# LEVEL OF IMPLEMENTATION OF THE SECONDARY SCHOOL SCIENCE CORE CURRICULUM IN NIGERIA

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## ABSTRACT

*The study determined the level of implementation of science curriculum in secondary schools. The products of education have not exhibited the required and desired knowledge, skills and attitudes needed from them after being exposed to the designed curriculum. The researchers observed this existing gap. The purpose of the study is to evaluate the level of the implementation of the curriculum in terms of the contents of the core curriculum that stipulates what is taught to the child, the instructional materials used in teaching and the evaluation procedures used by teachers in assessing students' learning outcomes. The scope of the study was delimited to the level of implementation of the chemistry core curriculum in Ebonyi State of Nigeria. The design of the study was the program evaluation research design. The population was all the secondary schools in the state totaling 405. The state was stratified according to the three educational zones. Proportionate random sampling technique was used to sample 120 secondary schools out of 405 schools. A Checklist of the Nigerian core curriculum for chemistry education was used for data collection. Data collected were analyzed using mean, standard deviation and percentages. Findings revealed that the Level of Correspondence of the Contents of Chemistry Education taught in Ebonyi state secondary schools with the specification of the Chemistry Core Curriculum were achieved to a very high extent. The level of correspondence of the Instructional Materials used in teaching Chemistry lessons to the specification of chemistry education core curriculum and evaluation procedures were achieved to a very low extent. The implication is that students are taught the required content areas without good instructional materials, and with the evaluation procedures like written and oral tests and not projects or the other performance assessment tools. These can lead to poor achievement of students and can generate scores that lead to poor inferences. The researchers therefore recommended for the retraining of teachers that will be well versed in the actual implementation of the core curriculum and for government to give more attention to education by providing essential facilities for teaching and learning.*

**Keywords:** Implementation, Core Curriculum, Evaluation Procedures, Content and Instructional Materials.

## INTRODUCTION

Education is a major agent of economic development and improvement in the world. Anugwo (2010), opined that "*education is at the centre of every sector of the economy. It makes*



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*provision for the availability of manpower to all sectors. The flourishing extent of every sector is dependent on the capacity of the human resource provision by the education sector. It is such that when the available manpower is lacking in quality and quantity, the education sector is not geared to maximize its productive capacity*". In line with this, Ojerinde (2015) said "*As global economic competition grows sharper, education becomes an important source of competition advantage, and appears to be one of the key human developments*".

It is widely accepted that the type of education acquired by students in most parts of the world is still below expectation and optimal and has failed to yield the necessary attributes, knowledge and skills among the recipients. Coming home to the African setting, many students lack the motivation and enthusiasm to learn because of the type of content, process of teaching, assessment issues and how education is generally handled or implemented. According to Musau (2018), education in the African nations and training programs suffer from low quality teaching and learning as well as inequalities and exclusion at all levels. She added that there is the additional challenge of Africa's poorly resourced education systems, the difficulties ranging from the lack of basic school infrastructure to poor quality instruction. In Nigeria, there are three levels of education: Primary, Secondary and Tertiary. Each with stated achievable objectives (Igwe, 2015).These objectives at any level of education cannot be achieved if the planned program for such a level of education is not properly implemented.

The planned program here is the core curriculum, defined as the set of courses and basic requirements designed for the students for a particular program. It is considered the best, suitable and essential for the students' all round living. According to Nevenglosky et al. (2013) curriculum implementation referred to how teachers deliver instruction and assessment through the use of specified resources provided in a curriculum. When the curriculum is properly implemented, it fosters students' development and makes them a square peg in a square hole. This informs the view of Igwe (2002), that no matter how well the curriculum of a subject is planned, designed and documented, implementation is very important. It seems that the problem of most programs is at the implementation stage. In senior secondary education level, Chemistry is one of the core science subjects for science students. It is the pivot on which the wheel of science rotates (Nwani, 2018). Chemistry is very important and helpful in fields such as medicine, agriculture, transportation, housing, industries, etc. Life is made more meaningful with chemical product such as drugs, cosmetics, paints, soap, fertilizers etc. Chemistry as an academic discipline plays a very significant role in unifying other science subjects. Chemistry therefore is seen as the central science and the mother of all sciences. It is a branch of pure science that deals with composition, transformation, properties and uses of matter (Agogo & Maduawesi, 2014).

The objectives of secondary school chemistry education curriculum are expected among other things enable students to:

1. Develop interest in the subject of chemistry;
2. Acquire basic theoretical and practical knowledge and skills;
3. Be positioned to take advantage of the numerous career opportunities offered by chemistry;
4. Be adequately prepared for further studies in chemistry.

The chemistry curriculum needs to be effectively implemented to achieve the above mentioned objectives, curb the numerous pit-falls in chemistry education and prepare students for tertiary education. For instance, because of poor background formation of secondary students in chemistry, many African students are unemployed and cannot employ themselves because they lack the pre requisite skills for job creation even after passing through a well-articulated curriculum that has been revised by experts and equipped to meet the challenging needs of our



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society. This again revealed the existing gap in the level of curriculum implementation and confirmed the need to ascertain the level of its implementation, to know whether the level the content of the core curriculum inculcated to the students, as well as the instructional material used in teaching and evaluation procedures used in assessing students' learning outcomes are all in line with the core curriculum. These are the scope this study is delimited to.

## The Problem

Every child deserves an opportunity to achieve and develop maximally in the school, but this is far from being the real situation as attested by experts and from the researchers' observation. According to literature, achievement of students in sciences in most African countries and beyond is low. Sam and Eriba (2012); West African Examination Council, WAEC (2018) recorded poor achievement in chemistry examinations and other sciences in 2018 and in the years before. WAEC attributed this decline to students' lack of understanding of the demands of the questions and poor knowledge of some contents. Al-Zoubi & Younes (2015) writing from Jordan said that the problem of poor achievement of students in examination is one of the most challenging problems that face students as well as teachers. Wu & Xin (2019) said that failing a test has become a common phenomenon in university study life. 65% failing rate for single subjects and 18% for 3 or more and failing, 2 or more subjects, rates 26%. Aremu and Jokun (2003) said that secondary school education has received little attention by governments and donor agencies, a factor that could have contributed to the poor academic performance in secondary schools. The quality of education at primary section depends on the quality of teachers and their competence, their capacity, the teaching and learning process and it is widely recognized that quality of teachers lies at the heart of schooling systems to offer quality education. Masha (2004) said that secondary schools are managed by government, the foundation bodies and local community initiatives. Masha opined that all these culminate into inefficiencies that are managed in terms of teacher deployment, repetitions, school dropout, and juvenile delinquency among other challenges. Other literatures abound. Education does not stop with policy making. For education to produce an all-round and functional individual there is need to stipulate and inculcate in the students contents of the curriculum which match the needs of the individual and that of the society, provide adequate resources for implementation and use the right evaluation procedure to assess students' capabilities. These teaching and learning processes are encountered in every school in the world. Schools should be meant to be on their toes always, involving in basic activities that cause permanent and positive change in behavior. This is achieved by school monitoring, supervision and finding level of implementation of the curricular activities. Hence the need for this study to determine the level which secondary schools follow the core curriculum in their daily teaching and learning delivery, with the study being delimited to Ebonyi State of Nigeria.

## Purpose of the Study

The general purpose of this study is to evaluate the level of implementation of secondary school core curriculum. Specifically the study aimed at finding out the level of correspondence of the:

1. Chemistry contents taught in secondary schools, to the specification of the chemistry core curriculum.
2. Instructional materials used in teaching in secondary schools, to the specification of the chemistry core curriculum.
3. Evaluation procedures used to assess students, to the specification of the core curriculum in Nigeria.



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**Research questions:** In order to achieve the aims of this work the following research questions were formulated;

The questions are:

1. What is the level of correspondence of the contents of chemistry taught in secondary schools to the specification of the chemistry core curriculum?
2. What is the level of correspondence of the instructional materials used in teaching chemistry in secondary schools, to the specification of chemistry core curriculum?
3. What is the level of correspondence of the evaluation procedures used to assess students, to the specification of the chemistry core curriculum?

## METHODOLOGY

Program evaluation research design was used in this study because the study involved a systematic method for collecting, analyzing, and using information to answer questions on the extent of secondary chemistry education curriculum implementation, particularly about the effectiveness and efficiency of the program (Vedung, 2010). The population of the study comprised four hundred and five (405) secondary schools in Ebonyi State. It was stratified into the 3 education zones, namely: Abakaliki, Onueke and Afikpo. One hundred and twenty (120) schools were simple randomly sampled from the zones, 50, 37 and 33 schools respectively. The instrument for data collection was a checklist and a questionnaire. Section A elicited personal information from the respondents. Section B, a cluster that contained all the content areas for SSI to SSIII students, another cluster, Section C contained a list of instructional materials for chemistry teaching and Section D, which is the last cluster and a 4-point optioned questionnaire that contained the evaluation procedures for assessment of students' outcomes. The options were Very High Level (mean of 3.1-4.0), High Level (2.1-3.0), Low Level (1.1-2.0) and Very Low Level. All means are approximated to one decimal point. All the items of the instrument were adapted from the core curriculum approved by the federal ministry of education in Nigeria and used by all the examination bodies in the country, like West African Examination Council (WAEC) and National Examination Council of Nigeria (NECO). The instrument for data collection went through confirmatory validation and reliability (face and content validation; Inter rater reliability) by chemistry specialists and measurement and evaluation experts. In validation, the experts checked for an inclusive document that is relevant and representative of the contents, instructional materials and evaluation procedures for the study. In reliability, the Kendal's coefficient of concordance of 0.92, 0.82 and 0.85 were established for content, instructional materials and evaluation procedures respectively. This shows that the instrument is reliable, but not perfect and may not be exhaustive. The researchers went ahead to use the instrument as stipulated, because that is the one available to the schools. This is a research for some other time. This study is interested in its implementation. The researchers and trained assistants went to these schools, checked the contents taught in the schools, instructional materials and evaluation procedures used by the teachers in the schools and matched them with the ones stipulated in the core curriculum. This was done by looking into the teachers' diaries on topics they taught in chemistry in each school, which they submitted to the head teachers or dean of studies and also the ones in the students' note and assignment books. The availability of the instructional materials used in teaching each content area, in each school as stipulated in the core curriculum was checked. Teachers in each school ticked the evaluation procedures they used in assessment. Data collected were analyzed using mean and percentage. The decision rule was a cluster mean and percentage of 70 and above were accepted as very high level of adequacy; 60-69 was termed



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high level, from 50-59 was average, 40-49 was low level and 0-39 were accepted as very low level of adequacy of materials and use of content in the implementation of chemistry core curriculum.

## RESULTS

Results are presented in Tables, in line with the research questions.

**Research question** 1: What is the level of Correspondence of the Contents of Chemistry Education taught in Ebonyi state secondary schools with the specification of the Chemistry Core Curriculum? Table 1.

**Table 1**
**PERCENTAGE RATING OF RESPONDENTS ON THE LEVEL OF CORRESPONDENCE OF THE CONTENTS OF CHEMISTRY EDUCATION TAUGHT IN EBONYI STATE SECONDARY SCHOOLS TO THE SPECIFICATION OF THE CHEMISTRY CORE CURRICULUM**

| S/N | Topics | Contents specified | Contents taught | Percentage level of coverage | Decision |
|---|---|---|---|---|---|
| 01 | Introduction to Chemistry | 5 | 5 | 100% | VHL |
| 02 | Symbols, formulae and equations | 6 | 6 | 100% | VHL |
| 03 | Particulate Nature of matter | 7 | 7 | 100% | VHL |
| 04 | Chemical combination | 6 | 6 | 100% | VHL |
| 05 | Chemical Industries | 3 | 3 | 100% | VHL |
| 06 | Gas laws | 10 | 10 | 100% | VHL |
| 07 | Standard separation techniques for mixtures | 9 | 9 | 100% | VHL |
| 08 | Acids Bases and Salts | 4 | 4 | 100% | VHL |
| 09 | Water | 15 | 15 | 100% | VHL |
| 10 | Carbon and its compounds | 12 | 12 | 100% | VHL |
| 11 | Periodic table | 7 | 7 | 100% | VHL |
| 12 | Chemical reaction | 6 | 6 | 100% | VHL |
| 13 | Non- metals & their compounds | 5 | 5 | 100% | VHL |
| 14 | Electrolysis | 5 | 5 | 100% | VHL |
| 15 | Hydrocarbon | 7 | 7 | 100% | VHL |
| 16 | Quantitative and qualitative analysis | 6 | 6 | 100% | VHL |
| 17 | Petroleum or crude oil | 9 | 9 | 100% | VHL |
| 18 | Metals and their compound | 11 | 11 | 100% | VHL |
| Cluster Mean Percentage | | | | 100% | VHL |

Key: 1. Cluster Mean Percentage=( Sum of percentage level of coverage%÷ Total numbers of items in the cluster)

**2. VHL=Very High Level, HL=High Level, LL=Low Level, VLL=Very Low Level, DEC=Decision**

Items 1,2,3,4 to 18 in research question one; have percentage ratings of 100% on each item and cluster mean percentage of 100%. The cluster mean percentage of 100% indicated that the secondary schools in Ebonyi state teach the approved Contents of Chemistry Education in the Chemistry Core Curriculum to a very high extent, perfection.

### Instructional Materials



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**Research question 2**: What is the level of correspondence of the Instructional Materials used in Ebonyi state secondary schools in Chemistry lessons with the specification of core chemistry education curriculum? Table 2.

**Table 2**
**PERCENTAGE RATING ON THE LEVEL OF CORRESPONDENCE OF THE INSTRUCTIONAL MATERIALS USED IN EBONYI STATE SECONDARY SCHOOLS IN CHEMISTRY LESSONS TO THE SPECIFICATION OF CORE CHEMISTRY EDUCATION CURRICULUM**

| S/N | Instructional Materials Specified | Materials To Users' Specification | No of Materials available | No of users in schools | Ratio | Percentage Correspondence | DEC |
|---|---|---|---|---|---|---|---|
| 1. | Pictures of chemical industries and laboratories | 1:50 | 120 | 32100 | 1:268 | 19% | VLL |
| 2. | Posters and charts | 1:50 | 240 | 32100 | 1:134 | 37% | VLL |
| 3. | Locally available chemical industries | 1:1 | 10 | 120 schools | 1:12 | 8% | VLL |
| 4. | Periodic table of elements. | 1:50 | 120 | 32100 | 1:268 | 2% | VLL |
| 5. | Common salt | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 6. | Candle | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 7. | Models (coloured beads) | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 8. | Calcium carbonate (calcium trioxocarbonate (IV) ($caco_3$) | 1:5 | 120 | 32100 | 1:268 | 2% | VLL |
| 9. | Camphor balls | 1:5 | 1300 | 32100 | 1:25 | 20% | VLL |
| 10. | Some liquids e.g oil, water | 1:5 | 120 | 32100 | 1:268 | 2% | VLL |
| 11. | Aerosol | 1:5 | 150 | 32100 | 1:214 | 2% | VLL |
| 12. | Piston and pump | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 13. | Cotton wood and ammonia solution; conc. Hcl | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 14. | Thermometer and glass vessel | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 15. | Sand | 1:5 | 5000 | 32100 | 1:6 | 83% | VHL |
| 16. | Iodine crystals | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 17. | Sulphur powder | 1:5 | 421 | 32100 | 1:76 | 7% | VLL |
| 18. | Filter paper | 1:5 | 5000 | 32100 | 1:6 | 83% | VHL |
| 19. | Ink | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 20. | Separating funnel | 1:5 | 421 | 32100 | 1:76 | 7% | VLL |
| 21. | Evaporating dish | 1:5 | 405 | 32100 | 1:79 | 6% | VLL |
| 22. | Liebig condenser | 1:5 | 240 | 32100 | 1:134 | 4% | VLL |
| 23. | Cubes of sugar | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 24. | Ripe and unripe fruits (mango, orange, pawpaw, grape, lime, etc) | 1:5 | 1500 | 32100 | 1:21 | 24% | VLL |
| 25. | Sour milk | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 26. | Brightly coloured flowers or leaves (hibiscus, croton, ixora, allamanda, blue bells, etc) | 1:5 | 1230 | 32100 | 1:26 | 19% | VLL |



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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 27. | Chemicals (NaOH, KOH, HCl, $H_2SO_4$) | 1:5 | 950 | 32100 | 1:34 | 15% | VLL |
| 28. | Distilled water | 1:5 | 5000 | 32100 | 1:6 | 83% | VHL |
| 29. | Acetone(propanone) | 1:5 | 120 | 32100 | 1:268 | 2% | VLL |
| 30. | Ethanol | 1:5 | 130 | 32100 | 1:247 | 2% | VLL |
| 31. | Mortar/pestle | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 32. | Litmus paper | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 33. | Methyl orange | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 34. | Phenolphthalein | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 35. | Charts (preparation of water, uses of water) | 1:5 | 3000 | 32100 | 1:11 | 45% | VLL |
| 36. | Water samples (river, well, tap etc) | 1:5 | 3555 | 32100 | 1:9 | 56% | HL |
| 37. | Soap | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 38. | Samples of contaminated water | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 39. | Samples of hard water | 1:5 | 409 | 32100 | 1:79 | 6% | VLL |
| 40. | Washing soda | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 41. | Distillation apparatus | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 42. | Sodium chloride | 1:5 | 300 | 32100 | 1:107 | 5% | VLL |
| 43. | Weighing balance | 1:5 | 455 | 32100 | 1:71 | 7% | VLL |
| 44. | Water bath | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 45. | Kerosene | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 46. | Oil stained piece of cloth | 1:5 | 406 | 32100 | 1:79 | 6% | VLL |
| 47. | Samples of carbon containing compounds in and around us e.g. stick, paper, coal etc | 1:5 | 450 | 32100 | 1:71 | 7% | VLL |
| 48. | Real examples of crude oil fractions such as petrol(pms), diesel oil, kerosene etc. | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 49. | shells, fruits, alkanols | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 50. | Carbonates | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 51. | Glass vessels | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 52. | Gas from decaying foods, fruits and vegetables | 1:5 | 5 | 32100 | 1:6420 | 0.08% | VLL |
| 53. | Periodic table of elements | 1:5 | 4000 | 32100 | 1:8 | 63% | HL |
| 54. | Blank periodic table template | 1:1 | 2000 | 32100 | 1:16 | 6% | VLL |
| 55. | Sodium metal | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 56. | Magnesium ribbon | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 57. | Aluminum metal | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 58. | Heat source | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 59. | Glass trough | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 60. | Beakers. | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 61. | Common reagents like HCl, $CuSO_4$, NaCl, $NH_4OH$, $NH_4$cl, etc | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 62. | Test tubes | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |



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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 63. | Conical flask. | 1:5 | 1200 | 32100 | 1:27 | 19% | VLL |
| 64. | Picture showing a welder at work | 1:50 | 120 | 32100 | 1:268 | 2% | VLL |
| 65. | Laboratory apparatus and reagents for the preparation of oxygen Hydrogen; Halogens; Nitrogen; Sulphur | 1:5 | 650 | 32100 | 1:49 | 10% | VLL |
| 66. | Matches | 1:5 | 5000 | 32100 | 1:6 | 83% | VHL |
| 67. | Splint | 1:5 | 5000 | 32100 | 1:6 | 83% | VHL |
| 68. | An electrolytic cell apparatus | 1:5 | 830 | 32100 | 1:39 | 13% | VLL |
| 69. | Hoffman's voltammeter | 1:5 | 450 | 32100 | 1:71 | 7% | VLL |
| 70. | An electrochemical cell apparatus | 1:5 | 450 | 32100 | 1:71 | 7% | VLL |
| 71. | Copper sulphur solution | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 72. | Dilute $H_2SO_4$ | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 73. | Bromine | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 74. | Models of hydrocarbons | 1:5 | 550 | 32100 | 1:58 | 9% | VLL |
| 75. | Bromine water | 1:5 | 600 | 32100 | 1:54 | 9% | VLL |
| 76. | Silver trioxonitrate (v) solution | 1:5 | 500 | 32100 | 1:64 | 8% | VLL |
| 77. | Indicator extract from flowers | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 78. | Bomb calorimeter | 1:5 | 450 | 32100 | 1:71 | 7% | VLL |
| 79. | Relevant acids and bases | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 80. | Relevant salts | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 81. | Starch, fats and oils, proteins etc | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 82. | Pictures: - on exploration of oil of any refinery in Nigeria | 1:50 | 120 | 32100 | 1:268 | 2% | VLL |
| 83. | Fractional distillation apparatus | 1:5 | 450 | 32100 | 1:71 | 7% | VLL |
| 84. | Petroleum product - kerosene, diesel oil, grease, etc | 1:5 | 1000 | 32100 | 1:32 | 16% | VLL |
| 85. | Samples of plastics, synthetic rubber, insecticides, detergents, fibres(nylon, Dacron, etc) | 1:5 | 400 | 32100 | 1:80 | 6% | VLL |
| 86. | Cylinder of natural gas | 1:5 | 350 | 32100 | 1:92 | 5% | VLL |
| 87. | Samples of metals and their compounds | 1:5 | 900 | 32100 | 1:36 | 14% | VLL |
| 88. | The periodic table of elements(picture) | 1:50 | 1200 | 32100 | 1:27 | 19% | VLL |
| 89. | Chart of mineral ore distribution in Nigeria | 1:50 | 1200 | 32100 | 1:27 | 19% | VLL |
| 90. | Chart of mining and metal-related industries in Nigeria | 1:50 | 1200 | 32100 | 1:27 | 19% | VLL |
| 91. | Cluster Mean Percentage | | | | 16.47% | | VLL |



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Result shows that the level of correspondence of the instructional materials used in Ebonyi state secondary schools on Chemistry lessons with the specification of the core chemistry education curriculum is to a very low level with a cluster mean of 16.47%. Although, some instructional materials like sand, distilled water, filter paper, matches, splint are used to a very high extent and others like periodic table of elements and water samples (river, well, tap) are used to a high and average levels respectively.

**Research question 3**: To what extent do chemistry teachers adopt evaluation procedures as specified in the national Chemistry core curriculum? Table 3.

**Table 3**
**MEAN RATING OF RESPONDENTS ON THE EXTENT TO WHICH CHEMISTRY TEACHERS ADOPT EVALUATION PROCEDURES AS SPECIFIED IN THE NATIONAL CHEMISTRY CORE CURRICULUM**

| SN | Evaluation Techniques | Mean | SD | Decision |
|---|---|---|---|---|
| 1 | Use of Written Tests | 3.17 | 0.91 | VHL |
| 2 | Use of Quiz | 2.93 | 0.86 | HL |
| 3 | Use of Oral Questioning | 2.53 | 0.50 | HL |
| 4 | Use of Essay Writing | 2.67 | 0.78 | HL |
| 5 | Use of Objective tests | 1.88 | 0.58 | LL |
| 6 | Use of Laboratory Work Assessment | 1.68 | 0.47 | LL |
| 7 | Use of Projects Assessment | 1.93 | 0.52 | LL |
| 8 | Use of Practical Assessment | 1.88 | 0.32 | LL |
| 9 | Use of Take Home Assessment | 2.98 | 0.59 | HL |
| Cluster Grand Mean | | | 2.29 | LL |

The result of the level of Correspondence of evaluation procedures used by chemistry teachers in teaching and learning with the specification in the core curriculum showed that use of written tests, quiz, oral questioning, essay and take home assessment evaluation procedures with the mean ratings of 3.17, 2.93, 2.53, 2.67 and 2.98 respectively were used to a high level. Objective tests, laboratory work assessment, project and practical work assessments with the mean ratings of 1.88, 1.68, 1.98 and 1.88 respectively were to a low level of correspondence. The cluster grand mean of 2.29 showed that teachers generally use evaluation procedures to a high level in secondary schools in Nigeria.

## DISCUSSION OF FINDINGS

The findings on the level to which the Contents of Chemistry Education taught in secondary schools is in line with the specification of the Chemistry Core Curriculum revealed that all the schools cover the Contents of the Chemistry Core Curriculum to a very high level, which means that Chemistry teachers teach the recommended curriculum content areas in their schools. In another study by Aja (2021) out of 66 topics done by students in the junior secondary in basic science, 59 topics had 100% correspondence with the core curriculum. Only 7 topics did not measure up with 80%, 89%, 67%, 67%, 75%, 75% and 50%. Anugwo & Ekoyo (2019) on the evaluation of the level of implementation of the contents of computer core curriculum for primary schools in Nigeria, the story was different. Out of 23 content areas in computer from primary 1 - 6, only 7 topics, very highly (100%) correspond to the specification of the core curriculum. Others highly corresponded. A topic, computer games was not taught at all by any of the schools. The finding is also in agreement with that of Ezeudu (2018), who reported that most teachers cover all themes in the senior secondary school chemistry curriculum and also



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confirmed the statement of the principal of one of the secondary schools in Nigeria, Nweke (2021) who said that, the problem of curriculum implementation is not about covering scheme of work, because her teachers cover scheme of work for sessions.

Content, according to Oteh & Akuma (2010) is referred to subject matter, what is taught and learned in the school. It is the knowledge, principles, concepts, generalizations, theories, attitudes, values, skills and processes to which the learner is exposed to. It is surprising to find out that students are exposed to the right contents as stipulated in the curriculum and yet achieve poorly. This can be attributed to so many factors like the method of teaching, the facilities available for teaching, the assessment processes and tools, etc. Science is embraced by the students differently from the way they see other areas of study. Chapman (2000) said that science typically engage in a certain kind of thinking and behavior. They regularly make careful observations, collect, organize data, measures graphs and understand spatial relations, pay attention to and regulate their own thinking, know when and how to apply knowledge to solve problems. These should be taken into consideration in delivering the contents to the students.

On the level of correspondence of the Instructional Materials used in teaching in secondary schools with the specification of core chemistry education curriculum, the result revealed that the level of correspondence of the use of specified instructional materials in teaching Chemistry when compared with the Core Curriculum is to a very low extent. Most of the teaching materials that are supposed to be sufficiently made available in schools were not there at the time of investigation. Some available materials look very old, expired and damaged. Instructional materials according to Igwe (2015) are alternative channels of communication which a teacher can use to compress and express information and make them more vivid to his learners. The finding is in agreement with that of Ezeudu (2018), who reported that there is inadequate availability of chemistry instructional materials for senior secondary schools teaching and learning in Anambra state of Nigeria. These findings gave reason to the poor achievement of students in the sciences. In a study by Adalikwu & Iorkpilgh (2012) found out that students taught chemistry in Cross River State of Nigeria with instructional materials performed significantly better than those without. Their understanding of concepts was improved and led to high academic achievements. Instructional materials make the lesson interesting, real, enhance learning, conceptual abilities and skills and make it easy for teachers to communicate their lessons effectively to the students. A lot of researches confirming the importance of instructional materials in teaching and learning of the sciences abound. Government should stop paying lip attention to the education sector and provide all the instructional materials necessary for teaching and learning in every school.

On the level of implementation of the Evaluation procedures used by chemistry teachers in assessing secondary school students in relation to the chemistry core curriculum. The findings revealed that there is low level of adoption of the evaluation procedures among the teachers. The teacher did not use all the approved evaluation procedures as indicated in the curriculum. It was found that teachers mostly used tests, quizz, oral Questioning, essay writing and take home assignments in their evaluations and neglected the use of the multiple choice questions, practical, laboratory work assessment and project evaluation procedures. Similar research by Aja (2021) on the level of implementation of Basic science core curriculum in Nigeria, tests and quiz dominated all assessment techniques. Also in Ekoyo (2018) on the evaluation of the implementation of national computer curriculum in primary schools in Nigeria. The result also showed that there was very little use of projects, peer assessments. Teachers use mainly written tests and take home assessments at all the levels of primary school from primary 1 to 6. In Aja



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(2021); Ekoyo (2019), there was no significant difference in the results in both the private and public schools in Ebonyi State of Nigeria. The findings above are closely related to the reports of some earlier researchers; like Ezeudu (2018) who found out that most teachers were deficient in competencies required for continuous assessment.

Evaluation is an integral part of teaching. It is an essential tool for all programs. It is ascertains the extent the students have achieved the content and learning experiences they are exposed to. It involves assessing the general outcome of evidence to determine whether in fact certain changes are taking place in the learner as well as determine the degree of the changes in the individual, (Santock, 2006). Most of the time of the teachers and students are spent on assessments. Therefore it should be done properly. Assessment not only documents what the students know but also affects their learning and motivation. To assess the student is to examine the cognitive, psychomotor and the affective aspects of the child's life. All the evaluation procedures have roles they play. Oral evaluation discovers student' problems and aid instructional decisions and services, essay writing reveals the students' cognitive capability and develops his/her creative, critical and decision making skills. Projects help us to assess the three domains of education at the same time. Basing a grade on series of tests and different types of assessment helps to balance out students' strengths and weaknesses as well as compensate for a poor performance or two because of internal and external sources of measurement error, (Santock, 2006).

## RECOMMENDATIONS

Based on the findings, the following recommendations are made:

- Every educational program should be evaluated from time to time based on the objectives to know the level of implementation as most programs fail at this stage. Every nation to ensure strict implementation of all educational programs.
- The contents of every curriculum should be derived by experts in the field based on the needs of the learner, the society and must be all inclusive.
- The scheme of work should be drawn from the core curriculum of every subject. Teachers should adhere to it religiously.
- Teacher education institutes should make every effort to graduate competent teachers to implement any curriculum.
- African governments, Non-Governmental Organizations and donor agencies should give education in Africa the attention it deserves by providing instructional materials and facilities to enhance teaching and learning.
- Teachers should endeavour to assess not only the cognitive, but also the psychomotor and affective skills. They should also use not only written and oral assessments in evaluation of learning outcomes and experiences, students should be exposed to projects and other performance assessment tools.

## CONCLUSION

This study sought to explore the level of implementation of secondary school chemistry core curriculum in Ebonyi state of Nigeria. The poor result of implementation in terms of the instructional materials and evaluation procedures can be generalized to most countries in Africa and elsewhere. Teachers resort to written tests, take home assessment administered verbally, on paper or computer and avoid projects, laboratory works, peer assessments, use of performance assessment tests likes use of students' portfolios and exhibitions because of lack of fund and level of teachers' competencies. It is so disturbing that the inherent poor academic achievement among students in Nigeria can be attributed to these factors. The educational implication is great. The system produces students with poor entrepreneurial skills who wait for government's



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employment and since the work cannot go round we have high graduate unemployment with the consequent delinquencies. The system each year produces such persons who are menace to the society. It is pertinent to mention here that the system has also produced people who have acquired skills, knowledge, competences and have shown social responsibility. The few bad ones destroy the good reputation of the latter. Hence, every program should be adequately implemented to meet the objectives of such programs and carry both the weak and the strong along.

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