

The Extent of Mathematics Contents Coverage in Bayelsa State Public Secondary Schools, Nigeria

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Abstract

The study examined the extent of mathematics contents coverage by mathematics teachers with their students in the Bayelsa State public secondary schools. Three research questions and a null hypothesis guided the study. The study employed a descriptive survey research design. The population of the study consisted of all mathematics teachers and their principals in the public schools. A simple random sampling technique was used to select 110 mathematics teachers and 50 principals from fifty (50) public secondary schools. The study made use of two instruments; Mathematics Teachers Contents Coverage Questionnaire (MTCCQ) and Questionnaire for Principals on Mathematics Contents Coverage (QPMCC). These instruments were validated by the method of face validity in conjunction with the experts in the field of mathematics education. All the data generated were analysed by the methods of mean, standard deviation and t-test. The result indicated that mathematics teachers did not covered all the contents with their students. Therefore, the paper concluded that the extent of contents coverage by mathematics teachers was not encouraging. It therefore recommended that more qualified mathematics teachers should be employed by the Bayelsa State Government to increase the existing number of mathematics teachers in the state for effective contents coverage with the students.

Keywords: Coverage, Extent, Mathematics Contents, Mathematics Teachers, Perceptions, Principals.

INTRODUCTION

Mathematics is an abstract subject offered by students at the secondary school level of education. Mathematics is a core subject and at the same time one of the science subjects in the secondary school. Be a compulsory subject, all students at this level of education are expected to learn it. Although, the learning of the subject demanded the critical and logical reasoning of those that taught it and those that are expected to learn it. Also, those that taught the subject (teachers) are expected to undergo training at the colleges of education and Faculty of Education in the universities to acquire the necessary mathematics contents and methodology. These trained teachers on their parts exposed the students to the contents appropriate to their levels of education.

Contents of mathematics imply the various topics that the students are expected to be exposed to in the classroom by the teachers. Various topics in mathematics in the different classes are documented in a book called curriculum. The performance of students in mathematics will depend largely on the extent to which the teachers covered the contents. Studies have shown that if curriculum coverage in mathematics improves, then the academic achievement of the students will also improve. Many studies have indicated that low contents coverage by teachers in the classroom was one of the reasons why students

persistently did badly in mathematics examinations (Stols, 2013, Taylor, 2011, Reeves & Muller, 2005). Furthermore, these researchers were not far from the truth. Students cannot give what they do not have. In addition, if the students were taught few topics out of many topics, definitely such students cannot do well in both internal and external examinations. The practice of inadequate coverage of the contents is very common among teachers, especially in the public schools. This may be as a result of lack of qualify teachers, poor supervision of teachers by superior officers (principals) or poor remuneration to teachers by the government and among others.

Content coverage which is also called curriculum coverage in mathematics has been shown to be an important variable for discussing students' academic progress (Plewis, 2010). According to Plewis (2010), the more the teachers covered the mathematics curriculum, the greater the progress made by the students in the classrooms. This implies that, if the content of the subject was not adequately covered by the teachers, the consequence is that such students may not likely do well in the subject.

Adequate coverage of mathematics contents (topics) in a specific class, is the duty of the teacher not to be overlooked. A situation where the teacher does not care to cover the contents in the classroom, the tendency that the students will do well in the subject will not be then. By this development, the students' level of knowledge in the subject matter will be limited to the few topics taught by the teacher. Inability of the teacher to cover the reasonably percentage of topics in the subject curriculum may be depends on certain factors such as poor attitudes of the teacher, level of competency of the subject matter, and other factors that have been already listed in this paper. Because of the shortage of mathematics teachers, some secondary schools relied mostly on members of National Youth Service Corps (NYSC) to teach the students. These members of National Youth Service Corps (NYSC), some of them were not qualified as teachers. Furthermore, the presence of National Youth Service Corp members in some of the schools had contributed to the negative attitude of some of the mathematics permanent teachers towards teaching. This was because, some of these permanent teachers had completely abandoned their teaching works in the hands of the unqualified mathematics teachers (NYSC members), hence, poor contents coverage.

A study carried out by Shikuku (2017) on the effect of syllabus coverage on secondary school students' performance in mathematics and discovered that syllabus coverage has a significant impact on students' achievement in mathematics. According to the author, the study was conducted in Kenya for mathematics students in the secondary schools.

The extent of further mathematics contents coverage by students was low and obvious (Charles-Ogan & George, 2019). This implies that mathematics teachers do not complete the scheme of works with their students, hence, low contents coverage. The investigators concluded that there was a positive high correlation between further mathematics contents coverage and students' performance. Mathematics contents coverage and students learning in Kindergarten (Engel, Claessens, Watts & Farkas, 2016). The investigators discovered that time on advanced contents in mathematics is positively associated with students learning. The authors further stated that the high exposure of learners to more advanced mathematics contents will benefit the large number of kindergartners. They further noted that the learners were under taught in the kindergarten by their mathematics teachers. This implies that the mathematics contents at the kindergarten were not adequately covered by the teachers. On the arrangement of mathematics contents at kindergarten, Engel, Claessens and Finch (2013) found out that kindergarten mathematics contents were poor aligned with students knowledge and skills in the subject at the school entry.

On the causes why majority of mathematics teachers failed to complete the required contents with their students, Essay (2016) stated that teachers whose financial needs are not satisfied by their employers will be psychologically and socially demoralized in their working

behaviours and this is of great effect to the performance of teachers. According to Essay (2016), some teachers came to school only to put their names on the attendance register and moved out in pursuit of other jobs which will earn them a large sum of money to make ends meet, since teachers' salaries are very small, hence, low contents coverage in mathematics. This will also accounted to poor performance of students in mathematics.

Moreover, on the relationship between the level of contents coverage by mathematics teachers and students' achievement in mathematics. Williams, Leland, Richard and Curtis (2011) discovered that there was a significant relationship between classroom mathematics contents coverage and the achievement of mathematics students. Furthermore, their study suggested that if the mathematics teachers adequately covered the contents with the students, there is possibility that such students will do well in mathematics, especially in the external mathematics examination. On the other hand, according to the study of Williams et al (2011), if the students were not properly taught by their mathematics teachers, such students may experience poor performance in the external examination.

A study conducted by Oketch, Mutisya, Sagwe and Musyoka (2013) on the effect of active teaching and subject contents coverage on students' achievement and discovered that greater contents coverage by mathematics teachers had a positive effect on the achievement of students. In support of the finding of Oketch et al (2013), Borg (1979) reported that there was a high correlation coefficient between teacher's coverage of academic contents and pupils' achievement in the two experimental groups used.

Before now, the present researcher has not discovered study or studies that have been conducted on the extent of mathematics contents coverage in Bayelsa State public secondary schools, Nigeria. The already created gap in the literature needs to be fill in order to inform the Bayelsa State Government and, indeed, the general public the extent to which mathematics teachers completed the various expected mathematics topics with their students. Therefore, this study was conducted to examine the extent to which mathematics teachers completed the mathematics contents with their students as perceived by the mathematics teachers and their principals in Bayelsa State public secondary schools.

Research Questions

1. To what extent mathematics contents were covered by mathematics teachers as perceived by the teachers?
2. To what extent mathematics contents were covered by mathematics teachers as perceived by their principals?
3. Is there any difference between the mean scores of the perceptions of teachers and their principals on the extent of contents coverage in mathematics?

Hypothesis

The hypothesis formulated below was tested at 0.05 level of significance.

1. There is no significant difference between the mean scores of the perceptions of teachers and their principals on the extent of contents coverage in mathematics.

Research Methodology

A descriptive survey research design was adopted by the study. This design enabled the study to obtain the relevant information from the respondents on the level of mathematics contents coverage by mathematics teachers. The population of this study consisted of all mathematics teachers and their principals in Bayelsa State Public secondary schools. A simple random sampling technique was used to select 110 mathematics teachers and 50 principals from fifty (50) public secondary schools in the state. The 110 teachers represented all mathematics teachers in the fifty (50) public secondary schools of Bayelsa State, Nigeria.

Two instruments were used in this study. Mathematics Teachers Contents Coverage Questionnaire (MTCCQ) and Questionnaire for Principals on Mathematics' Contents Coverage (QPMCC). Both instruments consisted of one section. Each of the instruments was a 4-point likert type questionnaire of Strongly Agree (SA), Agree (A), Disagree (D) and Strong Disagree (SD). The two instruments were constructed by the researcher and contained 5 items each.

Also, the two instruments were validated by the method of face validity in conjunction with the experts in the field of Mathematics education. The corrections made by the experts were injected into the final drafting of the two instruments. The corrected instruments were then administered to 15 mathematics teachers and 10 principals. The data generated were used to test the reliability of the two instruments. For the MTCCQ instrument, the reliability coefficient stood at 0.73 and that of QPMCC stood at 0.68 using Cronbach Alpha for both instruments.

Procedure for Data Collection

The two instruments were administered to the sampled mathematics teachers and their principals in the 50 schools by the researcher. The instruments were retrieved from the respondents immediately after supplying the information needed.

Method of Data Analysis

The method of responses to the items in the Mathematic Teachers Contents Coverage Questionnaire (MTCCQ) and Questionnaire for Principals on Mathematics' Contents Coverage (QPMCC) was on the closed response mode of 4-point scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strong Disagree (SD). Scoring on both instruments was therefore be from 4 to 1 mark, that is, 4 marks for Strong Agree (SA), 3 marks for Agree (A), 2 marks for Disagree and 1 mark for Strong Disagree (SD) of the item if positively worded.

All the research questions were answered by the methods of mean and standard deviation. The null hypothesis was tested by the method of t-test statistics.

Results

Research Question 1

To what extent mathematics contents were covered by mathematics teachers as perceived by the teachers? Data in Table 1 were used to answer this question.

Table 1: Extent of Mathematics Contents Coverage as Perceived by Mathematics Teachers

S/N	Items	Responses	S	A	D	SD
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	SA	A	D	SD			
	4	3	2	1			
1. I taught all the mathematics topics in my class/classes and with the students in the first term.	2	10	84	14	2.00	0.54	D
2. In case I did not taught all the mathematic topics in the first term, I added all the untaught topics to the second term for continuation.	8	12	77	13	2.14	0.71	D
3. All the untaught topics in the second term in mathematics were added to third term topics for continuation.	10	19	44	37	2.02	0.94	D
4. I taught all the mathematics topics in my class/classes with the students in the full academics session.	7	11	85	7	2.16	0.63	D
5. Those untaught mathematics topics in the third term were added to the first term in the next class/classes of the same students by you or other mathematics teachers for continuation in the new academic session.	9	22	70	9	2.28	0.73	D
TOTAL					2.12	0.71	D

From the above Table 1, the mean and standard deviation of mathematics teachers that responded that they taught all the required mathematics topics with their students in the full academic session were 2.16 and 0.63, respectively. Also, the mean and standard deviation of the mathematics teachers that responded that those untaught mathematics topics in the third term were moved to the next class/classes of the same students in the new academic session for continuation were 2.28 and 0.73, respectively. Infact, majority of the mathematics teachers that were sampled for the purpose of this study disagreed with all the items worded in positive direction. This implies that the majority of the mathematics teachers in Bayelsa State public secondary schools did not complete all the mathematics required topics with their students in the various classes. This is because, the total mean and standard deviation scores of all the responses of the mathematics teachers that responded to the five (5) items stood at 2.12 and 0.71, respectively. By this result, the extent of mathematics contents coverage by mathematics teachers in Bayelsa State public secondary schools was not relatively high.

Research Question 2

To what extent mathematics contents were covered by mathematics teachers as perceived by their principals? Data in Table 2 were used to answer this question.

Table 2: Perceived Mathematics contents coverage by principals

S/N	Items	Responses					
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	SA 4	A 3	D 2	SD 1			
1. My mathematics teachers taught all the topics in their teaching classes with the students in the first term.	4	2	8	36	1.48	0.91	SD
2. All the untaught topics in the first term were added to the topics in the second term by my mathematics teachers for continuation.	2	12	30	6	2.20	0.70	D
3. All the untaught topics in the second term were added to the topics in the third term by my mathematics teachers.	5	8	28	9	2.18	0.85	D
4. My mathematics teachers taught all the topics with their students in the full academic session under consideration.	3	4	32	11	1.98	0.74	D
5. Those untaught mathematics topics in the third term of the previous classes of the students were added to the first term topics in the new classes of the same students for continuation by my mathematics teachers.	1	6	16	27	1.62	0.78	D
TOTAL					1.89	0.80	D

From table 2, the mean and standard deviation of the principals' responses that responded that mathematics teachers taught all the required mathematics topics with their students in the full academic session were 1.98 and 0.74, respectively. Furthermore, the mean and standard deviation of the responses of the principals that responded that those untaught mathematics topics in the third term of the previous classes of the students were moved to the new classes of the same students in the new academic session by the mathematics teachers stood at 1.62 and 0.78, respectively. In all, the results indicated that the majority of all the principals sampled for the study disagreed with all the five (5) items that were worded in positive manner. Moreover, this means that majority of the mathematics teachers were unable to teach all the expected topics with their students in Bayelsa State public secondary schools as perceived by their principals. In all, the extent of mathematics contents coverage by mathematics teachers in Bayelsa State public secondary schools as perceived by their principals was not relatively high.

Research Question 3

Is there any difference between the mean scores of the perceptions of teachers and principals on the extent of contents coverage in mathematics? Data in Table 3 were used to analysed this question.

Table 3: Mean and Standard Deviation of the Perceptions of Mathematics Teachers and Principals on Contents Coverage

Variables	\bar{X}	SD	N
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Teachers	2.12	0.71	110
Principals	1.89	0.80	50

In Table 3, the total perception mean and standard deviation scores of the mathematics teachers were 2.12 and 0.71, respectively. Also, the total perception mean and standard deviation scores of the principals stood at 1.89 and 0.80, respectively. Therefore, the difference between the total perception mean scores of the mathematics teachers and their principals on the extent of contents coverage in mathematics was 0.23 ($2.12 - 1.89 = 0.23$). The result indicated that there was difference between the perceptions of mathematics teachers and their principals on the extent of contents coverage in mathematics.

Hypothesis (H₀₁)

There is no significant difference between the mean scores of the perceptions of teachers and principals on the extent of contents coverage in mathematics? Data in Table 4 were used to test this hypothesis.

Table 4: t-test Summary Table Showing the Perceptions of Mathematics Teachers and their Principals on Contents' Coverage.

Variables	N	\bar{X}	SD	Df	t. cal.	t. critical	Decision
Teachers	110	2.12	0.71	158	1.824	1.980	H ₀₁ accepted
Principals	50	1.89	0.80				

$P > 0.05$

Looking at Table 4, the t-calculated value of 1.824 is less than the t-critical value of 1.980. With these values, the null hypothesis (H₀₁) is hereby accepted. This means that the difference between the perceptions of teachers and their principals on the extent of contents coverage in mathematics was not significant. The study further reveals that the responses of the mathematics teachers and their principals on the extent of mathematics contents coverage were in the same direction.

Discussion of Results

The data generated by the study indicated that the extent of mathematics contents coverage as perceived by the teachers and their principals was indeed not satisfactory. Both the majority of the mathematics teachers and their principals sampled for the study from Bayelsa State public secondary schools responded that mathematics teachers in Bayelsa State public secondary schools did not taught all the expected various topics stated in the mathematic curriculum with their students. Although, the study did not relates their responses to the academic achievement of their students in mathematics, but data indicated that the students were not exposed to all the topics in the full academic session of the various classes in Bayelsa State public secondary schools. The inability of the mathematics teachers to complete the various topics with their students might due to strikes embarked upon by the NUT and NLC, shutdown of schools by Bayelsa State Government as a result of flood.

The study also discovered that, there was no significant difference between the perceptions of mathematics teachers and their principals on the extent of mathematics contents coverage. Furthermore, this confirmed the relatively low level contents coverage in mathematics by mathematics teachers. From the data emanated from this present study, the researcher can conveniently say that low contents coverage was one of the reasons why students in most cases, performed poorly in mathematics external examinations. In addition, the reasons why majority of the mathematics teachers unable to complete the scheme of works with their students might due to shortage of mathematics teachers, handling of

mathematics by unqualified teachers, poor supervision of mathematics teachers by their principals, examination malpractice perpetuated by some teachers and principals which also led to the negative attitudes of the teachers towards teaching and poor remuneration to teachers. Others are negative mind-set of the students as a result of examinations malpractice, some schools not linked with motorable roads, and among others. For example, a situation where three (3) classes (SSS 1-III) with three (3) arms each, assigned to a teacher to teach mathematics every week, there is no way such mathematics teacher can complete all the expected topics with the students in the full academic session, hence, low contents coverage in mathematics will be the result.

In all, the findings of this study agreed with the findings of these previous researchers such as Oketch et al (2013), Charles-Ogan and George (2019) and Shikuku (2017). These researchers reported that there was direct relationship between the level of contents coverage and students' achievement in mathematics.

Conclusion

The study concluded that the extent of mathematics contents coverage by mathematics teachers with their students in Bayelsa State public secondary schools was not encouraging. This implies that, the extent of mathematics contents coverage by mathematics teachers with their students in the Bayelsa State public secondary schools was not relatively high.

Recommendations

Based on the conclusion, the study makes the following recommendations.

1. More qualified mathematics teachers should be employed by the Bayelsa State Post Primary Schools Board. These teachers should be evenly distributed to all the secondary schools.
2. Special allowances should be paid to mathematics teachers to boost their moral towards mathematics teaching.
3. A situation where a member of National Youth Service Corps (NYSC) is assigned to a class to teach mathematics should be discouraged. Instead, such NYSC member should be paired with a more qualified mathematics teacher for guidance.
4. The academic supervisory role of the principals in the schools should be speed up. The principals in the various public secondary schools in the State should wake up to their academics responsibility.

REFERENCES

- Borg, W. R.(1979). Teacher coverage of academic content and pupils' achievement. *Journal of Educational psychology*, 71(5), 635-645.
- Charles-Ogan, G. I & George, N. R (2019). Further mathematics content coverage and first year mathematics students' algebra and calculus performance in universities in River State, Nigeria. *American Journal of Mathematics and Statistics*, 9 (3), 115-122.
- Engel, M, Claessens, A & Finch, M. A (2013). Teaching students what they already know? The (MIS) alignment between mathematics instructional content and student knowledge in kindergarten. *Educational Evaluation and Policy Analysis*, 35(2), 157-178.
- Engel, M., Claessens, A., Watts, T. & Farkas, G. (2016). Mathematics content coverage and student learning in Kindergarten. *Educational Researcher*, 45 (5), 293-300.
- Essay, S. (2016) Causes of low performance of students in mathematics. Available from <<http://www.essaysauce.com>.

- Oketch, M., Mutisya, M., Sagwe, J, & Musyoka, P (2013). The effect of active teaching and subject content coverage on students' achievement: Evidence from primary schools in Kenya. *London Review of Education*, 10(1), 19-33.
- Plewis, I (2010). Curriculum coverage & classroom grouping as explanation of between teachers differences in pupils' mathematics progress. *An International Journal on Theory and Practice*, 4 (2), 97-107.
- Reeves, C, & Muller, J (2005). Picking up the pace: variation in the structure and organisation of teaching school mathematics. *Journal of Education*, 37 (1), 103-130.
- Shikuku, B. N (2017). Effect of syllabus coverage on secondary school students' performance in mathematics in Kenya. *International Journal of Educational Sciences*, 4 (1), 31 -34.
- Stols, G (2013). An investigation into the opportunity to learn that is available to grade 12 mathematics learners. *South African Journal of Education*, 3 (1), 1-18.
- Taylor, N (2011). The national school effectiveness study summary for the synthesis report. Johannesburg, JET.
- Williams, H.S, Leland, S.C, Richard, T. H. & Curtis, C. M (2011).Content coverage differences across districts/states. A persisting challenge for U.S Education policy. *American Journal of Education*, 117 (3), 399-427.