
DEMYSTIFYING THE PHOBIA OF MATHEMATICS

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ABSTRACT

The teaching and learning of Mathematics must focus on the learners' background hence their level of attention and understanding, curiosity, interest, motivation and metacognition. Thus, progress can be made in mastering Mathematics by the learners. The National Bureau of Statistics (NBS) of 2019 revealed that 1.58 million children in Nigeria sat for West African Examinations Council (WAEC) in government schools in 2018 in contrast with 1.56 million candidates recorded in 2017, out of which 756,726 of the results revealed 5 credits and above including Mathematics and English Language thus represents 48.15 percent of the results of that year. The report also shows that one hundred and nine thousand, seven hundred and eight (109, 798) students were presented for WAEC in government schools in 2018 as against 133,258 candidates in 2017. These figures show that 37,184 of the candidates that sat for the examinations had 5 credits with Mathematics and English Language inclusive, thus the percentage represents 33.81 percent. Therefore, this journal examines the phobia of Mathematics using empirical method of research anchored on structural functional theory. The study found out that children develop the phobia from home, the teaching method and emphasis on theoretical rather than practical in the curriculum, inadequate budget for education in the country are among other reasons hence the paper suggested that parents should inculcate the interest of mathematics in their wards right from home because it makes one to work smarter, teachers should device the simplest and easiest ways of making the learner to understand Mathematics and government should collaborate with the Science Teachers Association (STAN) and the National Mathematical Centre, Abuja in training and retraining Mathematics teachers in Nigeria, government should dedicate 26 percent of its budget to education with science and technology as a priority among other recommendations.

KEYWORDS*Mathematics, Phobia, Curriculum, Teacher, Practical, Development***INTRODUCTION**

A lot of students fear Mathematics in Nigeria both within and outside the school environment. In Nigeria, it is no news that students fail mathematics more than any other subjects, compared to English Language, Mathematics has a higher failure statistics in Nigeria. For example, the official figure from NBS of 2019 pointed out that 1.58 million of secondary school children sat for the West African Examination Council (WAEC) in government schools in 2018 as against 1.56 million candidates in 2017, out of which a total of seven hundred and fifty six thousand, seven hundred and twenty six (756,726) of the candidates who sat for same had 5 credits and above including Mathematics and English Language representing 48.15 percent. Similarly, a total of 109,798 candidates sat for WAEC in private schools in 2018 as against 133,258 candidates in 2017. The figure of the students that had 5 credits with Mathematics and English Language inclusive stood at 37,184; hence the percentage was put at 33.81 percent. The failure of students in mathematics cannot be blamed on parent and teachers alone, lots of blame should go to the government because it failed to create enabling environment for the students to develop the habit of taking the study of mathematics seriously. For instance, in 2019, the percentage of the budget to education was 8.4 percent, 2016 got 7.9, 2017 was 6.1 percent and was jacked up to 7.1 percent in the subsequent year, 2018. The allocation to the education sector was reduced to 6.5 percent in 2020 after two years while it subsequently received 5.7 and 5.4 percent in 2021 and 2022 respectively (Ojo, 2023).

It is very important that Nigerian Students overcome the fear of Mathematics because we cannot escape it, even if you play your way through school, examinations like WAEC will keep you hostage and prevent your entering the university. The fear of Mathematics or Mathematics Phobia is an uneasiness or anxiety about taking Mathematics tests or examination, sometimes, this fear becomes so intense and abnormal that a student may get sick or fall into depression before the examination date.

Definitions of Phobia and Mathematics

Phobia can be defined as an extreme, irrational fear or very powerful dislike of a specified group or thing such as spiders or confined spaces. In Mathematics, it is a feeling of anxiety that appears because of solving different Mathematical problems. It is also referred to as tension, panic, helplessness, and mental disorganisation; on the other hand, Mathematics is more about logic and critical thinking which requires a lot of perseverance. The fear of Mathematics has always arisen in kids up till the upper Basic Education since time immemorial due to lack of basic foundation, methods of

the teachers teaching them, inadequacy of teaching aid, impatience of pupils and students among other factors (Ashcraft, 2002; Hembree, 1990; Scarpello, 2007; Beilock and Willington, 2014; Umar, 2017, Adelaja cited in Gbadeyanka, 2017, Noplag, 2017). Ask any child, “What subject do you detest most?” The answer is not farfetched. What is surprising is the reason (s) you will possibly get from such kid for having such attitude towards the subject in discourse.

Robin Usher, an Employment Consultant, suspects that the phobia is a fear that came from one generation to another generation both in respect of nature and nurture. Nature, in the sense that genetically, our brains will be hard wired similar to our parents’ and if they struggled with abstract principles we might too. Nurture on the other hand, is the fact that every time a child hears a parent, older sibling, grandparent e.t.c. say “I was useless at Mathematics, it was difficult”, it is conditioning a negative response to Mathematics (Noplag, 2017).

Mathematics as a concept can be defined as the science that deals with the logic of shape, quantity and arrangement. It is all around us and we do it every day. It is the building block for everything in our daily lives, including mobile devices, architecture (classical and contemporary), art, money, household management, engineering and even sports. Thus, Mathematics is not a strange subject as it can be found in both primitive and civilised cultures.

LITERATURE REVIEW

Society has made tremendous progress from the weightage to the knowledge of Mathematics. Its contributions can be found in all aspects of human endeavor such as science and technology in the production of cars, computers, and drones among others. In the field of social sciences, one needs the knowledge of Mathematics in the exchange of goods and services, banking services, and analysis of data in the area of research and yet some equations are simple but never-ending as it is conditioned to infinity (Jayanthi, 2019).

From the above submission, it can be argued that there is an element of Mathematics in all aspects of human endeavor which makes it a very important subject. Therefore, there is a need for parents and teachers to make it an interesting subject for pupils and students to learn. The phobia for Mathematics was attributed to the poor attitudes of some teachers that are ill-prepared before impacting the Mathematical skills of the learners. They are not conversant with the curriculum hence the lack of capacity to control the class, and teach the subject effectively and efficiently for the desired result hence, the learners find it difficult to cope as expected which accounted for the mass failure of Mathematics in general examinations in the country (Swart, 2018).

From the above submission, Mathematics is a subject that needs adequate attention and preparation most especially external examinations such as WAEC and NECO in Nigeria, a closer look at the performances of the students over the years would show that there is a decline in the performance which is not completely the fault of the student alone but teachers and parents. Therefore, the curriculum teachers used to teach them should be reviewed to emphasise on practical rather than theoretical as it is now, also, parents should give a close marking on their wards in terms of Mathematics practice for any meaningful development to be achieved.

The future belongs to the young ones, hence developing mathematical skills in them will improve in the long run the level of science and technology of the country, opportunities are there in terms of employments, thus creating avenue for the development of the country technology wise, the journal concluded. Obviously, investment in Science, Technology and Engineering today would guarantee improvement in economic growth due to employment generation most especially in the areas of technology generally and ICT in particular and this will even address the issue of poverty and security challenges that we currently experience (Changwe and Mwanza, 2019).

The learners of Mathematics are supposed to be in the hands of qualified teachers taught in the Universities and Colleges of Education in that field and not in a related field such as Engineering or Sciences. The consequences would be that such learners would not have the proper background of it. Imagine the number of patience that would be lost in the hands of quacks in the hospitals in the name of nurses and doctors, same thing is applicable to Law and lawyers would not win cases if they have not been going to courts during Students Work Experience Scheme (SIWES) in Nigeria or the compulsory National Youth Service Corps (NYSC) scheme and of course the training at the law school in the country to prepare them for the challenges ahead in their field (Changwe and Mulenga, 2018).

From the above position, one can situate it to other professions. For instance, we have seen cases of building collapse and people are staying in darkness for years because of a faulty transformer that could easily be fixed by our engineers if it were produced in the country with local materials.

Available records revealed that countries that embraced Mathematics which translated to improved science and technology is seen to be having an improved standard of living compared to those that did not. Also, it also implies that while they are independently producing, others would have to depend on them for the uses of same. It is clearer when a comparative analysis of the developed, developing and under developed is brought to the table. The former (developed) have advanced in

science and technology while the latter is still thinking and struggling on what to do in the area of science and technology. Thus, beyond the emphasis on having credit in Mathematics as a condition for getting admission in Nigerian universities, it should be prioritised in the education of every child in the country. It is an open secret today that the advanced countries relied heavily on the idea of Mathematics and Science which allows them to build on their developmental strides over the years while in Africa and particularly Nigeria, our successive government prefer to have series of SUV cars in their offices along with an unimaginable salary and allowances than allocate 26 per cent of the annual budget for the education sector and the development of science and technology in the country (Zin, 2021).

Theoretical Framework

Structural functionalism theory was adopted as the theoretical framework of the study. It was propounded in 1973 and the prominent contributors to this approach are Talcolt Persons, Robert Merton, Marian Levy, Gabriel Almond, David Apter and Fred Riggs. The emphasis of the theory is that every structure that exist today emerged at a particular time to solve a purpose and it has its functions, these functions identified (educational institutions are set up to impact knowledge and shape the character of the learners to an acceptable standard set) makes it easy to associate it with structure it belongs. The basic tenets of the theory were thus: all structures came with its functions and the way the structure was established also determines its functions hence, it also conditioned the bahaviours of those that operationalise these functions (cited in Umar, 2019).

Other contributors to this theory argued that structures are set to achieve equilibrium in order to satisfy the needs of the people. This equilibrium can only be achieved if people can easily adapt to the conditions of the system, proper management of the facilities by the government for instance and its citizens, work harmoniously to achieve the goals of the structure and hence the society need a process of socialisation. Everyone must in one way or the other contribute their widows might for the desired to be achieved (Person, 1951; Merton, 1968; Redcliff-Brown, 1952; Anosike, 2010).

Accordingly, the theory is very crucial most especially in terms of formation of schools and the determination to make sure that the students and pupils admitted in it to look at Mathematics as a subject like any other subject they see as very easy so that their understanding of it is made formal. This is based on the fact that most of the regulatory institutions and the Ministry of Education were established in the country to serve as a check to certain attitudes of persons within the sector vis-à-vis the parents who register their wards in these schools established (both public and private schools) to mold the character and learning of these kids as still evident till today.

RESEARCH OBJECTIVES

1. Examine the views of the professionals in the field regarding the reasons for the phobia of Mathematics
2. Make efforts to sensitize the learners to improve their Mathematics skills.
3. Motivate other researchers to come up with other factors responsible for the phobia and mass failure of Mathematics.

RESEARCH HYPOTHESIS

1. The mass failure of Mathematics is a result of phobia.
2. There is no relationship between constant learning and practice of Mathematics and mass failure.

RESEARCH METHODOLOGY

This study utilized both the primary and secondary methods of data collection. The primary methods comprise the qualitative data collection which is a purposive In-depth Interview (IDI) with the relevant stakeholders in the field of Mathematics. The journal also sourced materials from the library mostly books, journals, articles, daily newspapers, past research and the internet as secondary sources which enabled this conclusion.

DATA ANALYSIS AND FINDINGS**The Building Blocks of Mathematics**

Mathematics consists of five (5) building blocks as discussed below:
Count, Read and Write Small and Large Numbers

The recognition, counting and ability to write numbers are the foundation of Mathematics which teachers must emphasise while teaching the skills in the classroom. The ability of the learner to recall a small and progressed into the large ones enable same to be able to do the addition, multiplication and subtraction as the case may be while solving questions either as assignment, class work or on their own at home. It also prepares them for the challenges at higher level in problem solving.

Understanding Arithmetic and Algebra

A firm grip of the place value system in writing numbers is fundamental in understanding Mathematics. In place value system of numeration, the units, tens and hundreds and so on are each represented by a single numeral written in a special position hence, for any whole number, the units place is at the right hand corner end of the number, the tens place is next to the units place on the left, etc. For example, 5603 can be written in place value system as 5 thousand, 6 hundreds, 0 tens and 3 units. The understanding of this is very important for the solving of arithmetic, word problem and algebra questions at the secondary school level.

Basic Operations of Mathematics

The ability to manipulate the four (4) basic operations in Mathematics comprising the addition, subtraction, multiplication and division or whole number operation of Mathematics build on standard algorithm procedure which must be learnt at elementary level. Knowing the nutty gritty of standard algorithm give both the teachers and students a common ground of Mathematical language.

Fractions and Decimal Numbers

Understanding fractions and decimals is a knowledge built on the whole number system or operation. Fractions are basically used to describe parts of quantities like two-third ($\frac{2}{3}$), Three-fifths ($\frac{3}{5}$), four-sevenths ($\frac{4}{7}$) and so on. Decimals on the other hand, are number based on 10, it has a whole number on the left side such as 18 while the right side is ten times bigger as one move further, on the right side is in tenth ($\frac{1}{10}$) and ten times smaller as we move further as in .689 (i.e 18.689). Acquiring the knowledge of these two (2) concepts gives students a firm grip of Further Mathematics as fraction is the foundation of algebra and ratios commonly found in various endeavours including business environments.

Solving Critical Problems

Mathematics is a subject that relies on steps while trying to solve a particular problem either in word problem or storytelling. The stress of converting words into Maths and the ability to proffer solutions to multiple problems is an aspect of critical thinking which is the goal of studying Mathematics at school.

Why are Young Learners Running Away from Mathematics?

Thomas Hakahu, who taught for about a decade in Papua New Guinea, has the answer to that. He stated that:

1. The learners of Mathematics usually look down on themselves thinking that they are not one of the “extra-ordinary kids” who are fast learners hence; they cannot be good in Mathematics.
2. The background of every learner of Mathematics is very important. A situation where both the slow and fast learners are not coordinated together, the slow learners usually give up along the way because of the ‘bad’ teacher who prefers to always associate with the ones who get most of their answers correctly, not the “slow ones”.
3. The reflection on their Mathematics assignments and class works in their lower classes tend to condition their minds that they cannot cope with the skills being impacted in them hence, being good in Maths is impossible for them.
4. Those students were not advised properly that everyone should learn Maths eagerly because it would be applied in most areas in life later on, as in

business, home management, loan repayment, farm management, navigation techniques, analysing questionnaires e.t.c. Other subjects they may want to learn will be built on the Maths they are learning now.

5. Nobody taught them the right/correct methods and routines to study this particular subject (and related subjects like Physics, Economics, Chemistry, e.t.c). You do not study Maths in exactly the same way you study English Language or Geography.

Views Expressed on why Children are Afraid of Mathematics

Views of experts were sought to further buttress the materials cited in the study for better understanding of the subject matter. Thus:

Munawara Mustapha Musa, an educationist and a Mathematics teacher, viewed that Mathematics is a complex yet simple, abstract calculations that happens in our day to day activities. Students and Pupils run away from Mathematics because of lack of interest, poor Mathematical background, poor teacher's performance and availability of materials. Thus, for them to pick interest in it there is a need for their teachers to constantly give them group work, teaching them using Mathematical games, giving them extra time, practical mathematical problems with them. Parents as well should try their best by coaching them at home or engage extra teachers to teach them at home.

From the above submission, the fear of Mathematics by students and pupils can be reduced or eliminated if all hands are on desk by their teachers and parents so that they can achieve the expected results. This can be done by providing the necessary materials for the teachers and also train and retrain them on latest development on teaching Mathematics globally.

Another expert, Yusuf Hassan, asserts that Mathematics is a scientific subject that deals with numerical presentation of an expectation value. He stressed that students do have phobia due to the fact that mathematics has associated concept that they need to understand and once they do understand it irrespective of the topic, they would be able to maneuver their way. Thus, there is a need to provide teaching aid related to the topic (s) to be treated in form of practical for example; plain shape, rectangle, a box and students should attempt more examples for them to understand the topic and concepts associated with it. However, they should practice more without looking at the examples so as to master the topic being studied. In all these, both teachers and parents have roles to play. Teachers should be open to the children so that they can be free to ask questions, they should also test the students or pupils on the examples given to them. Parents on the other hand, should always go through their ward's books as the bulk of the work is on the parents as they spend more time at home than the school and with the teacher.

It is imperative to point out that Mathematics needs constant practice and mastering of concepts but a situation whereby the person taking the subject lacked the basics himself, becomes a problem because you cannot give what you don't have. Therefore, schools should check the kind of teachers they employ to handle Mathematics. The National Bureau of Statistics (NBS) shows a downward trend in the performance in mathematics. For instance, the 2019 report revealed that 1.58 million Senior School Certificate students sat for the West African Examination Council (WAEC), in government schools in 2018, as against 1.56 million candidates in 2017, out of which 756,726 of them had 5 credits and above including Mathematics and English Language representing 48.15 per cent. Similarly, a total of 109,798 of same sat for WAEC in private schools in 2018 as against 133,258 candidates in 2017. The figures of the candidates that had 5 credits and above including Mathematics and English Language stood at 37,184, thus the percentage is put at 33.81.

Jamiu Ayinla, another Mathematics teacher, opined that Mathematics is the study of manipulation of values and its application to human endeavours. There is this mindset that Mathematics is difficult and the moment you accept that as a student or pupil, you are bound to run away from it, another reason is the tutor, most tutor of Mathematics lack the patience to take the kids through the rigorous process from the unknown to the known, the teaching condition where the teacher is not provided with proper materials and motivation to give their best, teaching method and environment all contributed to the reasons why students run away from Mathematics. He further argued that teachers need to prove to them that it is not difficult and also encourage them by rewarding those children that are making effort. Also, teachers need to make Mathematics more practical and they (teachers) need orientation that they have to be patient and resilient, parents need to give support from the home front by ensuring that they follow up on the task and performances of their wards. He concluded that mathematics is a subject whose knowledge makes other subjects easier. Therefore, relevant stakeholders should ensure that all hands are on desk to help the children as they look up to them and trust their judgments and should therefore, not let them down. Mathematics is a universal subject that must be taken seriously by all and sundry whether you are a science student or not. Today, if your mathematics is not at credit level in your school certificate in Nigeria, most institutions would not admit you. Therefore, all those in a position to make it easier for these kids should do so most especially now when information and communication technology have taken over virtually everything. Again, students should be informed that mathematics is the foundation of all the subjects that is figure related; hence mastering it would facilitate the understanding of the societal issues after the thorough analysis of the evidence or facts before one concerning the subject matter (Iren, 2015).

Abdullahi Abdulkadir, an Engineer and resident of Kurmi Mashi who is also a teacher,

opined that Mathematics is a simplified way of getting the actual value of variable and unknown numbers. Generally, this comes from the fact that their elderly ones are telling them that Mathematics is difficult, so they develop that phobia right from their childhood. They must be shown that the reverse is the case by demonstrating the simplicity of Mathematics which sends away the phobia. Therefore, the love for Mathematics should be introduced at all levels of their education pursuit hence the phobia would disappear.

Mathematics is simple when you understand the logic associated with the topic being treated. But the interest must be there first so that it can serve as a driving force to find a solution to the problem. Parents or guardian should stop putting fear in their children in respect of Mathematics or any other subject for that matter as no subject is simple or difficult but how you handle it and your interest in it.

Bashir Aliyu Abba, a Lecturer at Kaduna Polytechnic, asserts that Mathematics is a subject that requires creativity and wisdom to handle. Most children lack the basic foundation, teaching methods of teachers, school system also contributed to the phobia of mathematics because they put much emphasis on English Language compared to Mathematics and the design of the curriculum which emphasise on theoretical instead of practical all combined to heightened the phobia of mathematics. Thus, we need to redesign the curriculum to focus more on Mathematics most especially practical. For instance, an aid to demonstrate a rectangle shape should be made available, cube, kite etc. Training and retraining of teachers on new trend in teaching mathematics and finally, parents should teach their children/wards some basics in their local languages at home and this would make Mathematical applications easier for them at school. The learning of Mathematics both at school and at home helps in grasping the Mathematical terminologies. Further simplifying it with practical application with the aid of a diagramme or sample like a rectangle, cube and circle and something similar like matches container, sugar, female bangles at home could serve as rectangle, cube and circle respectively at home for the children to familiar with hence making Mathematics an easy subject for them.

DISCUSSION

Discussion of Findings

Contrary to the notion that Mathematics is a difficult subject as proved from both the literature and field survey conducted. What students need to do is to be more committed, focused and be ready to practice exercises more often to perfection so as to remove the consistent report of failure of Mathematics in WAEC, NECO and other related examinations in the country. For instance, the National Bureau of Statistics of 2019's report shows the 48.15 percent in 2018 and 2017 respectively, for government schools and 33.81 percent performance in Mathematics for private schools in 2018

and 2017 respectively is not a healthy one because the analysis shows a below average percentage scores in both years reviewed. The story today in terms of performance of students in Mathematics is no different hence most of them had to combine two results of WAEC and NECO of the same year or before to be able to secure admission into the higher institution in Nigeria.

The failure of students in Mathematics cannot be blamed on parent and teachers alone but the government because it failed to create enabling environment for the students to develop the habit of taking the study of mathematics seriously. For instance, in 2019, the percentage of the budget to education was 8.4 percent, 2016 got 7.9 percent, 2017 was 6.1 percent and was jacked up to 7.1 percent in 2018. The votes to the sector were reduced to 6.5 percent in 2020 while it received 5.7 and 5.4 percent in 2021 and 2022 respectively (Ojo, 2023). These figures show that government between 2015 and 2019 never met the 26 percent budget mark by United Nation Education, Scientific and Cultural Organisation (UNESCO) in order to encourage science and technology hence improving the level of employment and reducing poverty in the country. The priority of the government was concentrated on enriching the political elites and their cronies and leaving the sector to its current state.

There is the need for government to provide adequate textbooks for proper understanding and previous knowledge which shows the trend of knowledge building. Findings also show that teachers can contribute to the phobia of Mathematics which suggests that vibrant teachers in the field of Mathematics could help to salvage the situation in teaching the subject through the proper interview and selection process in both private and public schools and of course, they should be trained and retrained. The issue of curriculum development is very important as it set the stage for either moving forward or remains where we are at the moment. The curriculum should be reviewed to emphasize on practical rather than theoretical and same commitment given to English language be extended to Mathematics. Finally, parents role in achieving phobia free children in Mathematics cannot be over emphasised, they are expected to watch over these kids at home in terms of monitoring trend of their understanding Mathematics by way of checking their books, guiding them in their assignments and in trying more exercises in the topic at hand.

RECOMMENDATIONS

Understanding Mathematics is a must for any serious student. Therefore, we encourage students who aspire for a greater goal in life to choose Mathematics in higher institutions for the following reasons:

The study of Mathematics brings out the best of people in all aspect of human endeavour. It entails learning just as endurance is to sports hence, there is a need to

develop critical thinking and Maths is there to help in achieving it. Mathematics helps one to make money and progress with it because critical thinking would serve as a guide on how to properly utilise and even multiply it. It makes life easier at higher levels once the Mathematics language is understood, problems can be solved in a smart way. Mathematics open doors for all ages to choose any career of their choice in the future as closing the door to it would prevent one from taking a particular course of study at higher level and the choice of careers too. For instance, students that want to study Engineering, Medicine (MBBS) or even Economics and the like without Maths would not be admitted into the University in Nigeria. Scholarships should be given to students studying Mathematics in the higher institutions, particularly the female ones as they are few in number compared to their male counterparts currently teaching in both public and private schools in Nigeria. There is a need for government in collaboration with Science Teachers Association of Nigeria (STAN) and the National Mathematical Centre, Abuja to continuously train Mathematics teachers in Nigeria irrespective of where they are teaching it in the country. Finally, government should stop playing politics with education sector but be serious with it by allocating 26 percent of its annual budget to it so that interest in mathematics would bring innovations in science and technology and job creation hence the standard of living of the people would improve.

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