

Coping with Mathematics Anxiety for Scientific and Technological Development in Nigeria.

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Abstract

Mathematics anxiety has been a problem facing Students, teachers and society. This affects the performance of students in Mathematics negatively. This means that a large number of students aren't on a path to gain access to the many job and life opportunities which require a solid foundation in Mathematics. Some of the root causes of Mathematics anxiety include activities of Teachers in and outside the classroom; such as Knowledge of the subject, teaching approach; care e.t.c Many societies commonly accept that Mathematics is difficult. The students learn this from the society. Mathematics anxiety comes as a result of bad study habits, low confidence on days of Mathematics test. The roles of teachers and students in reducing Mathematics anxiety were discussed. Therefore teachers of Mathematic should prepare well for lessons, have positive attitude and help students in and outside the classroom. Students, teachers and parents should work together to overcome this menace.

Keywords: *Anxiety, Mathematics anxiety and Scientific and Technological Development.*

Introduction

Mathematics is the science that enables scientist and technologies to drive relationships among biological, chemical geophysics and physical qualities understand and explain natural phenomena. It can expand our critical thinking and problem solving skills that will enable us to navigate our complex world and understand our own role in it. Abubakar Wokoma and Afebuame (2012) observed that, mathematics is a tool, and its knowledge and skills are the bedrock of all societal transformation and transfer of ideas into reality. Mathematical literacy has always been a key factor in improving a country's productivity and competitiveness (Melkadze, 2012).

Unfortunately the mathematics learners continue to record abysmal low attainments, and ever depressing interest in the subject despite its roles for national development (Obioma, 1990). Furthermore mathematics achievement has never fared better, and has affected subjects like physics and chemistry adversely. West Africa Examination council (WAEC, 2006) noted that the marks lost by each physics student as a result of poor knowledge in mathematics accounts for fifty percent (50%) of the ones lost for errors in that subject. We wish to look into one of the problems that affect student's performance in mathematics. Mathematics anxiety is widespread and tied to poor mathematics skills; we must understand what we can do to alleviate it.

Anxiety is Stress, tension and strain brought into one's body and mind (Olatunde 2009). It is marked by apprehension, uneasiness and fear which an individual cannot escape. It is also a feeling of helplessness in an individual for being unable to find solutions to his/her problem.

Mathematics Anxiety

As mathematics teachers, we hear of "I was never any good at mathematics" more than any other thing in our society. To many people; "Mathematics is a scary word". They don't like it, they just want to stay away from it. People who feel tensed, apprehensive, and fear situations involving mathematics are said to have mathematics anxiety. Although children begin their formal education

with a very positive view of mathematics, as they progress through education, many of them develop negative feelings and attitudes. The feeling of tension, apprehension and fear experienced when faced with mathematics problem has been termed mathematics anxiety. Mathematics anxiety interferes with mathematics performance. Students with a high degree of mathematics anxiety perform worse in mathematics from primary, secondary, to tertiary institutions, relative to their counterparts with less mathematics anxiety (Sian and Daniel, 2014). This is so because highly anxious mathematics students will avoid situations in which they have to perform mathematical calculations. Unfortunately, mathematics avoidance results in less competency, exposure and mathematics practice, leaving students more anxious and mathematically unprepared to achieve. Mathematics anxiety is a fear response to mathematics situation not a failure of intelligence. The problem is emotional, not intellectual. Tension, lack of confidence and previous failure can all result in the kind of anxiety that sets in the way of performance. Mathematics anxiety implies more than “bad at mathematics”. It implies that someone would be better at mathematics if he or she weren't so anxious.

It is easy to imagine how mathematics anxiety might emerge in, and impact one some everyday situations, such as estimating the price of purchases, splitting the bill in a restaurant, and the ability to interpret health statistics. The mathematics teacher at any level faces serious obstacles to teaching his students the mathematics they need. One of the biggest obstacles for the teacher is trying to teach students who experience mathematics anxiety.

Because mathematics anxiety is widespread and often tied to poor mathematics skills, it's imperative to understand when anxiety about mathematics starts to emerge, where it comes from and what we can do to alleviate it.

Causes of mathematics anxiety

Mathematics anxiety may start when children are quite young, but it can't come out of nowhere. Factors related to both students' mathematics abilities at the start of elementary school and students' social environment (in the classroom, at home, and in the society in general) likely play a role in the development of mathematics anxiety. At the secondary and tertiary level mathematics anxiety reaches its crux. Research has found that both teachers and parents have a strong influence on students' mathematics anxiety. (Blazer; 2011)

There are many things the mathematics teacher can do that will make his students to dislike mathematics. The teachers may be perceived as not caring about students because he is unwilling to give extra help to students who need it. The students need to know that their teacher is able and willing to help them.

Students often develop mathematical anxiety in schools, often as a result of learning from teachers who are themselves anxious about the mathematical abilities in certain areas (Wikipedia; 2011).

Another major source is the teaching approach. Poor teaching leads to the inevitable idea that the subject (mathematics) is only adapted to peculiar minds, when it is the one universal science, and the one whose ground rules are taught us almost in infancy. While teaching; many subjects have changed from rote memorization to the current constructivist approach. Mathematics is frequently taught with a rote learning behaviourist approach. That is; a problem set is introduced
a solution techniques is introduced

practice problems are repeated until mastery is achieved constructivist theory says the learning and knowledge is the students' creating. The fact that mathematics has a tarnished reputation in our society. It is commonly accepted that mathematics is difficult obscure, and of interest only to “certain people”. The implication is that, the study of mathematics carries with it a stigma and people who are

talented at mathematics or profess enjoyment of it are often treated as though they are not quite normal.

Students often develop mathematics anxiety in schools, often as a result of learning from teachers who are themselves anxious about their mathematics abilities in certain areas. Typical examples of areas where mathematics teachers are often incompetent or semi-competent, include fractions, (long) division, algebra, geometry “with proofs”, calculus and topology. In many countries would be mathematics teachers are required only to obtain 50% in mathematics examination, so that a mathematics student who has failed to understand 50% of the mathematics syllabus throughout his or her education can, and often does become a mathematics teacher. His fears and lack of understanding then pass naturally to his or her students.

Mathematics is more challenging for some students than others, and a student with problems in the subject finds ways to continue to do poorly. Bad study habits, low confidence on days of mathematics tests and poor self-esteem inhibit academic potential and can snowball into a lifelong phobia for mathematics, which can spread to other area of life. Few people can think clearly with a clock ticking away. Especially, if they are standing at a blackboard with a lot of students watching. Most people especially young people do not do well when they are scared.

A student's success in school is increased if their parents are involved in their education, both at home and school (Henderson and Mapp; 2002). As a result, one of the easiest ways to reduce mathematics anxiety is for the parent to be more involve in their child's education especially mathematics. Similarly, parents' perception on mathematics influences their child's perception and achievement in mathematics (Yee and Eccles; 1988).

Young women continue to face an additional barrier to success in mathematics. Remarkably, even at the start of the 21st century, school age still discouraged by parents, peers, and teachers with the admonition that mathematics “just isn't something girls do”. Parents, teachers and peers who promote this idea cause girls to give up without even trying. Sometimes teachers are more willing to help males than females, and sometimes they tell the girls that they do not need to learn mathematics. Together these social and educational factors lay the groundwork for many widely believe myths and misconceptions about the study of mathematics.

Common misconceptions of mathematics

1. Aptitude for mathematics is inborn.

This belief is the most natural in the world. After all some people just are more talented in some things (music and athletics) and to some degree it seems that these talents must be inborn. Indeed, as in any other filed of human endeavour, mathematics has had its share of prodigies. It is easy for students to believe that doing mathematics requires a mathematics brain; one is particular which they have not got.

2. Mathematics requires logic, not creativity

The grain of truth in this myth is that, of course, mathematics does required logic. But what does this mean? It means that we want things to make sense. We don't want our equations to assert that 1 is equal to 2. It is a mistake to suppose that logic is what mathematics is about or that being a mathematician means uncreative or unintuitive, for exactly the opposite is the case. The great mathematicians, indeed, are poets in their soul.

3. In mathematics what counts is getting the right answer

Teachers benefit children most when they encourage them to share their thinking process and justify their answers out loud or in writing when they perform mathematics operations, with less of an emphasis on right or wrong and more of an emphasis on process. Teachers, can help

alleviate students' anxiety about mathematics. When learning, understanding the concepts should be paramount, but with a right/wrong approach to teaching mathematics, students are encouraged not to try, not to experiment, not to find algorithms that work for them, and not to take risks.

4. Men are better than women at mathematics

Research has failed to show any difference between men and women in mathematical ability (UAF; 1999) If there is even a ghost of a remnant of a suspicion in your mind about gender making a whit's difference in students' mathematics attitude, slay the beast at once. Special vigilance is required when it comes to this myth, because it can find insidious ways to affect one's attitude without ever drawing attention to itself people's outlooks, often without their even being aware of it for generations. A web search for “women in mathematics” will turn up many outstanding sites with information about historical and contemporary women in mathematics.

Teacher's roles in reducing mathematics anxiety

The parents are the teachers of the children at home, therefore parents; involvement in developing a child's educational processes is essential. One of the easiest ways to reduce mathematics anxiety in children is for parents to engage and encourage children around mathematics skills like basic numerical and spatial processing. This means that if a parent makes it apparent that they do not enjoy, or that they are not good at mathematics, this can influence the way in which their children view mathematics.

Knowledge that a teacher's mathematics anxiety can affect the student's mathematics achievement, suggests that, we also need to ensure that teachers feel fully confident in their preparation to teach mathematics. Let the teacher stay positive about mathematics, if possible enthusiastic. It has been shown that students tend to internalize their instructor's interest in an enthusiasm for teaching mathematics (Jackson & Leffingwel, 1999). If the teacher is not happy about teaching mathematics or does not enjoy being with students in the classroom, then students are less likely to be motivated to learn the materials.

The mathematics teachers also needs to encourage his students to think critically, share their thinking process and justify their answers out loud or in writing (Furner and Duffu, 2002). It is important that teachers emphasize the process, not right or wrong answers. Although correct answers are important, getting the students to think critically is even more important (Schwartz, 2000). Students of mathematics also need to realize that it is more than just computations, focusing more on the process or method enables students to make mistakes, but not 'fail at mathematics'. Studying mathematics is much more like studying; say music painting than it is like studying history or biology.

The teacher should be careful when asking for correct answers. He should not call on students to work at the blackboard if they are uncomfortable doing so. He should encourage students to keep working on a problem by pointing out to them, what is positive about their attempts. The teacher should put himself in the students' position and try to hear what the students would hear.

With regards to testing, the teachers should try to give as much time as possible to complete the test. He should also provide study guides so the students will know what type of questions to expect. Assessment should be informal at times.

Active learners ask critical questions, such as: why do we it this way, and not that way? Some teachers may find these questions annoying or difficult to answer, and may be hostile. Better teachers respond eagerly to these questions, and use them to help the students deepen their understanding by examining alternative methods so the students can choose for themselves which method they prefer. This process can result in meaningful class discussions for functional education.

Children learn best when mathematics is taught in a way that this is relevant to their everyday lives. To learn mathematics in any depth, students should be engaged in exploring, conjecturing, and thinking, as well as in rote learning of rules and procedures.

Study habits that help improve performance

Many students supposed that writing furiously to get down everything the instructor puts on the board is the best they can do. Unfortunately you cannot both write the details and focus on the ideas at the same time. Make understanding the lecture your primary focus. Remember that your success is your instructor's success too. He or she wants you to achieve your goals. So develop a rapport with the instructor, letting him/her know when you are feeling lost and requesting help. Do not wait until after the lesson or lecture.

Self-study and homework

Home work is for you and you alone. It is your opportunity to learn, and to begin to gain mastery. Work through the example yourself, until you thoroughly understand each step. Writing things down is far more effective than high lighting or underlining.

Exams

For many students, this is the very crucible of mathematics anxiety. Mathematics exams represent a do-or-die challenge that can inflame all of one's doubts and frustrations. Here are some techniques and strategies that will help improve your test-taking experience.

- * Do not cram. The brain is in many ways like a muscle. It must be exercised regularly to be strong, and if you place too much stress on it, then it won't function at its peak until it rest and recover.
- * Have breakfast on exam day the brain consumes large number of calories. When you get the exam, look it over thoroughly. Begin working only after you have read every question. Do the question you know well first and the hardest ones last.

Mathematics exams are usually timed bout remembers, it's not a race! Don't rush yourself either. Work efficiently, being methodical and complete in your solutions. Make your work neat and orderly. The exam is not a test of your overall intelligence neither of your worth as a person or of your prospects for success in life, therefore, fear not.

Conclusion

The importance of mathematics to national development cannot be over emphasized. Mathematics anxiety is a real problem facing students, teachers and parents. It has been a barrier for good performance in mathematics. This barrier can be overcome. In this paper we have examined the causes of mathematics anxiety, ways of reducing mathematics anxiety by the teachers and students. Some success strategies for a functional mathematics Education. After all mathematics is suppose to be fun with creativity for national development.

Recommendations.

1. Parents should show interest in the Education of their children. They should not tell their children that, mathematics is difficult.
2. Teachers should encourage, students to do well by making mathematics fun, by putting more emphasis on teaching method that is less lecture, more students directed classes and more discussion.

3. Teachers should prepare well for lessons and should have a positive attitude towards teaching mathematics.
4. Mathematics teachers should be willing to help students solve mathematics problems outside the class as this will make them wish to learn more which in turn increases performance.
5. The Federal Ministry of Education and the States Ministry of Education should give scholarship to Students who want to study mathematics.
6. The media should help through Jungles and campaigns on radio, television and posters to dispel that mathematics is difficult, through telling people the importance of mathematics for scientific and technological development in Nigeria.

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