

IMPLEMENTATION OF THE FURTHER MATHEMATICS CURRICULUM IN SCHOOLS IN BAYELSA STATE

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Abstract

The study is a survey to investigate the implementation of the Further Mathematics Curriculum in Schools in Bayelsa State. Six questions were asked and information was obtained from the official of the Examination Bodies, Ministry of Education, Schools Board, Principals and Vice Principals and Heads of Mathematics Departments, through a structure interview. A total of 480 questionnaires was also administered, 80 on Mathematics Teachers and 400 on SS III Students. From the data obtained, it was observed that majority of the schools do not teach Further Mathematics. The few that do so, an insignificant number of students attend classes for it. The classes are also not parallel to general mathematics. However, it was also observed that some student who were not taught, register and sit for the external Examinations in Further Mathematics and generally, performance in it is much more higher than in general Mathematics. It was found out that the main problem militating against the effective implementation of Further Mathematics curriculum is the shortage of qualified and experienced teachers to teach it. It was concluded that the Further Mathematics curriculum in Bayelsa state is not being effectively implemented and that if nothing is done the state will continue to be disadvantaged in science and technological development. A number of things to be done were recommended.

Introduction

The National Policy on Education states that mathematics is one of the core subjects to be offered by all students at the pre – tertiary level (FRN, 2004). This compulsory nature of mathematics carries with it the assumption that the knowledge of the subject is essential for all members of the society. According to Awoshiyan (2006), in a nutshell, the national policy on education, edition of 1981 from where the 2004 edition took its roots, because of some policy innovation and changes in education, the general objectives of mathematics education as stated there in, remain relevant.

These include;

- (i) To generate interest in mathematics and to provide a solid foundation for everyday living;
- (ii) To foster the desire and ability to be accurate to a degree relevant to the problem at hand;
- (iii) To develop precise, logical and abstract thinking;
- (iv) To stimulated and encourage creativity; and
- (v) To provide necessary mathematical background for further education.

Also, Betiku (2004), adds that mathematics competence is a critical determinant of the post – secondary educational and career options available to young people. In fact, it is observed that a credit level pass in mathematics is required for admission into Nigerian Universities as a general requirement. The general mathematics curriculum of the senior secondary school is expected to take care of this.

However, not every body in the society requires the same depth of mathematics for career choice. For instance, for those who would want to train as mathematicians, engineers, medical doctors, scientists and the science and technology related courses, may need more mathematics than

the general mathematics. As a result, to accomplish the objectives of mathematics education for these categories of persons, a parallel curriculum was produced and institutionalized in Nigerian senior secondary school general mathematics for these categories of persons.

According to Ibrahim (2004), the Further Mathematics Curriculum contains all the topics in the senior secondary general mathematics curriculum plus topics in Further Mathematics, which include pure mathematics, Mechanics and Statistics. This policy is not new. Before the two parallel curriculums there was the general mathematics and the additional mathematics. They were though not parallel. The additional mathematics as the name implies, contains additional topics which are not in the general mathematics. It was there for the students who are mathematically able and need more mathematics. Most times these are students who intend to train in the science related careers. In additional mathematics the students attend the general mathematics classes and attend another class for a shorter period on the timetable for additional mathematics. At the end, the students enter for two separate papers; the general mathematics and another in additional mathematics.

The difference in the two arrangements according to Ibrahim (2004), is that in Further Mathematics, apart from it being parallel, the policy guide regarding the implementation of Further Mathematics, stipulates that, a separate class be run for students who opt for the course. They will not attend regular general mathematics classes, although they cover everything in the general mathematics in the Further Mathematics class. At the end of the course, the student will sit for full set of papers i.e. the senior secondary school general mathematics plus papers set for Further Mathematics. For this, some universities in Nigeria specifically require a credit level pass in Further Mathematics or an attempt in the Further Mathematics in addition to the credit level pass in the general mathematics for some courses.

Problem of Study

Since the students in Further Mathematics sit for full set of papers in the two courses, like in the case of additional mathematics, there is the temptation that the Further Mathematics courses may be run as its predecessor, the additional mathematics. Where this is done, it is not humanly possible to cover adequate content in the further mathematics within the time allocated for it in the school timetable. The class in Further Mathematics ends up being a repetition of the general mathematics without treating adequately the extra depth and topics in Further Mathematics.

Also, the general phobia for mathematics and its learning will make very few students opt for the Further Mathematics course if it is run parallel and separate class. In fact if the general mathematics was not compulsory, very few students would have offered it. As for the further Mathematics, presumed to be higher mathematics, if it is presented as an option to the general mathematics, students will choose not to enter for it.

Besides, the inadequacy in the number and quality of mathematics teachers in our senior secondary schools, is no longer news. The Further Mathematics will suffer a worse situation in its implementation. The result is that it may not be taught at all in many senior secondary school or it may not be properly taught. This paper is therefore interested in how the Further Mathematics curriculum is being implemented in our schools.

Purpose of Study

The major purpose of this study is to investigate how the Further Mathematics curriculum is been implemented in the public senior secondary schools in Bayelsa State. It is interested in ascertaining how many students enter for the subject, whether these students attend separate classes and the problem and prospects in the implementation of the Further Mathematics Curriculum.

Research Question

To facilitate the study the following questions are posed for which answers are sought;

- 1 How many of the public senior secondary schools in Bayelsa State teach Further Mathematics?
- 2 How many students in each of the schools that teach Further Mathematics enter the class?
- 3 How many of the senior secondary schools which teach Further Mathematics, teach it as an option to general mathematics?
- 4 How many students sit for Further Mathematics in the Senior Secondary School Certificate Examination?
- 5 What is the performance of the students who sit for Further Mathematics in the Senior Secondary School Certificate Examination?
- 6 What are the problems and prospect of effectively implementing the Further Mathematics Curriculum?

Research Methodology

The study adopted a survey design. This is so because all the questions can be answered by collecting data that are available in the schools. The population is all the officials in the state's offices of the West African Examination Council (WAEC) and National Examination Council (NECO); all officials of the State Ministry of Education and Post – Primary Schools Board; all principals and their vice principals, heads of department of mathematics, mathematics teachers and SS III students in all public senior secondary schools in Bayelsa State.

The sample involved was one official from each of the Examination Boards, the mathematics supervisor or one official from the Ministry of Education and the Schools Board. For the schools, four schools were selected from each of the ten educational zones. In each school selected the principal or vice – principal (academic), the mathematics head of department, two other mathematics teachers and ten students in SS III were used as shown in Table 1.

Table 1

Distribution of participants in the study.

Participants	Number
WAEC	1
NECO	1
Ministry	1
Board	1
Principal/Vice principal	40
HOD	40
Teachers	80
Students	400

The instruments used consist of a questionnaire and an interview. The questionnaire was used to gather information that was used to answer research question 6. It was a Likert Scale of 4 points. The information to answer the other research questions was collected through a structured interview, designed specifically for the study. Validity of both instruments was done by asking other researchers and mathematics educators to examine the content of instruments for their suitability for the purpose. For the questionnaire a test – retest reliable was performed. A coefficient of 0.693 was obtained.

The researcher personally visited the offices of the Examinations Boards, the Ministry of Education and Schools Board. The interview was conducted in each case and available statistics that are useful were collected. The researcher also visited the selected schools and interviewed the principal or vice principal and the head of department of mathematics. The mathematics teachers and selected students responded to the questionnaire. All the completed questionnaire were collected, processed and used for the analysis.

Data Analysis

The analysis of data was done by taking each question at a time. Simple percentage were calculated and the decisions based on them.

Results

Question 1

How many of the senior secondary school in Bayelsa State teaches Further Mathematics?

Table 2

Number and percentages of schools teaching Further Mathematics

Year	Number	Percentage
2008	15	37.5
2007	16	40.0
2006	16	40.0
2005	17	42.5

Table 2 shows the number and percentage of the schools visited who indicated they have been teaching Further Mathematics since 2005. It shows that less than half of the schools each year teach Further Mathematics. It can be seen that the number of school is also gradually reducing as the years go by. This means that majority of the schools do not teach Further Mathematics.

Question 2

How many students in each of the schools that teach Further Mathematics enter the class?

Table 3

Number and percentage of students entering Further Mathematics classes

Year	Schools that Teach	Students in Class	Students for Further Mathematics	Percentage of Students for Further Mathematics
2008	15	1,500	60	4.0
2007	16	1,568	56	3.6
2006	16	1,612	61	3.8
2005	17	1,604	49	3.1

The response to this question was that less than 5 percent of the students enter class for Further Mathematics. The heads of department, in some cases, further explained that it is because of the small number of students who opt for Further Mathematics that they choose not to teach it.

Question 3

How many of the senior secondary school who teaches Further Mathematics, teach it with an option to general mathematics?

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Table 4

Number and percentage of schools teaching Further Mathematics as option

Year	Schools that Teach	Schools that Teach it as Option	Percentage
2008	15	1	0.07
2007	16	1	0.06
2006	16	1	0.06
2005	17	1	0.06

In response to this question, it was observed that of all the schools visited, only one school (The Federal Government Girls Secondary School) indicated that they teach Further Mathematics as an option to general mathematics. In all the other schools, all the students enter the general mathematics class. Only the few students interested in Further Mathematics are given extra class in it. In most of the schools, Further Mathematics does not appear in the school time table.

Question 4

How many student sit for Further Mathematics in the Senior Secondary School Certificate Examination?

Table 5

Number and percentage of students sitting for Further Mathematics examinations

Year	Schools that Teach	Students in Class	No. of Students Sitting for Further Mathematics Exams	Percentage of Students Sitting for Further Mathematics
2008	15	1,500	95	6.5
2007	16	1,568	95	6.0
2006	16	1,612	96	5.9
2005	17	1,604	101	6.3

In response to this question, it was observed that the number of students who sit for Further Mathematics in the Senior Secondary School Certificate Examination is about 6 percent. This is a little higher than the number of students who entered the classes for Further Mathematics. This is so because some of the student where Further Mathematics is not taught, on their own register and sit for Further Mathematics in the examination.

Question 5

What is the performance of the students who sit for the Further Mathematics in the Senior Secondary School Certificate Examination?

Table 6

Performance of students sitting for Further Mathematics examination

Year	Schools that Teach	No. of Students Passing at Grade C and above	Percentage
2008	98	58	59
2007	95	62	65
2006	96	65	67
2005	101	56	55

In response to this question, it was gathered that over 50 percent of the students who sit for Further Mathematics in the Senior Secondary School Certificate Examination had grades of level C and above. Only very few of them usually have F grade. It was observed that generally the performance of Further Mathematics is much higher than in the general mathematics.

Question 6

What are the problems and prospects of effectively implementing the Further Mathematics Curriculum?

Table 7a

Teachers and Students Responses on Possible Problems

Possible Problems Militating against Effective Implementation	No. of Maths Teachers Responding Positively	No. of Students Responding Positively	Total Out of 480	Percentage
Students phobia for mathematics and its learning.	47	260	307	64
Does not need mathematics for further study.	52	111	163	34
Shortage of qualified and experienced teachers to teach it.	70	232	312	65
No suitable textbooks.	42	68	110	23
No clear directions from the Ministry of Education on its implementation.	62	202	264	55
The examination bodies do not give any direction on Further Mathematics as an option to general mathematics.	65	184	249	52
Lack of interest from school heads and sometimes outright refusal to include it on the school timetable.	54	234	288	60
Too many subjects in the school programme to choose from.	40	112	153	32
The schools population is too large for the available infrastructure.	23	111	134	28
The few mathematically able students who would have opted for Further Mathematics are needed in the general mathematics classes to mentor the others.	70	149	249	52

Table 7b

Teachers and Students Response on Possible Prospects

Possible Prospects of Effective Implementation of Further Mathematics	No. of Maths Teachers Responding Positively	No. of Students Responding Positively	Total Out of 480	Percentage
Schools graduates will have more confidence and also do better in higher mathematics in tertiary institution.	70	303	373	78
Students would work very hard.	33	125	158	33
Teachers would also learn more mathematics.	36	113	149	31
More of students could go for science and technology related courses.	76	343	419	87
It will reduce the congestion in the general mathematics class.	40	66	106	22

Among the listed possible problems and prospects, for mathematics teachers and SS III students to react to, the item with scores of 50 percent and above response are shown below

List of the Highest Problem Militating Against Effective Implementation of the Further Mathematics Curriculum.

- 1 Shortage of qualified and experience teachers to teach it.
- 2 Students phobia for mathematics and its learning.
- 3 No clear directions from the Ministry of Education on its implementation.
- 4 The examination bodies do not gave any direction on Further Mathematics as an option to general mathematics.
- 5 Lack of interest from school heads and sometimes outright refusal to include it on the schools' time table.
- 6 The few mathematically able students who would have opted for Further Mathematics are needed in the general mathematics classes to mentor others.

Prospects of Effectively Implementing the Further Mathematics as perceived by Teachers and Students.

- 1 More of the students could go for science and technology related courses in universities.
- 2 School graduate will have more confidence and also do better in higher mathematics in tertiary institutions.

Discussion

The findings of this study have revealed so much about the implementation of the Further Mathematics Curriculum in Bayelsa State. The findings show that firstly, majority of the public schools in the state do not teach Further Mathematics. Secondly, even the few schools that teach it, only an insignificant number of student enter the classes and register for it in the external examinations. This suggest that, students from the state are not benefiting from the essence of teaching Further Mathematics. According to Ibrahim (2004) this means that the students in the state

are not properly getting the solid foundation in the fields of Engineering, Science and Technology. This has a devastating effect on the future development of the state.

The other findings are equally very informative. Firstly, that students who were not taught Further Mathematics register and sit for the subject in the external examination. This means, these students have the spirit of venture and are pleasantly disposed to mathematics and its learning. This means that these students if encouraged could be very good in mathematics. Secondly, it was observed that the students who enter for the subject in the external examination do better than in general mathematics. This means some of the students who were not taught Further Mathematics could have done well in it in the examinations. Teaching Further Mathematics therefore is a potential that has not been fully exploited. If some students can register and sit for examinations in Further Mathematics without being taught and do well, many more would have done so, if they were taught. It is therefore not surprised that the main problem militating against the effective implementation of the Further Mathematics Curriculum is found to be the shortage of qualified and experienced teachers to teach it. If there were enough teachers, qualified and experienced to teach it and mentor students, more schools would have taught it, more students would have sat and passed the Further Mathematics in the examinations. They would have gotten a solid foundation for the much needed Science and Technology courses in university.

Recommendations

Based on the findings of this study and the discussion that followed, the following recommendations are made;

- 1 The state government should make all effort to recruit qualified and experienced teachers to teach Further Mathematics in all the public schools in the state.
- 2 An inducement allowance of a sort could be instituted to retain the teachers.
- 3 The state's Ministry of Education should give a very clear directive that Further Mathematics should be taught as an option to general mathematics and should start from SSI.
- 4 There should be an increased instructional supervision in mathematics education in the state. This should be undertaken by knowledgeable supervisors in the subject. Where the personnel are not available, knowledgeable supervisors could be engaged on consultancy.

Conclusion

Further Mathematics is not additional mathematics. It is a parallel curriculum to the general mathematics. This study has shown that the Further Mathematics Curriculum in Bayelsa State is not being effectively implemented. The study has shown that if it is not effectively implemented the state will continue to be disadvantaged in science and technology development. It is not an overstatement to say that the state and Nigeria as a whole is in dire need for this development. All efforts should be made to see that the situation is changed. Further Mathematics the bedrock of science, engineering and technology should be properly taught.

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