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Statistical Anxiety of Religious College Students: A Review of Reducing Factors of Statistical Anxiety

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ABSTRACT

This research aims to determine the level of statistical anxiety among students from religious universities. Understanding this is crucial since knowledge of statistics is necessary for completing final assignments, while the students' backgrounds are generally from Islamic boarding schools. This research employs a mixed-method approach with an explanatory sequential design, prioritizing a quantitative approach followed by a qualitative approach. The respondents were students enrolled in statistics courses, totaling 479 participants. The sampling technique used multistage random sampling, starting with cluster random sampling, followed by purposive sampling. Anxiety levels were measured using the Statistics Anxiety Scale (SAS) instrument, consisting of 17 questions covering three aspects: worry, avoidance, and emotional aspects. The Mixed-Methods Sequential Explanatory Design involved gathering and analyzing quantitative data first, followed by qualitative data. Results indicated differences in statistical anxiety levels among non-exact students. Initially, 45% of students exhibited high anxiety levels, which decreased to 14%, while low anxiety levels increased from 27% to 49%. This suggests that learning processes requiring complex numeracy need appropriate interventions, such as using various tools (software) that significantly impact the learning process. Implementing a peer tutoring program can also boost self-confidence. Therefore, study program managers or lecturers must focus on enhancing students' self-confidence to reduce anxiety. Using suitable learning aids can make a significant difference.

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1. INTRODUCTION

Statistics is a science that studies how to collect, process, and conclude analyzed data (Wahab et al., 2021). Presenting collected data in graphs or tables can specifically explain it, making it more comprehensible (Firmansyah, 2017). However, this process is challenging for some individuals to implement and understand. For students in religious colleges, statistics often trigger anxiety (Chew et al., 2018). This anxiety can lead students to postpone or avoid taking statistics courses. Students from religious universities often perceive statistics as a course filled solely with numbers, formulas, and complex calculations required to draw accurate conclusions (Paechter et al., 2017). Such perceptions contribute to confusion and apprehension towards statistics, further exacerbating their anxiety

Spielberger(2022) described anxiety as an uncomfortable emotional state. Anxiety develops when a certain circumstance or object that does not exist is interpreted as frightening or threatening (Spielberger, 2022). Anxiety can be divided into two categories: state anxiety and trait anxiety (Leal et al., 2017). State anxiety, also known as transitory anxiety, is a psychological, biological, and emotional condition characterized by the emergence of tension, uneasiness, fear, and worry that fluctuates in intensity. This type of anxiety occurs in specific situations, such as taking a test, undergoing surgery, or facing other potentially stressful activities. Trait anxiety, also known as fundamental anxiety, refers to anxiety experienced when confronting a variety of issues that are relatively permanent and are a reflection of one's personality. Situational anxiety, which is related to trait anxiety, refers to worry experienced when facing temporary issues. Anxiety is an unpleasant experience that

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can affect a person's psychological, biological, and emotional components, such as making it difficult to sleep, producing excessive dread, and upsetting the equilibrium of one's soul.

A person may experience statistical anxiety, also known as statistics anxiety when taking statistical courses or undertaking statistical analysis, such as collecting, processing, or interpreting data (Steinberger, 2020; Tutkun, 2019). Students frequently encounter statistical anxiety, particularly during statistics classes. This anxiety spans a range of emotions that can significantly influence a student's performance and overall educational experience, from moderate to severe (Huang et al., 2023; Macher et al., 2012). Statistical anxiety manifests in various forms, including fear of exams, reluctance to ask for help, apprehension towards statistics professors, and dread of interpreting data. When studying statistics, students may also experience restlessness, depression, and other stress symptoms (Nesbit & Bourne, 2018). This type of anxiety is an illustration of transient anxiety, also known as state anxiety, affecting both psychological and emotional states. Students' statistical anxiety can significantly impact their performance and educational experience. To address this, lecturers or teachers can allow students to express their sources of anxiety and suggest methods to minimize it. Using software to study statistics can provide benefits in understanding statistical concepts and offer new experiences in operating statistical tools under teacher guidance (Jayadi & Anwar, 2018; Ramadhani & Sribina, 2019). Employing software to enhance understanding is an effective solution.

Several studies have examined statistical anxiety, though the field remains relatively underexplored. Research by Suminta and Sayekti (2018) investigated differences in statistical anxiety between women and men, revealing distinct variations based on gender. Dzulfikar's (2021) study focused on student statistical anxiety using Edmodo, showing that this learning medium can positively impact students' anxiety levels. Bourne's (2018) exploration of statistical anxiety identified various influencing factors, including the type of intervention provided. Further research by Jayadi and Anwar (2018) examined using SPSS to improve students' data processing skills. Their findings indicated that familiarity with software as a data analysis tool significantly enhanced students' capabilities. These studies collectively suggest that statistical anxiety can be mitigated through various interventions. No research has specifically measured the statistical anxiety of students who, after taking statistics courses using analytical software, are from religious colleges. This is crucial, considering that the secondary education background of many religious college students often lacks the mathematical foundation typical in public school curricula. Statistics is essential for these students to complete their studies, and anxiety in this area can significantly hinder their academic progress.

This research aims to provide insights into the impact of learning with analysis software on students' statistical anxiety. The study identifies factors that can reduce statistical anxiety, facilitating better comprehension of the teaching materials. Previous studies have not specifically examined the anxiety levels of statistics students at religious universities. Most existing research has focused on gender differences and the anxiety levels of students using analytical tools. This study seeks to assess the statistical anxiety levels of students from religious universities to offer appropriate interventions for those experiencing excessive anxiety.

2. MATERIAL AND METHOD

Study Design

This research employs a mixed-method approach with an explanatory sequential design, emphasizing a quantitative followed by a qualitative approach to compare the level of statistical anxiety among Religious College students before and after attending statistics lectures (Almeida, 2018; Subedi, 2016). A quantitative approach and qualitative analysis are used to provide deeper insights.

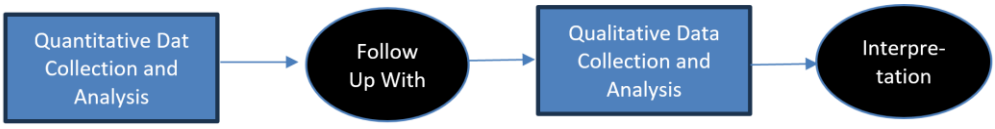

Figure 1. Explanatory Sequential Design

Figure 1 illustrates the explanatory sequential design where quantitative data is collected and analyzed first, shaping the subsequent qualitative research questions, sampling, and data collection. This approach ensures that qualitative data can explain and expand upon the quantitative outcomes, identifying the best participants for the qualitative studies. The quantitative phase aims to statistically assess the level of statistical anxiety among

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religious college students after attending statistics classes. This measurement uses SAS instrument, which includes three indicators: Worry, Avoidance, and Emotionality (Iriyadi et al., 2024). Based on the quantitative results, researchers selected several respondents for interviews to explore further the factors influencing changes in statistical anxiety levels.

Participants

Participants in the study were fourth-semester students enrolled in statistics courses. The study included 479 students, as shown in **Table 1**. The research was conducted from February to May 2023.

Table 1. Characteristics of Respondents

No	Indonesian Region	Number of Samples
1	Western Indonesia	284
2	Central Indonesia	133
3	Eastern Indonesia	62
Total		**479**

Respondents were selected using a purposive sampling technique. In the first stage (quantitative approach), researchers employed cluster random sampling to collect data, dividing Indonesia into three distinct regions: Western Indonesia, Central Indonesia, and Eastern Indonesia. Participants in this study were college students who had previous experience with statistics. A purposive sampling technique was used to determine the sample for the qualitative approach.

Data Collection

Data collection using the SAS instrument was conducted during the pre-tests and post-tests. This study utilized SAS instrument developed by Pretorius and Norman (1992), which comprises 17 questions across three aspects designed to measure students' statistical anxiety levels. Qualitative data were collected through interviews with respondents selected using purposive sampling techniques. This technique was employed to gather data from individuals who experienced changes in statistical anxiety after undergoing a series of treatments in statistics courses. The objective of the interviews was to obtain detailed information about the experiences and factors influencing changes in statistical anxiety among respondents. Samples with high levels of anxiety were chosen to serve as informants. Through these informants, researchers could gather more comprehensive information about the initial levels of statistical anxiety. This insight is crucial for study program managers and lecturers to develop strategies and steps to provide effective understanding and support for those with high statistical anxiety.

Data Analysis

The data analysis process in this research used a comparative test with a quantitative approach. Researchers conducted a normality test for quantitative data analysis as a preliminary analysis. The Paired T-test was used for hypothesis testing, considering the study's use of grouped data to compare pre-test and post-test values. The hypothesis in this study posits that there are differences in students' statistical anxiety levels after studying using analysis software and peer tutoring approaches.

The qualitative approach employed three steps of analysis: reduction, presentation, and conclusion (Miles et al., 2014). In the reduction stage, information unrelated to the research focus was removed. The remaining data was presented to obtain comprehensive information on the research focus. Finally, in the conclusion presentation stage, interpretations were made from the data, examining the relationships between the information gathered from respondents. The results of the qualitative data analysis were then used to explore and provide deeper insights into the findings from the quantitative analysis, resulting in a more comprehensive and in-depth understanding of the research outcomes.

3. FINDINGS

Overview of Findings

From the results of the research, data was obtained regarding the level of statistical anxiety among students at religious colleges. The data describes student anxiety levels before and after taking statistics courses.

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The instructor used data analysis software as a support tool during the lectures. The findings indicated a decrease in statistical anxiety among students after taking statistics classes using data analysis software.

Quantitative Results

This study aimed to determine the statistical anxiety of religious college students after attending statistics lectures with the help of data analysis software. Data on student statistical anxiety before attending lectures can be seen in **Figure 2**.

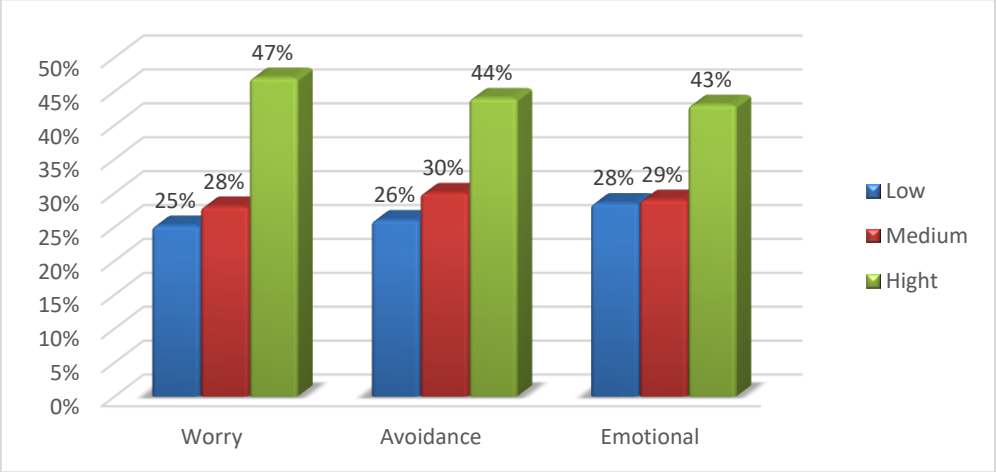

Table 2. Anxiety Level Preliminary Statistics of The Three Aspects

Based on **Figure 2**, the statistical anxiety level of students is relatively high, with each aspect showing a high anxiety level above 40%. The overall anxiety level before students took statistics courses was 45%, as illustrated in **Figure 3**.

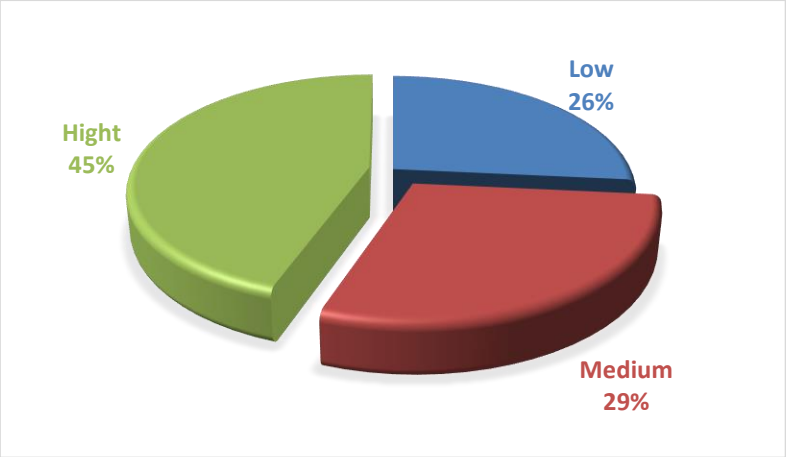

Figure 3. Graph of Anxiety Level Preliminary Statistics

Figure 3 illustrates that only 26% of students have low levels of anxiety. This value is relatively low given the number of respondents (479). The data indicates that Religious College Student students have a high level of statistical anxiety. The field of study they are involved in, within the realm of Religious College Students, contributes to this anxiety. Observations reveal feelings of discomfort and passive attitudes among students when attending class. Data on student anxiety after completing statistical recovery using data analysis software for Religious College Student students can be seen in **Figure 4**. The data show a change in the percentage of students' statistical anxiety levels between before and after attending statistics lectures.

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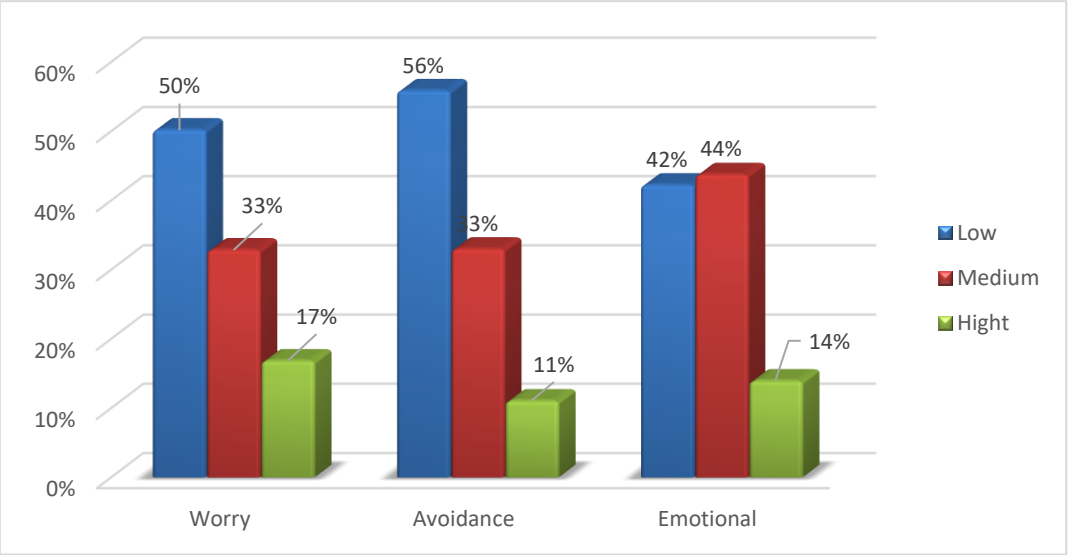

Figure 4. Graph of Statistical Anxiety Levels After Lectures from Three Aspects

From **Figure 4**, it can be seen that the level of student anxiety has decreased, with anxiety levels tending to be low. This change is due to the use of data analysis software.

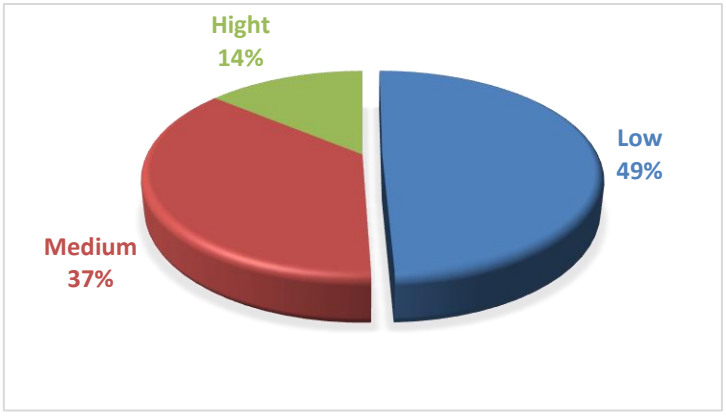

Figure 5. Graph of Statistical Anxiety Levels After Lecture

Statistical Analysis

Based on the normality prerequisite test results shown in **Table 2**, the data analyzed meets the normality criteria, with a significance value (sig.) > 0.05.

Table 2. Test for Normality

	Kolmogorov-Smirnova		
	Statistic	df	Sig.
Pre	.078	106	.113
Post	.084	106	.112

Based on **Figure 6**, no outlier data points exist, and the data distribution appears normal, indicating that normality conditions have been met.

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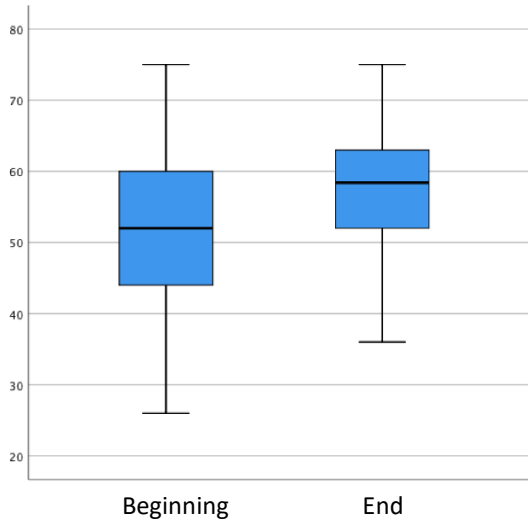

Figure 6. Box Plot Graph of Student Statistical Anxiety Data

Table 3 shows the paired statistical tests of the two groups of data. The results indicate a significance value (sig.) < 0.05, meaning that H0 is rejected. Thus, there are differences in the level of student statistical anxiety. Figure 7 shows the significance of these differences. The percentage of students with low anxiety increased from 27% to 49%, moderate anxiety levels rose from 29% to 37%, and high anxiety levels decreased from 45% to 14%.

Table 3. Paired Test

Pair	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pre-Post	-7.528	14.42	-5.374	105	.000

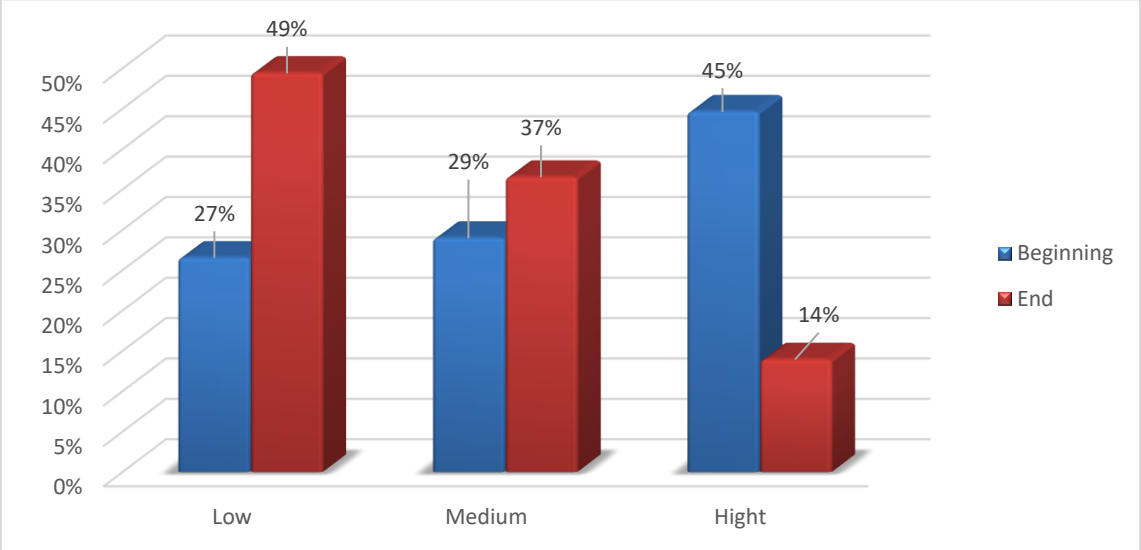

Figure 7. Comparison of Student Anxiety Levels

4. DISCUSSION

Reduction in Statistical Anxiety

A discernible reduction in the amount of statistical anxiety experienced by students was observed after taking the statistics lesson. Various circumstances contribute to alterations in anxiety levels, including the

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learning environment, instructional materials, academic support, and classmates. Many students tend to avoid studying statistics. **Figure 6** illustrates a significant change in the student anxiety level, which substantially impacts their ability to understand statistics. Providing comprehensive treatment through the use of data analysis tools in the form of software can positively influence student anxiety. The comparative test analysis results indicate differences in students' statistical anxiety levels at the beginning and end of the learning period. The proportion of students with low anxiety levels increased from 27% to 49%, a noteworthy improvement that enhances students' understanding of statistics. This change deserves recognition, as it enables students to grasp statistical concepts more effectively. Koparan (2015) highlights that many people perceive statistics as intimidating, unpleasant, and difficult subjects to comprehend.

Statistical anxiety involves negative sensations experienced during statistical tasks. It becomes a significant obstacle for students to overcome to complete their education successfully (Steinberger, 2020). A study by Onwuegbuzie and Wilson (2003) found that about 75% of students suffer from statistical anxiety, supported by their research. Interviews with students in the high anxiety category revealed that their anxiety stemmed from non-exact educational backgrounds. One student stated:

"I feel anxious about statistics courses because I do not know much about it; I do not learn calculations; I mostly learn interpretations and memorization."

The statistical anxiety of religious college students is caused by their secondary school educational background, which tends to lack numeracy lessons. Math anxiety and statistical anxiety are sometimes considered closely related, yet significant distinctions exist between the two types of anxiety. Mathematical anxiety is synonymous with the anxiety experienced when manipulating numbers. In contrast, statistical anxiety covers a wider range of issues, including anxiety in interpreting data, the results of statistical calculations, fear of asking questions, and fear of statistics instructors (Paechter et al., 2017).

Statistical anxiety can negatively impact students' performance in learning statistics, leading to feelings of inadequacy and low self-efficacy when asked to carry out activities connected to statistics. Students who lack confidence in comprehending statistical material tend to perform poorly academically. Failure to conquer anxiety leads to feelings of fear and hopelessness, both of which interfere with the ability to study (Macher et al., 2012).

"I do not know about statistics because it is all calculations; that is why I often get low scores on every exam."

Those anxious about statistics tend to have low achievement, especially in statistics courses. Assumptions in them always make statistics difficult due to the calculation processes involved. Students who struggle with statistics tend to have a high level of anxiety over the subject. This anxiety may prevent them from meeting the required academic levels. Active engagement in learning statistics often leads to elevated worry, pressure, and stress levels, negatively impacting their ability to learn and achieve in this subject area (John et al., 2021). Improving thoughts and perceptions of the utility of statistics significantly impacts one's ability to learn the subject effectively. The detrimental effect of statistical anxiety on learning statistics is well documented. There is a correlation between the unfavorable experiences students have had while learning mathematics in high school and high levels of statistical anxiety. Given that mathematics and statistics are related, it is reasonable to conclude that negative experiences in mathematics can result in adverse perceptions of statistics. These perceptions cause panic and hopelessness, affecting the ability to learn.

Anxiety over mathematics hinders the development of talents and the ability to apply statistical methods in real-world contexts. Statistical anxiety, a unique condition, interferes with learning or using statistical materials, procedures, and formulas (Paechter et al., 2017). Anxiety related to statistics encompasses the fear of

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taking statistical tests and learning statistics and the broader experience of success and failure in mathematical contexts (Cipora et al., 2022).

Unconquered anxiety leads to feelings of fear and despair, negatively impacting a person's ability to learn and increasing the likelihood of avoiding classes like statistics. Success in learning statistics depends on students' anxiety levels, their mathematical and computing skills, and their existing understanding of statistical content. Statistical anxiety can influence one's statistical literacy skills, educational background, and knowledge level. Concerns about numbers and percentages can harm students, leading to decreased performance in statistics classes and feelings of inadequacy and low self-efficacy in related activities. This issue affects not just performance in statistics classes but also performance in research programs, potentially determining whether students complete their studies. This anxiety necessitates action to boost students' self-confidence and willingness to engage with calculations.

> *"At first, I did not like calculations, but what the lecturer did changed my mindset. It turns out that statistics are not as complicated as I imagined. We learn concepts and the problems of using data analysis tools. So, now I have calmed down a bit when studying statistics."*

This statement illustrates how proper interventions, such as effective teaching methods and data analysis tools, can change students' perceptions and reduce anxiety about statistics. Encouraging students to approach statistics positively and providing practical tools for understanding statistical concepts can alleviate their fears and improve their learning outcomes.

Advancements are crucial to reducing statistical anxiety among students. A working knowledge of statistics is essential for students to complete their education, especially for those pursuing quantitative research areas. Opportunities to debate statistics, participate in group presentations, and discuss data analysis tools allow students to immerse themselves in the course's statistical content (Legaki et al., 2020). These activities help students better understand statistical content, increasing their comfort with the material and reducing any fear they may have experienced (Jamil et al., 2019). Lecturers should encourage anxious students to seek help from peers (peer tutors), act appropriately, emphasize that statistics is not merely mathematics, reinforce the value of statistics, use humor when teaching, assess student attitudes, and lead class discussions about attitudes. Peer tutoring can also boost students' self-confidence.

> *"It is easier with your friends because they are already familiar with it, so it is not awkward if you want to ask."*

The participation of friends makes a direct contribution to educational goals. Friends may help each other by understanding, tutoring, assisting with homework, or studying together (Tenenbaum et al., 2020). The academic support of friends is one factor that increases statistical anxiety; another is the academic support of instructors. A lack of appropriate attention, encouragement, and communication from lecturers during the learning process may explain why students have difficulty solving problems in statistics. Instructing and being instructed is a nuanced human interaction requiring sensitivity and experience in dealing with others. Lecturers should accept students as whole individuals, capable of rational and constructive thinking, optimism, and potential development (Bardach & Klassen, 2020). The relationship and interaction patterns between instructors and students are critical to the success of the teaching and learning process. In most cases, the instructor significantly influences student interaction and relationships. Mutual acknowledgment and acceptance make it easier to establish healthy patterns of interaction and cultivate meaningful connections. A strong personal connection between teacher and student encourages students to express difficulties and obstacles in learning mathematics and statistics. The learning process is influenced not only by the individual but also by various

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surrounding systems. These systems shape a student's learning capacity, with the environment playing a significant role. The family serves as the primary social environment during childhood, later expanding to include the academic environment, consisting of parents, teachers, friends, and the community. Academic support from teachers, friends, and family members is essential for student success.

Improvement in Student Confidence and Understanding

Individual growth begins with the closest environmental system and progresses to more remote systems. Intensive connections often come from family, school friends, neighbors, and teachers at educational institutions. Students' academic interests and motivation are impacted by the amount of academic support they receive from their environment (Garcia-Melgar et al., 2021). Research on academic accomplishment must consider both statistical anxiety and the influence of the social environment, which significantly affects students' academic performance. Parents, educators, and peers significantly influence a student's academic success. Comprehensive academic assistance involves those surrounding the students, either directly or indirectly, preparing the necessary items for learning. Academic support includes assistance in developing, enhancing, and expanding mastery of subject matter and skills through purposeful and structured activities (Kakada et al., 2019). The ultimate goal of academic support is to help individuals realize their full potential and give their lives more significance.

Changes in student anxiety levels stem from the use of analytical software, which aids significantly in analyzing research data (Nurhayati & Novianti, 2020). Students with Religious College Student educational backgrounds often feel anxious when faced with material that requires mathematical calculations. Proper interventions can substantially alter students' perspectives on statistics, alleviating their fears. The perception that statistics are difficult to understand impacts students' psychology, leading to anxiety that affects their behavior in statistics courses.

A passive nature and tendency to avoid participation are common at the beginning of courses. As students become familiar with data analysis software, their data analysis skills improve, reducing overall statistical anxiety (Jayadi & Anwar, 2018). Feelings of erratic fear signal impending danger, prompting individuals to act. Life events such as guidance, competition, and disasters affect physical and psychological health, causing anxiety (Rizki et al., 2019). Anxiety, an emotional response to perceived danger, is closely related to feelings of uncertainty and helplessness. This often manifests in interpersonal relationships, leading students to avoid participation during learning sessions (Saputro & Fazrin, 2017).

Using analysis software reduces students' anxiety about statistics. Appropriate media plays a crucial role in learning success (Paechter et al., 2017). This applies to various fields, including Religious College Student groups (Eshet et al., 2021). Religious College Student students who lack in-depth knowledge about calculations feel excessive anxiety when dealing with counting, especially when done manually. Anxiety emerges during statistics courses, which is essential for compiling final projects. Prolonged anxiety about statistics leads to problems in completing final assignments (Widigda & Setyaningrum, 2018), negatively impacting students' psychology. Anxiety lowers cognitive levels and affects performance (Foley et al., 2017; Park & Moghaddam, 2017). Religious College Student students, whose numerical abilities are not as strong as those of exact science students, experience anxiety related to counting. This also affects their ability to receive material. Using appropriate media helps students understand teaching materials (Astuti & Alhidayatuddiniyah, 2020). Religious College Student students tend to prefer narrative forms over numerical ones. Reduced anxiety levels positively impact student understanding in statistics courses. Providing appropriate treatment, particularly for Religious College Student students, can anticipate and mitigate anxiety.

The Role of Educational Interventions

Relationships with peers and faculty are among the contributing variables. Interactions between

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students and faculty play a crucial role in academic support. Negative interactions with faculty and peers tend to put students at risk for behavioral difficulties, leading to lower performance in college. Conversely, positive interactions with faculty and peers enhance motivation to learn, academic achievement, and psychological well-being. Support from faculty significantly increases student motivation to learn. Research has shown that faculty support affects students' performance at postsecondary institutions. Students' perceptions of faculty support are strongly associated with various academic outcomes, including learning interest and drive. Encouraging students fosters a positive learning environment. Students' social environments are also important contextual factors influencing their desire to learn. Adolescents are greatly influenced by their friends, both in school and outside. Adolescents strongly desire to be accepted by their peer group and tend to act by their peers. High-quality interactions provide opportunities for individuals to improve themselves. Results from data analysis in **Table 3** show a difference in students' statistical anxiety levels. These results indicate that anxiety levels can be reduced with appropriate treatments. Psychoanalytic theory identifies two types of anxiety (Carveth, 2021). First, post-traumatic stress develops after experiencing a large number of stimuli. The mind cannot follow the rapid series of events, resulting in a sense of impending danger. This sentiment is based on the capabilities of the nervous system and the fact that birthplaces every child in a state of acute anxiety for the first few years of life. Traumatic experiences during childbirth can lead to subsequent worries. The second type of anxiety, cue anxiety, arises when a person feels the urge to prevent themselves from experiencing severe anxiety. The ego assesses how well it can meet its needs while facing obstacles from the outside world. When usual stress management methods are close to failure, the ego reacts with anxiety, driving the person to try new activities as a way to cope with stress. Avoiding larger experiences is assisted by avoiding small-scale discomfort and anxiety signals (Park & Moghaddam, 2017). Both types of anxiety are consistent with the explanation of statistical anxiety, where people react with worry as a defense mechanism to prevent unpleasant experiences. Academic support includes emotional support (such as providing encouragement or motivation and positive communication), instrumental support (such as accompanying students while studying or doing homework or providing necessary study materials), and cognitive support (such as exchanging ideas in learning). These forms of support help students learn directly and indirectly through deliberate and structured activities in preparing, building, and strengthening students' mastery of subject matter and skill development.

Relationships with peers and faculty are crucial contributing factors to academic success. Interactions between students and faculty play a vital role in academic support. Negative interactions with faculty and peers tend to increase the risk of behavioral difficulties, leading to lower performance in college. On the other hand, positive interactions with faculty and peers enhance motivation to learn, academic achievement, and psychological well-being. Support from faculty significantly boosts student motivation to learn. Research has demonstrated that faculty support influences students' performance at postsecondary institutions. Students' perceptions of faculty support are strongly associated with various academic outcomes, including learning interest and drive. Encouraging students fosters a positive learning environment. Students' social environments also play a significant role in influencing their desire to learn. Adolescents are greatly influenced by their friends, both in school and outside. They strongly desire to be accepted by their peer group and tend to act by their peers. High-quality interactions provide opportunities for individuals to improve themselves. Results from data analysis in **Table 3** show a difference in students' statistical anxiety levels. These results indicate that anxiety levels can be reduced with appropriate treatments. Psychoanalytic theory identifies two types of anxiety (Carveth, 2021). The first type, post-traumatic stress, develops after experiencing a large number of stimuli. The mind cannot follow the rapid series of events, resulting in a sense of impending danger. This sentiment is based on the capabilities of the nervous system and the fact that birthplaces every child in a state of acute anxiety for the first few years of life. Traumatic experiences during childbirth can lead to subsequent worries. The second type of anxiety, cue anxiety, arises when a person feels the urge to prevent themselves from experiencing severe anxiety. The ego assesses how well it can meet its needs while facing obstacles from the outside world. When usual stress

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5. CONCLUSION

Research findings indicate a notable change in the level of statistical anxiety among non-exact students after participating in statistics courses that utilize data analysis software. Using the Statistical Anxiety Scale (SAS) instrument effectively detects student anxiety, providing early warning to study program managers and lecturers. This allows for timely interventions to enhance understanding, particularly in statistical learning. Initially, 45% of students experienced high levels of anxiety. After the intervention, this percentage decreased to 14%. Concurrently, the proportion of students with low anxiety levels increased from 27% to 49%. The implementation of the SAS instrument had a significant impact and contributed to these positive changes. Reductions in statistical anxiety among non-exact students facilitate their academic progress, especially in mastering essential statistical concepts. Providing appropriate support and using tools such as data analysis software can significantly improve students' confidence and understanding. Such interventions are crucial for helping students overcome their anxiety and succeed in their studies, given the importance of statistics in their academic and professional pursuits.

6. REFERENCES

Almeida, F. (2018). Strategies to perform a mixed methods study. *European Journal of Education Studies*. https://doi.org/10.5281/zenodo.1404121

Astuti, S. P., & Alhidayatuddiniyah, T. W. (2020). Pemanfaatan Software Matrix Laboratory (Matlab) untuk meningkatkan minat belajar mahasiswa dalam pembelajaran fisika kinematika. *Pendekar: Jurnal Pendidikan Berkarakter, 3*(2), 54–57. https://doi.org/10.31227/osf.io/x7rs8

Bardach, L., & Klassen, R. M. (2020). Smart teachers, successful students? A systematic literature review on teachers' cognitive abilities and effectiveness. *Educational Research Review, 30*, 100312. https://doi.org/10.1016/j.edurev.2020.100312

Bourne, V. J. (2018). Exploring statistics anxiety: Contrasting mathematical, academic performance and trait psychological predictors. *Psychology Teaching Review, 24*(1), 35–43. https://doi.org/10.53841/bpsptr.2018.24.1.35

Carveth, D. L. (2021). Psychoanalytic theory of anxiety and defense. *Metalepsis: Journal of the American Board and Academy of Psychoanalysis, 1*(1), 12–24. https://doi.org/10.52112/mtl.v1i1.3

Chew, P. K. H., Dillon, D. B., & Swinbourne, A. L. (2018). An examination of the internal consistency and structure of the statistical anxiety rating scale (STARS). *PloS One, 13*(3), e0194195. https://doi.org/10.1371/journal.pone.0194195

Cipora, K., Santos, F. H., Kucian, K., & Dowker, A. (2022). Mathematics anxiety—where are we and where shall we go? *Annals of the New York Academy of Sciences, 1513*(1), 10–20. https://doi.org/10.1111/nyas.14770

Dzulfikar, A. (2021). Pengaruh kecemasan statistika terhadap kemampuan penalaran statistik dalam pembelajaran kolaboratif berbantuan Edmodo. *GAUSS: Jurnal Pendidikan Matematika, 4*(2), 1–10. https://doi.org/10.30656/gauss.v4i2.3285

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://dx.doi.org/10.20961/ijpte.v8i1.89913

Eshet, Y., Steinberger, P., & Grinautsky, K. (2021). Relationship between statistics anxiety and academic dishonesty: A comparison between learning environments in social sciences. *Sustainability, 13*(3), 1564. https://doi.org/10.3390/su13031564

Firmansyah, M. A. (2017). Analisis hambatan belajar mahasiswa pada mata kuliah statistika. *JPPM (Jurnal Penelitian dan Pembelajaran Matematika, 10*(2), 1–12. https://doi.org/10.30870/jppm.v10i2.2563

Foley, A. E., Herts, J. B., Borgonovi, F., Guerriero, S., Levine, S. C., & Beilock, S. L. (2017). The math anxiety-performance link: A global phenomenon. *Current Directions in Psychological Science, 26*(1), 52–58. https://doi.org/10.1177/0963721416672463

Garcia-Melgar, A., East, J., & Meyers, N. (2021). Peer-assisted academic support: A comparison of mentors' and mentees' experiences of a drop-in programme. *Journal of Further and Higher Education, 45*(9), 1163–1176. https://doi.org/10.1080/0309877X.2020.1851665

Iriyadi, D., Asdar, A. K., Afriadi, B., Samad, M. A., & Syaputra, Y. D. (2021). Analysis of the Indonesian version of the statistical anxiety scale instrument with a psychometric approach. *International Journal of Evaluation and Research in Education, 13*(2), 672–681. https://doi.org/10.11591/ijere.v13i2.26517

Jamil, N. I. B., Rosle, A. N., Baharuddin, F. N., Ibrahim, S. S., & Kasim, S. (2019). Exploring students' intentions towards game-based learning in statistics. *International Journal of Academic Research in Business and Social Sciences, 9*(13), 1134–1148. https://doi.org/10.6007/IJARBSS/v9-i13/6255

Jayadi, A., & Anwar, Z. (2018). Pemanfaatan aplikasi SPSS untuk meningkatkan keterampilan mahasiswa mengolah data statistika. *Jurnal Visionary: Penelitian dan Pengembangan di Bidang Administrasi Pendidikan, 2*(2), 65–74. https://doi.org/10.20527/jv.v2i2.20

Lothes, J. I., Mochrie, K., Wilson, M., & Hakan, R. (2021). The effect of DBT-informed mindfulness skills (what and how skills) and mindfulness-based stress reduction practices on test anxiety in college students: A mixed design study. *Current Psychology, 40*(6), 2764–2777. https://doi.org/10.1007/s12144-019-00207-y

Kakada, P., Deshpande, Y., & Bisen, S. (2019). Technology support, social support, academic support, service support, and student satisfaction. *Journal of Information Technology Education: Research, 18*, 549–570. https://doi.org/10.28945/4461

Koparan, T. (2015). Difficulties in learning and teaching statistics: Teacher views. *International Journal of Mathematical Education in Science and Technology, 46*(1), 94–104. https://doi.org/10.1080/0020739X.2014.941425

Leal, P. C., Goes, T. C., da Silva, L. C. F., & Teixeira-Silva, F. (2017). Trait vs. state anxiety in different threatening situations. *Trends in Psychiatry and Psychotherapy, 39*, 147–157. https://doi.org/10.1590/2237-6089-2016-0044

Legaki, N.-Z., Xi, N., Hamari, J., Karpouzis, K., & Assimakopoulos, V. (2020). The effect of challenge-based gamification on learning: An experiment in the context of statistics education. *International Journal of Human-Computer Studies, 144*, 102496. https://doi.org/10.1016/j.ijhcs.2020.102496

Macher, D., Paechter, M., Papousek, I., & Ruggeri, K. (2012). Statistics anxiety, trait anxiety, learning behavior, and academic performance. *European Journal of Psychology of Education, 27*(4), 483–498. https://doi.org/10.1007/s10212-011-0090-5

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook and the coding manual for qualitative researchers*. Sage Publications Sage CA: Thousand Oaks. https://doi.org/10.1080/095183998236809

Nesbit, R. J., & Bourne, V. J. (2018). Statistics anxiety rating scale (STARS) use in psychology students: A review and analysis with an undergraduate sample. *Psychology Teaching Review, 24*(2), 101–110. https://doi.org/10.53841/bpsptr.2018.24.2.101

Nurhayati, N., & Novianti, N. (2020). Pengaruh SPSS terhadap hasil belajar pada materi statistika deskriptif. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 9*(1), 101–107. https://doi.org/10.24127/ajpm.v9i1.2770

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://dx.doi.org/10.20961/ijpte.v8i1.81619

Onwuegbuzie, A. J., & Wilson, V. A. (2003). Statistics anxiety: Nature, etiology, antecedents, effects, and treatments. *Teaching in Higher Education, 8*(2), 195–209. https://doi.org/10.1080/1356251032000052447

Paechter, M., Macher, D., Martskvishvili, K., Wimmer, S., & Papousek, I. (2017). Mathematics anxiety and statistics anxiety: Shared but also unshared components and antagonistic contributions to performance in statistics. *Frontiers in Psychology, p. 8*, 1196. https://doi.org/10.3389/fpsyg.2017.01196

Park, J., & Moghaddam, B. (2017). Impact of anxiety on prefrontal cortex encoding of cognitive flexibility. *Neuroscience, 345*, 193–202. https://doi.org/10.1016/j.neuroscience.2016.06.015

Pretorius, T., & Norman, A. M. (1992). Psychometric data on the statistics anxiety scale for a sample of South African students. *Educational and Psychological Measurement, 52*, 933–937. https://doi.org/10.1177/0013164492052004015

Ramadhani, R., & Sribina, N. (2019). Pemanfaatan media pembelajaran SPSS untuk meningkatkan kemampuan statistik siswa SMK. *Jurnal Solma, 8*(1), 159–170. https://doi.org/10.29405/solma.v8i1.496

Rizki, F., Rr Dian, T., & Nihayati, H. E. (2019). Development of holistic nursing care model for mental disorder patients care in Indonesia. *Indian Journal of Public Health Research and Development, 10*(8), 1351–1355. https://doi.org/10.5958/0976-5506.2019.02077.5

Saputro, H., & Fazrin, I. (2017). Penurunan tingkat kecemasan anak akibat hospitalisasi dengan penerapan terapi bermain. *JKI (Jurnal Konseling Indonesia), 3*(1), 9–12. https://doi.org/10.21043/jki.v3i1.2507

Spielberger, C. D. (2022). Anxiety. In *Social problems and mental health* (pp. 15–19). Routledge. https://doi.org/10.4324/9781315233247

Steinberger, P. (2020). Assessing the statistical anxiety rating scale as applied to prospective teachers in an Israeli teacher-training college. *Studies in Educational Evaluation, 64*(March), 100829. https://doi.org/10.1016/j.stueduc.2019.100829

Suminta, R. R., & Sayekti, F. P. (2018). Kecemasan statistik ditinjau dari jenis kelamin. *Quality, 5*(1), 140–154. https://doi.org/10.1234/quality.v5i1.1234

Subedi, D. (2016). Explanatory sequential mixed method design as the third research community of knowledge claim. *American Journal of Educational Research, 4*(7), 570–577. https://doi.org/10.12691/education-4-7-10

Tenenbaum, H. R., Winstone, N. E., Leman, P. J., & Avery, R. E. (2020). How effective is peer interaction in facilitating learning? A meta-analysis. *Journal of Educational Psychology, 112*(7), 1303–1319. https://doi.org/10.1037/edu0000436

Tutkun, T. (2019). Statistics anxiety of graduate students. *International Journal of Progressive Education, 15*(5), 32–41. https://doi.org/10.29329/ijpe.2019.208.3

Wahab, A., Junaedi, J., & Azhar, M. (2021). Learning effectiveness of education statistics using N-Gain improvement test in PGMI. *Jurnal Basicedu, 5*(2), 1039–1045. https://doi.org/10.31004/basicedu.v5i2.845

Widigda, I. R., & Setyaningrum, W. (2018). Kecemasan mahasiswa pendidikan matematika Universitas Riau Kepulauan dalam menghadapi skripsi. *Jurnal Pendidikan Matematika dan Sains, 6*(2), 190–199. https://doi.org/10.25273/jpms.v6i2.1231

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://dx.doi.org/10.20961/ijpte.v8i1.89913