathematics anxiety and emotional quotient are known, it will be easier to apply appropriate learning to minimize students' anxiety and train students' emotional intelligence to be more able to control themselves in solving problems so that learning can run smoothly and learning objectives will be achieved.

REFERENCES

Dian Ratna Puspananda

ORIGINALITY REPORT

9%

SIMILARITY INDEX

4%

INTERNET SOURCES

4%

PUBLICATIONS

4%

STUDENT PAPERS

PRIMARY SOURCES

1	www.researchgate.net Internet Source	2%
2	garuda.ristekdikti.go.id Internet Source	1%
3	Submitted to School of Business and Management ITB Student Paper	1%
4	Submitted to Universitas Mercu Buana Student Paper	1%
5	Maria Vakola, Ioannis Tsaousis, Ioannis Nikolaou. "The role of emotional intelligence and personality variables on attitudes toward organisational change", Journal of Managerial Psychology, 2004 Publication	1%
6	Submitted to Universiti Teknologi MARA Student Paper	1%
7	Submitted to Universidad de Almeria Student Paper	1%

8

Helin Garlinia Yudawisastra, Daniel T. H. Manurung, Fitria Husnatarina. "Relationship between value added capital employed, value added human capital, structural capital value added and financial performance", Investment Management and Financial Innovations, 2018

Publication

1%

9

LUTFIA HAKIM BANU MUSTAIN, KOMARA DJAJA. "THE BURDEN OF REGIONAL DEVELOPMENT PLANNING IN INDONESIA: A CASE STUDY OF DISCREPANCIES BETWEEN LAND USE AND SPATIAL PLANNING DOCUMENT IN BANTEN PROVINCE", WITPRESS LTD., 2017

Publication

<1%

10

Submitted to Universitas Muhammadiyah Surakarta

Student Paper

<1%

11

Mahdi Salehi, Zahra Dastanpoor. "The effects of psychological factors on the performance of independent auditors in Iran", Current Psychology, 2018

Publication

<1%

12

M Naqiyah, Jumadi, I Wilujeng. "Physics Learning Using Direct Instruction Model Assisted by Plickers Application to Measure Problem Solving Ability", Journal of Physics:

<1%

Conference Series, 2019

Publication

13

Reza Gharoie. "Chapter 13 Emotional Intelligence: The Most Potent Factor of Job Performance Among Executives", IntechOpen, 2012

Publication

<1%

14

Lilik Shofiyah, Ani Wilujeng Suryani. "Audit Report Lag and Its Determinants", KnE Social Sciences, 2020

Publication

<1%

Exclude quotes Off

Exclude matches Off

Exclude bibliography On