



Critique of Development and Validation of 4-Factor Mathematics Anxiety Scale among Secondary School Students in Ibadan, Nigeria

**Ogazi, Francisca Chinonso ^{a*},
James, Oluwayomi Laseinde ^b and Enya, Immaculeta Eleje ^c**

^a Department of General Studies/Counselling Unit, Federal College of Animal Health and Production Technology, Vom, Nigeria.

^b Department of Mathematics, University of Ibadan, Ibadan, Nigeria

^c Department of Sociology, University of Ibadan, Ibadan, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJESS/2024/v50i31292

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/108410>

Review Article

Received: 19/09/2023

Accepted: 24/11/2023

Published: 15/02/2024

ABSTRACT

Mathematics as a daily cultural activity of human in space and time; concretized into symbols to be computed using mental computer or activities, is a subject that puts people not only the learners into a feeling of phobia/ anxiety whenever the name is mentioned. This article from psychological perspective posits that, the masses general adoption of mathematics as a difficult and fearful subject is a cause from environmental factors. This is because prior scientific approach to mathematics, human beings have been solving daily issues, removing, adding, dividing and multiplying using available counters like fingers, toes, sticks, stones, grains, charcoal, seeds even

*Corresponding author: Email: ogazifrancisca@gmail.com;

human beings, animals, plants, buildings, cars and others. Today, teaching and learning of mathematics is affected. Majority of the mathematics teachers teach mathematics in abstract; learners learn in abstract coupled with some psychological issues that may be opposing the mental ability as at the time of learning which also goes on to affect the retention, remembering and transferring. This article critiqued Development and Validation of 4-Factor Mathematics Anxiety Scale among Secondary School Students in Ibadan, Nigeria. The study adopted opinion research design. The population of the study comprised all aspect of humans that are educable or can learn, but 42 respondents (20 male and 22 female which comprised 8 teachers, 6 non-educators, 24 junior and senior students and 4 postgraduate students) was sampled. The instruments for data collection were interview and focus group. Two research questions guided the study. The main purpose of the critiquing is to counter the masses' negative notion and the claim about math by this paper; to inculcate into the masses especially the younger learners /scholars that math is like every other subject; that mathematics anxiety is as a result of mathematics nature misconception and the negative verbalization influence from the teachers, parents and the society that, "math is difficult"; to expose the lapses in parents and teachers inadequacies in instilling mathematics self-efficacy into the learners and thereby encourage learners to learn with confidence built on constancy for "constant practice makes for perfection. From the findings, it was discovered that the onset of mathematics anxiety centered around the teachers' demonstrating incompetence, giving rigid approaches and personalities and employment of untrained math teachers in teaching mathematics. The study on mathematics anxiety was critiqued and recommendations made that would help educational development and management.

Keywords: Mathematics anxiety; teachers; students; masses; teaching and learning.

1. INTRODUCTION

Mathematics is a school subject as well as a home or human daily activity practice. [1], added that, Mathematics plays a key role in shaping how individuals deal with the various spheres of private, social and civil life. Unfortunately, in this day and age many young people and adults do not feel confident in their ability for math [2]. Interestingly, life activities are carried out solving one mathematical problem or the other using subtraction, addition, division and multiplications; either progressively and/ or geometrically, substituting and balancing the thought processes. For so being, nature made it that in every corner of the earth are mathematical instruments/tools inbuilt for easy understanding and working of mathematical activities. Such tools include: humans, animals, plants, stones, sand, buildings, cars and other materials. In interactions with all these creatures, even in man's thought processes, math (subtraction, addition, division and multiplications) is going on. It indicates that, no man's activities are done without operating mathematics consciously or unconsciously. Because Mathematics is a Sino qua non, it becomes really a school's obligation to see that their students value and feel confident in their ability to do math, because ultimately a child's life; all decisions they will make and careers choices may be determined based on their disposition toward mathematics [2]. For this

reason, importantly, mathematics is a must to deal with if any development and achievements must be attained and gained. It is in realization of the vast applications of this subject in all aspects of human education that led [3] to state that a disciplined and ordered pattern of life can only be achieved through the culture of language and mathematics. It implies that mathematics is likely to be the foundation of scientific and technological knowledge that is vital in the development of a nation.

Mathematics is a life's natural systematic behavior that is associated with critical and logical mind functions. Advanced English Dictionary sees Mathematics as a science dealing with the logic of quantity, shape and arrangement. Mathematics according to Cambridge Advanced Learner's Dictionary is the study of numbers, shapes and space using reason and usually a special system of symbols and guidelines for organizing them. This kind of calculation that needs recognition of the symbols and the internalization of the guidelines for its operation, and must be taught by somebody in an organized structure with planned and organized methods and materials, the researcher refers to this as an advanced mathematics. From this context, come rules, regulations and formulas as well as expectations of what must be followed and arose at an acceptable conclusion.

Everyone feels anxious now and then. Anxiety is one of the normal and natural emotions in human life. [4], agreed by saying anxiety is a normal emotion; it is brain's way of reacting to stress and alerting of potential danger ahead while [5] postulated anxiety to mean trouble. [5], opinioned anxiety to be trouble; in the sense that, in either presence or absence of psychological stress, it can create a feeling of fear, worry, uneasiness and dread. It indicates that anxiety is a feeling of fear over something known or unknown; fear of what may or may not happen in the future. In the context of mathematics, it is a mental generated feeling that comes when math is mentioned and one is confused of what will happen or in an anticipation of who knows what will happen over my expectation. To this one can say it is an unpleasant feelings or emotions caused by ill definition of one's anticipation. So because math is ill defined, it elicits anxiety. Most times it involves mental disorder, compulsive behaviour and attack. Anxiety according to studies appears almost in every action a person wants to take in life. But in the subject mathematics unlike other school subjects, anxiety is highly pronounced.

2. STATEMENT OF THE PROBLEM

Mathematics is made compulsory for every learner in school probably because it affects all aspects of human life at different levels. Mathematics achievement over the years has not been statistically encouraging staring at the results from the primary, secondary, and tertiary levels of education in Nigeria and globally as a result of mathematics anxiety. The problem in achieving mathematics is that it is generally conceptualized and seen as a problematic subject by the masses. Societal misconceptions of mathematics have created negative impact on the students that they have little confidence on their ability to take up math activities. Annually, global statistics report on academic failures or poor performances of mathematics in alarming proportions keep increasing upon all different devices employed by technology (calculations, computers, math tool sets, internet, projectors and more) to alleviate the seemingly uneasy nature of mathematics. The results of final exams of learners especially the post primary learners are not always reporting good pass rather the results are fluctuating yearly.

The family, school, peers, other students and the society general contribute to the learners developing math anxiety. In the school, the idea

of placing a learner in the class without the consideration of learning differences, that is, putting into considerations the uniqueness of each learner among the enrolled students is weakness in the side of the educators. Another problem is in choosing of a teacher for a particular class and the teacher in choosing method of and materials for instruction that will benefit all kinds of learners in the class. Learners learn differently. Putting all learners in one place for learning forgetting the categories of the learners, (age, interest, background, readiness, biological, psychological make-up and learning pace differences in one way or the other affect the teacher's competence in instructing math to the group of people whose strengths of learning differ; as well it affect the learners' mode of learning and speed especially the slow learners.

Anxiety in mathematics is a crucial challenge facing learner in school in Nigeria and worldwide especially non-science learners; whereas the study of mathematics is widely used in all spheres of human life many researches proved. The fact that it is widely used in all aspects of life does not remove the anxiety that is associated with taking up a task nor is it the fault of the students. The problem is that the mathematics foundation was not well laid in 97% of the earlier school age/time of the students, coupled with some lacks from parents, guardians and materials. It is approvable that only very few students were opportune to have good mathematics foundation, some with curiosity while in senior primary school and early secondary school assiduously learnt mathematics. The reasons were/are that, there were/are very few mathematics experts who are not enough to go round the classes in each school; some mathematics teachers available are not committed and humane in service; then in primary school, every class teacher including those with mathematics anxiety teach math in the class; some schools do not have a mathematics teacher or have a half baked math teacher and more to that. With this it can be agreed that the most well known problem of mathematics anxiety is the mathematician teachers. They lack emotional intelligence, patience, collaboration and consideration during impacting knowledge. The students on their parts lack self efficacy and determination. It is on this ground that the researcher writes to critique the study carried out by [1] on Development and Validation of 4-Factor Mathematics Anxiety Scale Among Secondary School Students in Ibadan, Nigeria in

which he they laid the cause on math anxiety on the students only.

3. PURPOSE OF THE STUDY

The purpose of the study is to:

1. Create awareness that what makes math seems difficult are the abstract approaches towards it and the negative verbalizations people keep transferring about math.
2. Correct the notion and emphasize on the need for parent and teachers to build interactive environments during math teaching learning process
3. Discourage the act of oversight teachers teaching math in any level of education, and also the act of teaching math in abstract without instructional or adequate teaching learning materials.

4. RESEARCH QUESTION

1. What do you think make people to feel and say that mathematics is very difficult, thereby frown from it?
2. What do you think can be done to remedy the problems of internalizing mathematics to be very difficult?

5. CONCEPTUAL FRAMEWORK

5.1 Mathematics

A global view of mathematics as a 'difficult' subject reveals that it is widely recognized as a problem area and many students have phobia for it [1]. As a result of this, low math achievement is a recurring weakness in many students, [6]. That is to say that, the global view of mathematics as a problematic subject is inadequate in reasoning. This argument is made in the sense that mathematics from natural perspective is an integral part of human's life; its operation, being daily encountered by man in his activities. Still on the concept, [7] furthermore exposed that, the attitudes to mathematics also involve conceptualization of what mathematics is, many people seem to regard mathematics as only school taught arithmetic but may not consider other cultural practices involving numbers as mathematics. This proves that Math is a daily cultural activity (habit) of human. Therefore seeing math as the only school taught arithmetic in the recent times based on [1] makes it assumed a worrisome dimension. It implies that

Mathematics is not worrisome by nature but the judgment brought into its operational nature is what makes it seems worrisome. The mathematics that poses anxiety on the engagers is what the researcher referred to as judgment oriented mathematics. Judgment oriented mathematics according to the researcher is autocratic in nature. It has its rules/guidelines, regulations, formulas and strict expectations of. This 'a must to do subject', must be taught by a person with a pronounced arranged structure and materials who must judge the outcome at the end of the course with or within a limited time frame, and marking scheme. That shows apprehensive nature of school mathematics. Obviously, placing math on strict expectations with regulations and limited time instills anxiety in students' ability.

Domestic or ordinary or life mathematics is never anxious driven. It is an act done with ease as in "estimating prices when shopping, fractions in cooking, decimals in financial transactions and measuring skills in sewing or woodwork" according to [8] sees these actions as basic mathematics in the sense that man in his daily activities engages in different kinds of calculations of how to carry out his daily functions. It implies that inability of the memory to engage in this calculation, may likely lead to failure, not only in daily needs but in life as well. Man's memory keeps working to calculate activities, and when people cannot use their working memory as they typically can, it can make it difficult to perform calculations in their heads [9] explained. At this point in most cases, it may lead to a misconception that they are bad at math, reinforcing their anxiety. From the statement above, it indicates that Mathematics is domestically started but vulnerable to biological and psychological affect for inadequacy. It connotes that mathematics from home is what one engages daily unconsciously; democratically doing it at will with ease accomplishing a task at his own pace; making a good outcome or going back recalculating the result to see the error thereby making a correction that satisfies his reason. This kind of mathematics is devoid of other's judgment, therefore does not impose any anxiety. The mathematics that imposes anxiety is one that has judgment upon it like in school mathematics where academic performance is laid and measured on criterion excellence/standard pass mark or norm reference/expected pass mark. Collaborating with this, [8] confirmed that, pressure of examinations and tests and risk of public

embarrassment are the main sources of unproductive tension among many students. It is naturally not alone in mathematics to exhibit anxiety when trying to take up a course especially when the situation is not familiar. The mathematics' own in eliciting fear is that the materials requires more of abstract letters representing numbers like in equations that deal with x , y , xy , a , ax , b , bx , $2x$, $2y$, xy , ax , by , ay or $x + y = 4$, $2x+3y = 7$, $7b - 4a = 15$, $3y + 4 = 5$, $x + 3x = 6$ among other abstract symbols. However, in so far as anxiety and mathematics are natural, mathematics anxiety is of great importance to the development among other abstract symbols. However, in so far as anxiety and mathematics are natural, mathematics anxiety is of the great importance to the achievement math self-efficacy and mathematics skills. The importance of it is seen in solving real life situations.

6. PERCEPTIONS AND BELIEFS

Perception is a process of by which individuals organize and interpret the sensory impressions in order to give meaning to the environment. [10], viewed perception as a process through which we receive, select, organize and interpret information in the environment to be meaningful. The above statements imply that in daily life, the meaning people give to thing(s) they come across with is from how they perceive it with their sensory stimuli. This corroborates with (Bandura, 1997) who stressed that People who believe they can control what they learn and perform are more apt to initiate and sustain behaviors directed toward those ends than are individuals who hold a low sense of control over their capabilities. From this view it can be believed that the irrational perception and interpretation on mathematics is what makes it seems difficult, mathematics itself is not difficult. This aligns with the words of Ellis Albert (1962) in Rational Emotive Therapy which said, it is not the event is the problem but the perception of the event. Therefore, the view of Bamidele by [1] that students' general impression is that mathematics is a dreadful subject is as a result of acquisition of irrational thoughts, beliefs and philosophies according to Ellis Albert (1962) who maintained that, emotional disturbances is sustained by continued illogical thinking and the persistence self verbalization of it. The expression people who had problem with mathematics come out to give to the world especially to the hearing of the upcoming learners leads to irrational and illogical views on mathematics. This aligns with the assertion of [8], which says, when parents with

high mathematics anxiety try to help their children with their homework, they unintentionally convey the idea that mathematics is difficult and anxiety provoking. This they do by saying, 'my dear, hmm! If you don't know it, leave. Math was a problem I had during my school days that made me change my dream course in the university. Everybody must not be a mathematician. Math is hard, don't border yourself. Just cram it. So many words like these parents with high mathematics anxiety unintentionally convey to their children who seek math help from them. Such communications or verbalizations will likely put the child into subject/course maladjustment as well as have his future career affected. This is because according to [11], through words and deeds of parents, children's personality is shaped and their ways of doing things become habitual. That means what students keep hearing from parents or other significant persons and mostly telling themselves about mathematics is the root of their mathematics anxiety. Parenting style correlates with academic achievement. And [11] asserted, every parent has his own parental values, beliefs and practices which can affect students' behaviour towards school activities. His assertion means that, parents who place high value and beliefs in education whether educated or not place high involvement in their wards school activities which positively affect them for good performance.

The words of Ellis Albert stressed that man's illogical ideas are rooted in biological limitations and mostly the teaching from the parents, teachers, peer group, mass media and society. This implies that, school factor, students' factor and teachers' factor are the potent predictors of mathematics anxiety in this study. [11] supporting Albert Ellis underscored thus, every parent has their own parental values, beliefs and practices which can affect students' behaviour towards school activities. In addition, they also maintained that through words and deeds of parents, children's personality is shaped and their ways of doing things become habitual. This indicates that parents are big core factors that influence students' attitude towards mathematics. But in the study conducted by [1] on development and validation of 4-factor mathematics anxiety scale, the result from table eighteen in the chapter four revealed the relative contribution of each of the independent variables (teachers' factor, students' factor, parental factor and school factor) on the dependent variable (mathematics anxiety). The result shows that

only students' factor made highest significant contribution to the prediction of mathematics anxiety, followed by school factor and teachers' factor. Parental factor did not make any significant contribution to the prediction of mathematics anxiety. While the result from [12] research, showed some correlations between some parts of parent's socio economic background with Mathematics anxiety and academic achievement. Therefore, [12] disagreed with the findings of [1], proving that students' Mathematics anxiety and poor performance in it, is as a result of family status. In addition the researchers believing Ellis Albert and [12] stressed thus, mathematics anxiety is from biological limitations and mostly the teaching from the parents, teachers, peer group, mass media and society and not in any way the students' factor. The fact stands that genetic factors play very important roles in domains of growth and development (cognitive, psychomotor, affective, social, emotional, language and physical development of every child) before the nurture factors.

Some advent of Mathematics anxiety is because it has been often verbalized that mathematics is difficult, then some individuals who have not tried, believed that it is difficulty, thereby decided blocking their self efficacy to sail through in mathematics. Based on what the children hear from home environment at early stage of life, before entering school, they have pre determined mathematics to be so hard. These irrational and illogical ideas on mathematics caused by illogical learning from significant others, lead students into neurosis and self mathematics defeat. It shows that mathematics ability can be influenced.

7. ATTITUDE TO MATHEMATICS

Attitude and concept is everything in life. Attitude according to Advanced English Learners Dictionary is a complex mental state involving beliefs and feelings and values and dispositions to act in certain ways. Man is only limited in life by the limits of his mindset. Most mathematics teachers would agree that mathematics anxiety stems primarily from students' fears of failure and feeling of inadequacy [1]. National Council of Teacher of Mathematics (NCTM) (1991) suggests that, "Classrooms should be mathematics communities that thrive on conjecturing, inventing, and problem solving, and that build mathematical confidence. This proves unachievable because from the research

conducted on pre-service mathematics teachers by [13], the results showed that some teachers' mathematics reasoning ability is not wide, more than half of the teachers do not recognize half of the (math test) content, some teachers their cognition (of the math test content) is not deep, while some, their understanding of ability performance is simple. The meaning from the result is that the tested/interviewed mathematics to-be, have some inadequacies in their Math Teacher Training Period. Then the question is, how can such mathematics teachers instill into the students math self-efficacy and resilience for mathematics, since they lack the math competent? How can they give out what they gained, what they claimed to be expert on since their knowledge of the subject is questionable? This proves why some of them are anti questions for clarification during teaching-learning of mathematics.

Interestingly, [1] found that many children and young adults develop a fear for Mathematics while they are in school, often as a result of inappropriate methods of teaching or lack of interest on the part of the students. Moreover, [14] identified that the type of method adopted by the teachers has an indispensable influence on the students' comprehension and understanding. Teaching method is a series of activities that are logically and systematically planned and executed in the classroom by the teachers to enable the students receive direct information that will make learning permanently retain in their memories and easily recall back to tackle subsequent academic challenges. It indicates that the reason for the students having phobia for mathematics is the approach given to it. Underachieving it indicates that the reason for the students having phobia for mathematics is the approach given to it. Underachieving mathematical students can be assumed to have been affected by some factors such as biological, physical, social, cultural, emotional, psychological, socio-economical, socio-personal, socio-educational or environmental. But the 'choice to engage in, expand effort on and persist in pursuing mathematics' is dashed by seeing some of these people who are handling mathematics lacking teaching skills, techniques and teaching soft skills. Therefore the issue is not the students but the mathematics mode of operation and the experts giving it out. This is proving that both the teachers and the students are lacking mathematics efficacy when it comes in terms of verbal persuasion, performance establishment, and vicarious learning

All the above assertions prove that, students do not just have anxiety for mathematics but do as a concern of how the condition of the mathematics would favour them to succeed since it is a law bounding activity. However the most well known problem of mathematics anxiety is the mathematics teachers. They lack emotional intelligence (to understand the learners), patience (to endure student's I don't understand and give feedback), collaboration (to relate friendly with the learners while teaching) and consideration (to give attention by lowering teaching pace to carry different learners along) during impacting knowledge. The students on their parts lack self efficacy and determination. Without doubt, the inadequacies created during teaching learning process and the poor result dissatisfaction from the learners' side is likely to elicit mathematic anxiety into the students. Therefore mathematics anxiety is coming from negative factors probably from outside triggers interfering with emotions. It is a psychological and physiological state characterized by physical, emotional, cognitive and behavioural components. The cognitive dimension, labeled as worry, refers to concern about one's performance and the consequences of failure, and the affective dimension labeled as emotionality refers to nervousness and tension in testing situations and respective automatic reactions [7]. Interventions to reduce math anxiety are limited as they exclude the expert skills of professional school counselors to help overcome this nervousness often times [2].

8. LEARNERS' MODE OF LEARNING

Precisely, learning generally agreed by the Educational psychologists is a relative permanent change in behaviour as a result of practice or experience. According to levels of Intelligence Quotient (IQ) and types of intelligence, this learning occurs differently at different pace in every person. It aligned with what [15] [14] opted, that, different individuals differ in the modality of instruction that is most effective to them. Learning as a consistent attribute of individual based on [16] [12] can likely be seen according to the researchers' view as a natural process of discovering through unique perceptions, thoughts and feelings, and constructing meaning from the information and experience and transferring the knowledge acquired to the appropriate situations. This made [17] [13] to define learning style as differential preferences for processing certain types of information as observed among learners. Recent

online publication revealed that leaning style is the way learners gather, sift through, interpret, organize, come to conclusions about, and store information for further use. It implies that, there are individualities in learning. So also is in mathematics. Some are logical and computational in nature while some are not; who end up in spreading anxiety about calculations.

Personality brings individualities. Personality in a simple sense according to what was proven by previous studies is the qualities, characteristics, or traits an individual possesses. An individual whose trait possesses any of the below behaviours: disorderliness, worrisome, irritation, tension and anxiety deficit will likely have that, play inhibiting role in his learning of mathematics which is an orderly subject. It means personality determines learning. And no learning will take place outside calmness. Every learner comes into learning with his whole being and experiences. This is stressing the impact of personality in learning and learning style. That means environment inside and/or outside a learner influences his learning disposition and the outcomes. This is a fact the teachers and the government need to know. It may help the government in choosing math teachers and the math teachers in choosing methods and instructional materials as well as psychologically prepare positively to influence the learners effectively and positively. In addition, it will enable the parents to conduct themselves calmly and friendly in relating math matters to their wards.

9. ANXIETY

Anxiety is the uncomfortable feeling of nervousness or worry about something that is happening or might happen in the future (Cambridge Advanced Learner's Dictionary). To Advanced English Dictionary, it is psychiatrically, a relatively permanent state of worry and nervousness occurring in a variety of mental disorders, usually accompanied by compulsive behaviour or attacks of panic. Most times it comes inform of stress, tension or strain into one's body and mind. [18], in view to more explanation further, out stated the two types of anxiety– somatic that involves loss of body control, sweaty palms, neck pains or sick to the stomach which involves loss of concentration, having negative self talk, feelings of doubt or mind wanders. Exactly this is what happens when one is unsure of what to do on a task, mathematics, a must to do. Anxiety is used so

widely and is believed to be a general feeling of fear and apprehension whereby an individual anticipates some dreadful happening not objectively predictable from his actual circumference [19]. Based on [19] postulation, speculation in math has weakened self-efficacy in math that any student called up for math would fear to take it up predicting inability or failure. Several studies have proven that anxiety is a normal and natural emotion in human life which always comes up when faced with a challenge. Positive aspect of it is helpful in achieving success. [20] Ogazi, Ekoja, Michael & Meseko (2023) pointed out, though anxiety is a normal/common emotion to life situation, but when the duration of this anxiety, the length of the anxious feeling towards what the person is facing goes out of proportion of the original trigger or stressor, the anxiety (normal emotion) moves to anxiety disorder. The anxiety that has made people negatively internalize that math is difficult, which makes students often score low in math exams or tests is anxiety disorder. For this reason, in addition, [7] corroborating with the statement above, in his study emphasized that anxiety, is a common undeniable phenomenon in human beings' life that effect their performance and effectiveness in different situations. It implies that everyone feels anxious now and then, and that may influence his concentration and performance of a task at any time, any place.

10. MATHEMATICS ANXIETY

What is mathematics anxiety? Mathematics anxiety is anxiety when confronted with math, especially about one's own performance in solving math problems. [6], viewed math anxiety as a persistent and significant theme to math avoidance and low achievement. Math anxiety can either be learnt from others or transmitted from parent to child or teacher to student or student to student. It can range from slight nervousness to all-out panic. This anxiety makes it more difficult for students to focus in class, learn math, and solve math problems [2]. Corroborating, [21,22] with the statements above proposed that mathematics anxiety is likely to be due both to pre-existing difficulties in mathematical cognition and to social factors e.g. exposure to teachers who themselves suffer mathematical anxiety, for so being based on the established reports of researches, the causes include social, cognitive, and academic factors.

Put in other way, Mathematics anxiety is described as (students' action of) experiencing

feelings of panic and helplessness when asked to solve a mathematical task or problem [23]. That means students are always afraid to take math work either for fear of inaccuracy or total failure. This is in line with National Council of Teacher of Mathematics (1991) who asserted that, in this day and age many young people and adults do not feel confident in their ability to do math. It indicates that Mathematics anxiety is inability of one to manipulate figures that have rules and formulas sometimes, steps too. In corroboration, Mathematics anxiety is a feeling of tension and anxiety that interferes with the manipulation of numbers and the solving of mathematics in ordinary life and academic situations [24] reported. Educators have strongly established that Mathematics anxiety is an intense emotional and irrational fear of mathematics based on unrealistic feelings of frustration, hopelessness, and helplessness associated with repeated failure or lack of experience of success. So based on [25], mathematics anxiety is negative associated with academic performance.

Mathematics anxiety according to [26] can occur in all levels of education from primary to university education is a feeling of tension, apprehension and anxiety that interferes with mathematics performance ability, the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations. Mathematics anxiety appears in all levels of life as well as levels of education. Recent studies showed it can be triggered by family, age, sex, parents, school, teachers, peers, biological, sociological, physical and or psychological factors likely to be characterized by tension or mental disturbances from the learner's surrounding. Supporting this [9] opined, Mathematics anxiety established by is worry or fear about performing math calculations.

Anxiety in mathematics is thus a non-productive experience that harms future learning as the student's inability to do numerical operations leads to psychological pain, discomfort, reduced interest and motivation as well as avoidance of mathematics and mathematics lessons (Wagh; Richardson & Suinn; Mathison in [1]. It was discovered that Parents' attitude towards provision of learning needs like mathematics aids, government's attitude to providing enough mathematics trained 'teaching teachers' not 'lecturers' and mathematics learning materials, all contribute to mathematics anxiety.

Furthermore, [27] found that, in the home parents who themselves suffer mathematics anxiety can unintentionally transfer such anxiety to their children. [20] also identified how parents unintentionally raise mathematics anxiety in their children by providing them with an excuse to stop trying when they are frustrated or upset due to difficulties with a mathematical task using such response as: 'Don't worry, I've never understood fractions' or 'Never mind, mathematics was always tricky for me at school too', thereby planting a seed that may grow into a strong belief for children that they are incapable of learning mathematics during their own time.

According to online publication, students have mathematics anxiety as a result of the presence of 'the time pressure, imposing authority figures (may be teachers, parents or peer group) and requirements of the common core standard (rules, regulations and formulas), and risk of public embarrassment' (may be poor performance) attached to mathematics subject. The point shows that mode of operation of this kind of mathematics is what makes it anxiety prone because it is full of "I pray I get it"; an emotion that anticipates unpleasantness; worrisome actions. From this point it can be believed that it is the mode of operation that puts the engager into a state of fight or flight and this is anxiety.

11. ONSET OF MATHEMATICS ANXIETY

Although many researchers Claessens & Engel; Fritz, Haase & Rasanen and others have written something on mathematics and its students' anxiety as identified by [23] but how many have written something on the onset of and the extent of the mathematics anxiety: the way out? [23], stressing on this point further revealed that, little research has investigated the relationships between mathematics anxiety, mathematics self efficacy and approaches to learning in the context of mathematics education among STEM and social students. Certainly, pointing out an issue is sharing and showing out a way out is solving the problem. The onset of mathematics anxiety could be traced to the onset of calculators and other calculating machines which lessened cognitive calculating activities (people can no more reason out simple value for two figures), psychomotor performance (people can no more patiently write and compute a simple equation), and mind strength to strive (people can no more concentrate or focus due to physical and psychological stress on increase). Secondly,

action of employing none qualified math teachers for less wages/salary payment. Thirdly, compulsory sitting for mathematics for any certificate award without consideration of cognitive efficiency (which brought about malpractice during mathematics exams, stealing or forging of mathematics results).

Speaking more, Mathematics anxiety can be caused by unpleasant teaching and assessment strategies for students, like time testing [28] and assigning mathematics as punishment, the methods which are still widely used in schools today. Also according to [7] some aspects of mathematics appear to be cognitively difficult for many people to acquire; and some people have moderate or severe specific mathematics learning disabilities. Shy children will be weary in new social situations, will perceive such instances as threatening, and may experience high levels of anxiety [29]. Shy students will very likely withdrawn from mathematics class activities such as asking or answering questions and will not participate in many academic and social growth opportunities [1]. The fear of being ridiculed by the teacher which will open avenue for other students to follow suit is what could make a student with anomalism of shy to shy away from mathematics class participation as well as asking questions. Shyness is the "tendency to feel awkward, worried or tense during social encounters, especially with unfamiliar people" (APA, 2012). It implies that a child with shyness will definitely show up with anxiety during mathematics learning not because it is mathematics.

[30] in a study "Overcoming Mathematics Anxiety Multitudes" revealed that, Mathematics anxiety could also develop as a result of a student's prior negative experiences in learning mathematics in the classroom or at home. And, [1] added, students whose fathers were professionally employed were found to be lower in mathematics anxiety than those whose fathers were labourers. Then, the researcher putting objection on that maintained that, students who are found "lower in mathematics anxiety" could be as a result of parental involvement in provision of learning aids or extra mathematics class lesson which may have put them through in understanding the fundamental rudiments in mathematics; not that their fathers were labourers, though, socio-economic status of the parents may contribute to that where the gene is not superior. For observations have shown where poor students performed better than the rich students. In such

cases gene or parental commitments play upper hands but more researches need to be carried out to ascertain the fact.

12. MATHEMATICS SELF EFFICACY

Self efficacy is people's belief in their capacity to undertake a particular programme of action. Attitude and concept is everything in life. Factors that influence self-efficacy include perceptions of ability, social comparisons, attributions, time available, and perceive importance by Dale H. Schunk Frank Pajares. [2] asked, 'What is happening to our students that so many of them lose interest in math and lack the confidence to do and take more math classes?'. The answer is in the internalized irrational beliefs about mathematics which gave the scholars the attitude of disgusting mathematics. Bandura's (1977) observed that self efficacy for mathematics is an individual's confidence in his or her ability to perform mathematics and thought to directly. This is because self efficacy according to [10] is a self judgment made about one's own ability to complete a task. When this self judgment is negative, or the self confidence is lacking, anxiety sets in. In terms of mathematics, previous studies and mathematics results have linked mathematics anxiety with a lack in mathematics self efficacy. That is, there is still general fear of self ability in matters of computation among the scholars.

Speaking more, the failure to give a child basic foundation for mathematics, that is, giving the child mathematics or calculation self-efficacy as early as time in lower elementary class, together with the negatives about math he hears from his siblings who are in school, could cause inadequate relationship between him and mathematics likes or dislikes. The inculcation of problem solving skill and self efficacy skill in a child as early as age 3 -5 is very paramount. It builds in the child, self knowledge, self capacity knowledge, self confidence, ability to strive, independence spirit, self influence, curiosity mind and positive attitude towards any task he may face. These skills enfold a learning child to be bold to kick off anxiety and tackle a confronting activity. Such a child sees every task as a mountain to crossover, which he must cross. The above assumption aligns with the view of [31] who citing Bandura's Social Cognitive Theory posited that, individuals' beliefs about themselves propel them to act in ways to either overcome obstacles in pursuit of desired goals or cave in to them. Luszczynska and Schwarzer in

[31] collaborated when he said one's sense of self efficacy can play a major role in how one approaches goals, tasks and challenges. Self efficacy is people's belief in their capacity to undertake a particular programme of action. In fact, many students who suffer from mathematics anxiety have little confidence in their abilities to do mathematics. That means a student with self-efficacy would always confidently overcome fear in any given task.

13. METHODOLOGY

The study adopted opinion research design using mixed methods which can otherwise be called ethnography method whereby the researcher used observation, interview, focus group and literature review. The method is used because it is an effective and primary way to gather data from people's feelings and attitudes on something. It investigated the opinion of people on the subject mathematics anxiety with the question (What do you think make people feel and say that mathematics is difficulty?). The population of the study constituted 42 participants (20 males and 22 females) of whom 24 were students, 8 teachers, 6 non-teaching persons and 4 post graduate students from different environments. . The instrument for data collection was unstructured oral interview based on the research question which the researcher carried out by meeting people one and one in groups or individually. Data analysis was done with no statistical tool. The views were independently explained.

14. INTERVIEW FINDINGS

During the interview, the researcher conducted on 9th and 10th November, 2023, the findings correlate with the researcher's critiquing points and what many other researchers have written to be the reasons for mathematics anxiety.

14.1 Research Question 1

What do you think make people to feel and say that mathematics is very difficulty?

The interviewees' responses are as follows:

Interviewee 1: A post graduate gave the opinion that it is because of inconsistency practice, lack of understanding of the principle or formula, unbelief, lack of patience and perseverance.

Interviewee 2: Another postgraduate guessed it is due to fear and the method the teachers use.

Interviewee 3: Another stated that it is fear of not to get it during calculation.

Interviewee 4: A mother said, 'I like math and my daughter do but my son don't. It is laziness to sit down and work'.

Interviewee 5: Another postgraduate opined it to be failure of understanding the logic in it and the formula to use. In fact I love statistics not math. I love math only in my Senior Secondary 2 because I enjoyed the teacher teaching it. Math is frustrating; it needs patience and creativity for one to get it.

Interviewee 6: Two female cleaners. One said, I don't like math and she frowned at it. The other said, 'I was good in math in my Junior Secondary 1- 3 but in Senior Secondary 1-3, it was like magic. They further said that teachers' reaction make people fear math. Some teachers are not good in Math. They lack skills and methods. Most times don't answer questions but say, come to lesson. Generally they don't teach people to learn.

Interviewee 7: A teacher reported that the reason is that majority teaching math did not do it as a course but are teaching it. We call such one math teacher by sight. Schools employ such teachers so as to minimize what they have without considering the students. Again, some students don't have math books; some nobody help them at home; some fear of not failing it and lack of time in teaching math. All these make students not to have interest in math.

Interviewee 8: A male math teacher opted that people fear math as a result of general belief from people talking and complaining that math is not easy. He added that parents do over emphasize the student must pass math. Prioritizing it makes students to be scared of passing it. Furthermore, the females teaching math contributes because they are lenient.

Interviewee 9: SS 2 students, two girls and one boy. The boy said, 'I like math. It is self explanatory and easy to understand' while the girls said 'math formula is not easy to understand'.

Interviewee 10: four SS 3 students, three males and one female. They revealed that people see

math as difficulty subject because it involves a lot of critical thinking and logic and not everybody wants to think critically; math is step by step, any step forgotten kills all efforts; that is one little mistake at the beginning destroys the whole answer. They mentioned again laziness.

Interviewee 11: A female teacher pointed out that the reason is teachers' approach makes it difficult and students not having interest in calculation. She said though people may not like it but teacher's approach can make them like it.

Interviewee 12: A male teacher underscored that people fear math because they say it is full of many formulas and the manipulations in it are too tedious.

Interviewee 13: Four JS 3 students, 1 boy and 3 girls. The girls said it is the teacher that determines a student liking math or not. The manner he presents the lesson and himself impacts on the student's interest on math. And the boy added, the mentality of the students on math also makes math difficult.

Interviewee 14: A male teacher and a home math teacher stressed teaching system and how the lesson is being delivered matters; teacher's personality and willingness as well as the act of the teacher teaching well only when he collects money.

Interviewee 15: One of the four JS 1 students stated that she hate math before but her parents have to encourage her to like it. Another said, thinking too much about it disturbs the brain. Another added some teachers' explanation, method, not asking the students questions and laziness make math tough. Lastly one said, some teachers make silly mistakes while teaching math and some do not make math class attractive.

Interviewee 16: JS 2 male student gave that math is hard and cannot be understood.

Interviewee 17: JS 3 students, 3 boys and 1 girl. They echoed, it is hard, doesn't look interesting, can't be understood and fear of that it is hard.

Interviewee 18: The school Counsellor said it is because people don't like calculation and math is full with too many calculations.

Interviewee 19: The cause according to a female teacher is math teacher not being friendly, carefree attitude, no interest and

readiness from both parties, not liking the teacher, negative thing people say about math to the hearing of others, parents not contributing to the children's math assignment, it is from the family, it is genetic.

Interviewee 20: SS 3 students, 1 boy and 1 girl. Illustrated that math is a complex subject, hard and difficult to comprehend due to many formulas

Interviewee 21: JS 2 student emphasized that the cause of people saying math is difficult is because they don't put mind in it, it is hard, not knowing the formula, teacher's poor method of teaching math, poor explanation from the teacher, not making class interesting while teaching, not attentive and laziness in solving.

Interviewee 22: Two fathers selling at the school gate contributed by saying the causes are bad foundation, bad group, and parents having no interest in the education of their children.

Interviewee 23: Two gatemen pointed out that the causes are from math teachers, teaching math with another language, teachers' threatening students on it, teacher's way of teaching, and people's belief from childhood that math is difficult.

Interviewee 24: Another man reported that what makes math seems difficult is because general view that math is difficult settles at the back of the mind that even when math is simple dare not try it but conclude it is difficult, teachers are not making teaching math attractive, teachers are not friendly in teaching math, and sometimes students will say my course has nothing to do with math.

Interviewee 25: A student said math is difficult because it has a lot of problems like too many calculations and naturally some people dislike the strokes in math therefore fear math. Again, math teachers are insensitive to the students' reactions while learning math. They are self centered.

14.2 Research Question 2

What do you think can be done to remedy the problems of internalizing math to be very difficult?

Some of the interviewees suggested:

- Math teachers to change the attitude of talking to self while teaching but care to know the learners' abilities to help in teaching and in learning
- Math needs a strict person like male teacher so that the students can take command from him.
- Math teachers should explain math well and not with harsh voice nor in abstract
- Math teachers should always play math game like quantitative game with the students
- Math teachers should make math interesting with songs and examples
- There should be use of self-explanatory formulas, instructional materials that explain each topic and math laws and principles should be made known in easy way to students
- Math teachers should be patience and kind, play talking before starting to teach and equally love the parents of the students
- Math teachers should have and maintain positive interactions with the students during math class
- Math teachers and students should not doubt about their capabilities
- To allow students ask questions on their areas of math confusion and teacher should give feedback relating it to something they like to explain
- Students to practice math daily, engage in thinking games like magic cube and be focused
- Students should be allowed to ask questions on the areas they are not cleared with
- Parents to encourage and monitor students, and work with teachers to help students in math activities
- Parents to buy needed mathematics books for the students for math self learning
- To change school for the student if the school is lacking in good skill for teaching math
- To allow the students to work on their own, and stress the brain to be able to think deep to get the answer to the math
- School and parents should encourage students to realize that paying attention to math makes it easy and also encourages them not to hate math teacher.
- Schools and government should employ only those who study math to teach it.

From the above findings, the researchers discovered that the problem of mathematics anxiety found around people and students is as a result of:

- ❖ Negative beliefs and its constant verbalization to the masses ears which has affected students' math self-efficacy and performance.
- ❖ Math teachers' rigid and bigoted attitudes towards teaching and learning mathematics
- ❖ Parents' lack of involvement in helping their wards in math learning requirements
- ❖ Non mathematics teachers teaching mathematics

Surprisingly and interestingly, the results of the interview carried out on critique of mathematics anxiety aligned with the previous studies of many researchers. It indicates that the study is consistence with the known facts or with other facts about mathematics.

15. CONCLUSION

No matter how mathematics has been made a core subject in school, there is still a lack in teaching and learning mathematics. From the findings, the onset of mathematics anxiety centered around the teachers' demonstrating incompetence (as in right methods and techniques, conducive classroom environment) and giving rigid approaches and personalities (shown as lack of humour, friendliness, positive interactions) in teaching mathematics. Moreover, the views from people showed that mathematics teachers are so bigoted that they find it very difficult to accept student(s) asking question(s) that show they do not understand and are not following. These attitudes have led to the general view, 'mathematics is very difficult'. Therefore the researchers conclude that, improving student's mathematics self efficacy will be helpful to curbing the issues of anxiety on mathematics but that is not enough to solve the problem. Since mathematics is generally seen as to be very difficult, the educators' attention should be on making the learners relax with it by allowing students' questions, answering the questions in a friendly way and giving them feedback in their strengths and weaknesses time; and not the questioning as 'why don't you understand it and how else would you want me to explain it before you understand? On this context, a study suggested, 'instead of instructing the content and practices of mathematics, the main focus should

be on students' experience of the discipline and providing mathematics sense making' attitude.

16. A WAYOUY OF MATHEMATICS ANXIETY

Mathematics anxiety is accompanied with lack of attitudinal and environmental motivations. This is as a result of according to Ellis Albert that man's illogical ideas are rooted in biological limitations and mostly the teaching from the parents, teachers, peer group and mass media. For this reason, to reduce anxieties of all kinds, during and after teaching learning process of mathematics, the researchers suggest that:

The mathematics facilitators/teachers should have greater functions of learning stimulations to display in the class and at home in order to assess the cognitive competency of the learner which will enable them inculcate interests, willingness and readiness as well as facilitate them in the learner for mathematics competency.

The teacher plays important role in making the class more attractive and reducing anxieties. Therefore mathematics teacher can create a learning environment in which the students have a positive expectation about their learning as well as the parents' behaviours [26]. For so being, the teacher should always create an attractive entering behaviours associated with previous life daily mathematics knowledge in simple naturally perspective format.

Moreover, before teaching any class, the facilitator should always enhance his competence for teaching that class type mathematics; fathoming daily the cognitive level and readiness of the students for learning mathematics and enhance mathematics environment for attractive mathematics learning, assimilation and participation.

Teaching mathematics should be done only by career mathematics teachers who had mathematics education training and can teach mathematics with fun using instructional materials.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Taiwo AK, Rasaq TA. Development and validation of 4- factor mathematics anxiety scale among secondary school students in Ibadan, Nigeria. *Nigeria Journal of Applied Psychology*, Retrieved from Researchgate. 2018;20(1):66-89.
2. Furner JM. Teachers and counselors: Building math confidence in schools. *European Journal of STEM Education*. 2017;2(2):3. Available:<https://doi.org/10.20897/ejsteme.201703>
3. Dan. Anxiety and Panic Disorders Guide. Retrieved from WebMD, LLC; 2022.
4. Bouras N, Holt G. Psychiatric and behavioural disorders in intellectual and developmental disabilities (2nd ed) Cambridge University Press, 2007.
5. Ann D, Amar S, Chung YL. Mathematics anxiety: What have we learned in 60 years? Retrieved from frontiers; 2016.
6. Ruff SE, Boes SR. The sum of all fears: The effects of math anxiety on math achievement in fifth grade students and the implications for school counselors. *Georgia School Counselors Association Journal*. 2014;21(1):1.
7. Oberlin L. How to teach children to hate mathematics. *School Science and Mathematics*. 1982;82:261. Available:<https://doi.org/10.1111/j.1949-8594.1982.tb17187.x>
8. Abigael O. Assessment of woods and hartman's problem solving strategies of self -efficacy on junior secondary school social studies students attitude to environmental education. *Nigeria Journal of Applied Psychology*. 2020; 22(1):57-73.
9. Busari A, Ijale M. Parenting style, self determination and academic adjustment among secondary school students in Zaria Metroplis Kaduna. *Nigeria Journal of Applied Psychology*. 2020;22(1):158-168.
10. Fanglin X, Zezhong Y. 2023;49(2):38-48. Available:10.9734/ajess/v49i21116
11. Else-Quest NM, Hyde JS, Hejmadi A. Child Emotion During Mathematics Homework, *Mathematics Thinking and Learning*. 2008; 10(1):5-35.
12. Romanelli F, Bird E, Ryan M. Learning styles: A review of theory, application and best practictes. *American Journal of Pharmaceutical Education*. 2009;73(1):09.
13. Cassidy S. Learning styles: An Overview of Theories, Models and Measures. *Journal of Educational Psychology*. 2004;(24):420-444.
14. Pashler H, Rohrer D, McDaniel MA, Bjork RA. Learning styles: concept and evidence. *psychological science in the public interest*. 2008;9(3):105-119.
15. Pashler H, Rohrer D, McDaniel MA, Bjork RA. Learning Styles: Concept and Evidence. *Psychological Science in the Public Interest*. 2008;9(3):105-119.
16. Romanelli F, Bird E, Ryan M. Learning Styles: A Review of Theory, Application and Best Practictes. *American Journal of Pharmaceutical Education*. 2009;73(1):09.
17. Cassidy S. Learning styles: An Overview of Theories, Models and Measures. *Journal of Educational Psychology*. 2004;(24):420-444.
18. Nwamuo P. Management: IN application of therapeutic priciples of behavioural modification. Owerri: Career Publishers; 2005.
19. Solomon BT, Abudukadir AO. Academic stress and anxiety as correlates of mental health among final year students of tertiary institutions I Sokoto Metropolis, Sokoto, Nigeria. *The Counsellor: Counselling Association of Nigeria(CASSON)*. 2022;45 (1):397-412. ISSN: 0189 -0263. Avialble:www.cassonnigeria.org,
20. Ogazi FC, Ekoja LA, Michael AA, Meseko JT. Causes and mitigating strategies against anxiety behaviour disorders among staff of Federal Institutions in Kuru Vwang District of Jos South, Plateau State, Nigeria. *Journal of Counselling Psychology on the Plateau*. 2023;1(9).
21. Meloney EA, Bellock S. Math anxiety: Who has it, why it develops and how to guide Against It; 2012. DOI:10,1016/j.tics.2012.06,008
22. Dmitri R, Tiina K, Karin T. Mathematics Anxiety Among STEM and Social Sciences Students: The Roles of Mathematics Self Efficacy and Deep and Surface Approach to Learning. *Internationa Journal of STEM Education*. 2020;7(46). Available:journal.springeropen.com
23. Richardson, Suinn. *Mathematics anxiety*; 1972. Available:www.frontiersin.org

24. Ehab K, Cameron G, Brett W. What impact does maths anxiety have on university students? BMC Psychology. 2021;9.
25. Joslyn J, Mary W. Mathematics anxiety: What is it and how to overcome it?; 2022.
26. Prasanta K. Maths Phobia: Causes and Remedies. Retrieved from Researchgate; 2020.
27. Usman A, Sanusi RA, Abubakar M, Nwosu JN. Effect of Discussion Method on the Academic Achievement of Upper Basic Students in Kwara State, Nigeria, the anambra clor. 2023;1(1): 211-222.
28. Ashcraft MH, Ridley KS. Math anxiety and its cognitive consequences—A tutorial review. In J. I. D. Campbell (Ed.), Handbook of mathematical cognition. New York: Psychology Press. 2005;315-327.
29. Coplan RJ, Arbeau KA. The stresses of a "brave new world": Shyness and school adjustment in kindergarten. Journal of Research in Childhood Education. 2008;22(4):377-390.
30. Rosnann S. Overcoming Math Anxiety. Mathitudes. 2006;1(1):1-4.
31. Stolpa J. Mathematics and writing anxieties. Phi Kappa Phi Forum. 2004; 84(3):3,5.

© 2024 Chinonso et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/108410>