



Prevalence and Management of Mathematics Phobia Among Public Senior Secondary School Students in Lagos State

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Abstract

Mathematics as a subject is indispensable in everyday life cannot be overstressed. However, regardless of its usefulness, many students manifest irrational fear of the subject notwithstanding its relevance to the desired future career. Admission into Nigeria's tertiary institutions has been stalled due to failure in Mathematics mostly arising from phobia of Mathematics. This study focused on the prevalence and management of Mathematics phobia among secondary school students in Lagos public schools. The study employed a survey research design, the instrument for data collection was a researchers-designed questionnaire titled "Prevalence, Assessment and Management of Maths phobia (PAMMP) with a reliability coefficient of 0.89. Two education districts were randomly selected from the six education districts in Lagos state. Six secondary schools were randomly selected from each of the two selected districts, 40 students were purposively selected from each of the sampled schools making a total of 480 students who were involved in the study. The data collected were analysed using T-test statistics and chi-square at 0.05 level of significance. Results showed that gender difference and subject combination has no significant impact on students experience of mathematics phobia. However, response of the respondents indicated that most students experience math phobia, but it is higher among the non-science students. Teachers' method has significant impact on the prevalence of math phobia among secondary school students. The study recommended among other things that cognitive restructuring, systematic desensitization and study habit training be organised for the students.

Key words: Mathematics, Phobia, Functional, Concepts, Mathophobia

Introduction

It is characteristic of a majority of students to have phobia at one aspect of their educational development or the other. For example, while some science-oriented students loathe language lessons, some arts-oriented students loathe figures and formulae. Even the gifted as well as the talented students once in a while manifest phobic expressions however tidy or trivial the sources may be.

Without mincing words, in whatever educational strata the students may find themselves, phobia exists. For instance, kindergartens manifest school phobia or caregiver's phobia during the home-school transitional period until they become well-adjusted to schooling. Graduates of the primary school manifest phobia during their transition to the secondary at the Junior Secondary School level where they will be faced with many subjects, not less than thirteen, with different teachers for each subject. Of course, the

transition from the Junior Secondary School (JSS) level to the Senior Secondary School (SSS) level is germane to the candidate's future because all subjects offered must be relevant to his/her future career among which Mathematics and English are nationally compulsory.

Phobia according to Nwoke and Charles (2019) is one of the popular anxiety disorders that manifest persistently through irrational fear and avoidance of the specific object or situation giving rise to such irrational fear. For instance, a client who fears thunderstorm becomes jittery as soon as the clouds gather and may even hide at the sound of the storms because the storms are the stimuli that arouse her fears.

Bashir, Muhammed and Umar (2016) opined that there are two categories of people with phobia; the first category comprised those people who have accepted their phobia and live with it. The second category comprised the people who are totally incapacitated by



what they feared originally, that is, the trigger and hence decide to avoid the feared circumstance or object. At the end of the day, a strong fear becomes a phobia if it irrationally forces clients to desire to avoid the object or situation that initially triggered the fear in them. (Tillfors, 2003)

Phobia focuses anxiety on specific objects or situations; this is why those psychologists who work on learning situations call it anxiety disorders as a result of the conditioning, stimulus and reinforcement of fearful situations. Phobia is an extreme or irrational fear of or aversion to something. Anything or any person that arouses strong feeling of dislike or disinclination is considered an aversion. Phobia is a disorder in which an individual feels irrationally and intensely afraid of a specific object or situation. Merely thinking about having 6-8 credit pass including English and Mathematics before being promoted to SSS 3 is enough to arouse irrational fear in the student. Different people have phobia for different things depending on what constitute unnecessary fair to the individual. Examples of phobias according to Rajendra (2020)) include:

Acrophobia ---- fear of height, Antophobia ---- fear of being alone, Astraphobia ----- fear of thunder or lightening, Aerophobia ----- fear of getting on a plane, Aviophobia ---- fear of flying on a plane, Hydrophobia ---- fear of water, Hemophobia --- fear of blood, Xenophobia ---- fear of new faces or crowd, Entomophobia --- fear of insects, Agoraphobia ----- fear of places and situations. It is an anxiety disorder that develops after one or more panic attacks. In other words, the fair of Mathematics can likewise be coined as “Mathophobia” following the above scenario.

Mathematics is a compulsory subject for all secondary school students in Nigeria irrespective of the subject combination which could be in the Arts, Sciences, Commercial or Technical areas. No students can gain admission into the tertiary institution without a credit pass in Mathematics.

Senior Secondary School (SSS 1) is a class for a consolidated effort to prepare the students for their future career after having been exposed to all prevocational subjects at the Junior Secondary School (JSS) level. hence, the subject combination of each student dovetails to specific courses on which the Joint Admission and Matriculation Board (JAMB) aptitude tests would be based.

Every school forces any student that fails Mathematics and or English Language to repeat the class. Same for SS2 class; no promotion to the final

class which is SSS3 with a failure in English Language and Mathematics.

Mathematics is the science of structure, order and relation that has evolved from elemental practices of counting, measuring and weighing. Mathematics (from the Greek word ‘mathema’’) refers to knowledge, study and learning. It includes the study of topics like numbers, algebra, geometry and anything mathematical.

Mathematics is very important to life; it is the bedrock of science and technology (Ayinla, 2011). The place of Mathematics cannot be overemphasised. It helps people to think analytically with better reasoning abilities. It empowers students to solve problem and look for solutions. Kolawole and Oluwatayo (2004) asserted that there is hardly any area of science that can succeed without involving mathematical concepts to analyse the different concepts and theories. However, many students fail due to their inability to cope with the pressure of catching up with the realities. Some are scared of the subjects due to manipulation of figures and the formulas. Some look for ways to avoid learning the subjects called Mathematics. These, according to (Ahmed, Minnaert, Kuyper, & Van Der Werf, 2012) are partly responsible to the fluctuating performance of students hitherto in the West African School Certificate Examination (WASCE) in Nigeria.

Mathematics affects our daily life. It helps us to do everyday tasks like cooking, cleaning, shopping, and many others without messing up. For instance, in cooking rice, you need to measure using cups. Right from infancy, counting with seedlings, buttons and grouping in tens are good foundation for learning Mathematics even among the children with disabilities (Hardman, Drew & Egan; 2008). All students including the ones with disabilities must of necessity be prepared to master certain fundamental quantitative concepts to scale the hurdle of more abstract and complex Mathematics at the college and university levels (Jorgensen, Fichten & Havel, 2005). Girls fail Mathematics, even the high achieving girls fail because they manifest high level of anxiety and low self-confidence (Devine, Fawcett, Szucs & Dowker, 2012).

The causes of Mathematics failure cannot be overstressed. Research has shown that some causes can be traced to the family background, the child himself – his intrinsic interest, his intelligence quotient, absenteeism, attention deficit, housing unit, frequent relocations and many others. (Abakpa & Agbo-Egwu, 2014). Other factors include class size, learning



facilities, funding, personnel and the learning environment.

The methodology of Mathematics teachers has been under attack for some decades as a predisposing factor for mathematics phobia. The rote learning and the forceful memorisation of the multiplication tables in the 1960s raised high tension and unparalleled anxiety. This is the computer age. On the basis of the above assertion, Ramadan and Huseyin (2014) canvassed for computer technology for teaching mathematical skills in a way to reduce Mathematics phobia and increase students' interest in Mathematics. The use of technology according to Ramadan and Huseyin ' can aid effective handling of large class size and proper monitoring; reinforcement, drills and practice with a plethora of instructional applications can go a long way to reduce anxiety and phobia for Mathematics (Adeniyi, 2012; Olaniyan & Salman, 2015).

Failure on the part of the teachers to teach mathematical concepts via daily activities like problem-solving tasks, money concepts, shopping in the stores and many practical applications that can leave indelible marks on the students' memory are fundamental to phobia for learning Mathematics (Gbolagade, Wahead, & Sangoniyi ; 2013)

Hypotheses

The following hypotheses was formulated to guide the study

- H₀₁: There is no significant influence of students' subject combination on phobia for Mathematics among SS1 students in Lagos public schools.
- H₀₂: There is no significant gender difference in the prevalence of Mathematics phobia among SS1 students in Lagos public schools.
- H₀₃: Teachers' methodology has no significant effect on the prevalence of Mathematics phobia among SS1 students in Lagos public schools.

Results

Table 1: Independent Samples t-test on the mean responses of the perception of the respondents on students' subject combination and phobia for Mathematics

VARIABLE	Subject combination	N	\bar{X}	STD DEV	STD ERRO R	DF	T	P	REMARK
Math phobia 0.0428	science S	184	42.56	0.7175	0.1205	438		-2	.0157
	Non-science	256	76.14	0.4352	0.0113				

Methods

The target population for the study consisted of all senior secondary school students in Lagos metropolis who are being taught on the basis of the specific subject combination in line with their future vocational choice in which Mathematics is a compulsory requirement whichever their choice may be. Lagos State has a total of 322 senior secondary schools with a population of 259,980 according to 2022 Annual Public-School Census. The study adopted descriptive survey, the instrument for data collection was a researcher-designed 4point Likert scale questionnaire titled 'Prevalence, Assessment and Management of Maths Phobia (PAMMP). The questionnaire was divided in to two parts, the first part elicits the biodata of the respondents while the second part source information on prevalence causes and solution to mathematics phobia. The instrument was trial tested using 30 students outside the school selected for the study. A test-retest reliability coefficient of 0.89 was obtained.

Two educational districts were randomly selected from the six education districts in Lagos state. Six schools were randomly selected from each of the two selected educational districts making 12 schools. 40 students were purposively selected from each of the sampled school making a total of 480 students (154 male and 286 female) who were involved in the study. The sample for the study comprised of 150 science and 380 non-science students. Purposive sampling was employed because the students were selected across course /discipline. However, only 440 copies of the questionnaire which were correctly filled and returned were used in the data analysis. The data collected were analyzed using frequency counts, mean, t-test and chi-square at 0.05 level of significance.



The result in Table 1 shows a significant difference in the perception of the respondents on students' subject combination and phobia for Mathematics. T-test value of -2.0157 was obtained, P=0.0428 which was significant at 0.05 level of probability ($p < 0.05$). Hence, the hypothesis testing that there is no significant influence of students' subject

combination on phobia for Mathematics among SS1 students in Lagos public schools was rejected. Hence, all students experience mathematics phobia whether science or non-science students. However, the mean response of the respondents indicated that the science students have less phobia for mathematics compared to non-science students.

Table 2: T-test analysis on Perceived cause of Mathematics phobia based on Gender

VARIABLE	GROUP	N	\bar{X}	STD DEV	STD ERROR	DF	T	P	REMARK
Math phobia 0.0228	male	154	44.56	0.8172	0.1295	438		.0157	
	female	286	87.15	0.7353	0.0125				

The result on Table 2 shows a significant difference in the perception of the respondents on students' gender and phobia for Mathematics. T-test value of -2.0157 was obtained, P=0.0228 which was significant at 0.05 level of probability ($p < 0.05$). Hence, the hypothesis testing which state that there is no significant gender difference in the prevalence of

Mathematics phobia among SS1 students in Lagos public schools was rejected. Thus, all students experience mathematics phobia irrespective of their gender.

H₀₃: Teachers' methodology will not significantly affect the prevalence of Mathematics phobia among SS1 students in Lagos public schools.

Table 3: Chi -square test on the association of Teachers' methodology and causes of Mathematics phobia among post basic students

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	62.000 ^a	12	.0265
Likelihood Ratio	95.536	12	1.000
Linear-by-Linear Association	7.006	1	.008
N of Valid Cases	628		

a. 270 cells (100.0%) have expected count less than 5. The minimum expected count is .01.

Table 6 revealed a significant effect of teachers' methodology on the prevalence of mathematics phobia among secondary school students. Chi square value (χ^2) of 62.00 was obtained, P= 0.0265 < 0.05 which is significant at 0.05. Therefore, the null hypothesis which state that teachers' methodology will not significantly affect the prevalence of Mathematics phobia among SS1 students in Lagos public schools is rejected. Hence, teachers' methodology will

significantly affect the prevalence of Mathematics phobia among SS1 students.

Discussion of Findings

The findings of the study revealed that most sampled students experience mathematics phobia whether science or non-science students. However, the mean response of the respondents indicated that the science students have less phobia for mathematics compared to non-science students. This finding is in



line with the work of Bashir, Muhammed, & Umar, (2016) who found a significant effect of mathematics phobia on secondary school students; performance in mathematics. Also, the study is in line with that of Kargar, Ahmad and Bayatc, (2010) and Parvathamma and Sharanamma (2010) who found a negative correlation between anxiety, attitude and self-confidence respectively.

The study also revealed a significant difference in the perception of the respondents on students' gender and phobia for Mathematics. Thus, most sampled students experience mathematics phobia irrespective of their gender. This finding is contrary to that of Devine *et al* (2012) who discovered that female students exhibit higher mathematics phobia than their male counterparts.

Finally, the study revealed a significant effect of teachers' methodology on the prevalence of mathematics phobia among secondary school students. This is in support of the finding of Akinsola, and Tella, (2007); Adeniyi, (2012); Olaniyan and Salman, (2015) who in their different studies affirmed that teacher's methodology is a key factor in the reduction of learning difficulties in mathematics concepts. This according to them is as a result of the abstract nature of the subjects which requires effective illustration to make its learning less abstract.

Recommendations

Generally speaking, students experience phobia when exposed to concepts or topics that are abstract in nature such as mathematical concepts. However, when students are trained and assisted to understand the concepts and topics, such phobia reduces or disappears completely. To be successful in any academic venture; Mathematics inclusive a lot needs to be done by the teachers, the school authorities and the students themselves. In this regard, all energy and quality time must be diverted to the constant practice of the different equations and formulas in Mathematics. This would help in reducing tension and fear since mastery has been gained.

Again, to tackle phobia, especially extreme ones that affect the students' learning and performance in mathematics the school should, through the counselling unit, expose the students to systematic desensitization which is a good conditioning method for treating any form of phobia in helping students who show visible phobia for Mathematics to overcome their phobia. The students should be taken through the three stages of systematic desensitization by their school

counsellor in the following sequence. First, the counsellor needs to ascertain where the phobia for mathematics is emanating from. When this is ascertained, the counsellor takes the student through monitored relaxation before taking the Mathematics test or examination, then the student is exposed to the test.

Also, study habit training needs to be organised for the students by the school counsellor on regular basis to guide them on the appropriate study skills and habits that would ensure their success in not only Mathematics but in all their academic endeavours. Aside from systematic desensitization and study habit training, other measures are important in helping students to overcome phobia.

Importantly also, constant training and retraining should be organised for Mathematics teachers in the two Education districts sampled to assist them in utilizing varied teaching methods that would make Mathematics fun to learn. This would help them in employing teaching methods that the students would find easy and comfortable to learn mathematical concepts with. Since Mathematics is a compulsory course and cannot be avoided by any student who wishes to advance his or her academic career beyond the secondary school level.

Lastly, Adeniyi (2016) hinted that on the day of the test, the testee must eat well and avoid cramming the formulas a few minutes to the examination period. All instructions must be followed diligently. The student can scribble a few equations on the paper provided and work fast by doing the easy questions first only to come back to the difficult ones later if there is more time remaining. Preparing well before tests and being in the right frame of mind goes a long way in reducing fear and phobia.

References

- Abakpa, B. O., & Agbo-Egwu, A. O. (2014). Teaching Mathematics for the Development of Entrepreneurship: Implications for National Development. *Journal of Mathematical Association of Nigeria*, 39 (1), 75-
- Adeniyi, C. O. (2012). *Effects of Personalised System of Instruction on senior secondary school students' performance Mathematics in Kwara State*. (Unpublished Doctoral Thesis), University of Ilorin, Nigeria.
- Adeniyi, E.O. (2016). *Effects of Cognitive Restructuring and Study Skill Training on Test Anxiety Among Secondary School Students in Kwara State*.



- (Unpublished Ph.D. Thesis) University of Ilorin, Ilorin, Nigeria
- Ahmed, W., Minnaert, A., Kuyper, H., & Van Der Werf, G. (2012). Reciprocal relationships bet self-concept and math anxiety. *Learning and individual differences*, 22(3), 385-389.
- Akinsola, M. K., Tella, A., & Tella, A. (2007). Correlates of academic procrastination and mathematics achievement of university undergraduate students. *Eurasia Journal of Mathematics, Science & Technology Education*, 3(4), 363-370.
- Awofala, A. O. A. (2011). Curriculum Value Orientations and Reform in the 9-year Basic Education Mathematics Curriculum. In O.S. Abonyi (Ed.). *Reforms in STEM Education. Proceedings of 52nd Annual Conference of Science Teachers Association of Nigeria*, 297-305.
- Ayinla, J. O. (2011), *Effect of Teachers' Instructional Strategy Pattern on Senior School Students' Performance in Mathematics Word Problems in Ondo, Nigeria* (Unpublished M.Ed. Thesis) University of Ilorin, Ilorin, Nigeria.
- Bashir, S., Muhammed, M., & Umar, S. 2016). Mathematics phobia among senior secondary school students: Implication for Manpower Development in Science Education in Nigeria. *International Journal of Education (IJE)* 2 (8) 15- 21..
- Devine, A., Fawcett, K., Szucs, D., & Dowker, A. (2012). Gender differences in mathematics anxiety and the relation to mathematics performance while controlling for test anxiety. *Behavioral and Brain Functions*, 8(1), 33-41.
- Gbolagade, A.M., Wahead, A.A. & Sangoniyi, S.O. (2013). Demystifying Mathematics phobia in schools for transforming Nigeria in attaining Vision 20:2020. *International Journal of Academic Research in Business and Social Studies* 3(2) 188-196.
- Gierl, M.J. & Bisanz, J. (1995). Anxiety and attitude related to Mathematics in grade 3 and 6. *The Journal of Experimental Education* 63(2), 139-158.
- Ihechukwu, N. B. & Ugwuegbulam, O. C. (2016). Causes and solutions of mathematics phobia among secondary school students. *Journal of Humanities and Social Sciences*. 6(4) 172 –183.
- Ihendinihu, U.C. (2013). Enhancing mathematics achievement of secondary school students using mastery learning approach. *Journal of Emerging Trends in Educational Research Policy Studies (JETERAPS)* 4(6), 848-854.
- Jorgensen, C. S. Fichten, A. Havel, D. Lamb, C. James, and M. Barile (2005). Academic Performance Academic Performance of College Students with and Without Disabilities: An Archival Study *Canadian Journal of Counselling / Revue canadienne de counseling* (39),2 101-117
- Jorgensen, C. S. Fichten, A. Havel, D. Lamb, C. James, and M. Barile (2005). Academic Performance Academic Performance of College Students with and Without Disabilities: An Archival Study *Canadian Journal of Counselling / Revue canadienne de counseling* (39),2 101-117
- Kolawole, E B & Oluwatayo. J. A. (2004). Mathematics for everyday living "implication for Secondary Schools" Mathematics Association of Nigeria (MAN) National Conference Proceeding of September 2004.pg 112-123
- Makarfi, U.M. (2001). Keynote address delivered at the opening ceremony of the 30th Annual Conference of Mathematical Association of Nigeria Held in Kaduna.
- Nwoke, B. I, & Chaeles, N, (2019). Causes and solutions of Mathematics Phobia among secondary school students. *Research on Humanities and Social Science* 16 (20) 104 – 110 Retrieved from [www/http.iiste.org](http://www.iiste.org)
- Olaniyan, M. O. & Salman, M.F. (2015). Causes of mathematics phobia among senior school students: Empirical evidence from Nigeria. *The African Symposium* 15(1), 50-56.
- Rajendra, K. (2020). Mathematics phobia: Causes, Symptoms and way to overcome. *International Journal of Creative Research Thought (IJCRT)*.8 (8) 819 -824 Retrieved [www/http math phobia. Ijert.org](http://www.mathphobia.ijert.org)
- Ramadan, E. & Huseyin S. Y. (2014). Impact of Use of Technology in Mathematics Lessons on Student Achievement and Attitudes *Journal of Social Behavior and Personality* (42):31-42 *Journal of Social Behavior and Personality* 42(Supplement):31-42 DOI:10.2224/sbp.2014.42.0.S31
- Tillfors, M.(2003). Why do some individuals develop social phobia? A review with emphasis on theneurobiological influences. *Nord Journal of Psychiatry (Taylor & Francis)* 58(4).