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RESEARCH ARTICLE

ASSESSMENT OF THE IMPLEMENTATION OF SENIOR SECONDARY SCHOOL MATHEMATICS CURRICULUM IN ABAKALIKI EDUCATION ZONE OF EBONYI STATE

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ABSTRACT

The study focused on the evaluation of the implementation of senior secondary schools mathematics curriculum in Abakaliki education zone of Ebonyi State. Four research questions are posed to guide the study, and three null hypotheses are formulated and tested at 95% confidential level. Evaluation research design was adopted in the study. The design was chosen because of the evaluative nature of the study. The population is made up of all the teachers teaching mathematics and SSS students in all the public secondary schools in Abakaliki Education zone totally 119 schools, 142 teachers and 43,323 students respectively. The sample size is made up of 74 mathematics teachers and 600 students using purposive sampling Technique. Two instruments were adopted for the study - proforma and observational checklist. The proforma helped the researcher to collect data of the qualification of the sampled mathematics teachers and also yield data that was used to answer the research question one and for testing null hypothesis one. Observational checklist for collecting data of content coverage of mathematics curriculum, availability of mathematics instructional materials and extent of the utilization of the recommended assessment practices. Proportions, mean and standard deviations were used to answer the research questions while z-test and chi-square statistics were used to test the null hypotheses at 0.05 significant levels. The findings of the study shows that for the proportion of qualified mathematics teachers, out of the 74 mathematics teachers only 46 of them which is the proportion of 0.62 or percentage of 62% is qualified. The mathematics curriculum content coverage is fairly covered with mean coverage of 2.41. It is significantly below an average since the expected bench mark of 2.50 as recommended in Ho_2. Result also shows that out of 25 listed mathematics instructional materials only one is sufficiently available while 8 are insufficiently available and 16 is not available. This situation certainly does not enhance effective teaching and learning. Based on the findings of the study the following recommendations were made; Government should ensure that more qualified mathematics teachers are employed. Vice principals academics and principals should ensure that mathematics teachers sufficiently cover the mathematics curriculum content. Government should ensure that adequate mathematics instructional materials are provided apart from chalk, chalkboard and textbooks.

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INTRODUCTION

The definition of curriculum is dependent on who is defining it and the person's interpretation of the meaning of education as well as the functions of institutions of learning; hence Curriculum means different things to different people. The term curriculum originated from a latin word "currus" which means to run a race. It is courses offered in educational institutions. This means that curriculum is a race course, which implies that the moment a child starts school; the race begins and stops at the end of the child's educational career (Offorma, 2005).

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It is a course of study which students pursue in order to get a degree, a certificate, a diploma or any other forms of academic awards Curriculum is a structured series of learning experiences intended for the education of the learners. It is a course of studies offered in the school for the education of the learners. Curriculum is a set of courses constituting an area of specialization. Curriculum is a programme. This includes programme of studies, programme of activities and programme of guidance. One cannot talk about curriculum without referring to the programme of studies which is seen in the form of subjects, contents, subject matters and bodies of knowledge. The programme of activities is made up of all the learning experiences presented to the learners. These experiences can be avert or covert; mental or physical.

They are also leaner-oriented and goal-oriented. Learners learn through activities and so the programme of activities facilitates the learning of the programme of studies. In the line of the above assertion; Onwuka (2004) defined curriculum as a series of planned and unplanned learning activities which a child is exposed to in the course of his development. The aim of which is to make him develop fully his potential so as to function effectively in the community. He went further to state that curriculum is never static, rather it is dynamic. When curriculum is analyzed, the intended objectives, the learning experience, the method of instruction, the method of evaluation, and all parts of or steps in Curriculum development have continued to change. Ibe (2018), Curriculum can be taken to mean the instrument by means of which schools seek to translate the hopes of the society in which they function into concrete reality. It is planned and sequenced. It is a vehicle through which education is attained. The essence of education is the ability to transfer the knowledge, facts, skills, values and attitudes learnt from one situation to solve problems in another situation, and this is done through curriculum. Therefore curriculum is the vehicle through which education is attained. It is planned in formal education and the planning is what demarcates formal from non-formal education. Based on these definitions, it means that curriculum implementation is the stage of carrying out or doing what are stipulated in the curriculum plan.

Curriculum implementation according to Saidu (2018) is the putting into action the planned curriculum. It is the execution of the planned curriculum in the classroom through the efforts of the teacher and the learners. This implies that curriculum implementation takes place in the classroom. When the teacher is teaching a lesson, he/she is implementing the curriculum because several lessons makeup a unit of instruction and several units make up a scheme of work, several schemes of work make up the syllabus and several syllabuses make up the curriculum. So in the long run, the first lesson that is taught in the class room is the beginning of the implementation of the curriculum. The implementation of secondary school curriculum requires the effort of some people and institutions. These include the students, parent/guardians, school, ministry of education and the government (Amadi and Obiefuna; 2005). This means that each of them has some stipulated role to play for a successful implementation to the curriculum hence the failure of any of them in carrying out the assigned responsibilities efficiently and effectively as regards the implementation of the curriculum could put the realization of its goal in jeopardy. To determine how each of these people and institutions have carried out their assigned duties or whether the curriculum has been fully implemented as documented, evaluation is needed. According to Ojoko (2000) evaluation is the systematic process of collecting and analyzing data in order to determine whether and to what degree objectives have been achieved or are being achieved. Ogoamaka (2005) sees it as the determination of worth, worthlessness or the alternative uses of KSDS (Knowledge, Skills, and Disposition) which students acquired through exposure. Hence, curriculum evaluation is the process of seeking and obtaining information about a programme for such decisions as: whether to continue, change, modify, improve, or terminate. This activity tends to address the questions of what is curriculum; who does it; how the person does it; and how well he/she does it and how it is implemented. Considering the recent poor performances of students in both the senior school certificate examination conducted by both the West African Examinations Council (WAEC) and National Examinations Council (NECO) especially in the area of mathematics, (Ekwuonye and Egbo, 2011),Uchenna,(2017), it becomes pertinent that effort should be made to determine the extent to which mathematics curriculum is implemented. This is because successful implementation of the curriculum among others should positively reflect on the performance of students. Secondary education the education children receive after primary education and before tertiary education. According to Orji (2002), the broad goals of secondary education are to prepare individuals for useful living within the society and also for higher education. To achieve these goals, the Nigerian Educational Research and Development Council (NERDC, 2004) posited that secondary school education should offer diversified curriculum to cater for the difference in talents, opportunities and future roles. In achieving this, many subjects were listed for students to study based on their talents, opportunities and interest. Generally, mathematics was made compulsory for all students.

Undeniably, the recent poor achievement of students in Mathematics in Senior School Certificate Examination conducted by WAEC and NECO has raised concern on the quality of teaching and learning in secondary schools especially Mathematics. This has led to so many questions viz: what proportion of Mathematics teachers are qualified? To what extent is the content of Mathematics curriculum covered? What is the availability and adequacy of the instructional materials? Consequently, the researcher poised with these issues decided to evaluate the implementation of mathematics curriculum in senior secondary schools in Abakaliki educational zone of Ebonyi State.

Statement of the Problem: Several factors are responsible for students' poor academic achievement. Some of these factors among others include: teachers' poor attitude to work, government poor funding and supervision of education, parents'/guardians' poor attitude to their wards' education and students' poor attitude to their studies. Interestingly, these people contribute to the successful implementation of the curriculum, especially the teacher who is the major curriculum implementer. Undoubtedly, effective and efficient implementation of the mathematics curriculum should positively lead to good academic achievement of students in mathematics in both external and internal examinations. The case here is the extent to which it is implemented. The poor achievement of students in SSCE conducted by both West African Examinations Council (WAEC) and National Examinations council (NECO) recorded in the past has persisted till this time of the study. Abdullah! (2010), has cast huge doubt on the effectiveness in the implementation of mathematics curriculum. This situation has led to several unanswered questions like: What proportion of mathematics teachers are qualified to teach mathematics? To what extent is the mathematics curriculum content adequately covered? What is the availability and adequacy of mathematics instructional materials? Has the aims and objectives of mathematics education been achieved? To these questions, it becomes necessary to carry out an assessment of the implementation of senior secondary school mathematics curriculum with the view to identify the flaws if any, in the implementation of this curriculum so as to come up with useful solution.

Scope of the Study: This study will be restricted to Senior Secondary School (SSS) Mathematics teachers and students in

all public secondary schools in Abakaliki education zone of Ebonyi State. It will be limited to assessment of the implementation of Senior Secondary School mathematics curriculum only.

Purpose of the Study: The main purpose of this study is to assess the implementation of senior secondary schools mathematics curriculum in Abakaliki education zone. Specifically, the study will ascertain the;

- Proportion of qualified teachers in mathematics.
- Extent to which mathematics teachers cover the content of mathematics curriculum.
- Adequacy of instructional materials.
- Extent to which mathematics teachers use the recommended assessment practices.

Significance/ Justification of the Study: The findings of this study if published would be of immense benefit to the teachers, students, parents, government and educational researchers. Teachers; will be aware of the fraction or magnitude of the mathematics curriculum that is sufficiently covered, insufficiently covered and not covered at all. They might see the need to review their approach to work and put more effort covering all the facets of mathematics curriculum very well. Students through this study could be aware of the mathematics curriculum and the extent that are generally covered. This can inspire them to study harder and devote more time to study mathematics in order to cover all the aspects of the curriculum which will enable them do very well in their academic pursuit. Parents will also be aware of the extent of coverage of mathematics curriculum in secondary schools. With this, they can work together with school authority through Parents Teachers Association (PTA) on how to ensure that the mathematics curriculum is satisfactorily and commendably covered by those concerned. This in no hesitation can enhance students' academic achievement.

The government on the other hand will be aware of the availability of mathematics instructional materials in our schools and the extent they are used in teaching the students. Government may see the need to supply the lacking instructional materials and employ more qualified teachers.

Research Questions

The following research questions are posed to guide the study.

- What proportion of teachers teaching mathematics in senior secondary schools (SSS) are qualified?
- To what extent is the SS mathematics curriculum contents covered?
- How adequate are there mathematics instructional materials in secondary schools?
- To what extent do the mathematics teachers use the recommended assessment practices?

Hypotheses: The following null hypotheses are formulated and will be tested at 0.05 level of significance.

Ho_1: The proportion of the qualified teachers is not significantly greater than the proportion of unqualified teachers ($p<0.05$).

Ho_2: The proportionate coverage of mathematics curriculum does not significantly differ from 2.5 ($p<0.05$).

Ho_3: The extent to which the mathematics teachers use the recommended assessment does not significantly differ from 2.5 ($p<0.05$)

REVIEW OF RELATED LITERATURE

Conceptual Framework

Concept of Curriculum: The term curriculum originated from a latin word "currus" which means to nm a race. It is courses offered in educational institutions. This means that curriculum is a race course, which implies that the moment a child starts school; the race begins and stops at the end of the child's educational career (Offorma, 2005). Asoegwu, (2009), defined Curriculum as the body of knowledge that houses all the experiences, skills, creativity and activities going on the school environment in order to achieve educational goals". This definition describes, curriculum as a house that accommodates knowledge for student utilization. In line with Asoegwu, Ali (2006) sees curriculum as a sequenced contents or course of instruction needed by the learner who is expected to demonstrate some objectives or behavioural change. This is done following instruction and experience in some content provided by schools (teachers and administrators) and based on a structured form of continuing evaluation. From this definition, new concept here includes content. Something to teach the students represents the content. Content according to Olaitan and Ali (2007) is described as the knowledge, skills, attitudes and values to be learnt in a course, subject or lesson. Content is the totality of what is to be taught to and learnt by pupils. The authors continued by saying in addition to being useful to students to organize their learning content, also serves as a vital tool to the teacher in guiding him in his teaching.

It is pertinent to point out that the difficulty in having a universal accepted definition of curriculum is because the societal needs, norms and aspiration from which the curriculum derive dare dynamic changes from society to society. However, considering the above definitions of curriculum it becomes clear to see curriculum as a decision making process. Some of the decisions concerning curriculum involves: what learning students should develop and why; how learning are to be organized and thought; materials and equipment and the quality of teachers among others (Amadi; 2005). It is in taking these decisions that curriculum is formed.

The Subject Curriculum: The subject curriculum can be taking as the oldest and perhaps the most widely used of all curriculum organization. Curriculum planers plan and organize the curriculum. In curriculum planning, the curriculum experts, teachers, parents, different subject specialists, ministries of education and government agencies, lay person, learner and other interest groups come *together to plan the curriculum to suit each subject. Some* of these subjects for SSS include: Mathematics, English Language, Biology, Physics, Chemistry, Economics, Government just to mention but a few. The outcome of these resource people is a form of curriculum guidelines or documents containing the selected content and learning experiences, methods, materials, and mode of evaluation. These documents planned based on the subjects in school are refereed to subject curriculum (Amadi; 2005). According to Ogomaka (2002), subject curriculum means the

things to be learned, objectives to be achieved by the learner are organized with the respect to school subjects or disciplines. Hence we have compartmentalization of knowledge - curriculum for Mathematics, curriculum for English language, curriculum for Biology and so on. Some other scholars viewed subject curriculum in context in which evaluation takes place to include the child, teacher, subject, the content, physical and psychological environment (Onyemerekeya, 2003; Hass, 2008; Appanga, 2005). Stress that in Nigeria it has to comprise the following parts: topic, content specification, activities, resources evaluation and remark. Illustrating this in mathematics:

Topic: Geometric Construction

Content: Several content can be derived and these include: construction of lines, construction of line segments, bisection of lines, construction of special angles; 15°, 30°, 45°, 60°, 90°, bisection of angles, construction of shapes-triangles, quadrilaterals etc.

Objectives: By the end of exposure, students should be able to: construct lines of different dimensions, bisect lines of different dimensions, construct 15°, 30°, 45°, 60°, 90° using a pair of compass and ruler, bisect any given angle with a pair of compass and ruler, construct a ABC with /AB/A 6cm, A = 60°, B = 40° and */EC/* =7cm.

Activities: These are those things to be done, actions, events which constitute exposure. From the above content, possible activities involved are: students watch the teacher as he draws the line with the ruler and marker and do their own using ruler and pencil. They watch the teacher bisect the line with a pair of wooden/plastic compass and marker and they do their own with a pair of compass and pencil etc.

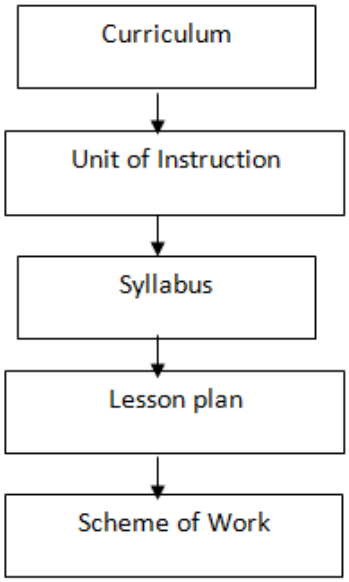
Resources: the resources needed in subject curriculum are both material and human. For instance, the resources needed to teach this topic include: marker, whiteboard, long wooden/plastic ruler, big wooden/plastic pair of compass for the teacher, students' ruler, pencil, pair of compass, protractor and so on, and of course a qualified teacher.

Evaluation: Both formative and summative evaluations are needed. Some questions for the evaluation of this topic include: draw horizontal line of 5cm, use a pair of compass and pencil bisect the 5cm line you have drew. Use a pair of compass and pencil to construct 90° and bisect it to get 45° and also bisect. 45 and measure all of the angles: construct a triangle ABC with /AB/ = 6cm, A = 60° and B = 40° and /BC/ = 7cm.

(**Source:** SSS Mathematics curriculum. 2015.)

Curriculum implementation: Curriculum implementation is a process of determining the total programmes for the learners. For Nicholls and Nicholls (1980: 14) 'curriculum implementation is the planning of opportunities intended to bring about certain changes in pupils and assessment of the extent to which these changes have taken place'. Curriculum implementation in the words of Offorma, (2002), is the term used to describe the creation of curriculum materials that are products of curriculum planning for use by the learners. Curriculum implementation which is the actual execution of the curriculum plan in the classroom through effective interactions of the teacher, learners and other elements in the instructional system is a very important stage of the curriculum plan and development process. Since the implementation of the curriculum takes place in the classroom, it means that the success or failure of any curriculum depends largely on the extent to which teaching and learning process carried out based on the plans specified in the curriculum. Among all the factors that influence the successful implementation of curriculum, teachers have been identified as indispensable elements (Kelly; 2004). Supporting the above statement, Duru (2011: 192), opined that, "the teacher is at the heart of curriculum implementation; the researcher can enhance its implementation or mar it." To determine whether curriculum implementation is successful or not, another stage of curriculum plan and development process known as evaluation is employed.

From the above definitions, it is very much clear that curriculum implementation is the series of activities or maneuvers directed towards executing curriculum plan. In no doubt, this fall directly in hands of the implementers principally the teachers. This means that for curriculum plan to be implemented successfully, teachers should understand in clear terms the curriculum plan and should also be willing to execute it the way it has been documented. Having good understanding of the curriculum entails that teachers among others should understand the: syllabus, scheme of work, units of plan, lesson plans and their efficient and effective usage. The overview of curriculum implementation specifies areas the classroom teacher should come in, in curriculum implementation. Curriculum implementation process should follow the sequence below:



The classroom teacher is not much involved in curriculum or syllabus planning and development rather, the syllabus is presented to schools so that the teachers can develop their scheme of work. Scheme of work which specifies the weekly topics and contents to be covered in each term is developed by team of subject specialist commissioned by the ministry of education from the syllabus. The documents of this resource team form the scheme of work is published by the State Ministry of Education and distributed to the schools. It is from the scheme of work that the individual teacher prepares the weekly plan and lesson plan. For the individual teacher to

write a meaningful lesson plan successfully, according to Onyemerekeya (2003), has to ensure that he:

- Has the knowledge of the subject matter;
- Exhibits adequate control and effective management of the class;
- Uses reinforcement and problem solving techniques effectively;
- Has at his disposal, teaching methods, instructional materials and good language command;
- Ask questions that reflect the specified objectives; and
- Gives adequate attention to students' individual's differences.

Curriculum Evaluation: Curriculum evaluation is also an integral and essential part of the curriculum. This is because of its position and the vital role it plays. It generates feedback which could be used to determine the effectiveness of the various components of curriculum and efficacy of the whole curriculum in attaining the stated objectives. In the modern concept of curriculum planning and development process, curriculum evaluation is no longer taken to be as the terminal stage due to the dynamic, cyclic and continuous nature of the curriculum plan and development process. (Duru, 2011). This is because it is now inbuilt in all the stages of curriculum process. All stages of curriculum planning and development process such as: content selection, learning experiences and or subsequent organization of content and learning experiences prepared using some specified criteria.

Factors Affecting Curriculum Implementation: Some of the factors which according to Amadi (2005) affect the implementation of the curriculum includes:

- **Teacher Factor:** The teacher according to (Orji 2002:24) is the hub of the educational system because the school cannot be better than its teachers. The quality of curriculum implemented reflects the teacher quality. While it can be argued that teacher qualification has been on the increase, the teaching quality and commitment have consistently been on the decline. The poor performance of students in most public examinations testifies to this. Owing to this, it then means that for a good curriculum to be effectively implemented, serious effort must be made to have qualified teacher in various subjects. According to Amadi (2003), there are short supply of mathematics, physics, chemistry, and introductory teachers in our secondary schools. The author stressed that inadequate motivation and remuneration of teachers is one factor causing this shortage of this crop of teachers in our secondary schools.
- **Financial Constrain Factor:** Onyemerekeya (2003) laments that this is one of the factors that affect curriculum implementation. Lack of funds can lead to poor implementation of the curriculum. Dwindling and unfavorable economic condition of a nation can cause this problem. Also government ignorance on the importance of education to nation building can cause this as well. However, whatever may be the cause it has been pointed out as one of the problems affecting curriculum implementation in Nigeria education. Poor funding can lead to non-payment of teachers' salaries and at when due. lack of basic instructional materials and poor infrastructures to make the environment conducive for teaching and learning. Through this way hinders the proper and effective implementation of the curriculum.
- **Lack of Commitment and Administrative Support:** This is also another identified factor affecting the implementation of curriculum. Amadi (1993) is of the opinion that an honest critical analysis of the situation shows lackadaisical commitment to implementation of the curriculum on the part of all concerned. Evidence indicates that most curricula like universal primary education (UPE) and 6-3-3-4 have failed as a result of this.
- **Socio - Political and Economic Instability:** To Onyemerekeya (2003), political instability does not promote effective curriculum implementation. A nation like Nigeria which have had several military coups, various changes in government policies, frequent strike actions and frequent revolts by students disrupt academic programmes of the schools and institutions. This hinders effective curriculum implementation which is inimical to the socio -political and economic development of the nation. The government contributes a lot to the effective implementation of the curriculum. The government provides the resources, pays the personnel, provide facilities and sets management guidelines especially in public secondary schools. The government also funds curriculum implementation. Hence any changes in government policies as it relate education is bound to affect the implementation of curriculum.
- **Lack of Students' Interest in Education:** Lack of students' interest in education affects curriculum implementation in our schools. Many children see education as a slow means of making money to become wealthy. Hence, many of them lack commitment to academic pursuit and consequently constitute problems to their teachers in teaching them. They tend to focus more attention to trades than in reading since they behave the former is well-paid than the later in acquiring wealth swiftly. Curriculum implementation requires interest and commitment on the part of the students who will be actively involved in the implementation process. When children lose faith in education, no matter the amount of effort the teacher puts into the process of implementation the result is low performance (Amadi 2003, Onyemerekeya 2003 ;3).

Mathematics Curriculum in Senior Secondary School: According to the National Policy on Education (2013), secondary education is seen as terminal for some students. Hence, the two basic functions the secondary schools must serve, therefore include:

- Prepare children for life and
- Give those with necessary background the opportunity to proceed to higher institutions.
- Objectives of Mathematics Curriculum as Presented by Federal Ministry of Education, FME (2004) include providing individuals with:
- Good habit of effective and reflective thinking
- Good communication of thought and symbolic expressions and graphs.

- Ability to distinguish between relevant and irrelevant data.
- Computational skills.
- Ability to recognize word problems and translate them into mathematical expressions before solving them with related mathematical knowledge.
- Ability to be accurate to a degree relevant to the problem at hand.
- Precise logical and abstract thinking
- However, then whether these objectives have been achieved and the extent to which they have achieved is another area that requires serious attention.

The WAEC Chief Examiners Report (2015) indicated that the candidates are generally weak in the following area:

- Negative indices where they should know that $a^{-z} = 1/a^{z}$
- Coordinates of a point (p, q) where p, stands for x - coordinate and q, stands for y - coordinate.
- Application of the rule of 'BODMAS' in solving problems.
- Trigonometric ratios of 0°, 30°, 45°, 60° etc.
- Geometry of circles.
- Latitudes and longitudes.
- Problems involving inequalities
- Scale drawing.
- Three - dimensional problems.
- Use of quadratic graphs to solve equation.

In solving these problems, the Chief examiners suggested the following remedies:

- Employment of more qualified mathematics teachers.
- Teachers should give more worked problems during the class lessons.
- Teachers should Endeavour to cover syllabus.
- More practice sessions in the form of assignments should be given.
- Seminars and workshops should be organized for mathematics teachers.
- Attempts should be made to correct the wrong notion among students that mathematics is a difficult subject. This can be done through effective campaigns.
- Teacher's student ratio in a class should not be more than 1:30.

The research has observed that in secondary schools, most teachers who specialized in physics, chemistry and biology are encourage to teach mathematics by the principals of schools where there is inadequate or no mathematics teacher. This condition is not good as they may not know all the aspects the curriculum of mathematics and students will suffer exceedingly for this. The researcher has also observed that in most schools the work load for mathematics teachers is too large and as a result most of them do not have time to pay adequate attention to students' assignments. The condition is worrisome as it does not encourage effective implementation of the mathematics curriculum.

Theoretical Framework

Antecedents Transactions and Outcomes (ATO) Model: This model was propounded by Stake in the year 1967.Three elements in the model were considered essential by Stake. Hence, evaluation of curriculum can focus on these three essential elements (ATO). Antecedents are the relevant conditions prior to the introduction of the programme. Transactions mean the various kinds of interactions and activities that are featured and occurred during the development and implementation of the programme. Outcomes are the various effects of implementing the programme.

- **Antecedents:** in this, the target audience and the needs to be met are identified. In this study, the target audience is the SSS students in Ebonyi education zone of Ebonyi State and the needs are the goals and objectives of mathematics curriculum which are achieved through the teaching and learning of the contents of the mathematics curriculum.
- **Transactions:** this involves examining the available resources which are both human and non-human resources such as teachers, instructional material etc. and determining whether they are adequate and effective.
- **Outcomes:** this involves examining results obtained to determine whether the need have been met.

Diagram illustrating ATO's Model

Review of Empirical Studies

Abdu (2014) carried out a work titled "Assessment of the implementation of mathematics curriculum in senior secondary schools in Kano state" This study was set to primarily investigate the issue of the implementation of Mathematics curriculum in Senior Secondary Schools in Kano State. In other words, the study was an attempt to study the level of curriculum content implementation. Research objectives, Questions and hypothesis were made to guide the study. Relevant research findings, studies and scholastic analysis related to this study were sought. The research design of the study was non-experimental or Qualitative Descriptive Design. The instrument used for the collection of data from the randomly selected sample of 624 out of the population of 3,679, was questionnaire. Two types of questionnaires were used in the study; one Questionnaire for Teachers and the other for Supervisors. Teacher's Questionnaire was made up of thirty items that were adopted from Mehmet (2005) and Ismet (2005) while supervisor's questionnaire was made up of twenty items. The response pattern or format of the questionnaire is open ended.On the-spot collection technique (Mkpa, 1998) was employed in the collection of the questionnaire distributed to subjects. Descriptive and Inferential Methods of Data Analysis were both employed in the analysis of the collected data. The Descriptive method of Simple Percentage was employed to answer the research questions , while the inferential analysis of Chi-square was used to test the hypothesis. Findings of the study revealed that Mathematics curriculum contents in Senior Secondary Schools in Kano State were not fully implemented. In addition, it was discovered that some internal factors i.e. those inclusive aspects within the curriculum, and other external factors such as provision of teaching and learning facilities, Qualified Teachers were influential to effective implementation of Mathematics curriculum. Based on the findings of the study, recommendations were provided at the concluding part. Part of the recommendations emphasized on the need for review of the entire curriculum contents in order to make it relevant to the needs and demand of this modern era.

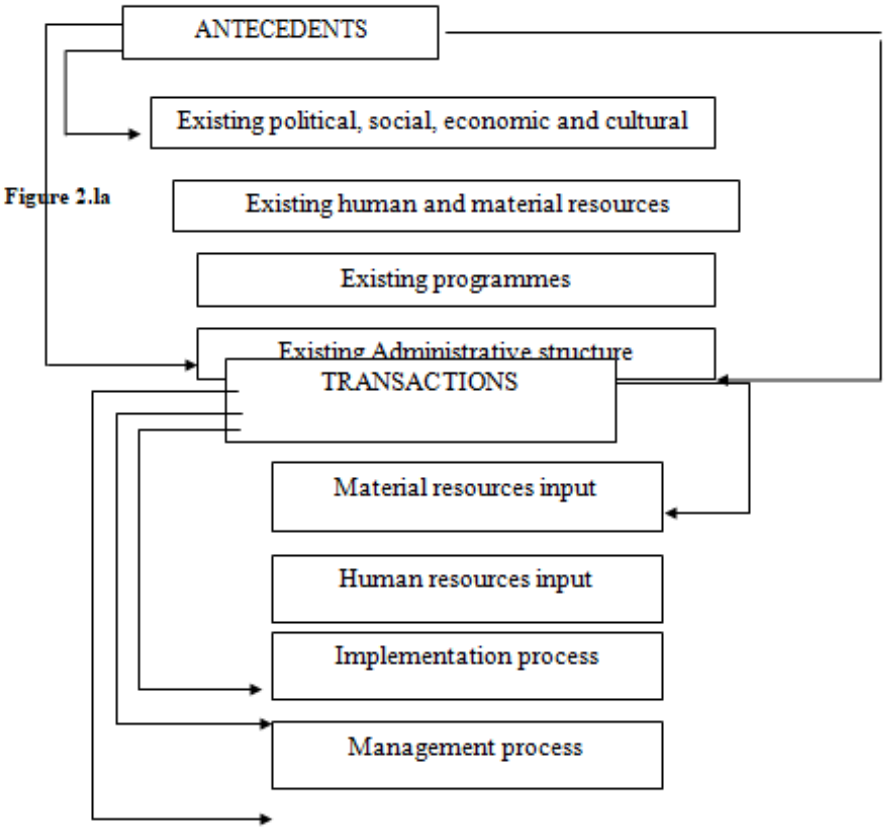


Figure 2.1a

Figure 2.1 b

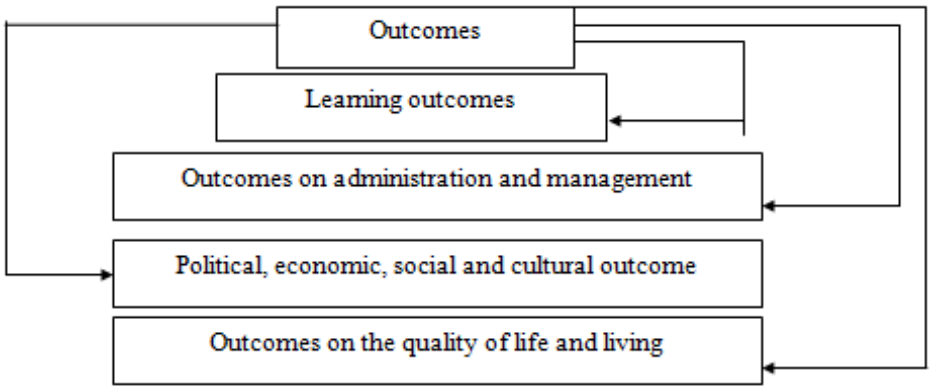


Figure 2.1c

Source: The countenance of educational evaluation. By Robert E. Stake

Table 1. Proportion of Qualified Mathematics Teachers

Qualification Total number Total number of of Mathematics Mathematics Teachers Teachers Qualified			Total of Number of Mathematics	Proportion Proportion of Qualified Unqualified Mathematics Mathematics	
			Teachers Unqualified	Teachers	Teachers
NCE	3	3	0	1.00	0.00
OND	-	-	-	-	-
HND	2	0	2	0.00	1.00
BA/B.Sc	9	0	9	0.00	1.00
BSC(Ed)	19	17	2	0.89	0.11
B.Ed	23	19	4	0.83	0.17
3. Tech	3	0	3	0.00	1.00
MA/M.Sc	6	0	6	0.00	1.00
M.Ed	7	7	0	1.00	0.00
PhD	2	0	2	0.00	1.00
B.Eng	-	-	-	-	-
M.Eng	-	-	-	-	-
Total	74	46	28	0.62	0.38

While this study was conducted in Kano State, the present study was conducted in Abakaliki Education Zone of Ebonyi State

METHOD

Design: Evaluation research design was adopted for the study. This design was chosen because of the evaluative nature of the study. Evaluation design in the words of Ali (2006), seeks to provide data for making value judgment about some events, objects, methods and materials within the context of the phenomenon evaluated.

Area of Study: The area of the study is Abakaliki Education Zone of Ebonyi State. It is made up of nine (9) local government area and one hundred and nineteen (119) public secondary schools. The inhabitants of this are mainly civil servants and few traders, farmers and artisans.

Population of the Study: The population is made comprise of all the mathematics teachers and SS students in all the 119 public secondary schools in Abakaliki Education Zone of Ebonyi State totaling 142 mathematics teachers and 43,323 students respectively.

Sample and Sampling Technique: The sample size is made up of 74 mathematics teachers and 600 students. Purposive random sampling techniques was employed. A sampling fraction of 0.5 used to determine sample size of 60 schools from 119 and random sampling technique was used to select schools from Education Zone. All the teachers teaching mathematics in selected schools (i.e. 74) were purposively selected because they are in better position to give information on the extent of mathematics curriculum implementation. However that of the students notes were checked which were of help to confirm the information supplied by teachers. This is because the researcher wanted to get the correct information regarding content coverage from the students. In each of the 60 selected schools, ten students (3 from SSI, 3 from SS2 and 4 from SS3) were selected to give a total of 600 students.

Instruments for Data Collection: Two instruments developed and used by Uchenna (2017) were adopted for the study - proforma and observational checklist. The Proforma has twelve items. The proforma will help the researcher to collect data on the qualification of the sampled mathematics teachers. The observational checklist is divided into 4 clusters based on the research questions. Cluster A contains items relating to content coverage of mathematics. Cluster B contains items relating to content coverage of mathematics curriculum and consist of 40 items from the main content areas in SSI, SS2 & SS3 which is in line with the current Mathematics curriculum. The researcher structured it in the four point likert type scale of Very Sufficiently Covered (VSC), Sufficiently Covered (SC), Fairly Covered (FC) and Not Covered at All (NCAL). Cluster C contains items relating to mathematics instructional materials and consist of 26 items. Cluster D contains items relating to recommended assessment practices and consist of 8 items.

Validation of the Instrument: The Profoma and the checklist instrument were face validated by four experts, one from mathematics department and two experts in measurement and one from the department of Curriculum.

All from Nnamdi Azikiwe University Awka. They were required to examine and critique the items of the instruments in order to:

- Determine the appropriateness of the items for the purpose of the study;
- Determine if the items were within the ability level of the secondary school mathematics studies;
- Identify any error, ambiguity or repetition in the items and make suggestions as appropriate.

Reliability of the Instrument: The instruments were trial-tested with thirty (30) mathematics teachers from the area of the study apart from those sampled. The internal consistency of the instruments were determined using Cronbach Alpha. Cronbach Alpha is applied to instruments that are not scored dichotomously (i.e. Instruments that do not have yes or no answers). The reliability estimates for the instruments was 0.68.

Method of Data Collection: The researcher together with the help of three research assistants adopted direct delivery technique (DDT) in administering the instrument. The researcher also went through the students' notebooks and the mathematics teachers lesson notes and collected data for the content areas covered and the assessment practices adopted by the mathematics teachers. To determine the available instructional materials, the researcher also visited the mathematics laboratories where the instructional materials are kept to took inventory of the available instructional materials. The researcher administered the proforma to the teachers to enable him collect data for their qualifications.

Method of Data Analysis: Proportions Mean and Standard deviations were used to answer the research questions while z-test and chi-square statistics were used in testing the null hypotheses at 0.05 significance levels. Decision Rule: on the level of coverage a mean of 3.50 - 4.00 is regarded as great extent; 2.50 - 3.49 as moderate extent; 1.50 -2.49 as less extent; and 1.00 - 1.49 as very less extent.

DATA ANALYSIS AND RESULTS

Research Question One: What proportion of teachers teaching mathematics in senior secondary schools (SSS) are qualified. Table 1 shows the sampled number of teachers teaching mathematics in the public senior secondary schools in Abakaliki education zone (74), and their various qualifications. Out of the number, 46 are qualified to teach mathematics while 28 are not qualified. Hence making the proportion of qualified teachers 0.62.

Research Question Two: To what extent is the mathematics curriculum content covered?

Table 2a shows the mean rating scores on the extent of coverage of Senior Secondary School (SSS) Mathematics Curriculum in the three classes -SS 1, SS 2, and SS 3. The table reveals that out of the 15 broad topics in SS 1, five are sufficiently covered (SC), eight are fairly covered (FC) while two are not covered at all (NCAL). In SS 2, out of twelve broad topics, six are sufficiently covered and also six are fairly covered. Also in SS3, five broad topics, are sufficiently coveted while three are fairly covered. Considering the grand mean for each class, SS 1, SS 2, SS 3 have grand mean of 2.17,

Table 2a. Mean rating scores on the extent of mathematics content coverage based on the teachers' lesson notes and students[9] note books

S/N	Broad Topics of SSI Mathematics Curriculum	vsc	SC	FC	NCAL	*X*	SD	Decision
1.	Number Base	-	2	52	20	1.76	0.49	FC
2	Laws of Indices	34	34	40	-	2. 50	0. 50	SC
3	Use of Logarithm	10	24	40	-	2, .59	0. 72	SC
4.	Sets	-	11	54	9	2 .03	0 .52	SC
[5]	Algebraic Simplification	5	10	46	13	2 .09	0 .76	SC
[6]	Quadric Equation	21	34	16	3	2 .99	0 .81	SC
7	Length of Arc of Circle	-	24	30	20	2 .05	0 .77	FC
8.	Menstruation of Solid Shapes	-	19	31	24	1 .93	0 .76	FC
9.	Geometric Construction	4	3	39	23	1 .91	0 .97	FC
10.	Locus of Moving Point	-	3	22	49	1 .38	0 .56	NCAL
11.	Deductive Proof	10	29	28	7	2 .57	0 .84	SC
12.	Polygons	12	18	32	12	2 .41	0 .94	SC
13.	Trigonometric Ratios of Right	9	15	32	18	2 .20	0 .94	FC
15	Trig ratio as related to Unit	-	4	20	50	1 .38	1 .59	NCAL
16	Circle							
[17]	Statistics	12	40	10	12	2 .70	0 .93	SC
SS 1 Mean and Standard Deviation2.17 0.74 FC								

S/N	Broad Topics of SS2 VSC Mathematics Curriculum	SC	FC	NCAL	*X*	SD	Decision
1.	Calculations Using Logarithm Tables in the Mathematical Operations of Numbers < 17	32	15	10	2.76	0.96	SC
2.	1 Approximation 21	34	16	3	2.99	0.81 0.76	SC
3.	Arithmetic Progression 11	24	37		2.68		sc
4.	Geometric Progression	11	24	37	-	2. 68	0.76 SC
5.	Quadratic Equations	34	6	29	35	1. .72	0. 83 FC
6.	Linear Inequality	12	18	32	12	2 .41	0. 94 FC
7.	Circle Theorem	14	28	24	8	2 .65	0. 91 FC
8.	Right Angled	12	40	10	12	2 .70	0. 93 FC
9.	Probability	-	9	52	20	1 .75	0. 48 FC
10.	Rules of Logarithms	24	34	10	6	3 .03	0. ,88 SC
11.	Practical Problems Involving Linear and Quadratic Equations	-	24	30	20	2 .05	0. 77 FC
12.	Statistics	20	40	10	4	3 .03	0.79 SC
SS 2 Mean and Standard 2.54 0.82 FC Deviation							

S/N	Broad Topics of SS3 Mathematics Curriculum	VSC	SC	FC	NCAL	*x*	SD	Decision
1.	Indices and Logarithm	14	21	32	7		2.57	0.90 SC
2.	Quadratic Equation	21	34	16	3		2.99	0.89 SC
3.	Further Menstruation	2	18	44	10		2.16	0.68 FC
4.	Statistics 1 (Group Data)	18	38	14	4		2.95	0.80 SC
5.	Compound Interest Investment Annuity	13	24	37			2.68	0.76 SC
6.	Trigonometry Graph	4	20	30	20		2.11	0.86 FC
7	Latitude and Longitude	4	20	38	12		2.22	0.78 FC
8.	Statistics II	10	29	28	7		2.57	0.84 SC
	SS 3 Mean and Standard Deviation						2.53	0.80 SC
	Grand Mean and Standard Deviation			2.41			0.79	FC
	Where:						^	
	VSC = Very sufficiently covered						V	
	SC = Sufficiently covered							
	FC — Fairly covered							
	NCAL = Not covered at all							

Table 2b. Summary of the information on Table 4a

Extent of SSS Mathematics Curriculum Content Coveragi

SS Classes	Mean	Standard Deviation	Decision
SSI	2.17	0.74	FC
SSII	2.54	0.82	SC
SS III	2.53	0.80	SC
Grand	2.41	0.79	FC

Table 3 Mean Rating Scores on The Availability of Mathematics Instructional Materials.

S/N	ITEMS	SA	IA	NA	*X*	SD	Decision
1.	Charts	10	19	31	1 ,18	0.44	NA
2.	Coins		3	57	1 .05	0.22	NA
3.	Dice		-	60	1 .00	0.00	NC
4.	Meter Rule	10	47	3	2 .12	0.45	IA
5.	Protractor		51	9	1 .85	0.36	IA
6.	Pair of Compass	2	47	11	1 .85	0.44	IA
7.	Probability Box		-	60	1 .00	0.00	NA
8.	Pie Chart Demonstration Board		-	60	1 .00	0.00	NA
9.	Clinometers		-	60	1 .00	0 .00	NA
10.	Plastic Cone		44	16	1 .73	0 .19	IA
11.	Plastic Pyramids	3	45	12	1 .85	0 .47	IA
12.	Plastic Sphere		8	52	1 .13	0 .35	NA
13.	Frustum Pyramids		13	47	1 .22	0 .41	NA
14.	Pair of Dividers		8	52	1 .13	0 .47	NA
15.	60° Set Square	7	45	8	1 .98	0 .50	IA
16.	45° Set Square	5	45	10	1 .92	0 .50	IA
17.	Textbooks	38	19	3	2 .58	0 .59	SA
18.	Instructional Television		-	60	1 .00	0 .00	NA
19.	Computer		4	56	1 .07	0 .25	NA
20.	Micrometer Gauge	5	43	12	1 .88	0 .52	IA
21.	Skeletal Globe		7	53	1 .12	0 .32	NA
22.	Graph Board		7	53	1 .12	0 .32	NA
23.	Dinar Box		-	60	1 .00	0 .00	NA
24.	Equation Board		-	60	1 .00	0 .00	NA
25.	Algebraic Rods		-	60	1 .00	0 .00	NA
	Cluster Mean and Standard Deviation				1 .39	0 .27	NA

Note: SA = sufficiently available; IA = insufficiently available; NA = not available.

Table 6. The Mean Rating Scores on The Extent to Which The Mathematics teachers Use The Recommended Assessment Practices

S/N	ITEMS :	GE	ME	LE	VLE	*X*	SD	DECISION
	Assessment Practices							
1	Oral questions	64	10	-	-	3.86	0. 34	GE
2	Essay writing	61	9	4	-	3.77	0.53	GE
3	Multiple choice	-	8	16	50	1.43	0 .68	VLE
4	True or false	-	-	-	74	1.00	0 .00	VLE
5	Project	-	-	-	74	1.00	0. 00	VLE
6	Home work	49	15	10	-	3.53	0.72	GE
7	Class work	54	20	-	-	3.73	0.44	GE
8	Completion of Blanks	-	-	-	74	1.00	0 .00	VLE
	Grand mean and	standard dev		iation		2.42	0.34	

Note: GE = Great Extent; ME - Moderate Extent; LE = Less Extent; VLE = Very Less Extent.

2.54, and 2.53 coverage respectively as shown in both table 4a and 4b, this means that the contents in SS 1, SS 2, and SS 3 are fairly, sufficiently and sufficiently covered respectively. The grand mean is 2.41 which indicate that the entire curriculum content is fairly covered.

Research Question Three: What are the mathematics instructional materials available? Table 3 shows that only textbooks are sufficiently available (SA), other items with serial number: 4, 5, 6. 10, 11, 15, 16, and 20 are insufficiently available (IA), and the rest are not available with the overall mean of 1.39. This means the level of availability is out of a total of 3 points indicating that as a whole mathematics instructional materials are not adequately available.

Research Question Four: To what extent do the mathematics teachers use the recommended assessment practices?. Table 4 shows the mean rating scores of the respondent as well as standard deviations and decision taken. The table shows that oral questions, essay writing, and home work are used to a great extent (GE) while multiple choice, true or false, completion type, project practices are to very less extent(VLE) used.

Hypothesis One: The proportion of the qualified teachers (QT) is not significantly greater than the proportion of unqualified teachers (UT) (P<0.05). Table 5 shows the z - test of Hoi. The table shows the z - calculated value (2.00) and z - tabulated value of 1.64 at significance level of 0.05. Since the z - calculated value is greater than z - tabulated value, the null hypothesis one (Hoj) is rejected.

Hypothesis Two (Ho_2)

The proportionate coverage of mathematics curriculum does not significantly differ from 2.5 (PO.05).

Table 6 Summary of z - test of Ho_2

Expected Observed SD z-calSLz-tab Decision
Mean *(X_E)* Mean (1_0)

2.50 2.41 0.79 1.00 0.05 1.64 Ho_2 Accepted Table 8 shows the expected mean (X_E), and the observed mean. (Xo) as well as the z - calculated value (1.00) and z - tabulated value of 1.64 at

0.05 significance level. The null hypothesis two (Ho_2) is accepted since the z -tabulated value is greater than the z - calculated value.

Hypothesis three (Ho_3): The extent to which the mathematics teachers use the recommended assessment practices does not significantly differ from 2.5 ($p<0.05$).

Table 7 Summary of X^2 - test of Ho_3

X^lcaidf SL X^ltab Decision

345.01 21 0.05 32.67 Ho_3 Rejected

Table 7 shows theX^2— calculated value and X^2— tabulated value as 345.01and 32.67 respectively. Since the X^2-calculated is greater than X^2-tabulated the null hypothesis (Ho_3) is rejected. This means that the use of recommended assessment practices differs significantly.

DISCUSSION OF FINDINGS

Proportion of Qualified Mathematics Teachers: The first objectives of this study is to determine the proportion of qualified mathematics teachers in SSS in the sampled areas. The result from table 1 shows that out of the 74 mathematics teachers only 46 of them, that is 62% are qualified. Also the result reveals that most of the unqualified teachers are those with degree in sciences and very few that had degree in mathematics but without educational background or qualification.

This finding is instructive to the owners of the schools - government. It has the potentialities of not exposing the child to all the aspects of mathematics curriculum since these unqualified teachers which is almost of the same size in proportion with the qualified teachers may not have all the professional skills and knowledge for teaching the students efficiently and effectively too. However, it is very important to mention that unqualified teachers who specialized in other subjects apart from mathematics are more likely to teach other subjects together with mathematics. The result of the study agreed with the finding of Ifeobu (2014) in her study which revealed that inadequate number of trained biology teachers were the problems militating against the implementation of the national curriculum to a moderate extent.

Extent of Mathematics Curriculum Content Coverage: Results from table 2a and 2b show clearly the content coverage of the mathematics curriculum in the three classes (SS 1, 2 and 3) and as a whole. The result indicates that SSS Mathematics Curriculum is only fairly covered with mean coverage of 2.41. This finding is very important to both the principal academics and the supervisory team of the SEB. The researcher is also of the opinion that the inadequate number of qualified mathematics teachers as discovered in this study, could among other factors contribute to this problem. The result of the study is in line with the findings of Ifeobu (2014) who indicated that the topical contents of the biology curriculum for senior secondary schools can achieve the objectives of the curriculum to a moderate extent. Again, the finding is in line with Alio's (2006) study, which reported that 75.5% average mean rating was found on the five aspects covered by his instrument which included content, language, methodology, evaluation and other feature aspects of the books.

Mathematics Instructional Materials: The result from table 3 shows that out of 25 listed mathematics instructional materials only one is sufficiently available while 8 are insufficiently available and 16 are not available. The result of the study is in line with the finding of Alabi (2014) which revealed that there are inadequate relevant instruction materials for the new subjects on the curriculum. This situation certainly does not enhance effective teaching and learning.

Extent of Utilization of the Recommended Assessment Practices: Result from table 4 shows that oral questions, essay writing, homework and class work are used to a great extent. This could be because these four practices are easy to use, not tedious and expensive. However, the result from the same table also reveals that multiple choice, true or false, project and completion of blanks are sparingly used. This could be due to the fact that these four strategies are tedious, time consuming in developing and utilization. They are also very expensive. The result of the study defers from the work of Ifeobu (2014) which indicates that teachers use the recommended assessment techniques in assessing their students to a moderate extent.

Summary of the Findings

The summary of the findings are presented as follows:

The proportion of qualified teachers teaching mathematics is greater than the proportion of unqualified teachers teaching mathematics.

- The proportion of qualified mathematics teachers teaching mathematics in our secondary schools are insufficient.
- The mathematics curriculum content is fairly covered.
- Result on the availability of instructional materials for mathematics shows that only one is sufficiently available (SA) While others are either insufficiently available or not available.
- The use of assessment practices are at variance with the recommendation of the State Ministry of Education.

Recommendation

Base on the findings of the study, the researcher recommended as follows:

- Government should ensure that more qualified mathematics teachers are employed.
- Vice principals academics and principals should ensure that mathematics teachers sufficiently cover the mathematics curriculum content.
- Government should ensure that adequate mathematics instructional materials are provided apart from chalk, chalkboard and textbooks.
- Seminars and workshops geared towards effective teaching and learning should be organized for mathematics teachers. These will help teachers on construction of test item based on multiple choice, fill in the gaps and use of project as assessment practices.
- All the varieties of assessment practices should be used to generate more valid and reliable performance scores of students.

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