

Statistical anxiety and teacher presence among graduate students: A moderation analysis

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ABSTRACT

Statistical anxiety is pervasive to a certain extent among graduate students and has been studied extensively in the literature. However, there seems to be a hiatus on what can moderate the relationship between anxiety and performance in statistics. The present study explored the moderating role of teacher presence in the statistical anxiety among 65 graduate students from three universities in the Philippines. The graduate students were found to have high levels of statistical anxiety in attending class, taking examination and in their computation self-concept while they have moderate levels of anxiety in asking for help, worth of statistics, and to their statistics instructors. There is sex difference in the statistical anxiety among the respondents with the male graduate students feel more negative in taking examination and attending statistics class, more afraid to ask help from others, and are less confident that they can succeed in their tasks than their counterparts. Meanwhile, teachers' presence is assessed positively by the graduate students with their visibility very evident during direct instruction and assessment. This signifies teachers' commitment to provide high quality instruction and assessment in their online statistics class. Also, the moderation analysis reveals that higher level of teacher presence is associated with weaker negative relationship between statistical anxiety while lower level of teacher presence is associated with stronger negative relationship between the two variables. The practical implications of this findings compel universities offering graduate programs to bolster teacher presence in statistics classes to ensure better learning experiences and outcomes among graduate students.

Keywords: Graduate students, Moderation analysis, Statistics, Statistical anxiety, Teacher presence, University teaching.

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Highlights of this paper

- The levels of Statistical anxiety among graduate students range from moderate to high where the respondents have high levels in attending class, taking examination and in their computation self-concept.
- Teacher presence is a significant moderator in the relationship of statistical anxiety and academic performance among graduate students.
- Universities offering graduate programs need to bolster teacher presence in statistics classes to ensure better learning experiences and outcomes among graduate students.

1. INTRODUCTION

Statistics is an important coursework in any graduate program across disciplines. This is because every graduate student is expected to undertake research projects as proof of their scholarship which may involve the application of various statistical procedures and techniques. Statistics help to shape scientific inquiries in collecting and analyzing data accurately, predicting outcomes, and making informed decisions based on empirical data (Frost, 2022). Thus, it is perceived to be a pivotal aspect of the academic and professional development of university students (Amirian & Abbasi-Sosfadi, 2021), particularly among graduate students.

However, Statistics is one of the feared subjects among university students, including graduate students and the generally negative attitude towards the subject is not completely new. Many students suffer from major anxieties when studying statistics (Amirian & Abbasi-Sosfadi, 2021; Sexton, 2019; Tutkun, 2019). The nature of the subject and the way the statistical concepts are taught are the common reasons why people have a negative perception of statistics. Students were forced to use computers and software in carrying out statistical tests which is a separate skill to master (Butler, 2018). Some also think that Statistics is taught out of context because the examples have no direct application in life (Practise, 2021). Instructors may be at fault too as some of them do not recognize the implication of teaching a very specialized content area (Ramsey, 1999). These challenges and negative experiences of students may lead to the development of statistics anxiety.

Paechter, Macher, Martskvishvil, Wimmer, and Papousek (2017) describe statistics anxiety as the apprehension that individuals experienced in instructional situations in studying statistics, which includes working on statistical tasks. It is the feeling of anxiety felt doing statistical analysis (Levpušček & Cukon, 2022) and it occurs when students are challenged with statistics in different levels and ways (Levpušček & Cukon, 2022). With this, when students manifest fear and uneasiness when working with statistical tasks, they experience statistical anxiety.

There is documented and published empirical proof that students' feelings of stress, anxiety, and tension have an important effect on their academic performance. Researchers emphasized that a person's ability to work is inversely correlated with their level of anxiousness. Less academic success would be the result of higher levels of worry. Graduate students frequently experience anxiety in statistics classes. According to Tutkun (2019), certain graduate students who are enrolled in statistics courses typically lack a background in math and statistics, which results in the development of a negative perception and attitude toward the topic. Due to the COVID-19 danger, this became even worse during online classes, as students found it difficult to comprehend statistical principles (England, Brigati, Schussler, & Chen, 2019; Luigi et al., 2007; Zhang, Zhao, & Kong, 2019).

Although there has been extensive research on the connection between statistical anxiety and academic achievement, there is insufficient evidence in the literature to support the moderating effect of teachers' presence on this relationship (Meda & ElSayary, 2021). The Community of Inquiry Framework's most important element, teacher presence, links cognitive and social presence to create authentic online educational experiences for students. It is defined as the teacher's visibility in the classroom (Caskurlu, 2018) and is associated with students' motivation and engagement in both traditional and online learning. It is believed that teacher presence can reduce the association between statistical anxiety and academic performance among graduate students since it has something to do with course design, fostering conversation, and direct instruction.

The present study aims to expand the existing body of knowledge regarding the relationship of statistical anxiety and academic performance among graduate students and to explore the moderating role of teacher presence. The findings of this study can be utilized by university instructors and others researchers in obliterating statistical anxiety among graduate students to help them improve their learning experiences and outcomes in statistics courses.

1.1. Research Questions

1. What is the level of statistical anxiety among graduate students enrolled in an online statistics course in terms of:
 - Interpretation
 - Test
 - Ask for help
 - Worth
 - Teacher
 - Self- concept
2. How do the graduate students' describe the online presence of their teacher in their statistics class?
3. Does teacher presence moderate the relationship between statistical anxiety and the academic performance of graduate students in their online statistics courses?

1.2. Statistical Anxiety

Sources of statistical anxiety are divided into three: situational, dispositional, and environmental. Situational factors that cause students' statistical anxiety are from their engagement in statistics courses themselves and may include teacher-related factors. Dispositional statistical anxiety has something to do with students' personality and characteristics while environmental antecedents include factors that are inherent to the learners even before their engagement in the statistics course such as their field of specialization, age, and technological skills (Baloğlu & Zelhart, 2003). These factors inform the possible causes of statistical anxiety of each student in the present study.

Kian et al. (2022) studied anxiety and examination stress in statistics among postgraduate students. They found out that the respondents have a moderate level of statistics anxiety and a high level of examination stress. When the groups were compared, they found no evidence to conclude gender differences in statistics anxiety among graduate students. Also, Koh and Zawi (2014) revealed in their study that at least one out of five postgraduate students has anxiety in at least one of the following: class activities, attitude towards class and mathematics, and self-perception in statistics. In this group of respondents, male students have higher levels of statistics anxiety. Regarding the gender influence of statistical anxiety among graduate students, it was found that older students have experienced higher levels of statistical anxiety compared to their younger peers (Edirisooriya & Lipscomb, 2021). Male students also have higher levels of anxiety when asking a fellow student for help.

1.3. Teacher Presence

In the qualitative study of [Bhatty \(2020\)](#) teacher-respondents perceived teaching presence as critical to humanization of learning. Teacher presence involves being technology and digital-friendly, appropriate course goals, development of deep learning, creation of community of learners, and monitoring of learners' progress. In addition, teacher presence was accounted for the change in behavioral, cognitive, and emotional engagement among college students using a structural equation modelling ([Wang, 2022](#)). Teaching presence is regarded as important and necessary in online class as perceived by the instructor-respondents. It is linked with being present in multiple forms and ways, setting clear goals and expectation, providing assessment, grades, and feedback, fostering autonomy and sense of community, and facilitating peer discourse ([Turk, Müftüoğlu, & Toraman, 2021](#)). Also, it is positively correlated with cognitive and social presence ([Vourloumis, 2021](#))

Moreover, students' perceived teaching presence had a positive impact on the constructive and interactive engagement behavior but not on their active and passive behavior of the students. However, teacher presence and course grades among students revealed no significant relationship ([Wendt & Courduff, 2018](#)).

2. METHODS

2.1. Research Design

The researchers used a correlational design to examine the relationship between statistical anxiety and academic performance among graduate students with the expected moderating role of teaching presence. In a correlational study, a kind of descriptive research, the researcher aims to comprehend the direction and strength of the relationship between uncontrollable, naturally occurring variables ([Barcelona, Gopez, Mariano, Pedreña, & Santiago, 2022](#)). This design is appropriately used in this study since the methodology is essentially non-experimental that facilitates prediction and explanation of the relationship among variables and does not establish causality.

2.2. Respondents

There are 65 graduate students who were involved in this study. There are 40 masteral and 25 doctoral students who were purposively selected from three universities in Metro Manila, Philippines. One important criterion considered by the researchers is that the respondents are currently enrolled in their statistics classes in their respective programs. Also, the respondents were actively participating in their statistics classes and to exposed to their teachers for at least three months.

Out of 65 respondents, 31 (47.69%) we male while the remaining 34 (52.31%) were female. There 21 (32.31%) respondents who are 20-39 years of age, 18 (27.69%) are 30-39 years old, 11(16.92%) are 40-49 years old, and 15 (23.08%) are at least 50 years of age. Also, there are 38 (58.46%) who are masteral students while 27 (41.54%) are doctoral students. In terms of academic performance in Statistics, the mean grade of the respondents is 92.89%.

2.3. Research Instruments

The first instrument utilized by the researchers is the Statistics Anxiety developed by [Cruise, Cash, and Bolton \(1985\)](#) and re-validated for Greek students in 2021. The present study used this version which consists of 49 statements across the same six domains namely test, interpretation, ask for help, worth, teacher, and self-concept ([Lavidas, Manesis, & Gialamas, 2021](#)). This instrument was proven to have convergent and divergent validity and has an acceptable level of internal consistency. However, after content validation by experts, 44 statements were used as the other five statements are not appropriate to the context of the respondents.

Also, teacher presence was measured using the scale developed by Wang, David, and Shusheng (2021) which consists of 30 statements across five factors namely design and organization, discourse facilitating, direct instruction, assessment, and technological support. This instrument was proven to have a good Confirmatory Factor Analysis (CFA) model fit and therefore has an acceptable level of internal consistency.

2.4. Data Gathering and Analysis Procedures

The researchers implemented the online data gathering for two weeks. As part of ethical considerations, the researchers ensured that the participation of the respondents is fully voluntary, they are not exposure to any form of danger, and measures for data privacy were explained clearly. Appropriate descriptive and inferential statistics were computed in analyzing the data. Moderation analysis was carried out using Jamovi software.

3. RESULTS AND DISCUSSION

The succeeding tables describe the graduate students' levels of statistical anxiety across six factors namely interpretation, test, ask for help, worth, teacher, and self-concept.

Table 1. Level of statistical anxiety in terms of interpretation.

Statements	Mean	SD	Level of anxiety
1. Interpreting the meaning of a statistical table in a journal article	2.68	0.60	Moderate
2. Making an objective decision based on empirical data	2.64	0.75	Moderate
3. Reading a journal article that includes some statistical analyses	2.79	0.79	Moderate
4. Trying to decide which analysis is appropriate for my research project	3.28	0.90	High
5. Interpreting the meaning of a probability value once I have found it	2.74	0.83	Moderate
6. Determining whether to reject or retain the null hypothesis	2.61	0.88	Moderate
7. Trying to understand the statistical analyses described in the abstract of a journal article	3.27	0.78	High
Overall mean	2.89	0.56	High

Table 1 presents the level of statistical anxiety of the students in terms of interpretation. In general, graduate students have a high level of anxiety when making statistical interpretation with an overall mean of 2.89 with a standard deviation of 0.56. Among those that cause the respondents high stress are when they discover which statistical tests are appropriate to their project and when they try to understand statistical analyses in published journal articles. The findings may due to the fact that not all of them are exposed well to different research problems and statistical tests. The respondents expressed their worries every time they make decisions on the most appropriate and accurate tests concerning their research projects. They also voiced that they lack the experiences and time to explore different research problems that require statistical tests. This makes them less confident in making appropriate interpretation which is an important skill in statistics.

Table 2 presents the level of statistical anxiety of students in terms of test and class. The data in the table above shows that the respondents have a high level of statistical anxiety when taking examinations and attending classes with an overall mean of 3.11 with a standard deviation of 0.78. Preparing and taking examinations are causing high levels of anxiety among the respondents. When they learn that their classmates have a different answer compared to theirs, they get stressed too. This reveals that anxiety due to tests and other assessments is also very evident in statistics class among graduate students despite all of them being working professionals already. As shared by some

of the respondents, they feel a certain level of anxiety when they are solving research problems by applying statistical treatments on their own. They are more confident when working with peers but not so when working individually.

Table 2. Level of statistical anxiety in terms of test and class.

Statements	Mean	SD	Interpretation
1. Studying for an examination in a statistics course	3.40	0.91	Very high
2. Doing the coursework for a statistics course	2.85	0.84	High
3. Doing an examination in a statistics course	3.43	0.99	Very high
4. Walking into the room to take a statistics test	3.30	0.72	High
5. Finding that another student in class got a different answer than I did to a statistical problem	3.35	0.55	High
6. Waking up in the morning on the day of a statistics test	2.99	1.06	High
7. Enrolling in a statistics course	2.95	1.08	High
8. Going over a final examination in statistics after it has been marked	2.64	0.77	Moderate
Overall	3.11	0.78	High

Table 3. Level of statistical anxiety in terms of fear when asking for help.

Statements	Mean	SD	Interpretation
1. Going to ask my statistics teacher for individual help with material I am having difficulty understanding	2.59	1.03	Moderate
2. Asking a fellow student for help in understanding a lesson.	2.15	0.92	Low
Overall	2.37	1.01	Moderate

Table 3 presents the level of statistical anxiety in terms of fear when asking for help. The graduate students have a moderate level of anxiety with an overall mean of 2.37 with a standard deviation of 1.01. Asking their statistics teacher when they experience difficulties in the lesson causes them a moderate level of anxiety. Interestingly, the anxiety associated with asking for help from a fellow student is low among the respondents. This implies that the respondents are more comfortable asking questions to their peers than to their teachers.

Table 4. Level of Anxiety in terms of worth of statistics.

Statements	Mean	SD	Interpretation
1. I am a subjective person, so the objectivity of statistics is inappropriate for me.	2.18	0.79	Low
2. I wonder why I have to do all these things in statistics when in actual life I will never use them.	2.78	0.93	Moderate
3. Statistics is worthless to me since it is empirical and my area of specialization is abstract.	2.44	0.95	Moderate
4. Statistics takes more time than it is worth.	3.02	0.84	High
5. I feel statistics is a waste.	2.20	0.90	Low
6. I lived this long without knowing statistics, why should I learn it now?	2.43	0.93	Moderate
7. Statistics is for people who have a natural leaning toward maths.	2.59	0.92	Moderate
8. Statistics is a pain I could do without.	2.49	1.12	Moderate
9. I wish the statistics requirement would be removed from my academic program.	2.70	0.87	Moderate
10. I do not understand why someone in my field needs statistics.	2.15	0.72	Low
Overall	2.49	0.62	Moderate

Table 4 presents the level of anxiety in terms of worth of statistics. The graduate students have a moderate level of anxiety towards the worth of statistics with an overall mean of 2.48 with a standard deviation of 0.62. The respondents perceived that they are consuming too much of their time compared to the practical worth of statistics in their lives. The idea of studying something they do not see it direct application to their daily lives cause moderate

anxiety to the respondents. In connection to this, some respondents wish that statistics courses will be removed from their program. The descriptive data reveals that the graduate students value the practical application of statistics to their personal and professional lives and that they feel a certain amount of anxiety studying something that they feel less relevant to them.

Table 5. Level of anxiety in terms of fear of statistics teachers.

Statements	Mean	SD	Interpretation
1. Statistics teachers are so abstract; they seem inhuman.	2.01	0.97	Low
2. Most statistics teachers are not human.	2.09	1.03	Low
3. Statistics teachers speak a different language.	2.93	1.12	High
4. Statisticians are more number oriented than they are people oriented.	2.45	0.55	Moderate
5. Statistics teachers talk so fast you cannot logically follow them.	3.15	0.76	High
Overall	2.52	0.85	Moderate

Table 5 presents the level of anxiety in terms of the fear of statistics. A moderate level of anxiety is recorded when fear of statistics teachers is considered among the respondents with an overall mean of 2.52 with a standard deviation of 0.85. It is interesting to note that the respondents perceived their statistics teachers as fast and very spontaneous when delivering lectures which made them struggle in understanding the concepts and procedures for analyzing data. Also, they see their teachers speaking a language that seems unfamiliar to them which is burdensome to them given that not all of them have adequate background and preparation to study statistics at the graduate level. The findings imply that fear of statistics teachers may be rooted in the dissociation between the teacher and the students. The manner the teachers are delivering the content in statistics is causing apprehensiveness among the students.

Table 6. Level of anxiety in terms of computational self-concept.

Statements	Mean	SD	Interpretation
1. I have not done maths for a long time. I know i will have problems getting through statistics.	3.12	0.88	High
2. I cannot even understand secondary school maths; How can i possibly do statistics?	3.43	0.76	Very high
3. Since I have never enjoyed maths, I do not see how i can enjoy statistics.	3.46	0.91	Very high
4. I do not have enough brains to get through statistics.	3.44	0.95	Very high
5. I could enjoy statistics if it were not so mathematical.	2.88	0.76	High
6. Statistics is not really bad. It is just too mathematical.	2.78	0.97	Moderate
7. I am too slow in my thinking to get through statistics	3.33	1.01	High
Overall	3.21	0.75	High

Table 6 discusses the level of anxiety in terms of computational self-concept. Computational self-concept in statistics revealed to cause a high level of anxiety among graduate students with a mean of 3.21 with a standard deviation of 0.75. The respondents who do not perceive mathematics enjoyable will not find statistics a pleasurable subject. The Self-concept of the respondents seems to be wretched where they believe that they are cognitively capable to do and survive statistics. It is also compelling to note that students who flounder in secondary mathematics suspect that they will perform poorly in statistics. Clearly, the descriptive data assert that self-concept among students is crucial in having a negative disposition towards statistics.

Table 7 discusses the sex difference in statistical anxiety among graduate students. There is a statistically significant difference on the overall statistical anxiety among the graduate students (p-value =0.034) when grouped according to sex with the male students experiencing a higher level of anxiety. Specifically, there is sex division in statistical anxiety among students in terms of the test (p-value =0.022), asking for help (0.001), and self-concept (p-

value =0.039). The findings reveal that male graduate students feel more negative about taking the examination and attending statistics classes, they are more afraid to ask for help from others and are less confident that can succeed in their tasks compared with their counterparts.

Table 7. Sex difference in statistical anxiety among graduate students.

Domains	Male	Female	P-value	Interpretation
Interpretation	2.94	2.87	0.310	Do not reject H_0
Test and class	3.25	3.02	0.022	Reject H_0
Ask for help	2.51	2.04	0.001	Reject H_0
Worth	2.50	2.47	0.875	Do not reject H_0
Teacher	2.44	2.56	0.090	Do not reject H_0
Self- concept	3.30	3.14	0.039	Reject H_0
Overall statistical anxiety	2.88	2.65	0.034	Reject H_0

These findings are in congruence with the studies of [Edirisooriya and Lipscomb \(2021\)](#) and [Koh and Zawi \(2014\)](#) regarding the sex influence of statistical anxiety among graduate students where male students have higher levels of anxiety when seeking help from a fellow student. The opposite results can be noticed in the study of [Decesare \(2007\)](#).

Table 8. Teacher presence in online statistics course among graduate students.

Dimension	Mean	SD	Interpretation
1. Design and organization	4.15	0.82	High
2. Discourse facilitation	4.24	1.07	High
3. Direct instruction	4.44	0.98	Very high
4. Assessment	4.30	1.07	Very high
5. Technological support	4.01	0.75	High
Overall	4.23	0.83	High

[Table 8](#) presents teacher presence in online statistics courses among graduate students. Teacher presence in the design and organization of content is highly felt by the respondents with an overall mean of 4.23 with a standard deviation of 0.83. The respondents generally have a very positive assessment of how the statistics teachers communicate essential course information such as the goals, strategies, schedule, and requirements. The respondents also noted that their teachers are explaining the significance of their assignments. The data unfolds that the teachers' role in planning and organizing course content and activities are crucial for them to feel their teacher's engagement and commitment. They appreciate their teachers who explain the purpose and relevance of every learning activity given to them and provide a clear and helpful guide in accomplishing them.

Teacher presence is equally felt in facilitating discourse with an overall mean of 4.24. The statistics teachers were observed to identify areas that cause disagreements among the students. They are also inclined to foster an inquiry-based environment where the students are encouraged to pose their own inquiries that will enrich their learning experiences. Individual and group collaborations and contributions are given importance by the teachers. Since classroom discourses are important in the learning environment, teachers' effective facilitation should be present to ensure that students are engaged and learning.

In addition, teacher presence is very high in terms of direct instruction (4.44) and assessment (4.30). This means that the graduate students believed that their teachers provide clear explanations of the statistical concepts and offered useful analogies for a better understanding of the statistical tests. In the area of assessment, the respondents shared that their teachers provide summary feedback regarding their performance in formative and summative tests.

Likewise, their teachers made full use of technology in teaching and used different media to promote different learning styles with an overall mean of 4.01.

Table 9. Model test fit measures of the regression models.

Model	R	R ²	F	Df1	Df2	P
1	0.354	0.125	6.15	1	64	0.017
2	0.662	0.438	6.71	2	63	0.003
Model comparisons		ΔR ²	F	df1	df2	p
1	2	0.313	6.50	1	63	0.015

Table 9 shows the overall model test fit measures. Model 1 is the relationship of statistical anxiety and the academic performance of the graduate students ($R^2=0.125$, $p=0.017$) while Model 2 is the relationship of the interaction of statistical anxiety and teacher presence and academic performance of the graduate students ($R^2=0.438$, $p=0.003$). Both models are significant ($p < 0.05$). Moreover, we can notice a significant difference between R^2 values of the two models with $\Delta R^2 = 0.313$. This means that the interaction of statistical anxiety and teacher presence explains the variation in the academic performance of the graduate students better with $R^2=0.438$. Thus, teacher presence is a significant moderator in the relationship between statistical anxiety and academic performance.

Table 10. Moderating role of teacher presence in the relationship of statistical anxiety and academic performance of the graduate students.

Teacher presence	Estimate	SE	Z	P
Low	-1.280	0.373	-2.455	0.024
Average	-0.786	0.320	-3.433	<0.001
High	-0.291	0.428	-2.543	0.011

Table 10 shows the simple slope estimates and the calculated standard errors of the moderation analysis. It shows the effect of the predictor variable (statistical anxiety) on the dependent variable (academic performance) at different levels of the moderator variable (teacher presence). All effects are significant ($p < 0.05$). It is interesting to note that a lower level of teacher presence can be linked to higher estimates or slope while a high level of teacher presence can be linked to lower estimates or slope in the regression model. Thus, teacher presence is a significant moderator of statistical anxiety and academic performance among graduate students.

The findings of the study are comparable to the investigation conducted by Kian et al. (2022) where the graduate student- respondents have a moderate level of statistics anxiety and a high level of examination stress and Koh and Zawi (2014) where some postgraduate students have anxiety in class activities, attitude towards class and mathematics, and self-perception in statistics. Also, the importance of teaching presence in an online class cannot be discounted. As posited by Turk et al. (2021) it is linked with being present in multiple forms and ways, setting clear goals and expectations, providing assessment, grades, and feedback, fostering autonomy and a sense of community, and facilitating peer discourse.

The influence of teachers presence in moderating the relationship between level of statistical anxiety and academic performance cannot be discounted. Teacher presence can prompt changes in behavioral, cognitive, and emotional engagement among students (Wang, 2022). Their supportive presence, rapport and trust with all their students, and building a positive relationship can help lessen students' anxiety (Moreau, 2014). Also, the way teachers' interact with students is negatively correlated with their anxiety (Taye, 2017). The same results can be referred to the study of Kangni (2021) where the visibility of the teacher can lead to increased social presences and decreased anxiety in statistics class.

4. CONCLUSIONS

The relationship between academic anxiety and academic performance is studied extensively in the literature. However, there are partial and curbed studies concerning the influence of teacher presence in the relationship between the two variables. The present study addresses this by carrying out a moderation analysis concerning Filipino graduate students taking statistics courses in their program. The graduate students were found to have high levels of anxiety in attending class and taking examinations in statistics and in their computational self-concept while they have moderate levels of anxiety in asking for help, the worth of statistics, and towards their statistics instructors. Thus, there is a considerable level of anxiety among graduate students that affect students' attitude and performance in statistics that universities offering graduate programs that need to be addressed. In addition, there is sex difference in the statistical anxiety among the respondents with the male graduate students feeling more negative about taking examination and attending statistics classes, more afraid to ask for help from others, and less confident that can succeed in their tasks compared with their counterparts.

Meanwhile, teachers' presence is assessed positively by the graduate students with their visibility very evident in direct instruction and assessment. This signifies the teachers' commitment to providing high-quality instruction and assessment in their online statistics classes. In this study, a higher level of teacher presence is associated with a weaker negative relationship between statistical anxiety while a lower level of teacher presence is associated with a stronger negative relationship between the two variables. Indeed, the quantitative analysis was able to capture a more illuminating and substantial relationship between statistical anxiety, teacher presence, and academic performance among graduate students.

The practical implications of the findings compel universities offering graduate programs to bolster teacher presence in delivering course outcomes to moderate the levels of anxiety of graduate students that are affecting their performance in statistics classes. Teachers handling statistics courses need to be more engaged and proactive. Despite the nature of the implementation of graduate programs where independent studies are encouraged among students, teachers' explicit visibility, engagement, and intervention are proportionately expected. Graduate students will have affirmative learning experiences when teachers' roles are felt and valued in the classroom. Undeniably, teachers' presence is critical in humanizing learning among students.

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