

Demystifying Mathematics Phobia in Schools for Transforming Nigeria in Attaining Vision 20:2020

Gbolagade, A.M., Waheed A.A.

Department Of Mathematics, Emmanuel Alayande College Of Education, Oyo

Sangoniya S.O.

Department Of Mathematics, Emmanuel Alayande College Of Education, Oyo

Gbolagadeam@Yahoo.Com

(08038063598)

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Abstract

The quest by Nigerians to join the league of 20 industrialized nations by the year 2020 may be a mirage if phobia for mathematics learning in secondary schools is not taking into cognizance. Therefore, the actualization of vision 20:2020 hinged on qualitative and functional Mathematics education. This paper explores through research the various factors that cause phobia in learning Mathematics in secondary schools. A carefully designed questionnaire which was faced validated by an expert in the field of Mathematics education was administered for collection of data. The result revealed that there was significant influence on students phobia for Mathematics and factors like incompetence on the part of Mathematics teachers, absence of ICT facilities and Mathematics laboratory among others. It is therefore recommended that trained Mathematics teachers should teach Mathematics in schools, keep abreast of modern methods of teaching Mathematics thereby making every lesson significant to students. By this, Mathematical ideas and skills required for further study in transforming Nigeria will be developed in solving everyday problems for their personal and societal satisfaction.

Introduction

The Nigeria vision 20:2020 mission statement means that "By 2020 Nigeria will be one of the 20 largest economies in the world, able to consolidate its leadership role in Africa and establish itself as significant player in the global economic and political arena". The vision is anchored on the Nigerian Economic Empowerment and Development Strategy (NEEDS) and the seven point agenda of the former president Umar Yar'adua. The draft document is also hinged on two specific targets; Gross Domestic Product (GDP) of not less than \$900 billion and national per capital income of not less than \$4,000 per year by the year 2020.

The following critical priority areas were identified for immediate attention; Decentralisation of governance, sustainability, electoral reforms, land use/property reforms, public service reforms, national security, human capacity development and critical infrastructure (with particular emphasis on power and transportation). From the draft blueprint, government aims to generate 60,000 megawatts of electricity to make Nigeria truly among the league of the 20 great countries by focusing on renewable and sustainable energy sources. By the plan, government projects that in 2019, Nigeria's per capital would reach \$1700 tripling the figure of 2005, while it projects that at current levels, Nigeria's population by 2020 would rise to over 200 million.

Nigeria's economic potential is well recognized. It is the biggest economy in the West African sub-region. Given the country's considerable resources endowment and coastal location, there is potential for strong growth. Yet, Nigeria has realized very little of this potential. Previous efforts at planning and visioning were not sustained. The history of economic stagnation, declining welfare and social instability has undermined development for most of the past 40 years. But in recent years, Nigeria has been experiencing a growth turnaround and conditions seem right for launching onto a path of sustained and rapid growth, justifying its ranking amongst the N11 countries.

From all the above mentioned vision, mission, statement and the action plans, one can infer that the fundamental instrument that is inevitable if this vision will be actualized is Education in general and Mathematics Education in particular.

A complete education otherwise known as qualitative and functional education is the one that equips a man to be vast in literacy and numeracy thus enabling him to reason logically, critically and apply his affective, cognitive and psychomotor skills thereby contributing positively towards the development of his immediate domain and the nation in general. According to Adeyanju (2009), education is an amalgam of multifarious processes, techniques, strategies, references, experiences etc by which individuals or groups of human beings, male or female, young or old, rich or poor etc are deliberately exposed to a wide and deep field of knowledge, ideas, skills, attitudes, norms and beliefs of their immediate geo-political environment and those of other cultures near and far. Here then comes the roles of the teachers, students, parents and the government in either the success or failure of education and Mathematics education in particular. Failure in education sector will be felt and seen in all other sectors of the economy which is in line with the popular saying that "no nation can rise above the quality of its teachers".

Mathematics is much more than a collection of techniques for getting answer and much more than a collection of definitions, theorems and proofs. It is a richly woven fabric of connections that involves visualizing, imagining, manipulating, analyzing, abstracting an associating ideas. This paper aims to equip Mathematics teachers to make their classes stimulating and enjoyable to students. The idea of teacher explaining rule on the chalkboard, give examples of the rule in operation and then set exercises to solve on their own are no more in use. This philosophy of Mathematics teaching was questioned when psychologist began to study how children see the world around them. Investigations were made by psychologists into how and why children came to understand Mathematical concepts. Mathematics teaching today therefore has taken into account this research and now follows the way children learn rather than what may be described as a 'logical' development of Mathematics topics.

The supremacy of Mathematics over every other subjects is extolled by the National Policy of Education (FRN, 1998), when it stated that Mathematics should be made a core subject in the Primary and Secondary education levels. The policy strongly emphasizes an effective teaching and learning of the subject through the use of variety of strategies. In pursuance of the National Policy's position, Ekpo (1999) enumerated five strategies for effective teaching and learning of Science, technology and Mathematics. The strategies include:

- (a) **Planning the Instruction:-** At the planning of lesson stage in teaching and learning of Mathematics concepts, the teacher has to consider among other things; the content area to be taught, the age and ability of the learners, the language of instruction to be used, the time and space available to the teacher and the suitable style to be used.
- (b) **The Instructional Techniques:-** Instructional techniques/approaches refer to different teaching methods/ techniques that can be used in the teaching of Mathematics. There are myriad of these methods and approaches but an effective teaching techniques/methods that will demystify Mathematics is important. Some of these techniques include among others: Cooperative learning strategy, problem solving strategy, play games strategy and the use of Mathematics laboratory.
- (c) **Teaching and Learning Environment:-** Good classroom or learning environment has an impact on the achievement of learners in teaching and learning of Mathematics. Hence, the school environment and classrooms should be conducive for learning.
- (d) **Maintaining Discipline:-** An effective teaching and learning is achieved in any class where there is a well defined discipline. Ukeje (1997) described a discipline Mathematics classroom as the one where the teacher is in perfect control. He stressed the need for Mathematics teachers to maintain discipline especially in classrooms characterized by over-crowdedness.
- (e) **Evaluation of Learners' Progress:-** Evaluation of learning outcomes is regarded as a critical component of effective teaching in Nigeria educational system. This is why continuous assessment was put in place to replace "one short" mode of assessment. To ensure effective teaching and learning of Mathematics, formative evaluation should be frequently used. This type of evaluation will provide opportunity for stage by stage assessment of what content areas have been mastered.

Mathematics:- Instrument for the development of modern society

Mathematics – The touchstone of wit and whetstone of intelligence is a tool that requires us to reason and then drawn an inference that with such power of reasoning, our national problems (economic, social, political, technological etc) can be tackled and a virile nation erected. Aminu (1990) revealed that Mathematics is not only the language of sciences but essential nutrients for thought, logic and reasoning and therefore progress. It is therefore not surprising to discover that the most effective and unparallel accomplishment of human being is found in his effort to utilize his Mathematical reasoning (Kline, 1980).

According to Makarfi (2001), Mathematics has played an important role in the development of society from the prehistoric era to the present and its role is more significant today than ever before and still be more significant in the future. Show me a man who doesn't need Mathematics and I will show you a man who is dead but yet to be buried. In the opinion of

Adetula (2005) while expressing the power of Mathematics argued that though one may not use Mathematical reasoning to learn how to eat or get along with opposite sex but as far as making a living is concerned, businessmen, boot licking civilians, sycophantic politicians, aberrant civil servants and crafty military men have amassed fortune and sent majority of their fellowmen to slavery and poverty without knowing more than the rudiment of Mathematics.

It is crystal clear that if the power of Mathematics is harnessed positively in any nation, its social, political, scientific, technological development goals will be achievable within the shortest time frame. Adetula (2005) while quoting Ihejiro (1989) established in a study that of fourteen isolated areas for emphasis in respect of technological growth, none could be achieved without a sound working knowledge of Mathematics, thus he concluded by giving credence to an American's slogan that Mathematics is everybody's future! Everybody's heritage!!

Now that the place of Mathematics as an inevitable tool for the overall development of a nation and specifically for the attainment of Nigeria's vision 20:2020 had been identified, useful time should now be devoted to its teaching with concerted effort be made to improve its learning.

Statement of the Problem

Over the years, student's performance in Mathematics in schools which is the direct outcome of its teaching had continued to decline as evident in both the internal and external examinations reports in the nation all over (Azuka, 1995 and Fadare, 2009). Since the increasing importance and contribution of Mathematics to bring about a modern society has been well established, the onus lies on all its stakeholders to look critically into the various factors that are responsible for its poor teaching and mastery by its teachers and learners respectively and fashion out ways of demystifying the phobia which will by extension enhance its learning. In this work, the problems are traced to secondary school level of education where solid foundation for Mathematics learning is expected to have been laid.

Research Questions

This research aims at providing answers to the following questions among others;

- i. What effects has the strictness of Mathematics teachers, incompetence on the part of Mathematics teachers and overcrowding of Mathematics classroom lesson on students phobia for Mathematics in secondary school?
- ii. Of what significant effect is absence of instructional materials during Mathematics lesson, laziness on the part of Mathematics teachers, learning Mathematics in the afternoon period and allocation of too many periods to Mathematics teachers have in teaching an learning Mathematics in secondary school?
- iii. What is the place of ICT facilities, Mathematics laboratory, poor remuneration and incentive to Mathematics teachers in making Mathematics interesting to students in secondary school?
- iv. Are the absent of counselors in schools, too wide Mathematics curriculum, incessant strikes of teachers and parents factors have significant effect on the phobia for Mathematics learning?

Research Hypothesis

Based on the research questions stated above, a null hypothesis which combine all the factors addressed is hereby stated as follows;

There is no significant influence on students phobia for Mathematics and the following factors; strictness of Mathematics teachers, incompetence on the part of Mathematics teachers, absence of instructional materials during Mathematics teaching, laziness on the part of Mathematics teachers, over-crowding in Mathematics classrooms, learning Mathematics in the afternoon period, poor implementation of policies by Government, absence of ICT facilities and Mathematics laboratory, absence of counselor in schools, too wide Mathematics curriculum and incessant strikes of teachers.

Population and Sample

Four hundred and fifty subjects were randomly selected from among the secondary school students in Oyo West and Oyo East Local Governments of Oyo State. The participants were students drawn from JS 2 to SS 2 classes.

Research Instrument and Its Administration

A carefully designed questionnaire which was faced validated by an expert in the field of Mathematics education and which contained a 15 items administered on the sample. The result was gathered for the analysis. The questionnaire contained two sections. Section A sought information on participants' Biodata, Section B required that they indicate

whether they Agree (A), Strongly Agree (SA), Disagree (D) and Strongly Disagree (SD) with each of the statement contained in the instrument.

Data Collection and Analysis

Upon collection of the questionnaire from the respondents, the following tables were generated.

Table 1:- Table showing observed scores from respondents via questionnaire

S/N	Factors causing phobia in teaching and learning of Mathematics in Secondary Schools	A	SA	D	SD	TOTAL
1	Too strict of Mathematics teachers affect my performance in Mathematics.	184	170	87	09	450
2	Incompetence on the part of Mathematics teachers causes failure in Mathematics.	209	104	123	14	450

3	Unnecessary phobia on the part of the students can affect the performance in Mathematics.	160	142	76	72	450
4	The absence of instructional materials during Mathematics teaching makes the subject too difficult for me.	121	182	100	46	449
5	Laziness on the part of Mathematics teachers make me to loose interest in the subject.	83	146	178	43	450
6	Over-crowding in Mathematics classroom constitute problem for me during Mathematics lesson.	92	123	131	104	450
7	Learning Mathematics in the afternoon period may not be a factor for failure in Mathematics.	94	98	128	130	450
8	Poor remuneration and lack of special incentive for Mathematics teachers affect me as a student in learning Mathematics.	49	78	182	141	450
9	Poor implementation of policies by Government and other stakeholders do affect my performance in Mathematics.	172	169	59	48	448
10	Absence of ICT facilities and Mathematics laboratory in my school constitute my hatred for Mathematics.	101	63	164	121	449
11	Mathematics teachers and parents are the major factors for developing interest or otherwise in teaching and learning of Mathematics in secondary school.	163	149	88	50	450
12	The curriculum for Mathematics is too wide for me to cope with hence I dislike Mathematics.	83	74	141	152	450
13	The fear for Mathematics in secondary schools is as a result of absence of counselor who can advice and guide students better on the nature of the subject.	178	140	72	60	450
14	Allocation of too many periods to Mathematics teachers in schools does not affect my interest in learning Mathematics.	189	182	47	31	449
15	Incessant strikes of teachers have seriously affected my studying of Mathematics hence it creates fear on the subject.	163	182	58	47	450
	TOTAL	2041	2002	1634	1070	6745

On calculating the chi-square using $\chi^2 = \frac{\sum(o-e)^2}{e}$ with a degree of freedom

$(r-1)(c-1)$, where r and c imply number of rows and columns respectively, then table 2 below is generated.

Table 2: Table showing the result of calculated and critical (table) values of chi square and statistical decision of the research work

No of rows (r)	No of columns (c)	Degree of freedom (r-1)(c-1)	χ^2 cal	χ^2 critical	Decision
15	4	42	36.16	2.02	The null hypothesis is rejected

Discussions

From the table above, the calculated value of the chi-square (36.16) is greater than the critical value of the chi-square (2.02), hence the null hypothesis is rejected. Hence, there is significant influence on students phobia for Mathematics and factors like strictness of Mathematics teachers, incompetence on the part of Mathematics teachers, absence of instructional materials during Mathematics teaching, laziness on the part of Mathematics teachers, overcrowding in Mathematics classroom, learning Mathematics in the afternoon period, poor implementation of policies by Government, absence of ICT facilities and Mathematics laboratory in schools, absence of counselors in schools, too wide Mathematics curriculum and incessant strikes of teachers.

From the result, it showed that the phobia for Mathematics learning in secondary schools is as a result of the factors mentioned earlier. The future of this country would have been indirectly catered for if teaching and learning of Mathematics in our secondary schools is improved upon. This is simply because the learners of today will be the architect of the country tomorrow and it is what they have learnt that they will impact into the future generation for no one can give what he or she does not have.

Recommendations

1. There should be prompt payment of teachers' salary with other incentives for Mathematics teachers to put in their best.
2. The Mathematics classroom should be downsized to a maximum of thirty students per class including private schools.
3. A Mathematics teacher should not be made to teach other subjects in addition to Mathematics and should not be over loaded in the school time table.
4. Mathematics should be taught in the morning hours of the time table.
5. Government should sustain its policies on education rather than to change it every year.
6. Government should employ more counselors into secondary schools so as to guide students on their future career.
7. In-service training and re-training of Mathematics teachers should be done regularly.
8. Recruitment of qualified and adequate professionals to teach Mathematics should be a regular exercise and should not be politicized.
9. The Government should ensure that all schools have ICT facilities and well equipped Mathematics laboratory and enforce its usage.

10. There is need for adequate and thorough supervision of secondary schools so that government will not be paying for the services not rendered.

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