



Online Class and Mathematics Anxiety

Lezlie M. Pabilona¹, Venerando G. Tenio²

Mindanao State University – Buug Campus, Buug, Zamboanga Sibugay, Philippines
Email: ventenio22psalms@gmail.com

ABSTRACT

Mathematics is one of the important and useful subjects in education. However, because of its abstract and computational nature it is often viewed as one of the hardest subjects and thus results to the presence of mathematics anxiety. By this fact, this study was conducted to unveil the relationship of the use of online class and the level of mathematics anxiety of the Grade XI-Socrates Science, Technology, Engineering and Mathematics (STEM) Senior High School (SHS) students of Mindanao State University – Buug Campus (MSU-BC). Samples of 27 students were the respondents through purposive sampling and data were gathered through distribution of questionnaire-checklist via google survey form. The results of the study revealed that the level of the use of online class of the respondents is “sometimes” and the level of mathematics anxiety of the respondents is “moderate”. Statistical analysis showed that there was a significant relationship between the use of online class and mathematics anxiety of Grade XI-Socrates STEM SHS students of MSU-BC. It is highly recommended that students are urged to have positive attitudes towards facing mathematical calculations in the context of online class. Teachers should create more active and timely teaching techniques and strategies to make the importance of doing mathematics in an online class context more appreciative for the learners. Parents must offer practical assistance and maintain a conducive learning environment since learning happens at home and that similar studies should be conducted to strengthen the findings of the study.

Keywords : online class, mathematics anxiety, STEM students, SHS students, MSU-BUUG

INTRODUCTION

COVID - 19 is one of the recent coronavirus outbreaks in the 21st Century. It was officially named as Coronavirus Disease 2019 by the World Health Organization (WHO) on February 12, 2020. It is a kind of zoonotic virus that causes illness ranging from cold to intense respiratory diseases. Its first human cases were reported by officials in Wuhan, Hubei Province China in December 2019. Due to its rapid spread the WHO urged the public to adopt precautionary measures to prevent the continuous spread. To achieve these precautionary measures every sectors such as Businesses, Churches, and even the educational system must adhere to the new normal protocol.

In order for the educational system to address the new normal they planned new ways in delivering the needed lessons and information. As such, this pandemic lead to educational system to deliver lessons not only through blended learning (with the use of Television, Radio, Modules, etc.) but also through the use of online classes. According to Tophat glossary, they defined Online Class as "a course conducted over the internet". They are typically conducted through a learning

management system (LMS) where students can view their course programs and educational progress; likewise communicate with fellow students and instructor.

The continuous increase in the number of cases may affect people psychologically which causes the emergence of mental illness such as stress, anxiety, and depression. Anxiety is of many types including exam anxiety, math anxiety, and death anxiety (Sarikaya, 2013). In relation to academic, one of the common anxiety experienced by the students is the math/mathematics anxiety. Erdogan, Kesici and Sahin (2011) defined math anxiety as "a form of situational anxiety that arises once someone is confronted with math questions. Generally, it is described as a negative thoughts, performance inadequacy, feelings of pressure, and avoidance that result from being asked to perform calculation inside and outside the classroom (Vahedi & Farroki, 2011).

Thus, this study, Online Class and Mathematics Anxiety contends



Asian Journal of Advanced Multidisciplinary Researches

ISSN: 2782 - 9057

to explore the relationship between the use of online class and the level of mathematics anxiety among Grade XI-Socrates Science, Technology, Engineering and Mathematics (STEM) Senior High School (SHS) students of Mindanao State University - Buug Campus.

This study is guided with the following theories. The Deficit Theory expounded that learners with low initial mathematics performance, have higher chances of experiencing mathematics anxiety. This notion implies that learner's success or failure in learning mathematics determine whether they will experience or not some degree of mathematics anxiety (Carey, et al., 2016),

Another theory suggested by Lev Vygotsky is the Zone of Proximal Development (ZPD), in which it means that the range of tasks that are too difficult for an individual to conquer on their own, but can be mastered with the guidance of individual more skilled. This implies that in order for learners to acquire more knowledge in mathematics, they must be guided by a teacher who mastered the specific course. If this difficulty is not addressed it may lead to low performance or high level of anxiety towards mathematics.

The Debilitating Anxiety Model puts forward the notion that learner's level of "mathematics performance" is a consequence of experiencing a certain "level of mathematics anxiety" (Carey, et al., 2016).

METHODOLOGY

This study used descriptive research design, to unveil the relationship of the use of online class and the level of mathematics anxiety of the Grade XI-Socrates Science, Technology, Engineering and Mathematics (STEM) Senior High School students of Mindanao State University - Buug Campus in the Academic Year 2020 - 2021.

The study was conducted in the Senior High School Department of Mindanao State University - Buug Campus, Datu Panas, Buug, Zamboanga Sibugay (Region IX). The Mindanao State University-Buug Campus is about 600 meters away from the national highway and is accessible by any land transportation. The Senior High School Department is located at the back of the Academic Complex Building of the university.

The respondents of the study are the Grade XI-Socrates Science, Technology, Engineering and Mathematics (STEM) Senior High School students of Mindanao State University - Buug Campus, who are officially enrolled in the Academic Year 2020 - 2021. Specifically, the researcher utilized only one section of the STEM Strand. The researchers chose the Grade XI-Socrates STEM SHS students because this strand has the most number of Mathematics related subjects.

The instrument that was used in gathering the necessary data for the study was the questionnaire-checklist. The questionnaire is divided into two (2) parts. The first part is the ten (10) questions adapted and revised from McVay Lynch, M. (2004) that measured the use of online class with three options; Always (3), Sometimes (2) and Never (1) and the second part includes ten (10) questions adapted from Siebers, W.M (2015) that measured the level of mathematics anxiety of the students with three options; Agree (3), Undecided (2) and Disagree (1).

The researchers used convenience sampling and judgment or purposive sampling. Convenience sampling was used because the researchers relied on the respondents who were readily available and willing to participate. Judgment sampling was also used because the researchers believed that the respondents could provide the best information to achieve the objectives of the study which resulted in saving time and money since the researcher had limited time because of the pandemic and the compressed semester.

In gathering the data, the researchers secured first a Letter to the Dean and when approved, the researchers also secured the Permission from the Principal to conduct the study. Upon approval, another letter was given to the adviser and subject teacher to inform them about the study to be conducted. Afterwards, letter of consent was given to the respondents (also by the use of Google Survey Form) prior to the distribution of the questionnaire-checklists in order to seek their willingness to participate in the study. Then the researchers distributed the questionnaire-checklist to the respondents by the use of Google Survey Forms because the researchers followed the health protocols imposed by the school and the government. Later, the data were collected, tabulated, analyze, and interpreted statistically to generate essential findings in making conclusions and recommendations for the study.

To analyze and interpret the data, descriptive statistics was used such as Weighted Mean and Standard Deviation; to determine the level of mathematics anxiety and the level of the use of Online Class.

For the ethical consideration of this study the researchers had asked permission from the Dean of the College of Education, Senior High School Principal and from the Adviser of the respondents as well as the consent from the respondents before she gave them the Google survey form. Only those respondents who had answered "yes" in the consent form proceeded to answer the questionnaire-checklists and those students who answered "no" were excluded. The researchers also set the name section as optional to respect the respondents' rights to put their name on it or not and it is ethical to do so in conducting a study. The researcher gave them six (6) days to answer the questionnaire-checklists.



Asian Journal of Advanced Multidisciplinary Researches

ISSN: 2782 - 9057

Results and Discussions

The discussion below presents the prominent findings of the study, analysis and interpretation of the data gathered to unveil the relationship between the use of online class and the level of mathematics anxiety of the Grade XI-Socrates Science, Technology, Engineering and Mathematics (STEM) Senior High School (SHS) students of Mindanao State University-Buug Campus.

Table 1
Level of the Use of Online Class of the Students

ITEM	WEIGHTED MEAN	STANDARD DEVIATION	DESCRIPTIVE INTERPRETATION
1. I am able to easily access the Internet as needed for my studies.	2.22	0.51	Sometimes
2. I am comfortable in communicating electronically.	2.04	0.59	Sometimes
3. I am willing to actively communicate with my classmates and instructions electronically.	2.33	0.48	Sometimes
4. I feel that my background and experience will be beneficial to my studies.	2.15	0.53	Sometimes
5. I am comfortable with written communication.	2.37	0.56	Sometimes
6. I am able to manage my study time effectively and easily complete assignments on time.	1.81	0.62	Sometimes
7. In my studies, I am not self-disciplined and find it easy to set aside reading	2.00	0.48	Sometimes

and homework time.

8. Learning is the same in class and at home on the Internet.	1.33	0.68	Never
9. As a student, I enjoy working independently.	2.11	0.51	Sometimes
10. As a student, I enjoy working with other students in groups.	2.19	0.56	Sometimes

GENERAL WEIGHTED MEAN 2.06 0.62 **Sometimes**

Scale: 1.0-1.6- "Never", 1.7-2.3- "Sometimes", 2.4-3.0- "Always"

Table 1 shows the responses on the level of the use of online class of the students. The general weighted mean is 2.06 with a standard deviation of 0.62 and the use of online class was interpreted as "sometimes". Thus, the results confirmed that the level of the use of online class of the students was sometimes. The results agreed to Macher, et al (2012) in which students with technophobia or specific online courses anxieties experience learning difficulties, delay taking online courses or exams, procrastinate, and exhibits lower academic achievement.

Table 2
Level of Mathematics Anxiety of the Students

ITEM	WEIGHTED MEAN	STANDARD DEVIATION	DESCRIPTIVE INTERPRETATION
1. When I am in math class, I usually feel nervous.	2.59	0.64	High
2. I worry that other students might understand math problems better than me.	2.11	0.85	Moderate



Asian Journal of Advanced Multidisciplinary Researches

ISSN: 2782 - 9057

3.	I feel stressed when I'm about to take a math test.	2.52	0.63	High
4.	I have "butterflies" in my stomach before I take math class.	2.11	0.75	Moderate
5.	My math teacher is helpful in learning math.	2.48	0.51	High
6.	I feel frustrated when working on math problems.	2.41	0.80	High
7.	I have trouble sleeping the night before a math test.	2.00	0.78	Moderate
8.	My parents/guardians have a positive influence on my learning of mathematics.	2.11	0.75	Moderate
9.	I need extra help in math.	2.70	0.61	High
10.	When I need help, I won't ask for help.	1.93	0.87	Moderate

GENERAL WEIGHTED MEAN	2.30	0.76	Moderate
------------------------------	-------------	-------------	-----------------

Scale: 1.0-1.6- "Low", 1.7-2.3- "Moderate", 2.4-3.0- "High"

Table 2 shows the general weighted mean is 2.30 with a standard deviation of 0.76 and was interpreted as "moderate" level of mathe-

matics anxiety. Thus, the results confirmed that the level of the mathematics anxiety of the students was moderate. The result confirmed the claims of Edris, S. A., et al (2019), Rubinsten, O., et al (2015) and Venkatesan (2009) that the students experiencing average or moderate mathematics anxiety have negative impact on their performance in mathematics.

Table 3
 The Use of Online Class and Mathematics Anxiety

The Use of Online Class	Mathematical Anxiety			Total
	Low	Moderate	High	
Never	0	1	0	1
Sometimes	3	5	14	22
Always	0	4	0	4
Total	3	10	14	27
$\chi^2 = 10.432$		$p = 0.034$		

The table shows the relationship between the use of online class and the mathematics anxiety of the students. It shows that only one (1) student who "never" uses online class has "moderate" mathematics anxiety. Out of twenty-two (22) students who "sometimes" used online class, three (3) of them have "low" mathematics anxiety, five (5) of them have "moderate" mathematics anxiety and fourteen (14) of them have "high" mathematics anxiety. Moreover, out of four (4) of them who "always" use online class, four (4) of them have "moderate" mathematics anxiety.

Furthermore, as reflected in the table, the test yielded to a Chi-square value of 10.432 with p value of 0.034 at 0.05 (5%) level of significance implied to reject the null hypothesis and accept the alternative hypothesis. Therefore, it can be concluded from the results that there was a significant relationship between the use of online class and mathematics anxiety of the Grade XI-Socrates Science, Technology, Engineering and Mathematics (STEM) Senior High School (SHS) students of Mindanao State University-Buug Campus. The result agreed to the study of Istikomah and Wahyuni (2018) entitled "Students Mathematics Anxiety on the Use of Technology in Mathematics Learning" which showed that there is high level of mathematics anxiety in all dimension (cognitive, affective, and psychomotor domain) in the use of technology in the course. It further showed that most students expressed severe anxiety during first lecture meeting and when receiving the task related with application of some software.



CONCLUSIONS

Based on the summary of findings, the study concludes that the “sometimes” use of online class in learning and a “moderate” mathematics anxiety experienced by the respondents has a significant relationship in the total learning of the Grade XI-Socrates Science, Technology, Engineering and Mathematics (STEM) Senior High School (SHS) students of Mindanao State University-Buug Campus (MSU-BC), Academic Year 2020-2021.

It shows that mathematics anxiety is still present in an online context and thus needs to be addressed, since learning in class and at home on the internet were never the same, in order to prevent the students not to avoid learning mathematics and doing related mathematical tasks in learning and daily activities.

RECOMMENDATIONS

Based on the results of the study, the following recommendations are given:

1. Teachers, students and the parents are encouraged to love mathematics, know the importance of mathematics and to have full understanding of the presence of mathematics anxiety in an online class context.
2. Students are encouraged to have positive outlook and attitudes towards facing mathematical calculations in an online class context. It is also highly recommended to them to have frequent communication and questions with their peers and to their teachers to address the difficulty that arises in solving mathematics with the use of online class.
3. Teachers are encouraged to have active and constant communications not only to their students but also to the parents in order to properly address the difficulty experienced by their students. Also they should create more active and timely teaching techniques and strategies that enable the students to appreciate more the importance of doing mathematics and will help to lessen the presence of mathematical anxiety in an online class context. This will help not only to improve their teaching skills but also to raise and improve the performance of their students.
4. Parents are urged to frequently assist and monitor their children's progress in order to know their difficulty and anxiety level they experienced. In this way, they can help to lessen the level of mathematics anxiety present in their children who are exposed to the online class approach. Most of all, they must offer practical assistance, reassurance, support and maintain a conducive learning environment in which their children can learn and appreciate more the application and importance of mathematics because they are the main source or instruments for the children to learn since learning happens at home.
5. Future researchers are also encouraged to conduct similar studies considering all sections of the same year level to strengthen the find-

ings of the study.

References

- Abocejo, F.T., & Padua, R.N. (2010). An econometric model for determining sustainability of basic education development. *CNU Journal of Higher Education*, 4(1), 40-53. Retrieved from <http://www.jhe.cnu.edu.ph/index.php/cnujhe/article/view/39>
- Arem, C. (2010). *Conquering math anxiety A self-help workbook* (3rd ed). Belmont, CA, USA: Charlie Van Wagner
- Ashcraft, M. & Kirk, E.P. (2001). The relationship among working memory, math anxiety and performance. *Journal of Experimental Psychology*, 130, 224-237
- Beilock, S.L. & Willingham, D.T. (2014). Math anxiety: Can teachers help students reduce it? Ask the cognitive scientist. *American Educator*, 38(2), 28-32. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1043398.pdf>
- Brewster, B. & Miller, T. (2020). Missed opportunity in mathematics anxiety. *International Electronic Journal of Mathematics Education*, 15(3), 1-12.
- Byrd, P. (1982). A descriptive study of mathematics anxiety: Its nature and antecedents. Unpublished doctoral dissertation, Indian University
- Carey, E., Hill, F., Devine, A. & Szucs, D. (2016). The direction of the relationship between mathematics anxiety and mathematics performance. *Frontiers in Psychology*, 6(article 1987), 1-6. doi:10.3389/fpsyg.2015.11987
- Cunado, A.G. & Abocejo, F.T. (2018). Lesson planning competency of English major university sophomore students. *European Journal of Educational Studies*. 5(8), 395-409. doi:10.5281/zenodo.2538422
- Edris, S.A., Malagum, J. & Simacas, J.J. (2019). Correlation of Mathematics Anxiety and Mathematics Performance of Grade VIII Students. An Undergraduate Thesis, MSU-Buug, Zamboanga Sibugay.
- Enoc, S.M. (2011). Math Anxiety: Its Effect to the Mathematics Performance of the Fourth Year High School students of Mindanao State University-Buug Laboratory High School. An Undergraduate Thesis, MSU-Buug, Zamboanga Sibugay.
- Erdogan, A., Kesici, S., & Sahin, I. (2011). Prediction of high school students mathematics anxiety by their achievement motivation and social comparison. *Elementary Education Online*. 10(2).646-652.
- Furner, J. M. & Duffy, M.L. (2002). Equity for all students in the new millennium: Disabling math anxiety. *Intervention in School and Clinic*, 38(2), 67-72.
- Godbey, C. (1997). Mathematics anxiety and the underprepared students. (Technical Report). Murfreesboro, TN: Middle



Asian Journal of Advanced Multidisciplinary Researches

ISSN: 2782 - 9057

- Tennessee State University
- Hembree, R. (1990). The nature, effects and relief of mathematics anxiety. *Journal for Research in Mathematics Education*, 221, 33-46.
- Hodges, H. (1983). Learning styles for mathophobia. *Arithmetic Teacher*, 30(7), 17-20.
- Istokomah, E., & Wahyumi, A. (2018). Student's Mathematics Anxiety on the Use of Technology in Mathematics Learning. Retrieved from https://www.researchgate.net/publication/331871407_Students%27s_Mathematics_Anxiety_on_The_Use_of_Technology_in_Mathematics_Learning/fulltext/5c90fef0a6fdcc38175e5211/Students-Mathematics-Anxiety-on-The-Use-of-Technology-in-Mathematics_Learning.pdf?origin=publication_detail
- Kurt, S. (2020). Vygostky's Zone of Proximal Development and Scaffolding. [Blog Post] Retrieved from <https://educationaltechnology.net/vygotsky-zone-of-proximal-development-and-scaffolding/>
- Lai, Y., Zhu, X. Chen, Y., & Li. Y. (2015). Effects of mathematics anxiety and mathematical metacognition on word problem solving in children with and without mathematical learning difficulties. *Plos One*, 10(6), e0130570. doi: 10.1371/journal.pone.0130570
- Lyons, I. M. & Beilock, L. (2011). Mathematics anxiety: separating the math from anxiety. *Cerebral Cortex*, 22(9), 2102-2110.
- 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.
- Matthews, G. (2000). *Human performance: Cognition, stress, and individual differences*. Psychology Press.
- McVay Lynch, M. (2004). *Learning Online: A guide to success in the virtual classroom*. New York, NY: Routledge Falmer. Retrieved from <https://dl101.zlibcdn.com/dtoken/c64e70c38d26ecc7754202f1a4e7c5e4>
- Mutawah, M. (2015). The influence of mathematics anxiety in middle and high school students math achievement. *International Education Studies*, 8(11), 239-252. doi:10.5539/ies.v8n11p
- Nolting, P. (2010). *Math study skills workbook: Your guide to reducing text anxiety and improving study strategies* (4th ed.). Belmont, CA, USA: Cengage Learning.
- Perry, A.B. (2004). Decreasing math anxiety in college students. *College Students Journal*, 38(2), 19-20.
- Prakash, J. (2011). Contribution of attention and interest in learning science. Retrieved from preservearticles.com
- Reali, F. et al (2016). Examining the link between math anxiety and math performance in Columbian students. *Revista Colombiana de Psicología*, 25(2), xx-xx. doi: 10.15446/rcp.v25n2.54532
- Richardson, E. & Suinn, R.M. (1972). The mathematics anxiety rating scale: Psychometric data. *Journal of Counseling Psychology*, 19, 551-554
- Rubinsten, O., Eidlin, H., Wohl, H. & Akibli (2015). Attentional bias in math anxiety. *Front Psychol.* 6: 1539. doi: 10.3389/fpsyg.2015.01539
- Sarikaya, Y. (2013). The development, validity and reliability of death anxiety scale (Unpublished Master's Thesis). Gaziosmanpasa University, Tokat, Turkey.
- Siebers, W.M. (2015). The relationship between math anxiety and student achievement of middle school student (Dissertation). Retrieved from https://mountainscholar.org/bitstream/handle/10217/166940/Siebers_colostate_0053A_1_2903.pdf
- Sparks, S. P. (2011). Math Anxiety Explored in Studies. *Education Week*, 30(31), 1-16.
- Tobias, S. (1987). Math anxiety. *Science*, 237, 1556
- Tophat Glossary (n.d). Online class. [Blog post]. Retrieved from <https://tophat.com/glossary/o/online-class/>
- Tsanwani, A. R. (2009). Tracing factors that facilitate achievement in mathematics in traditionally disadvantaged secondary schools. Unpublished PhD thesis, Pretoria: University of Pretoria.
- Vahedi, S., & Farroki, F. (2011). A confirmatory factor analysis of the structure of Abbreviated Math Anxiety Scale. *Iran Journal of Psychiatry*, 6(2), 47-53.
- Venkatesan, S. (2009). Mathematics anxiety, mathematics performance and academic hardness in high school students. Retrieved from <https://www.researchgate.net>
- Vitasari, P., Wahab, M. N. A., Othman, A., Herawan, T., & Sinnadurai, S. K., (2010). The relationship between study anxiety and academic performance among engineering students. *Procedia-Social and Behavioral Sciences*, 8, 490-497.
- World Health Organization (2020). Coronavirus disease 2019 (COVID-19) situation report-94.p.2. Retrieved from <https://www.who.int/docs/default-source/coronavirus/situation-reports/20200423-sitrep-94-covid-19.pdf>