

CASUAL ATTRIBUTIONS OF MATHS ANXIETY AMONG ZIMBABWEAN SECONDARY SCHOOL – LEARNERS

Christmas Denhere

Zimbabwe Ezekiel Guti University

ZIMBABWE

ABSTRACT

The larger majority of learners in the secondary schools does not enjoy learning mathematics and could forgo learning mathematics at the drop of the pin if they had a choice. High failure rate in Mathematics regardless of whatever level give rise to notions that mathematics is a difficult subject. The fear for failing has resulted in math- indifference among learners. This paper attempts to examine the following possible causes of mathematics anxiety that were identified by the form three students in a conversation with the writer: mathematisation of the curriculum; negative traditional beliefs/philosophies; defective genetic make-up; embarrassing mathematical experiences; eclecticism and hostile learning environment among others. The paper concludes by suggesting intervention strategies that could assist in attenuating math anxiety experienced by learners.

INTRODUCTION

Human life is characterized by psychological tension or conflict commonly referred to as anxiety. Anxiety may be viewed as ontological or as an inevitable part of being. It is a universal human experience intrinsic to human conditions. All human beings therefore are susceptible to anxious experiences which if mild are motivational while if severe they may render the individual dysfunctional and helpless.

There are many conceptions and theories of anxiety as there are theories of man. Freud (1966) a psychoanalyst views anxiety as stemming from the conflict between the id's forbidden drives and the superego's moral codes. He conceives anxiety as the ego's reaction to danger. It is an uncomfortable feeling, which motivates the ego to avoid perceived threat. On the other hand the cognitivists' explanations of anxiety are that 1.the perceived threat is irrationally exaggerated and 11. the capacity to deal with the threat is seen as inadequate or both.

From a more humanistic approach Rogers (1977) views anxiety as a pervasive feeling of helplessness in a hostile world. In agreement with Rogers (1977), Sullivan (1964) contends that anxiety occurs when organism's safety is threatened.

For Kelly (1963) anxiety occurs when a person is aware that the event (s) he is faced with falls outside the range of his or her construction system. Similarly Eysenck (1977) attributes anxiety to a person's genetic makeup for instance a neurotic is a neurotic because of his genetically determined sensitivity and over responsiveness to noxious (anxiety- provoking) stimulus.

The psychological tensions that characterize human life have not spared schoolchildren either. Literature has shown that many anxieties pervade the school life with some significant

pernicious effects on the learners. Tobias and Weissbrod (1980) define math anxiety as the panic, helplessness, paralysis and mental disorganizations that arise among learners when they are required to solve mathematical problems. Math anxiety has been called an illness that is both an emotional and a cognitive dread for mathematics (Tobias, 1978; Hodges, 1983)

It has been reported that the larger proportion of school time is spent in studying quite detailed mathematics. The school curriculum has been mathematized with the hope of producing mathematicians. To the contrary, the mathematization of the curriculum has somewhat had rather indifferent results. Broadly speaking, this practice has predisposed students to math anxiety.

It might be legitimate to ask ‘what is it about mathematics – learning that makes learners develop fear or phobia for the subject? Fiore (2003) argues that there is no single cause for it; rather there is a multiplicity of causes.

Possible causes

It is the object of this paper to examine the possible causes of math anxiety and suggest possible intervention strategies that could possibly be used to attenuate anxiety levels in student learning mathematics.

The Mathematized Curriculum

In Zimbabwe mathematics is regarded as one of the core subjects. It is also a prerequisite subject for one’s entry into professions such as teaching, engineering, nursing among others. Teachers have zealously responded to this requirement by over teaching the subject at the expense of other subjects on the Zimbabwean curriculum.

Over learning the subject has in some instances created anti-math feelings or anxious experiences among the learners. The following anti-math statements were collected from a conversation the writer had with some Form Three students. (Pseudonyms were used)

Taurayi: Math is a dull subject. You spend the larger part of the schooling time doing math. As if that is not enough one still carries math homework home.

Imi: Why is math considered so important? I hate math and forcing me to do it only makes me resent it more and more.

Simu: OH this subject called math makes my school life difficult. It makes my life miserable. Imagine, I have no problem with other subjects. It is not for girls so the school authorities should not force us to do the impossible. It requires complex reasoning. I do not think I have the brain stuff that will make me pass mathematics.

Sokuti: Math is difficult. My mother was not good at math either. This is purely a male domain. Teachers give more attention to those who know and ignore those who don’t. This makes it worse. Also the comments that one gets are not encouraging when one fails math.

Teachers and parents have some epistemological beliefs about the nature of mathematics. These philosophical unsubstantiated and jaundiced beliefs invariably predispose students to ant-math feelings or psych fear for the subject. Children are exposed to ant-math feelings at an impressionable age. Math trauma or anxiety behaviour is transmitted into the child before he/she goes to school.

The following mathematical beliefs however erroneous or correct they may be affect mathematical learning.

Beliefs

Math is a very difficult subject and only a few students are good enough to mathematically adept. Conditioned to such negative perceptions students are gradually conditioned to such fallacy. Such pervasive and pernicious fallacy creates a psychological context within which students learn mathematics. (Schoenfield, 1985).

It is believed that math is for intelligent students only. Many teachers, parents and the media as well indoctrinate children into believing that math is inborn, and therefore a preserve of the few. On the contrary math is a human trait possessed by the entire race. Hence everyone has the capacity to understand mathematical concepts provided he/she is given ample time to reach the expected criterion.

Parents and teachers also share the belief that girls are too weak to do mathematics. A study by Gordon (1995) in co-education high schools yielded the results that teachers regarded girls as having lower mental capabilities than boys. A related study by Nenty and Pollock (2001) carried at the National University of Lesotho with a sample of 563 students revealed among other things that mathematics achievement was significantly gender related. Although there is no conclusive evidence to suggest that mathematics is indeed a male domain, these stereotypic attitudes disable and disengage girls from achieving in math. On the other hand these stereotypes empower boys to become more autonomous learners than females (Femenna and Peterson, 1985).

The negative perceptions about the girl's inability to do mathematics destroy the girl child's self-confidence. Self-confidence is absolutely important as it has a positive significant correlation with mathematics achievement (Reyes, 1980). Most girls develop feelings of inadequacy that result in generalized feelings of incompetence that paralyze initiative and activate an expectation of failure.

Being regarded as incompetent by teachers and boys generate anxious feelings in girls. Poor achievement in math by girls does not necessarily imply lack of potential on the part of the learner. Batson (1997) argues that girls shy away from active participation for fear of being taunted by their male counterparts.

Past experience

Past experience determined our view and evaluation of situations including our beliefs about our ability to handle a certain situation. An encounter with unusual experiences may generate more

intense-than –necessary worries, self-doubts or anxiety. Students who had negative or embarrassing experiences with the subject mathematics may have an aversion for the subject. Parents, teachers, or peers often verbally or physically abuse students for giving wrong answers. Math abuse can be defined as any negative experience encountered with mathematic teachers or parents while doing math (Fiore, 2003). Statements such as, ‘You are dull’ or ‘You will never pass mathematics’, are not uncommon. Experiences such as these may arouse feelings of shame, frustration, helplessness, failure and uncertainty. The following is an extract from a student’s account of an experience of math abuse by a teacher:

From Grade One TO form three. I had no problem with math learning. I was however, not brilliant in the subject but I could manage quite well. Sometimes I could score very, very high marks. Hell broke loose when I was involved in a car accident, which saw me staying in the hospital for two months. Paradoxically, that was the day schools opened for the final term. I recuperated and went back to school but had missed a lot of learning time.

All the subject teachers except for the math one were very sympathetic and promised to assist me in many ways. The math teacher gave the class a test on concepts that I had never learnt; as a result I scored 25%. This shocked me as I had never failed maths before. I went to the teacher hoping to get assistance. The teacher fired virulent verbal attacks on me.’ You are not mathematics material. I do not even know where I should start from if I am to provide any remediation. People like you should just drop mathematics. The damage had been done. I felt abused so I slid out of the office without uttering a word. From that day I developed an ant-math feeling and all the interest that I had for the subject vanished. Had it not been for that particular incident may be I could still be comfortable with the most feared subject.

There is no doubt that math is taught by man of knowledge who possess authority in their field. There is a presumption by some such authorities that since the subject is simple for them it is also simple for everyone. They prefer to be abstract oblivious of the fact that students have individual differences. Many students end up contending that they are not good enough for mathematics when in fact they are fed on wrong mathematical milieu. If any charge of incapability is to be laid, it must now be upon the teacher who has been incapable of presenting his/her discipline.

Mythologization of mathematical language

The language of mathematics is a language of mythology. Mathematical language has hidden and mystified meanings. Difficult mathematical jargon used makes the subject incomprehensible and incommunicable. To access these ideas one needs to understand the language. Math teachers have been accused of raw eliticism (Elisembrgen, 1998). They prefer to be abstract thus mythologizing the subject hence the common belief that math is shrouded in mystery.

The learner’s genetic make-up

Naturally, human beings have their own weakness and ultimate character of self-condemnation. This may be due to the student ‘s own weak cognitive constitution. If the student has a defective

self-concept he or she may have a disposition for anxiety. Unsurprisingly his/her weak genetic make-up may make him susceptible to math anxiety.

Inappropriate teaching styles

Students' indifference to math learning has been exacerbated by the way in which the subject is taught. Research has shown that math anxiety results more from the manner the subject matter itself is delivered (Greenwood, 1984). The issue of the method to use in the teaching of mathematics is not a cut-and-dried answer.

Teachers often prefer using authoritarian methodology or the didactic pedagogy procedures in which the learners are viewed as receptive repositories eagerly waiting the deposits of experts. Such methodologies reduce the learner's status to a mere guest in the learning process. This type of learning is devoid of critical thinking, alienates the learner and subjects him/her to untold boredom and anxiety.

Some math teachers contend that weak students doing math are in the wrong area and should therefore leave. Students who present problems are viewed as 'outsiders' who at most have no right to be in the mathematics group. There is no consideration for remediation or adopting teaching methods that benefit the learner. It is hardly surprising therefore those mathematicians are accused of stiff-neckedness due to their inability to dilute the content in order to achieve greater comprehensibility.

The fact that mathematics is a practical subject is often disregarded in preference for the less effective traditional pedagogical methods such as lecturing. Students are made to gallop from one concept to another without being actively engaged in the construction of mathematical ideas. When students fail to grasp the basic ideas they naturally become frustrated.

Hostile learning environment

Some learning environments are not conducive for math learning. Teachers who abuse learners by undressing them down for giving a wrong answer create an antagonistic environment that has a pernicious effect on the learning of mathematics. The effect that humiliations have is that those rebuked either reflect resentment or express fear.

CONCLUSIONS

The paper examined eight possible causes of math anxiety affecting students as they wrestle with their math learning. An empirical study needs to be carried out to identify causes of math anxiety among students. The following suggestions are made not as panacea to the problem but as suggestions one thinks may ameliorate the mathematics learner's anxiety provoking situations.

- The Ministry of Education and Culture could introduce a two tier syllabus into the Education System;

1. Math for daily application that could be a simpler version and should be for those who would like to specialize in other subjects other than mathematics.
2. There should be hard-core mathematics for those who would like to specialize in areas that demand such knowledge.
 - Teachers should create safe social-environments for math learning. A co-operative atmosphere of mutual trust and respect encourage constructiveness, whereas the opposite atmosphere encourages destructiveness.
 - Mathematics should be indigenous to enhance maximum comprehensibility of concepts.
 - Parents and teachers should stop pedaling philosophies that create math phobias in students.
 - Mathematics should be stripped of its mythical character.
 - Students should learn mathematics actively, autonomously and practically: they should be involved in the construction of mathematical ideas freed from externally imposed direction.
 - Due attention should be given to applying mathematical ideas to real life situations. There should be a balance between learning how to perform calculations and using it in a practical situation.

References

- Chodoff, P. 1966 A critique of Freud's Theory of Infantile sexuality. *AM j. Psychiatry*, 123, 507-518.
- Eisebergen, N. 1998 *Handbook of Child Psychology*, Vol. 3. New York, Willey.
- Eysenck, H. J. and Frith C.D. 1977 *Remniscence, motivation, personality*. London Plenum Press.
- Femenna EL and Peterson PL 1985 Effective teaching, student engagement *American Research Journal* 22, 309-335.
- Hodges H 1983 Learning styles for mathphobia, *Arithmetic Teacher* 30(7) 17-20.
- Greenwood J. 1984 My anxieties about Math anxiety *Math Teacher*, 77,662-663.
- Reyes LH 1980 Attitudes and Math. In MM Lindquist (Ed) *selected issues in mathematics education*, p, 161-182.
- Rogers, C. 1977 The Politics of Education, *Journal of Humanistic Education* No 1, 6-22.
- Schoenfield, A 1985 *Mathematical Problem Solving* Orlando, Academic Press.
- Sullivan H 1964 *Interpersonal Theory psychiatry*. New York. Norton.
- Tobias S 1998 *Overcoming Math Anxiety* New York Norton.