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# **RAMANAND ARYA D.A.V COLLEGE**

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(NAAC: 'A' Grade with CGPA 3.19)

**One Day National Conference**

On

**DEMOGRAPHIC DEVIDEND:**

**CHALLENGES AND OPPORTUNITIES FOR INDIA**



*S. Lawa*

Organized By

The Department of Economics

**Saturday, 17th December 2016**



One Day National Conference on  
**"Demographic Dividend:  
Challenges and  
Opportunities for India"**

17<sup>th</sup> December, 2016

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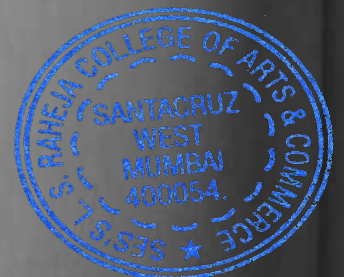
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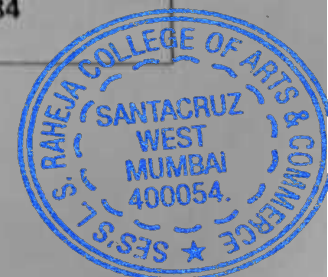
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## INDEX

SR. NO.	TITLE & AUTHOR	PAGE NO.
1	The Systematic Analysis of Demographic Trends of India Ms. Harsha B. Goyal	1
2	Outsourcing Innovation: Factors Influencing Potential Growth of Outsourcing Sector In India Prof. Prashant N. Nair	6
3	Effects of Skill Development on Employability in Developing Countries Youth Employment in the Development Perspective Mr. Sudhir S. Godi, Mr. Vishanlal L. Gupta	12
4	Mathematics Phobia among the Students Dr. Neelam Yadav	21
5	Can India Benefit from the Demographic Dividend? Dr. Sameer G. Thakur	32
6	Use of Technology in Mathematics Teaching And Learning Anant Narayan Phirke.	36
7	Redefining Technology Role in Education Kinjal Yogesh Acharya	41
8	Skill Development for Employability Vishnu Jayaraj Menon	45
9	Macro-Economic Linkages Associated with Demographic Changes Asma Sayyed Afsar	50
10	Demographic Dividend: An Overview into the Benefits & the Challenges Ms Suhas R Sawant	55
11	The Impact of Information and communication Technology on Higher Education in India. K.D.Landge	59
12	Demographic Dividend – Opportunities and Challenges By Dr. V. Aditya Srinivas, Priyanka Jain	61
13	Impact of E-Learning on Higher Education Margaret C William	63
14	Role of Technology in Education Prof. Virendra Prajapati	66
15	A Study of Effective Conflict Management Systems of Organizations for Socio-economic Impact Vishwanath Malji, Dr. Prashant Warke	71
16	Will Demographic Dividend be the Driving Seat for India's Future Growth Dr Malathi Iyer	77
17	A Study of Effects of Population Growth on Indian Economy Rupesh Gaikar	84



## Mathematics Phobia among the Students

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### ABSTRACT:

*This paper discusses about the Mathematics anxiety and phobia among the students. The study is focused to know the cause of Mathematics Phobia. This study was conducted through survey method by distributing questionnaires among the students. In the end conclusions and remedies are also included to highlight the importance of the paper.*

**KEYWORDS:** Mathematics phobia, reason, remedies

### INTRODUCTION

Mathematics is often called the queen of sciences. Mathematics is a language which gave a new way to life. Mathematics is used as a tool in solving various problems in Engineering, science, Commerce, Management and other streams of Education. That is why we can call mathematics as a "powerful force". But it is noticed that many students has a fear and anxiety towards Mathematics and find difficulties in understanding it, applying it in practical situations and treat it as a hard subject and hence as a result Mathematics phobia is developed among them.

Mark H. Ashcraft defines maths anxiety as "a feeling of tension, apprehension, or fear that interferes with maths performance". The first maths anxiety measurement scale was developed by Richardson and Suinn in 1972. Since this development, several researchers have examined maths anxiety in empirical studies. Ashcraft (2002) suggests that highly anxious maths students will avoid situations in which they have to perform mathematical calculations. Unfortunately, maths avoidance results in less competency, exposure and maths practice, leaving students more anxious and mathematically unprepared to achieve. In college and university, anxious maths students take fewer maths courses and tend to feel negative towards maths. Mathematics phobia grows gradually among the students due to some reasons like lack of sufficient number of good mathematics teacher, influence of Mathematics phobia already existing among students and in the society, lack of sufficient number of Mathematics book in the libraries and practical classroom facilities in colleges etc.

Its quite general on the part of students to fear studies. Majority really are afraid of studies. Student Age is a period of life when a child has no other tension other than studying and than appearing for examination. At this age, you just want to enjoy life and generally are carefree. Maths is an abstract subject. Under this subject, mugging up, rote learning in actual words RATTA MARNA won't work. You may do this for certain portion but not for all the time. This is major reason why many students really don't understand Maths. Maths is a practical subject, you cannot just fake the answer. Compared, to other subjects students find it tough as in this you actually have to understand the concept to solve the problems. One cannot just memorise it and than keep on writing here. A slight change in the question may altogether change the answer!!

### OBJECTIVE

1. To find the basic reasons of Mathematics phobia among the students.
2. To find the remedies to reduce Mathematics phobia.



3. To find some steps for popularization of Mathematics among the students.

### LITERATURE REVIEW

The review of related literature of this study identifies how fear and interest, together with the students' study habits can affect their performance in various subject matters, specifically, mathematics.

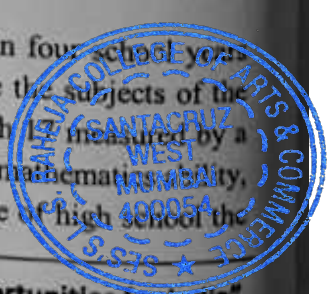
Mathematics as defined yourdictionary.com, is "the group of sciences (including arithmetic, geometry, algebra, calculus, etc. dealing with quantities, magnitudes, and forms and their relationships, attributes, etc., by the use of numbers and symbols." Ernest (1989) mentioned that learning mathematics involves more than basic knowledge of facts, skills and procedures. He added that it has a crucial involvement of conceptual structures, the general strategies in solving problems, attitudes towards the subject and appreciation of mathematics.

According to the latest Gallup youth survey conducted in 2004 (as cited by Saad, 2005), the subject that the teenagers find most difficult in school is mathematics. Thus, Saad(2005) said that it is not surprising how the subject has the lowest performance rate. The reasons were not mentioned, however, Stites (1993) said that people have the tendency to blame the educators of the poor performance of the students in math. However, Temple professor and mathematician John Allen Paulos (as cited in Stites, 1993) directed these problems to a number of factors. Paulos (as cited in Stites, 1993) attributed this problem to the educational system that "emphasizes practice without incorporating the concept." In addition to this, he mentioned that this is also partly because of the mentality that math is not for everyone. According to Paulos (as cited in Stites, 1993), people think that math is only for a selected few or the left-brained ones. However, Paulos (as cited in Stites, 1993) disagreed with this as everyone has the ability to do mathematics and problem solving as long as they know the basics. Another problem pointed out by Paulos (as cited in Stites, 1993), is the hierarchical way math is taught where teachers teach algebra and geometry instead of more applicable ones such as probability and statistics for their students to have a high percentage in passing standardized exams.

In the Philippine concept, as cited in a research conducted by Cabahug and Ladot (2005), the University of the Philippines' greatest failure is in mathematics. It is also said that repetition in mathematics is common among UP students that almost one out of three repeat a mathematics course. Cabahug and Ladot (2005) also said that the faculty of the UP Cebu Natural Science and Mathematics Division or NSMD have felt the declining performance of students in basic mathematics. It is also stated that the attitude towards mathematics and achievement in mathematics have always been a great concern.

Fullarton (1993) as cited in Cabahug and Ladot (2005), stated that poor attitude towards mathematics is often being said as one of the contributing factors to lower participation and less success in the courses. Neale(1969) still cited in Cabahug and Ladot (2005), said that the attitude towards mathematics affects performance as performance in turn affects attitudes.

In the study conducted by Cabahug and Ladot(2005), there were 941 students in four schools excluding transferees and those who withdrew from Math 11 and Math 17 were the subjects of the study. The dependent variable was the students' performance in Math 11 or Math 17 measured by a dichotomous criterion of "pass" or "fail". The researchers stated that the UPCAT mathematics ability, University predicted grade, attitude towards the subject, degree program and type of high school the



students graduated from are the factors of success and failure of students. The results of the study showed that the students who took up Math 11 and Math 17 got a passing rate of 73.3% and 73.2% respectively. The highest failure rate is 36% for math 11 and 31.2% for math 17. The researchers stated that these results showed that the training of the incoming freshmen is deficient.

Furthermore, Cabahug and Ladot(2005) said that for students who were required to take math 11, their only significant factor is the **attitude of students towards the subject**. The results of their study also showed that for students enrolled in degree programs requiring Math 17 in addition to UPCAT mathematical ability and attitude towards mathematics, the type of school is also a significant factor.

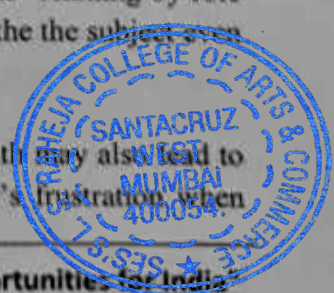
Davidson and Levitov (1993), on the other hand, point these difficulties to the condition that fears mathematics.

Overstreet (1951), believed that fear is the most deceitful emotional force that has the greatest impact on our behaviour. He said that fear "makes us do what we ought not to do and leave undone what we ought to do (p.3)." The author stated reasons on why the "fear-problem" remains unsolved despite its length of occurrence in human history. Part of this, Overstreet (1951) mentioned, is our lack of ability to recognize fear as it is. He added that fear disguises itself in a wide range of emotions which are, more often than not, an opposite of fear such that of courage, ambition, humility, sacrifices or loyalty.

Ficarra (1990), on another hand, described fear as a "basic emotional response" to a certain situation. He classified fear into four types: anxiety, panic, paranoia, and phobia. According to him, the distinction between these four types of fear lies in the intensity and how long these fear lingers. Ficarra (1990) said that the first two fears, anxiety and panic, stays on for just a fleeting moment or a short while, the only difference between the two is that while anxiety is a vague feeling in which a person fears what may happen, panic is just a sudden unreasonable fear. On another hand, he described the two remaining fear as lasting and is not just a cause of a single event - paranoia is a fear in which a person believes he/she is being followed (this could happen every time) and phobia is a intense fear on something that others find normal (this could happen when an environmental stimuli presents itself).

Since fear of mathematics happens only at moments when a person has to answer mathematical problems, Smith (1997) referred the condition as **math anxiety**. He defined it as a condition when a person feels helpless and frustrated in doing mathematics. He stated that not only "normal people" are prone to math anxiety but even those who are well-acquainted with math. Aside from other biological reasons such as mental retardation, the author mentioned that the causes of math anxiety can also be pointed towards the social context and learning strategies. Smith (1997) explained that labelling math enthusiasts as "geeks or nerds" causes a destroyed image of math in the society. This concept of math as only for "certain people," he stated, provides a reason for the students for not being able to do math. Smith added that the strategies practiced by the educators which he called as "learning-by-rote (memorization and repetition)" is "dull and unrewarding" making the students loathe the subject more.

Davidson and Levitov (1993) also considered that bad experiences regarding mathematics also led to **math anxiety**. The shame when one can't answer math problems, the teacher's frustration when



students can't understand what they teach and unsupportive parents are some examples of bad experiences with math that were stated by the authors. Additions to those above are childhood experiences (change of schools, divorced parents and bullying), unmatched teaching and learning styles and society's beliefs that math is for men and not for women.

In another study, the researchers Bilbase and Shashidar (2010) in a study entitled "Images, Anxieties and Attitudes Toward Mathematics" said that there could be various reasons for fear of the subject mathematics. Strawderman, (as cited in Bilbase and Shashidar, 2010) proposed three domains to study mathematics anxiety: social/motivational domain, intellectual/educational domain, and psychological/emotional domain. Bilbase and Shashidar (2010) clarified that the social/motivational domain includes those forces that act upon a person through the agencies of family, friends, and society as a whole. The authors described that the intellectual/educational domain is comprised of those influences that are cognitive in nature. According to them, these cognitive influences include but are not limited to, the knowledge and skills an individual has and or is expected to acquire and his or her perception of success or failure in them. The authors explained that the psychological/emotional domain is formed by the faculties that are affective in nature. They continued that it is largely comprised of the individual's emotional history, reactions to stimuli, and arousal states. Hence, the researchers said that the continuum associated with this domain is feelings wherein at either end of the feelings continuum lie anxiety and confidence.

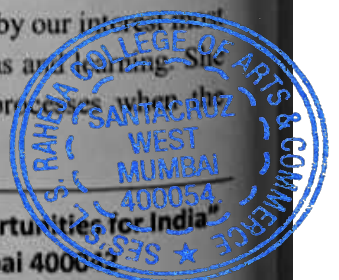
Bilbase and Shashidar (2010) continued that the images in the classrooms and the means of teaching may have a significant impact on shaping the attitude towards mathematics. They proposed that another thing that may affect a child's perception of mathematics is the attitude of the parents toward the subject. They said that most likely, parents **that show negativity towards mathematics** will give the child a negative attitude of it - this shows how much parental encouragement is important in a child's learning. They also added that anxieties and attitudes play significant role in learning mathematics.

**Part of these attitudes is a child's interest in mathematics, which is fear's counterpart.**

According to an article written by Jay Prakash(2011) that was published in preservearticles.com, interest, in Latin, means, "it matters" or "it concerns." He said that **interest may refer to the motivating force** that drives the individual to attend to a person, an object or an activity. He added that interest might be the cause of an activity and the result of participation in the activity. According to him, people "tend to attend to such objects that interest them."

Prakash(2011) continued that interest might not be the same for everybody. He said that our interests are governed by our drives, motives and emotions, but mostly our instincts. An example he offered was the instinctive interest of teenagers in clothes or appearance may be due to their drive to attract members of the opposite sex.

Hidi (2011) in a study entitled "Interest and Its Contribution as a Mental Resource in Learning" stated that our preference in processing certain types of information is determined by our interest at the time. She continued that our interests can also affect our cognitive functions and learning. She proposed that there is a huge difference in psychological and physiological processes when the



information received is interesting or not. She further said that there are unique aspects not present when processing uninteresting information.

In another article entitled "Creating an Interest in Learning Science", Paris and Turner (as cited in Keiff, 2005), said that interest plays an important role in motivating students to study. If the learner has an interest in the subject matter, it is more likely that the learner will engage into a good study habit that will help the student expand the knowledge at hand.

According to Kizlik (2012), study habits are different for everybody. A studying strategy may be effective for one but entirely of no use to another student. However the study habit fit for one can help the student in different ways. To name one, with continuous study habits, study skills develop and they create a more effective understanding about the topic. Study habits can also improve the learning and understanding about the subject, and thus, the grades.

In the study "Connections Between Learning Experience, Study Behavior and Academic Performance: A Longitudinal Study" conducted by Ning and Downing(2010), the relationship between learning experience and study behaviour on the students' performance was studied. The researchers tested their hypothesis by a survey given to 396 students from a university in Hongkong. They tested the students' study habits in terms of Concentration, Time Management, Self-testing, Study Aids, Information Processing, Selecting Main Ideas, Test Strategies, Anxiety, Attitude and Motivation. From the information obtained, Ning and Downing (2010), discovered a positive relationship between the variables. Aspects like motivation and study strategies in study behavior were also discovered to be of importance to the current academic performance. Despite the wide range of psychological area being studied, the research, however, is limited in scope as it just studies students from a single university.

From the different studies and articles presented, the researchers hypothesized that anxiety and interest may affect the performance of the First Year Biology, Mass Communication and Management students of the University of the Philippines - Cebu who took up Mathematics 11(College Algebra) classes during the first semester of school year 2011-2012. However, their attitude toward the subject cannot be the only basis of their performance as their study habits can also affect it.

#### METHODOLOGY

The study was conducted through questionnaires based survey. For collecting data the Interview Method was also used. The questionnaire was distributed and the response given by them was analysed. The questionnaire translates the research objective into specific questions. The answers to those questions provide the data. Questions must also interest the respondents enough that they will provide the information.

#### FINDINGS

**1.1 Why the fear of mathematics is so common among children. The main 3 reasons are**

1. it needs mental calculations
  2. it is abstract
  3. we get a negative remarks about mathematics
- ❖ **Mathematics is Abstract**



Mathematics is abstract. It does not have a shape. Children cannot see it. They need to visualize properly for solving a mathematical problem. Visualization comes from the everyday experience and relating mathematics with it requires a very strong trainer.

❖ **Calculation Takes Long time**

Samrana (Name changed) a class VI student narrates his stories. He says that he is never able to understand mathematical concepts. He fears mathematics because of calculation. He hates numbers. It takes him a lot of time to add two numbers. He fears multiplication and division. He finds mathematics boring. It does not excite his imagination. But he enjoys games. He hopes against hope that one day his math learning would be full of fun

❖ **Present Teaching System**

Another major contributor to the difficulty of mathematics is lack of innovation in conventional system of teaching. The conventional system of teaching makes mathematics a dull and boring subject. Students are unable to visualize the concept taught by the teacher. Therefore, their interest level goes down. Hence they start developing a disassociation with the subject. If this disassociation continues for a longer period of time child starts hating mathematics.

This phenomenon of Math fear is growing everyday and now central board has also recognized this problem. Through their circular they have asked the schools to create an environment where child takes interest in Mathematics.

❖ **Problem in converting word problems into mathematical equations**

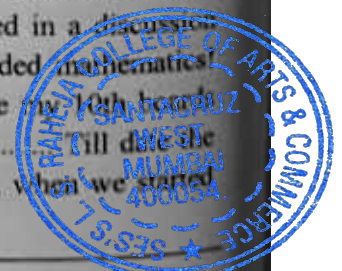
Converting word problems into mathematical equation requires good understanding of the language and math fundamentals. Fundamentals are still taught in old-fashioned way in the school. Teachers teach fundamental without much of illustration therefore, students are not able to visualize the problem when they face it. They try to learn mathematics much like other subjects where they memorize facts and figures. Mathematics wants a thorough and good understanding.

❖ **Poor Command over Tables**

I interact with many children every month. To my dismay I find that a good number of students show poor command over the tables. A few of them have gone to the higher classes say IX and X and still they rely on finger counting. When faced with multiplication like  $18 \times 7$  they follow the complete multiplication steps to get the answer. Due to this Calculation takes more time and even a simple mathematics paper seems difficult to the students. Here the question arises why do students have poor command over the tables? As far as my understanding goes we are moving towards Public School led education system and as we are anglicizing our education system more and more students are suffering from this syndrome. They have poor command over the tables because tables are not taught in mother tongue.

❖ **No system of Logic Development**

Our education system works on rote methodology. It tests you for how much you can cram before the examination day and vomit on the examination day. Mathematics does not work that way. It works on logic. In response to my question posted in a discussion group "Why did you fear Mathematics?" Pooja Bhatnagar wrote: I dreaded mathematics. Would you believe if I told you that I actually got fever the night before my 10th board maths exam!! I still managed a decent 83% though but the fear of maths... till date. My numbers get mixed up in my mind! The fear actually came in pretty late, when we started



handling the more complex calculations. Log tables never were any friendly to me. And assuming alphabets to be numbers again confused me to no end.

❖ **Poor Trainers**

Most of the time I find that the person teaching mathematics does not enjoy mathematics himself. If a math teacher does not enjoy mathematics then how can he create enjoyment for students? Take the example of Dhyuti. She is a student of class-1. She is average in mathematics. Her mother was fed up with math teacher's remark on Dhyuti's notebook. She did not know how to improve her daughter's mathematics. One day she went to meet Dhyuti's Math teacher. During the discussion the math teacher revealed that she is a History graduate entrusted with the responsibility of teaching mathematics. She does not like teaching mathematics. Effectively, in Dhyuti's class children developed a strong dislike for mathematics. Children are pure at their heart. Everything around them affects them. Be it dislike to mathematics shown by parents or teachers.

❖ **Exam Anxiety**

Examinations are almost always stressful. Students rarely know exactly what to expect on the test, and those who suffer from exam fear or exam anxiety can see their grades suffer as a result of this stress. A little anxiety can actually help your performance, but some students become so overwhelmed that they "seize up" and forget what they have studied. Exam anxiety can strike before, during and after a test. Battling this type of performance anxiety can be difficult, but good study habits and learning how to relax can help.

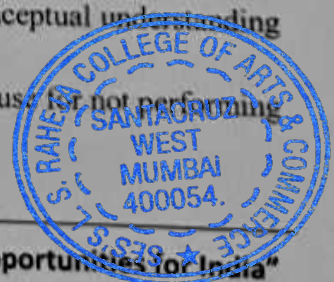
❖ **Fear of failure**

According to educational psychologists, excessive worry and fear of failure make adolescents panic and they experience higher levels of stress. This makes it difficult to concentrate. Test anxiety comes in the way of interpreting and organising information. It is a known fact that some students read the questions on the test paper but fail to comprehend the exact meaning and therefore write wrong answers. Studies have shown that greater level of test anxiety can actually hinder performance on exams. Therefore, reducing test anxiety is the key to improve performance. Another reason for anxiety is not having enough sleep. Today's generation suffers from sleep deprivation due to various reasons. Sleep deficiency can actually make you less sharp mentally which in turn negatively impacts the performance on tests, even if the student spent those missed hours of sleep studying! So, it is very important to get the studying done well in advance and get that quality sleep before the big day.

Anxiety problems can be dealt with effectively. Treatment may include a combination of individual and family therapy, behaviour modification, medication, and consultation with school. Cognitive behaviour therapy is found to be very successful. It aims at correcting faulty ways of perceiving events. An over-anxious adolescent is taught to identify anxiety producing thoughts and replace them with more realistic ones. It helps in reducing over-anxious features including excessive future and past worries, over-concern about competence, self-consciousness and tension. They are taught assertive skills.

**Reasons for fearing Maths**

- ❖ Pupils who have problems with Mathematics are generally weak in conceptual understanding knowledge\*.
- ❖ Lack of fundamental knowledge in Mathematics is normally the root cause for not performing well.

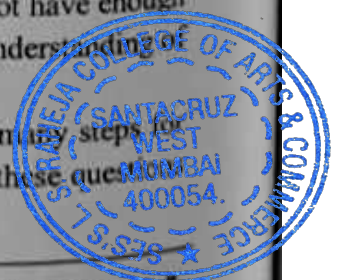


- ❖ If pupils do not have good fundamental conceptual understanding knowledge, they will have fear to solve problem sums.
- ❖ Most tutors will advise the students to focus and work on mastering procedural skill. This will weaken their ability to perform well in Mathematics in future.
- ❖ Some pupils are learning advanced topics without fully understanding the basic concepts. This will make them lose confidence in Conceptual Understanding.
- ❖ Lack of confidence will cause them unable or even unwilling to take the challenges of solving higher order thinking questions.
- ❖ Pupils that do not even achieve a pass in Mathematics are those who are lacking in both Procedural Skills and Conceptual Understanding. These pupils are simply too quick to answer the questions without any basic knowledge of understanding the questions. They may be lost and lack the confidence in using any systematic approach towards problem sums solving.

**Conceptual Understanding** is to understand each step of your solutions. You need to question each step of the solution and how you derive the steps. The steps of the solution can be logical to you and can be commonsense but you may not understand it. Take an example "A right angle is  $90^\circ$ ", why  $90^\circ$  not  $100^\circ$  and why a circle is  $360^\circ$ . You need to check and question those information that you have applied so as to understand your solution better.

Conceptual Understanding starts from day one when you start to learn mathematics. There are no guidelines or list of items you need conceptually understanding it. There is only a list of topics you need to learn to help you to advance in mathematic. Conceptual Understanding will help in making your foundation in Mathematic strong. You need to conceptual understand most of the topics so as to advance well in mathematics.

- To improve Conceptual Understanding, you need to ask Why? Why? Why? You also need to know what are the topics you are weak in. Some topics are prerequisite to another topic. You need to understand it before you can advance to the next topic. Go through the list of topics you have learnt in the past and check which topics you are unable to understand. Address those topics you are weak in first before you start to learn the next topic.
- Some concepts are for application and it is difficult to understand through practicing of solving problem sums. You need someone to explain to you its application. Some concepts are too abstract and you may not be able to understand at your level.
- Understanding your basic concept is very important. Some of them are taking things for granted. They view the basic concept as commonsense and ignore it. **Take an example why the circumference of a circle is  $C = 2\pi r$ ? How do you derive the formula?** Understanding the proving of the concept is always the best way to strengthen your conceptual understanding.
- Once you have Conceptual Understanding in the topics, you also need to practise the topics to strengthen the concepts. You may forget the concepts if you do not have enough practice. Practise more on higher order thinking questions to check your understanding of the concepts.
- Some higher order thinking questions are too complex and there are too many steps in the solution. Therefore Procedural Skill is the one to help you in solving these questions.

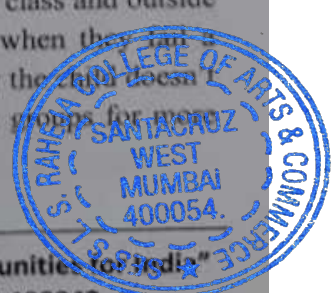


in a simplest way and in a shortest time. You need to strengthen your Procedural Skills so that you can work on higher order thinking questions.

- Once you have mastered both Procedural Skills and Conceptual Understanding of a topic, there should not have any question that you are unable to solve. Just be confident that you can do it. A student's inability to manage anxiety leads to a negative attitude

### SOLUTIONS

- ❖ Procedural Skills is the systematic approach how you solve the problem sums. Most mathematics questions can be solved by systematic approach. Every question has a solution and there are few approaches to derive the solution. You can memorise all the steps and answer any question by applying those steps. Each step is logical flow to you and you know those steps very well. You can solve problem sums without understanding the solution, especially for higher level mathematics.
- ❖ Procedural Skill can be acquired by lots of practice to memorise the steps of the solution. Procedural Skill is not easy to master as there are too many different types of questions. You need to practice and do all different types of questions and to memorise the solutions, this is very time consuming and you need to have a mega memory.
- ❖ As for examination purposes, procedural skill normally gives you a great help. The questionnaires for the examination are limited. You need to check the past years examination papers and do a summary of the types of questions being asked. By going through the list, you are able to find out what are the types of questions you need to practise.
- ❖ Bear in mind that learning mathematics should go beyond the results you want to achieve. Procedural skills can only help you to score well in the examination, it does not mean you understand the whole concept of relating topic. Those pupils who depend too much on procedural skills will eventually face problems in the higher mathematics at 'A' level or University.
- ❖ Positive support from the teacher is crucial to the math anxious student.
- ❖ If the student understands the math concepts then he or she is more likely to truly understand the concepts and develop confidence when learning math.
- ❖ The students need to feel comfortable, so they will ask questions. If the students ask questions, this will help them understand the math they are struggling to understand
- ❖ There are several anxiety reducing techniques that teachers can teach their children and practice periodically throughout the year. Teachers will need to learn these techniques and encourage the students to practice them at home and to use them prior to testing or when feeling anxious during math class.
- ❖ A positive attitude will help. However, positive attitudes come with quality teaching for understanding which often isn't the case with many traditional approaches to teaching mathematics.
- ❖ Ask questions, be determined to 'understand the math'. Don't settle for anything less during instruction. Ask for clear illustrations and or demonstrations or simulations.
- ❖ Practice regularly, especially when you're having difficulty.
- ❖ Stating further, she proffered that less pressure should be put on students in class and outside the class. Most students are scared of what their classmates would say when they ask a question. Some teachers put children in the spot light, even when they know the answer, instead of taking time out to teach them, or form study groups for more effective learning.



- ❖ When total understanding escapes you, hire a tutor or work with peers that understand the math. You can do the math, sometimes it just take a different approach for you to understand some of the concepts.
- ❖ Don't just read over your notes - do the math. Practice the math and make sure you can honestly state that you understand what you are doing.
- ❖ Be persistent and don't over emphasize the fact that we all make mistakes. Remember, some of the most powerful learning stems from making a mistake
- ❖ They also noted that teacher-student interaction is also very necessary in solving this problem. "Teachers have to go into more details of their students, especially as they serve as guide and mentor.
- ❖ In fact, maths anxiety - a recognised phenomenon - can be a huge barrier to learning. Thankfully, teachers who understand this can help their students overcome it.
- ❖ She said before every mathematics examination, the teacher and parent should revise with the child, in an encouraging and loving environment with lots of patience and kindness".
- ❖ Mathematics anxiety can be solved only when pupils begin to feel comfortable with the subject. This can be done by creating new fun ways in the learning environment, probably computer games, word games etc.
- ❖ The government should help to establish in every secondary school a mathematics-learning center where, students could consult for homework assignments, examination or test preparation or exploration of mathematical concepts. The center should have different mathematics books from basic to advanced on arithmetic, algebra, trigonometry, statistics, geometry, calculus, mathematical games, calculators, computers and assorted tools for learning mathematics

#### What Can Teachers Do?

- ❖ Be committed to the idea that all children can become proficient in math.
- ❖ Develop and deepen your understanding of math, of student thinking, and of techniques that promote math proficiency.
- ❖ Emphasize to policy makers, administrators, parents, and students the need for and the achievability of math proficiency.
- ❖ Use an instructional program and materials that, based on the best available scientific evidence, support the development of math proficiency.
- ❖ Teach mathematics for a sufficient amount of time (e.g., an hour a day).
- ❖ Attend professional development activities that integrate math, student thinking, and instructional techniques.
- ❖ Advocate for ongoing, sustained, coherent professional development activities that support teaching for math proficiency.
- ❖ Organize and participate in study groups at your school that focus on teaching practice.
- ❖ Engage in conversations with colleagues about developing proficiency and about students and their math proficiency.
- ❖ Become a mentor to a colleague learning to teach for math proficiency.

#### SUGGESTIONS

Mathematics phobia can be reduced by some measure like:

1. Providing special training to the Mathematics teachers
2. Appointing sufficient number of teachers in colleges having efficiency and comprehensive knowledge in Mathematics.



3. Providing Mathematics laboratory and introducing practical classes in Mathematics.
4. Mathematics can be popularized by establishing Mathematics club and holding discussion regarding the importance and application of Mathematics.
5. Mathematics can also be popularized by Quiz competition, Mathematics Olympiad among the students

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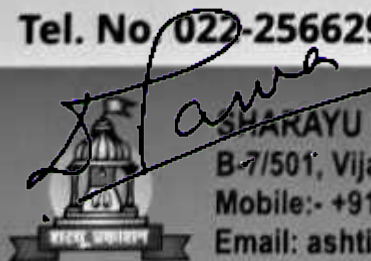


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