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Evaluation of Rarely Covered Topics in Port Harcourt's Senior High Mathematics Curricula.

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Abstract

This research looked at how Port Harcourt, the capital city of the state of Rivers, evaluates its high schools' teaching of mathematics topics that are seldom covered in courses. This investigation used an after-the-fact methodology. Data were collected using the Mathematics content measurement tool, and its reliability was examined using the Kudar-Richardson 20 and the Cronbach alpha. The investigation was guided by three different research topics. Means analysis was used to the data collected in response to the study's questions. The research showed that activity recording conformed to record-keeping templates to a considerable degree, with a mean score of 8.76, indicating strong conformity. It was also noticed that the planned and executed levels of material for high school were different for levels 1, 2, and 3. It is clear, when compared amongst each other, that SS1, SS2, & SS3 are all superior than SS2. It was found to be widely used in Secondary Schools 1 as well as 2, and Secondary Schools 1 as well as 3, but only partially used in Secondary Schools 2 but rather 3. Based on the findings, suggestions were made to address the gaps in coverage that were found.

Keywords: *Harcourt, curricula, analysed, subjects, studied, evaluating*

Introduction

Math is only one of many subjects that kids and teens encounter several times in many different contexts throughout their formal education. Therefore, steps must be made to domesticate its contents appropriately. "the science that utilizes numbers and symbols to describe and examine the cosmos in pursuit of explanations and solutions to basic issues," Ose (2019) writes to define mathematics. Math is seen as a method of considering and arranging logical verifiable evidence used to solve a wide variety of problems in the scientific, administrative, and industrial sectors, and is demonstrated by the interconnected effects of several related topics, including mathematics, arithmetic, quadratic equations, mathematical, and statistics (Charles-Ogan & Deme, 2016). The definitions offered indicate the content's value to readers and the entire community.

Considering its significance, the National Strategy for Education outlines the goals that should direct Mathematics education to provide students with the skills necessary to succeed in the modern world.

1. Acknowledge that mathematical concepts may be found everywhere in the world around us;
2. a deep appreciation for the practicality, potency, and aesthetic value of mathematics;
3. Math is fun and will teach you to be patient and persistent while trying to solve issues.

4. Possess an understanding of mathematics as well as the ability to employ any of its signs and abbreviations;
5. Cultivate an interest in mathematics as well as the ability to think inductively and deductively while solving issues;
6. Appreciate the global scope of mathematics as well as the diverse viewpoints it offers.

In accordance with these goals, the associated purposes of Mathematics Instruction as stated in the policy statement are as follows, and are as follows:

- Provide the person with the opportunity to think mathematically creatively and productively.
- Provide the person with the opportunity to develop their manipulative abilities.
- Provide the person with the ability to apply mathematical analysis to the patterning and relationship-finding process.
- Empower the person to use mathematics to solve life's issues and appreciate the extensive application of arithmetic in other fields of study, such as astrophysics.
- Provide each person the opportunity to understand, improve, and respect the sophistication and beauty of arithmetic.
- Those students who have completed the prerequisite coursework should be allowed to continue their education at universities and other professional schools (F.R.N., 2014).

Mathematical knowledge has historically been organized symmetrically, with consideration given to its accessibility and the requirement of fully comprehending its contents in light of its value. We have further separated the themes and sub-themes into subtopics to make it simpler for users to grasp and utilize the content provided. Everything that students are expected to learn and accomplish during their time at school is outlined in the curriculum. The word "education" may be interpreted in several ways: as a set of rules designed for teachers, as the conversations that occur between educators and their charges with the goal of producing specific results, or as a compilation of an individual's experiences in the classroom. There is validity in each of these criticisms of conventional schooling. In doing so, it takes into account the all-encompassing strategy, which integrates the learning goals. Several researchers back up this theory (Eduok & Udosen, 2016; Magaji & Ogenyi, 2020).

The mathematics curriculum is the plan for the instruction children will get in school to help them become proficient in the subject. These overarching goals may be broken down into a series of more manageable subgoals. In mathematics, the term "curriculum" describes the complete course of study, including all of the work performed by the instructor, the student, the mediator between the three, and the supporting materials. In order to achieve their goals in primary mathematics, kids need a strategy for their daily life and the personal observations that teenagers will have. The strategy, as well as the students' present conditions, are meant to facilitate this. Knowledge consists of a collection of information, talents, and procedures that may be used in a variety of settings. Aside from "the scientific body," the study organization went under a few other names among its members. Ekwueme (2013); Remillard & Heck (2009); Edson & Thomas (2016) (2014).

The following are some of the ways in which the mathematics curriculum is intended to assist pupils in reaching their goals:

- Cultivate a favourable defiance toward numbers and learn to grow its usefulness in everyday life,
- In addition to using mathematics in your day-to-day life, you should work on developing problem-solving abilities to a competent level.
- Make use of the language of mathematics. In a manner that is fluent, practical, and reliable by pursuing a line of inquiry, hypothesizing correlations and assumptions, and producing an argument, explanation, or conclusion using statistical terminology.

The production of pupils at all levels of external assessments has dropped over time, despite the compelling reasons for mathematics Instruction in all learning settings, from infants on up. When schools fail again, and time again, it is probable that factors other than students, instructors, and curriculum are to blame.

Problem Definition

A variety of ways to increase students' test scores and guarantee that course information is completely internalized have been presented by researchers and teacher educators over the course of many years. Each method has been shown to improve student's grades and understanding. The following are only a few of the numerous theories, strategies, and methodologies that have been proposed throughout the years. Think-pair-share, guided inquiry, pair work, imagine levels of education and retraining, the social constructionist instructional method, the collaborative learning approach, the different instructional strategy, etc. On the other hand, some educators have placed emphasis on using mathematically-themed games and software in the classroom. These include, but are not limited to, Computer - aided instruction, Algebraton, Mathlab, Django, Computational science, computer graphics, Arithmetic Scrabble, and others.

Despite the inherent value of such efforts, they fail to provide results because most mathematics educators still lack an in-depth understanding of how to domesticate them effectively in any given setting. Therefore, it is unlikely that the program's methodology, teaching technique, or approach is the primary barrier. The stakes are already high, and the inability to disclose the material in its whole or at the appropriate moment makes matters worse. Students' lack of subject knowledge; inefficient teaching strategies; and the attitudes of instructors, educators, and parents are all factors that may hinder students' capacity to acquire mathematical content, as noted by Akanmu (2018).

Given these challenges, it is reasonable to assume that underlying factors contributed to implementation gaps and, ultimately, students' poor results. One of these fundamental problems, such as inadequate curricular content or a lack of knowledge of the taught topics, will impact students' academic performance. Moreover, there are critical aspects that must have helped to the integrative gaps that led to students' poor performance. The purpose of this research is to evaluate the mathematics courses offered at the high school level in the Port Harcourt Metropolitan Township of Rivers.

Study Aims and Goals

This research aims to conduct a literature review of mathematics in secondary education in the local government of Port Harcourt, Rivers State.

The aims of the research were as follows:

1. To identify the areas where senior secondary 1 Mathematics curricula fail to achieve their pedagogical goals.
2. This study aims to identify the areas where the senior secondary 2 Educational approach falls short of meeting its stated goals.
3. This study aims to identify the areas in which the senior secondary level 3 Educational approach falls short of meeting its stated pedagogical goals.

Concerning This Study, There Are Several Questions

These survey questionnaires will serve as the basis for our investigation:

- Is there a significant difference between the planned and actual contents of the Junior Secondary 1 Curricula?
- What discrepancies did you find between the planned and actual content of the Math curriculum for the second year of high school?
- What discrepancies were found between your school's planned and actual third-year learning system?

Method

The after-the-fact investigation, or ex-post facto research, was used here. Nwankwo (2013) explains that the hallmark of this kind of study is a follow-up examination of the event that the researcher does not drive. In this method, a set of dependent variables is used to evaluate a set of preexisting groups. All of the Port Harcourt, Cross River state public high schools are included in the research.

Port Harcourt is only one of the twenty-three local governments found inside the state of Nigeria. Area-wise, it's around 369 square kilometers, and its borders are the Bonny Water, the Obio / International nonprofit Local Govt Authority, the Okrika Region, the Eleme Federal Capital Territory, and the Degema Local Management Area (142 sq. mi.). The G.P.S. coordinates for this location are 4049'27.0012" North, 702'0.9996" East, making its latitude 4.824167 and its longitude 7.033611.

All sixteen of the high schools studied were public ones, and they were all located in the city of Port Harcourt in the state of Rivers (Ibara, 2019). With a census sampling technique, researchers in this study surveyed 16 PHALGAO public high schools in Rivers State. The research included all of the public secondary institutes in the Port Harcourt municipal local government since big samples were necessary. Five years of data, starting in 2014-2015 and ending in 2018-2019, were analyzed from the school diaries of the 16 schools under consideration to determine how well they met the requirements for covering material in senior secondary levels 1-3.

Collecting data is done using a survey called the "Educational Assessment Instrument" (MCAI). Experts in mathematics education and evaluation were consulted, and the researcher's supervisors in creating this document. Each time period spent with the instrument was divided into smaller chunks. Sections "A" through "D" detail the high school curriculum for freshmen, sophomores, and seniors. In order to determine the instrument's trustworthiness, it was subjected to a triangulation of face, content, and concept validity. The Kuder-Richardson 20 (K.R. - 20) was used to assess reliability and validity, and its questions focused on whether or not the training had been provided and recorded (for content that was not taught and was not found recorded). Section B had a dependability of 0.72, section C 0.74, and section D 0.76.

In order to approximate the significance of differences across sections of the "Mathematics Curriculum Assessment Instrument," we averaged the results from each subtest. Below is a table that details not only the themes that will be addressed in depth in Years 12 and 13 but also the components that make up those themes throughout those three years. Additionally, it displays an overall median execution rate among all participating institutions.

Results
Inquiry Topic 1

Table 1: Course Development for Algebra I at the High School Level

Theme	**Sub-theme**	**Contents**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**MEAN (x)**	**Remarks**
1	Indicators of numerical value	Quantity based on Calculation in Modules	13 7	14 7	14 8	12 8	11 8	10 9	H.E L.E.
		Indexes and standard forms	12	13	13	13	13	12	V.H .E
		Mathematical notation	12	12	13	13	12	14	V.H .E
		Tends to set	9	10	10	10	9	11	H.E
2	Procedural algebra	Ease of Variations and Equations	12	13	14	14	13	12	V.H .E.
		Equations of the quadratic form	12	11	13	12	13	12	H.E
		Argumentation that stands on solid logic	4	5	5	4	3	4	V.L E
3	Geometrical	Establishing the Veracity of Primitive Equations via Construction	6	6	7	6	6	7	L.E.
		Ratios in trigonometry	11	11	12	12	12	12	HE
		Trigonometric ratios	9	9	10	9	10	9	HE
4	Statistical data	Exhibit of Material	8	8	8	8	8	7	LE
	Grand Mean ($\bar{X}$)		**9**	**10**	**11**	**10**	**10**	**10**	**H.E**

The contents of Table 1 illustrate the comment thread and the time period that are intended to be addressed throughout the first year of high school. As a bonus, it reveals how far schools have come in implementing each component.

Inquiry Topic 2

What discrepancies did you find between the planned and actual content of the Curricula for the second year of high school?

Table 2: Content Application of the Secondary School Mathematics Teaching, Grades 9–12

Theme	**Sub-theme**	**Contents**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**Mean (x)**	**Remarks**
1	Numerology and Numerical Notation	Mathematical notation	13	13	14	13	12	12	V.H .E
		Estimation	12	11	13	11	10	11	H. E
		Coherence and progression An Example of a Quadratic Equation	10	11	12	11	11	12	H. E

2	Procedural algebra	Dual linear-quadratic equation	14	13	14	13	13	12	V.H.E
		Indicative of a curve's gradient	12	12	13	12	11	10	H.E
		Argumentation that stands on solid logic	9	11	12	11	10	11	H.E
		Problems with linear inequalities	7	6	5	6	4	7	L. E
		Fractions in algebra	5	7	6	6	6	6	L. E
		Features of Chords	12	11	13	12	11	13	H.E
3	Geometrical	Mathematics of circles	12	10	10	11	11	10	H.E
		Trigonometry	7	8	7	7	7	7	L. E
		Containing	5	6	7	6	7	6	L.E
4	Trigonometry	Averages and medians	6	4	5	5	5	3	L. E
5	Facts and figures	Analyses of dispersion	11	12	13	12	12	13	H.E
		Clustered data histogram	12	11	12	11	10	11	H.E
		Cumulative frequency graph	10	9	10	10	10	11	H.E
		Clusters were formed from the data using central tendency metrics.	11	9	10	10	9	10	H.E
		Probability	8	9	9	8	7	8	L.E
		Mathematical notation	7	6	5	6	6	7	L.E
	Grand Mean		10	9	10	10	9	10	H.E

In Table 2, you can see the several topics that make up the overarching subject that is intended to be addressed throughout the final year of high school. It also displays the average degree of execution across all schools that adopted the curriculum.

Inquiry Topic 3

What discrepancies were found between the planned and actual third-year mathematics programme at your school?

Table 3.: Third-year secondary syllabus application in maths

Theme	**Sub-theme**	**Contents**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**Mean (X)**	**Remarks**
1	Calculation and counting	Surds	11	12	13	12	13	12	H.E
		Factors and matrices	7	8	9	8	7	8	L.E
		Mathematical notation	10	11	10	10	11	10	V.H.E
		Number crunching in the financial sector	7	5	8	8	8	7	L.E

2	Procedural algebra	Capital market applications of linear and quadratic equations	8	9	9	8	8	7	L.E
3	Geometry	Trigonometric Ratios and Graphs	6	5	5	5	5	5	L.E
		Calculating a sphere's area and radius	8	5	8	8	8	9	L.E
		Location	4	6	5	5	4	5	L.E
		Plain coordinate geometries	8	9	8	8	9	5	L.E
4	The Calculus of Variations and Their Applications	Quadratic fraction divergence	5	4	5	4	4	5	V.L.E
		Basic-function integration	5	5	4	9	4	3	V.L.E
		Apps	3	2	3	9	2	2	V.L.E
	Grand Mean		8	4	8	9	7	5	L. E

In Table 3, you can see the several topics that make up the overarching subject that is intended to be addressed throughout the final year of high school. It also displays the average degree of execution across all schools that adopted the curriculum.

Discussion of Findings

Table 1 demonstrates that those who followed the Education Board's record-keeping rules kept records for 10 years over five years. It showed educational use. Modular arithmetic, algebraic operations, geometric construction and measurement, and statistical data display are poorly implemented. Algebraic operations were largely logic-based.

Table 2 indicates the average number of files schools that followed Education Board rules preserved throughout the study. These places averaged 10, 11, and 9. The seven L.E. application fields include central data tendency, probability, and geometry theorems involving circles and trigonometric functions.

Table 3 shows that individuals who followed the Education Board's record-keeping criteria kept seven times more records. Matrixes and determinants, financial mathematics, the trigonometric graph, ratios, longitude and latitude in geometry, and differentiation, integration, and their applications in introductory calculus were the only subjects with modest extent.

After evaluating the senior high school mathematics curriculum in Abakaliki, Athanatius (2020) observed a gap between planned and executed curriculum material. This investigation supports his findings. These results support Igboko and Inekwe (2019) assertion that a lack of competent instructors makes it harder to teach more complicated mathematical ideas. Mkhwanazi et al. (2018) also noted that a lack of teacher supervision by department heads and other education hierarchy members, who are responsible for ensuring that what is recorded is what is taught and matches the curriculum tracker and students' books, was a significant obstacle to curriculum implementation. Daramola, Oginni, Tojo (2018). Wonu and Zalmon (2017) found that high school seniors struggled to identify and address math education issues. Students excelled in number theory, algebra, and statistics. Most youngsters struggled with geometry and other basic concepts. Athanatius (2020) found similar findings concerning number base applicability in high school mathematics courses. Fractions, quantities, and arc lengths in geometry. When calculating trigonometric ratios, we didn't employ units or a moving center of reference. Charles discovered (2019) Owaba that there was a shortage of mathematics education

coverage due to problems with numerical representations, rising frequency curves, central inclination measurements, spread-actions, and probabilities.

Conclusions

Conclusions The poor performance of the majority of students on external assessments may be attributed to the low, and in many instances extremely low, quality of implementation of curricular material across all levels of the curriculum. A consensus was reached that specific capabilities were unnecessary or might be offered as extras at no additional cost. These include, but are not limited to, a lack of resources, a lack of qualified Mathematics teachers, an emphasis on teaching methods that are less effective than those used in other countries, a high turnover rate among Math teachers, and a general lack of continuity in the classroom due to teachers coming from different backgrounds. Furthermore, the United States has a critical scarcity of qualified mathematics educators. Because of the challenges in their education, many teachers shy away from presenting challenging subjects to their pupils.

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