Addressing Mathematics Anxiety of Grade 5 Students through Modules and Strategies and Its Effect to Student Achievement

Ma. Edilyn Dimapilis Chiao, Elizabeth Seton School, Philippines

The Southeast Asian Conference on Education 2020
Official Conference Proceedings

Abstract
The study sought to address mathematics anxiety among grade 5 students of Elizabeth Seton School – Las Piñas Campus by defining its relationship with student achievement, facilitating modules and strategies, and determining its effect to student achievement. The study examined the mathematics anxiety levels of 267 grade 5 respondents and utilized an instrument adopted from Sierbers (2015). The study also examined whether mathematics anxiety modules and strategies improve student achievement and analyzed using Statistical Package for the Social Sciences (SPSS). A paired t-test for the difference between means of student achievement and Pearson–r for the relationship of mathematics anxiety with student achievement were used as statistical analyses to measure significance. The result of the study indicated that there is MEDIUM – HIGH mathematics anxiety levels among the respondents which after implementation of mathematics modules and strategies decreased to LOW – MEDIUM mathematics anxiety level. The result also showed there was a statistically strong relationship between mathematics anxiety and students achievement. Students who have high mathematics anxiety tend to have low mathematics achievement. Furthermore, the t-test showed that the mean difference between student achievements is significant in two out of eight sections only in grade 5 students. This implies that mathematics anxiety modules and strategies were effective in selected sections. Based on the findings of this study, it is worth noting that mathematics anxiety affects student achievement.

Keywords: mathematics anxiety, student achievement, anxiety levels, modules, strategies, addressing anxiety

It has been defined that "Math anxiety is a feeling of tension, apprehension, or fear that interferes with math performance" (Ashcraft, 2002, p.181). Mathematics anxiety can begin as early as the fourth grade and peaks in middle school and high school.

Since Mathematics Anxiety has been a well-known research topic for numerous years, there is a need of continuously research on the topic of math anxiety (Smith, 2004). With this, the study aimed to determine the levels of mathematics anxiety, its relationship of with student achievement and the effects of mathematics anxiety modules in mathematics at Elizabeth Seton School – Las Piñas Campus. The aspects looked into modules and strategies in improving students' achievement where research data were collected using an instrument (questionnaire) adopted from Sierbers (2015) and statistically analyzed.

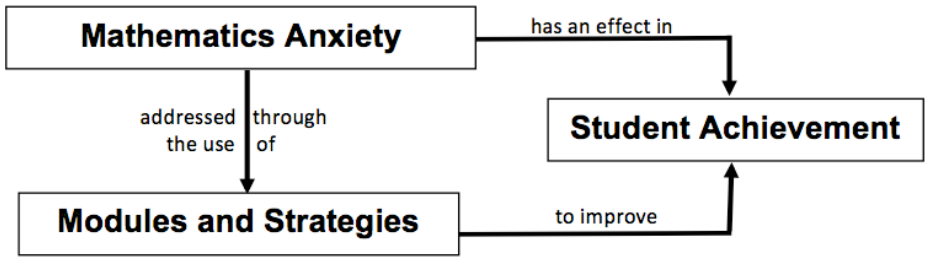

Figure 1: Conceptual Framework

Parallel to this study were the past work of Gough (1954) and Dreger and Aiken (1957) that noted mathematical performance is influenced by nonintellectual factors. Gough (1954) defined Mathemaphobia as a fear in the presence of mathematics that creates a negative attitude. Dreger and Aiken (1957) investigated the idea that math attitude scores made a significantly predict achievement in mathematics. Richardson and Suinn (1972) created a 98-item Mathematics Anxiety Rating Scale (MARS), which is the most used instrument to measure math anxiety. Suinn, Edie, Nicoletti, and Spinelli (1972) used the MARS in a study to measure math anxiety in students. Wigfield and Meece (1988) used a Student Attitude Questionnaire (SAQ) with students in 6th through 12th grade. The questionnaire in their study assessed the levels of math anxiety and student's beliefs concerning mathematics. Hembree (1990) studied the nature, effects, and relief of mathematics anxiety concluding that mathematics anxiety depresses performance.

This study used descriptive and quasi-experimental quantitative research as a type of methodology, which involved collection of data needed to determine the mathematics anxiety levels among grade 5 students, its relationship with student achievement, and the effects of Mathematics Anxiety Modules as an intervention in addressing mathematics anxiety. Using this research design, data were gathered and summarized through numerical reports and tables using measures of central tendency, variation and correlation.

Conclusion

Data gathered showed that after implementation of Mathematics Anxiety Modules and Strategies, the levels for math anxiety of students decreased. This implied through

Mathematics Anxiety Modules, mathematics anxiety be likely to decrease through several interventions. This was parallel to the study of Buchler (2013) which showed that students who participated in the classes with instruction on the three research-based anxiety-reducing strategies experienced positive change in their ability to control anxiety during anxiety-producing situations by using one or more of the strategies. Also, data gathered that changes in students' anxiety towards mathematics were significantly correlated with changes in the mean grade.

The study revealed the following findings:

1. The students' anxiety level in mathematics was MEDIUM to HIGH before the implementation of Mathematics Anxiety Modules and LOW to MEDIUM after the implementation. Students' anxiety in mathematics decreased as they become more aware on understanding mathematics anxiety. The more positive the students' perception towards mathematics, the higher the mathematics grades of the students.

2. There is a there a significant relationship between the levels of mathematics anxiety and the student achievement.

3. There is a significant difference/improvement in the mathematics anxiety and student achievement (as measured by the mathematics grade) of grade 5 students after the implementation of modules and strategies.

Acknowledgement

First and foremost the researcher would like to express her sincerest gratitude to the Almighty for His gift of wisdom, persistence and patience.

The researcher also acknowledges the contribution of the following:
Mr. Iean F. Castellano, Ms. Corazon D. Huvalla, Dr. Delia C. Navaza and Ms. Teresita F. Religioso, for the supervision, vital contribution, and constructive feedback and evaluation for the betterment of this paper.

Dr. Roberto T. Borromeo, Ms. Catherine Ann S. Rosero, Ms. Frances Ann A. Samson, and Mr. Ferdinand V. Alido, for their insightful leadership and encouragement and years of mentorship.

The Mathematics Department Faculty, Ms. Michelle B. Aquino and Ms. Arleth T. Follero, for their support and willingness to share their sharp-witted thoughts, which were essential for this research.

Elizabeth Seton School and the whole school community, for providing the opportunity to conduct this research and for the utmost support and understanding.

Most importantly, the researcher acknowledges and gives gratitude to her husband, Engr. Robert A. Chiao for the never-ending trust, unconditional love and continual support. He has been the researcher's inspiration together with their children Nicholas and Nichole for whom this study has been dedicated. The researcher also wants to thank her parents, Eduardo and Erlinda Dimapilis, for raising her with thorough

understanding the value of education and hardwork. The researcher will always be grateful, indebted, and inspired by their love.

References

Ashcraft, M. H., & Kirk, E. P. (2001). *The relationships among working memory, math anxiety, and performance*. Journal of Experimental Psychology. General, 130(2), 224-237.

Boaler, J. (2008). *What's math got to do with it?: Helping children learn to love their most* Buchler, Robin K., (2013). *"Anxiety-Reducing Strategies in the Classroom"* Dissertations. Paper 188.

Dreger, R. M, & Aiken, L. R. (1957). Identification of number anxiety. Journal of Educational Psychology, 47, 344-351.

Gough, M. F. (1954). Mathemaphobia: Causes and treatments. Clearing House, 28, 290-294.

Hembree, R. (1990). The nature, effects, and relief of mathematics anxiety. Journal for Research in Mathematics Education, 21, 33-46.

Kesici, Ş., & ErdoĞan, A. (2010). Mathematics anxiety according to middle school students' achievement motivation and social comparison. Education, 131(1), 54-63.

Mashayekha, M., Hashemi. (2011). *Recognizing , Reducing and Copying with Test Anxiety : Causes , Solutions and Recommendations.* www.sciencedirect.com

Meece, J. L., & Wigfield A., & Eccles, J. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. Journal of Educational Psychology, 82(1), 60-70.

Reys R. E., Lindquist M. N., Lambdin D. V., & Smith N. L. (2007). *Helping children learn mathematics.* Hoboken, NJ: John Wiley & Sons, Inc.

Richardson, F. C. & Suinn, R. M. (1972). The mathematics anxiety rating scale: Psychometric data. Journal of Counseling Psychology, 19(6), 551-554.

Rockoff, J. E., Jacob, B. A. (2011) *Organizing Schools to Improve Student Achievement: Start Times, Grade Configurations, and Teacher Assignments* (Research Paper). The Hamilton Project, Washington, DC.

Scarpello, G. (2007). Helping students get past math anxiety. Techniques: Connecting Education & Careers, 82(6), 34-35.

Siebers, W. M. (2015, May). *The relationship between math anxiety and student achievement of middle school students*. Retrieved from https://mountainscholar.org/bitstream/handle/10217/166940/Siebers_colostate_0053A_12903.pdf?sequence=1

Smith, Megan R. (2004). *Math Anxiety: Causes, Effects, and Preventative Measures Senior Honors Theses*. *255*. Retrieved from https://digitalcommons.liberty.edu/honors/255

Smith-Nelson, Courtney Kathleen, "Practicing Positive Coping Strategies For Managing Math Anxiety In A Secondary Mathematics Classroom" (2016). MSU Graduate Theses. Paper 2977

Suinn, R. M., Edie, C. A., Nicoletti, J., & Spinelli, P. (1972). The MARS, a measure of mathematics anxiety: Psychometric data. Journal of Clinical Psychology, 28(3), 373-375.

Suinn, R. M., & Edwards, R. (1982). *The measurement of mathematics anxiety: The mathematics anxiety rating scale for adolescents MARS-A*. Journal of Clinical Psychology, 38(3), 576-580.

Tobias, S. (1993). *Overcoming math anxiety*, (Rev. and expanded.). New York, NY: W.W. Norton.

Vitasari, Prima, et. al. (2010). *The Use of Study Anxiety Intervention in Reducing Anxiety to Improve Academic Performance among University Students.* International Journal of Psychological Studies, Malaysia

Contact email: chiao.edilyn@ess.edu.ph