

Appraising The Curriculum Content Coverage And The Learning Activity Index (Lai) Of Approved Mathematics Textbooks In Use In Ebonyi State Junior Secondary Schools

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Abstract

The need to entrench strong foundation for the study of mathematics, so as to create a mathematics literate society to stimulate the development of the society motivated the researchers to conduct this research study on appraising the curriculum content coverage (Topical content coverage) and Learning Activity Index (LAI) of the approved mathematics textbooks in use in the Ebonyi State Junior secondary schools. The study adopted evaluation design. The instrument for data collection was the Approved Mathematics Textbook Assessment Instrument (AMTAI). Simple Random Sampling (SAR) was used to sample the twelve approved mathematics textbooks, which formed the sample of the study. Two Research Questions and Two Null Hypotheses guided the study. The hypotheses were tested at alpha level of 0.05. The area of study was Ebonyi state. The findings of the study showed that most of the sampled approved mathematics textbooks recorded low Topical Coverage Index (TCI). Only four out of the twelve sampled approved mathematics textbooks scored up to 0.75 and above, which is the acceptable range. It was also found that only few of the sampled mathematics textbooks recorded the acceptable LAI of -0.25 to +.25. Based on the findings, it was recommended that government should approve only textbooks that attain atleast the minimum set standard for use in teaching mathematics. Secondly, teachers and students should combine different mathematics textbooks to serve as guide in teaching and learning of mathematics. Finally, government should set up standard library in schools where approved mathematics textbooks should be stocked, so that students and teachers should easily access them.

Keywords: Curriculum content coverage, learning activity index, mathematics textbooks, topical content coverage, chi-square.

I. Introduction

The study of mathematics as a subject at the basic education is indispensable. This is because the application of mathematics skills and knowledge permeates all aspects of man's daily lives. Indeed, what on earth does not involve numbers?. Which by implication is mathematics. Socio-economic development and advancement are centred around mathematics. This is because mathematics skills provide the key to the understanding of science. This is obvious as most scientific concepts or ideas depend on mathematics formular for their expressions. It could be rightly stated that mathematics provides the impetus for doing science. Based on this Odili (2006) conceptualized mathematics as a fundamental science that is needed for the understanding of most fields in the science and technological education. Infact, it is one of the subjects that cut across the practical value (numeracy) disciplinary value (reasoning and logic) and cultural value (fundamental mathematics) (Legner, 2013). The basic skills underlying all scientific and technological skills are the control of the tools of mathematics (Maliki, Ngban & Ibu, 2009). All countries of the world place premium on the teaching and learning of mathematics, since it is intricately tied to the learning of science, which drives development of nations. Hence, no nation toys with the study of mathematics, mostly at the basic or formative level of education, where the foundation for further study of mathematics is laid. Aside from the central roles of mathematics in structural and institutional development of nations, the lack of sound knowledge of basic mathematics impinges on man's daily activities. For instance, Okpara (2019) pointed out that a business woman/man calculates the total cost of his/her sales or knows the balance to give to her/his customer after sales. Similarly, a farmer knows the quantity of seedling to cultivate or one that suits each ridge he/she made. A driver tells the number of kilometres it takes to his destination and how many litres of petrol that will be enough for the journey. Hence, all these and many more are the roles of mathematics in one's life.

This inter-relationship between mathematics, development and advancement of human beings brings to the fore the importance of mathematics in life (Maliki, et al, 2009). In view of the fore going, it is critical to

state that for a country to develop scientifically, mathematics must be involved (Okpara, 2019). Based on this important reasons and perhaps in addition to others, mathematics was introduced into the curriculum of the Universal Basic Education programme and designated a compulsory subject of study to every student that passes through basic education programme (FRN:2013). This is to enable the Nigerian citizenry participate actively in the development of Nigeria and adapt to the socio-economic changes in the society.

The premium placed on the study of mathematics is further justified as it is seen as the language used to describe the problems arising in most branches of other subjects. It is a subject that is related to most school subjects in areas like: number and numeration; variation; graph; fractions; Logarithm and indices; algebraic processes; solution of equations, and in area and volumes (Maliki et al, 2009). It is pertinent to know that the premium placed on the study of mathematics and its designation as compulsory subject at the basic education is to enhance the achievement of one of the cardinal objectives of the Universal Basic Education which is the citizenry's acquisition of appropriate numeracy and manipulative skills (Popoola and Atanda, 2003). The Universal Basic Education (UBE) of the Federal Government of Nigeria is a compulsory ten (10) years of continuous education, starting from one year preprimary, to the third year of secondary education (FRN, 2003). The UBE programme comprises of three tiers; the one year preprimary, 6 years primary and 3 years junior secondary school (JSS). Mathematics as a subject of study in the UBE is a compulsory subject in all the three tiers. The junior secondary school (JSS) as the terminal stage of the UBE is meant to serve as a bridge or link between primary education and the senior secondary education (Nweke, 2022). Consequently, the mathematics studied in JSS Programme lays the foundation for the study of more mathematics and application of its principles in the study of science subjects in the senior secondary schools. Furthermore, the mathematics taught at the UBE programme is designed to prepare a student to fit into either the world of pursuit of further academic studies or vocation of one's choice, as UBE programme by design is pre-academic and pre-vocational. Unarguably, it is hoped that on completion of the JSS programme, students must have acquired the needed appropriate numeracy and manipulative skills through the study of mathematics as was stated by the UBE. To achieve the goals of the UBE programmes, the Federal Government through the Federal Ministry of Education laid a framework for UBE implementation at Federal and State level respectively. Hence, UBE is implemented at both federal and state levels. Each state reflects her peculiarity in her UBE programme.

Ebonyi is a state in Nigeria located in the South East geopolitical zone. It is designated as educationally less developed (NBS, 2018 and EBSMoE 2019). The state keyed into the UBE programme implementation as a major means of extricating itself from its tag as educationally less developed. For the state to exit from the doldrums of educationally less developed mathematics and science education in addition to other branches of education must be developed to be at par with those of other state in the zone as no other state in the zone falls under such undignified or demeaning categorization.

To achieve this, the State Ministry of Education, that oversees the implementation of UBE adopted the UBE programme objectives in mathematics. objectives of mathematics of the UBE adopted and implemented in Ebonyi state include assisting students that pass through the UBE programme:

- Acquire mathematics literacy necessary to function in an information age;
- Cultivate the understanding and application of mathematics skills and concepts necessary to thrive in the ever changing technological world;
- Develop the essential element of problem solving, communication, reasoning and connection within their study of mathematics;
- Understand the major ideas of mathematics bearing in mind that the world has changed and is still changing (FRN:2007).

A curriculum that provides the framework for the achievement of those objectives was developed by the Federal Government and was adopted by the state to guide the implementation.

It was emphasized in the curriculum that efforts will be directed at developing the affective domain and the quantitative reasoning of the learners, through the teaching and learning of mathematics as an addition to the development of cognitive and psychomotor domains of the learners (FRN:2013). This according to the UBE is to ensure the achievement of those objectives).

In order to attain those lofty mathematics objectives at the JSS,, the State Ministry of Education periodically conduct the review of available mathematics textbooks, in order to select those that meet the set standard for approval and for recommendation for use in schools. This is a right step in the right direction as the Mathematics textbooks have been identified by some researchers as contributory factor to poor students achievement in mathematics in Ebonyi State (Omiko, 2011, Okpara 2019). It is expected that the review usually brings about scrutiny of the mathematics textbook thereby eliminating those that are deficient in the set standard. This process will culminate in ensuring high achievement of students in mathematics.

But contrary to the expectations from the above measures adopted to ensure the selection and approval of standard mathematics textbooks that will enhance learners' achievement by the State Ministry of

Education, it has been reported that children in the state perform poorly in mathematics at the Basic Education Certificate Examination (BECE) (SMoE, 2017). This lacklustre performance was partly attributed to the quality of mathematics textbooks in use in schools (Omiko, 2011; Okpara, 2019). According to these researchers, the mathematics textbooks were inadequate in the coverage of topics in the core curriculum, learning activities and other major features that enhance pupils' and teachers' reading and comprehension. Given the important roles of textbooks in teaching and learning, it is evident that any textbook that lacks those qualities cannot contribute meaningfully in enhancing the transactive pedagogical processes which take place in the classroom. It can also assist pupils/students in independent learning. In fact, textbooks are veritable resources that make teaching and learning meaningful. Furthermore, it is the most widely used instructional material for both teachers and learners alike. This therefore means that there is a compelling need that approved mathematics textbooks must be valid in the curriculum content coverage, and the information it contains must be reliable as well as authoritative. This is to avoid the textbooks providing misleading information to learners and teachers, since it plays prominent roles as the primary agents of transferring knowledge to learners (Tok, 2010). Moreover, teachers and learners rely heavily on information provided in the textbooks.

It is worthy to note that the topical content coverage of any textbook in any subject matter must align with the topics in the core-curriculum as this is what qualifies such a textbook as useful instructional material. Any deviation makes the textbook a nullity.

Curriculum on the other hand is an indispensable term in any educational discussion. It refers to the planned experiences offered to the learners under the guidance of the school (Wheeler, 1967; FRN, 2007). Indeed, it is the planned course of study which is usually structured, sequenced and in progression (Pollard; Anderson, Swafield; Swann; and Wawick, 2011). The contents of the curriculum help to bring about intended educational behavioural changes or the intended outcomes in the learner (Wheeler, 1967). Specifically, curriculum contents depict the outlined teachable topics in the curriculum that impart the desirable behavioural changes in the learners. Invariably, the Nigerian mathematics curriculum is structured in a way that makes its contents, performance objectives, learning activities both for teachers and learners, and the evaluation guides tilt towards ensuring that the intended behavioural changes in the learners are brought about (FRN, 2007). It behoves on the mathematics textbook writers to take advantage of those numerous information contained in the curriculum which serve as guide in writing an acceptable textbook for use in our schools. In fact, the authors should adopt the topics in the curriculum in their textbooks. They should also develop activities similar to the ones contained in the curriculum or even adopt the activities already contained under each topic in the curriculum into the textbooks they write.

Furthermore, mathematics textbook content coverage is closely related to the critical consideration of content validity of the mathematics textbook. It refers to the extent to which all the topics in the curriculum are contained in the mathematics textbook. For a mathematics textbook to be useful in instructional delivery requires that the text book must possess content validity within the subject area and educational level under consideration. Content validity of an item or material refers to the adequacy of coverage of the contents of the material (Asika, 2009, Singh, 2008). It raises the major issues relating to whether all relevant dimensions of the topics of discussion have been fully explored. In passing judgement on content validity of an item, there presupposes to exist a set standard or yardstick for comparison. This forms the specification which the evaluated items or material is judged. Consequently, appraising the curriculum content coverage of approved mathematics textbooks implies that the topics contained in the textbooks are being compared with the topics in the mathematics curriculum, with a view to determine the adequacy of the topics contained in the mathematics textbook.

Inadequate curriculum content coverage of a textbook makes the textbook invalid and as such does not serve as instructional guide or material. Such textbook cannot be relied upon as a guide to teachers in instructional delivery, neither will such textbook guide students/pupils in independent learning.

Learning activities on the other hand are the different tasks that teachers and learners are required to carry out in order to bring about acquisition of the intended behavioural change by the learners. Learning activities give an estimate of the degree to which the textbook provides activities that will ensure optimal participation of the learner (Okpara, 2019). Learning activities are subdivided into two categories. There are activities for teachers to perform in order to provide information to learners and there are others to be carried out by the learners themselves in order to gain knowledge. In any standard textbook, there must be sufficient activities provided for learners to engage in order to gain experience. Those activities must be unambiguous and should fall within the age limit of the learners. These are some of the criteria for consideration when selecting a mathematics textbook that will serve as a useful resource material for both the teachers and the learners. Therefore, this research study is focused on appraising the curriculum content coverage (Topical content coverage) and the learning activities of sampled approved mathematics textbooks in use in Ebonyi state junior secondary schools.

II. Statement of the Problem

Ebonyi State Ministry of Education places premium on the study of mathematics at Basic Education and beyond. This has been amply demonstrated by her designation of mathematics a core subject at junior secondary school. The state also keyed into the implementation of the Mathematics objectives of the UBE programmes with a view to entrench the culture of mathematics literacy and numeracy in her citizenry and to lay solid foundation for the study of mathematics at other levels of education. Despite those apparent efforts and associated seemingly political will to support the study of mathematics, at JSS by Ebonyi State Ministry of Education, the achievement of students in mathematics at the Basic Education Certificate Examination (BECE) organized by the Ministry of Education remains perennially poor (Ebonyi, SMoE, 2018) The poor Performance of students in mathematics in BECE has become a concern and source of worry to stakeholders. People have continued to wonder about the cause(s) of the abysmal performances of students in mathematics. It is speculated that the mathematics textbooks in use in the JSS in the state form a contributory factor. Specifically, people opined that the topical content coverage and learning activities in these textbooks do not meet the set standard as contained in the approved curriculum (Okpara, 2019 & Omiko, 2011). These factors according to the researchers made the textbooks inadequate instructional materials to guide effective pedagogical processes.

Therefore, the purpose of this study is to appraise the topical content coverage and learning activities of approved mathematics textbooks in-use in the JSS in Ebonyi state, with a view to determine their adequacy in topical content coverage and learning activities.

III. Methodology

This study which focused on appraising the curriculum content coverage (topical content coverage) and learning activities in the approved mathematics textbook in use in Ebonyi state adopted evaluation design as the research design of interest. This adopted research design is considered appropriate to this study as it helped to make value judgement about the approved mathematics textbooks in-use in Ebonyi State Junior secondary schools. The particular value judgement of interest made in this study focused specifically on the content coverage and learning activities in the approved mathematics textbooks.

The population of the study consisted of two hundred and twenty one (221) Junior Secondary School (JSS), and seventeen (17) Approved Mathematics textbooks in use in Ebonyi State. Four (4) of the approved seventeen (17) mathematics textbooks were sampled for the study using simple random sampling techniques. These four (4) selected textbooks formed the sample of the study.

The instrument for data collection consisted of the Approved Mathematics Textbook Assessment Instrument (AMTAI). The instrument had earlier been validated and standardized. The researchers only adopted it. The instrument was used to collect the data which were analyzed, while chi-square was used to test the hypotheses.

Research questions

Two research questions guided the study. These were:

1. To what extent do the contents of mathematics textbooks approved for use in Junior Secondary Schools in Ebonyi State represent the core-curriculum?
2. How adequate are the learning activities of the mathematics textbooks in use in Junior Secondary Schools in Ebonyi State.

Hypotheses

The following null hypotheses were formulated to guide the study and they were tested at 0.05 level of significance.

HO₁ The contents of the mathematics textbooks in-use in Ebonyi state JSS do not Significantly deviate from the specifications of the core curriculum.

Ho₂ The learning activities of each mathematics textbooks approved and in use in Ebonyi Junior Secondary Schools do not significantly depend on the specifications of the core-curriculum.

IV. Results

Research question I

To what extent do the contents of mathematics textbooks used in Junior Secondary School represent the core-curriculum?

To answer the question, data relating to topical index coverage on the approved. mathematics textbooks in JSS in Ebonyi state were collected. The scores of the sampled twelve mathematics text books in use in JSS were calculated, and presented in table 1.

The following equation was used to analyze the data collected.

$$TCI = \frac{Tt}{TS} + \frac{St}{Ss}$$

Where Tt = Number of topics sufficiently covered by the textbook

Ts = Number of topics in the syllabus

St = Number of sub-topics sufficiently covered by the textbook.

Ss = Number of sub-topics in the syllabus

Table I: Topical Coverage Index (TCI)

S/No	Textbook	Tt	Ts	St	Ss	Index
1	STAN Maths for JSS 1	11	21	26	41	0.58
2	STAN maths for JSS 2	10	14	20	38	0.62
3	STAN maths for Jss2	10	16	25	46	0.59
4	NGM for JSS 1	18	21	33	41	0.83
5	NGM for JSS 2	10	14	23	38	0.66
6	NGM for JSS 3	15	18	36	46	0.81
7	MAN Maths for JSS 1	15	21	50	41	0.97
8	MAN Maths for JSS 2	13	14	21	38	0.74
9	MAN Maths for JSS 3	18	16	33	46	0.89
10	NSM for JSS 1	8	21	18	41	0.41
11	NSM for JSS 2	6	14	17	38	0.44
12	NSM for JSS 3	8	16	20	46	0.47

Acceptance range = 0.75 to 1.0

Note: STAN=Science Teachers' Association of Nigeria; NGM= New General Mathematics; NSM = New School Mathematics, MAN = Mathematics Association of Nigeria.

From table 1 as displayed, the indices of the twelve sampled mathematics textbooks were shown. The indices for STAN mathematics JSS I-III were 0.58; 0.62; 0.59 respectively. For New General Mathematics (NGM) JSSI – JSSIII, they were 0.83; 0.66 and 0.81 respectively. For the MAN JSSI – JSS III, they were 0.97, 0.74, 0.89 while that of NSM were 0.41, 0.44 and 0.47 respectively.

Research Question 2

How adequate are the learning activities of the approved mathematics text books in use in JSS in Ebonyi State?

To answer the research question, the collected data from the twelve(12) sampled mathematics textbooks were analyzed using the following mathematical relationship.

$$LAI = \left(\frac{A - P}{A + P} \right)$$

Where A= Number of sentences requiring the learner to perform some activities.

P= Number of sentences requiring the learner to receive information with no other activity

Table 2: Learning Activity Index (LAI)

S/No	Textbook	A	P	Index
1	STAN MATHS JSS1	26	51	-0.32
2	STAN MATHS JSS 2	24	66	-0.47
3	STAN MATHS JSS3	61	128	-0.35
4	NGM MATHS JSS 1	-	119	1
5	NGM MATHS JSS 2	47	151	-0.53
6	NGM MATHS JSS 3	12	57	-0.53
7	MAN MATHS JSS 1	17	86	-0.65
8	MAN MATHS JSS 2	9	46	-0.67
9	MAN MATHS JSS 3	13	65	-0.67
10	NSM MATHS JSS 1	323	1	0.96
11	NSM MATHS JSS 2	462	9	0.99
12	NSM MATHS JSS 3	333	4	0.98

Acceptance Range = - 0.25 to + 0.25

From The Table 2. the results displayed show that STAN JSS 1 = 0.32, STAN JSS 2 = -0.47 and STAN JSS 3 = -0.35. For the NGM JSS 1-JSS3, the results were:1, -0.53; and -0.53. For MAN JSS 1 - 3, they were -0.65, -0.67, -0.67 but for NSM JSS 1-3, they were 0.96, 0.99 and 0.98

HYPOTHESES

Ho₁: The contents of the mathematics textbooks in use in the junior secondary schools in Ebonyi state do not deviate significantly from the specification of the core- curriculum in mathematics studies.

To test this hypothesis the contents of each of approved mathematics textbooks were matched with the contents of the core-curriculum. The frequencies were subjected to a chi-square test of goodness of fit and were presented on the tables that follow.

For the STAN Mathematics textbooks, table 3 shows the result.

Table 3: Chi-square (X^2) table on significance of deviation of contents of STAN mathematics textbooks (JSSI-JSSIII) from core-curriculum.

Textbooks	Major topics	Minor topic	X^2 cal	X^2 crit	Alpha	Decision
STAN MATHS JSS1	11(21)	26(41)	33.11	12.592	0.05	REJECT
STAN MATHS JSS 2	10(14)	20(38)				
STAN MATHS JSS3	16(10)	25(46)				

From the table 3, the chisquare (X^2) calculated (X^2 cal) is 33.11 while the chisquare critical (X^2 crit) is 12.592 at 0.05 level of significance The researchers reject the null hypothesis and conclude that the contents of the STAN mathematics textbooks significantly deviate from the specifications of the core curriculum

Major topics = Number from the textbook = Tt = observed and topic from the syllabus= TS =Expected. Minor topics: Number of subtopic sufficiently covered by the text book = ST = Observed and number of sub-topics in the syllabus = SS = Expected.

For the New General Mathematics (NGM), the contents were matched with the contents specified in the mathematics core-curriculum in-use in the state. The output is displaced in table 4.

Table 4: Chisqure table on significance of deviation of contents of NGM mathematics textbooks JSS I-JSS III from the approved core –curriculum

S/N	Textbook	Major topics	Minor topics	X^2 cal	Alpha	X^2 crit	Decision
1	NGM MATHS for JSS 1	18(21)	33(41)	11.72	0.05	12.592	Accept
2	NGM MATHS for JSS 2	10(14)	23(38)				
3	NGM MATHS for JSS 3	15(18)	36(46)				

From table 4, the chi-square calculated (X^2 -cal) is 11.72 while the chi-sequence critical (X^2 crit) at Alpha level of 0.05 is 12.592. Based on the result, the researchers accept the null hypothesis and conclude that the content of New General Mathematics does not significantly deviate from the content of the core curriculum of the mathematics of JSS in use in the state.

For the Mathematics Association of Nigeria (MAN) the contents were matched with that of the core curriculum in-use in the JSS in the state. The result is displayed on table five.

Table 5: chi-square (X^2) table on significance of deviation of contents of MAN mathematics textbooks JSS I - JSS III from the core-curriculum of mathematics in use in JSS in Ebonyi State.

S/N	Textbook	Major topics	Minor topics	X^2 cal	Alpha	X^2 crit	Decision
1	MAN MATHS for JSS 1	15(21)	50(41)	12.13	0.05	12.592	Accept
2	MAN MATHS for JSS 2	13(14)	21(38)				
3	MAN MATHS for JSS 3	19(18)	43(46)				

From table 5, it is shown that the calculated chi-square value (X^2 -cal) is 12.13, while the critical chisquare (X^2 -crit) value at 0.05 alpha level is 12.592. Based on the result, the researchers accept the null hypothesis and conclude that the contents of MAN mathematics JSS I to JSS III does not deviate significantly from the core-curriculum of mathematics for JSS I-JSS III in use in Ebonyi State.

Similar chi-square test of significance of deviation was done on the contents of New School Mathematics (NSM). The result is displayed on table 6.

Table 6: chi-square (X^2) table on the significance of deviation of contents of New School Mathematics Textbooks JSS 1 – III from core –curriculum.

S/N	Textbook	Major topics	Minor topics	X^2_{cal}	Alpha	X^2_{crit}	Decision
1	NSM MATHS for JSS 1	8(21)	18(41)				
2	NSM MATHS for JSS 2	6(14)	17(13)	55.83	0.05	12.592	Reject
3	NSM MATHS for JSS 3	8(16)	20(45)				

As displayed on table 6, it is seen that the chi- square critical (X^2 -crit) value at 0.05 alpha level is 12.592 while the calculated (x^2_{cal}) is 55.83. Based on those values,It is seen that there is much deviation of the calculated chisquare value from the critical value and as such the researchers reject the null hypothesis, and conclude that the contents of New School Mathematics deviated from the contents of the core curriculum.

H_{02} : The learning activities of mathematics textbooks in the junior secondary school in Ebonyi state do not significantly depend on the specification of core-curriculum

To test this hypothesis, the learning activities of each of those textbooks were matched with learning activities specified in the core-curriculum. The frequencies of each mathematics textbooks were subjected to a chi-square (X^2)test of goodnes of fit. The summaries of the results are presented in tables 7 to 10.

Table 7: Chisquare (X^2) table showing the significance of relationship of learning activities of STAN mathematics textbooks with the specification of the core-curriculum in JSS (I – III) in Ebonyi State

S/NO	TEXTBOOKS	A	P	X^2_{CAL}	Alpha	X^2_{crit}	Decision
1	STAN MATHS FOR JSS 1	(24) 26	(53) 51				
2	STAN MATHS FOR JSS 2	(28) 24	(62) 66	1.17	9.95	5.991	Accept
3	STAN MATHS FOR JSS 3	(59) 61	(130) 128				

Based on the summary of the calculated X^2 displaced on table 7, it is seen that the calculated chisquare of 1.17 is less than the critical chisquare (X^2_{crit}) value of 5.991 at alpha level of 0.05. This led the researchers to accept the null hypothesis that the learning activities in STAN Mathematics textbooks of JSS1 - III does not depend significantly on the specification of the core-curriculum.

For the New General Mathematics textbooks. The learning activities requiring learners to receive information and those requiring learners to carry out activities were subjected to the same chisquare test. The summary of the result is presented on table 8.

Table 8: Chisquare (X^2) table on significance of learning activities of New General Mathematics Textbooks in use in JSS I-III in Ebonyi State with specification of the core-curriculum in use in Ebonyi State.

S/NO	TEXTBOOKS	A	P	X^2_{CAL}	Alpha	X^2_{crit}	Decision
1	New General Maths for JSS 1	-	(101) 119				
2	New General Maths for JSS 2	(30) 47	(158) 151	1414	0.05	5.991	Reject
3	New General Maths for JSS 3	(11) 12	(59) 57				

From table 8, it is seen that the calculated chi square (X^2_{cal}) of 14.14 is greater than the table critical chisquare value of 5.991 at an alpha level of 0.05. This made the reserachers to reject the null hypothesis and conclude that the learning activities of New General Mathematics Textbooks of JSS I-III in Ebonyi State depend significantly on the specification of the core-curriculum.

Similar test of significance of correspondence was carried out on the learning activities in New School Mathematics JSSI-III in-use in Ebonyi State.

Table 9. Chi-square (X^2) table on significance of correspondence of learning activities of New School Mathematics textbooks JSS I-III with the core-curriculum.

S/N	Textbook	A	P	X^2_{cal}	Alpha	X^2_{crit}	Decision
1	NSM MATHS for JSS 1	(320) 325	(4) 1				
2	NSM MATHS for JSS 2	(465) 462	(6) 9	3.99	0.05	5.991	Accept
3	NSM MATHS for JSS 3	(334) 333	(5) 4				

From the above table 9, it is seen that the calculated chi-square (X^2_{cal}) value of 3.99 is less than the chi-square (X^2_{crit}) value of 5.991 at alpha level of 0.05. Hence the null hypothesis was retained. The researchers therefore

conclude that the learning activities in New School Mathematics does not significantly depend on the core-curriculum in the JSS I – III text books in Ebonyi State.

For the MAN JSS I III mathematics textbooks, the researchers conducted similar Chi-square test and the result is displayed on table 10.

Table 10: Chi-square (X^2) table on significance of correspondence of learning activities on MAN mathematics textbooks with the specification of the core-curriculum.

S/N	Textbook	A	P	X^2_{cal}	Alpha	X^2_{crit}	Decision
1	MAN MATHS for JSS 1	(18)	(87)				
		17	86				
2	MAN MATHS for JSS 2	(10)	(48)	0.95	0.05	5.991	Accept
		9	46				
3	MAN MATHS for JSS 3	(16)	(63)				
		13	65				

As shown in table 10, the calculated chisquare value (X^2_{cal}) is 0.95, while the table critical chisquare (X^2_{crit}) value is 3,991 at the alpha level of 0.05. The researchers accept the null hypothesis and conclude that the learning activities of MAN mathematics textbook JSS I – III does not depend significantly on the specification of the core-curriculum.

V. Discussion

The discussion of the findings of this study will be done in line with the research questions and the two(2) hypotheses that guided the study. For the topical content coverage of the mathematics textbooks in-use in the Junior secondary schools in Ebonyi State, the study found that whereas some of the 12 sampled textbooks fall within the acceptable range of 0.75 to 1.0, others did not. Those that met the acceptable range were New General Mathameties for JSS I with a score of 0.83, New General Mathematics for JSS 3 with a score of 0.81; MAN mathematics for JSS I, and MAN mathematics for JSS 3, whose scores were 0.97 and 0.89 respectively. These indicated that only four out of the twelve sampled approved mathematics text books in Ebonyi state met the set standard in topical content coverage. The test of the null hypothesis for each of the set of textbooks showed that STAN Mathematics and New School Mathematics deviated significantly from the specification, while MAN Mathematics and New General Mathematics textbooks did not deviate significantly from the specification on topical content coverage. This therefore means that some of the textbooks in-use in Ebonyi State are adequate in topical content coverage. This is a welcome development as teachers depend wholly on text books for teaching, while students rely on textbooks for the revision of the learning done in the classroom and for independent learning. The findings of this study are closely in consonance with those of other researchers, as Tok (2010) had reported that the content coverage of mathematics textbook evaluated was fairly adequate.

In the area of adequacy of learning activities of the Aproved Mathematics Textbooks, this study found that some of the textbooks did not contain enough activities that would enhance the students mastery of the topics very well. This is very unfortunate as Okpara (2019) had observed that mathematicis subject issuch that cannot be taught or learnt verbally, as it can be easily forgotten if problem solving is not adequately involved. In the sampled mathematics textbooks. It is obvious as was revealed from their LAI that all the textbooks are lacking in terms of the activities that requires students to tackle problems outside the exercises or study questions solved in the text, which would improve students' understanding of the topics. STAN Mathematics textbooks JSS I – III has LAI of – 0.32, -0.47 and -0.35 New General mathematics JSS 1-11 had LAI of I, -0.53 and 0.65. MAN mathematics had LAI of – 0.67, - 0.67, and – 0.67 while New School Mathemetics JSSI III had LAI of 0.99, 0.96, and 0.98. These findings were confirmed by the hypothesis which showed that most of the testbooks learning activities deviated significantly from the specification in the core-curriculum. This is very unfortuante and calls for the textbook writers to take urgent action to address. It equally goes to show the reasons why most students that use these textbooks do not achieve high grade in mathematics at the Basic Education Certificate Examination organized by the Ebonyi State Ministry of Education. This study's findings correctly aligned with the findings of Omiko (2011) as he reported that the LAI of chemistry textbooks evaluated in Ebonyi secondary schools were inadequate.

VI. Recommendations and Conclusion

This study on the appraisal of the curriculum content coverage and learning activities Index (LAI) of approved mathematics textbooks in use in the Junior secondary schools (JSS) in Ebonyi State has made deep revelations relating to the causes of poor achievemnets of students in BECE in Ebonyi State. The findings of this study showed that not all the approved mathematies textbooks in JSS I-III have adequate curriculum content

coverage (Topical content coverage). The same inadequacy was found to apply to the learning activity Index (LAI) of the mathematics textbooks. Based on these findings, it is easy to understand why the JSS students who use these textbooks have shallow knowledge of the topics outlined in the mathematics core-curriculum, for them to study in order to adequately prepare for the BECE examination. The implication is that topics in the corecurriculum that are not in the textbooks are left out by the teachers and students. This makes them fail the examination questions drawn from those topics they did not study. The findings of this study should serve as a wake up call to the Ebonyi State Ministry of Education and the textbook writers to take all necessary steps to address these whooping gaps. Based on these findings, it is being recommended that:

- (i) the State Ministry of Education should only approve those mathematics textbooks that meet basic requirement of Topical Content Coverage and specified learning activity index among others for use in schools.
- (ii) The State Ministry of Education should always involve experts in appraisal of mathematics textbooks, since its outcomes have far reaching effects in achieving educational goals in the state.
- (iii) Teachers and students should be encouraged to make use of many mathematics textbooks since it is difficult to get a textbook that is adequate in all the criteria that are considered in a standard mathematics textbook.
- (iv) the state Ministry of Education should on regular basis organize a sensitization workshop/seminar for textbook writers in order to intimate them on areas their textbooks must emphasize, in order to qualify for selection and approval.
- (v) The State Ministry of Education should build capacity of their relevant staff on textbook appraisal.
- (vi) Government of Ebonyi state should invest more on provision of standard library in all approved public juniors secondary schools. The libraries should be stocked with textbooks while students should be encouraged to make use of the libraries. Private JSS should be mandated to set up libraries in their schools.

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