

EVALUATION OF THE IMPLEMENTATION OF SENIOR SECONDARY SCHOOL CHEMISTRY CURRICULUM IN KOGI STATE, NIGERIA.

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Abstract

The study evaluated the implementation of the senior secondary school chemistry curriculum in Kogi State, Nigeria. Three research questions and one null hypothesis guided the study. Descriptive survey research design was adopted. The population of the study comprised all the 122 chemistry teachers and 1,594 SS11 chemistry students in the 254 public senior secondary schools in Kogi State. The sample size for the study comprised 93 chemistry teachers and 320 SS11 chemistry students sampled from 32 co-educational secondary schools in the area using multistage sampling procedure. Two questionnaires were used in the study namely; Evaluation of the Implementation of Senior Secondary School Chemistry Questionnaire (EISSSCQ) for Teachers and Evaluation of the Implementation of Senior Secondary School Chemistry Questionnaire (EISSSCQ) for Students respectively. Cronbach Alpha was used to determine the internal consistency of the instruments with reliability coefficients of 0.89 and 0.84 respectively. The research questions were answered using mean and standard deviation while-test was used to test the hypothesis at 0.05 level of significance. Findings of the study revealed that the implementation of chemistry curriculum is facilitated by the availability of chemistry curriculum in the schools, teachers also used recommended instructional methods such as lecture method, discussion method, concept mapping, laboratory, simulation and games, and cooperative learning among others. Evaluation techniques used by the teachers to implement chemistry curriculum are essay writing, take home and practical assignments, among others. The results also revealed that there was no significant difference between the mean responses of teachers and students on the evaluation techniques used by chemistry teachers to implement chemistry curriculum. Necessary conclusions were made.

Keywords: Science, chemistry curriculum, evaluation, implementation, instructional methods.

Introduction

Science provides knowledge for use in addressing various forms of human, material and environmental problems. Science is the process by which we learn about the natural universe by observing, testing, and then generating models that explain our observations (Gordon, 2022). Science can also be seen as made of two major complementary modes: accumulation of knowledge through exploration and discovery efforts about the natural world, and the use of such knowledge for human and material development. Science is studied and practiced in all parts of the world, including Nigeria. Nigeria is a developing nation with an increasing demand for science based skilled manpower. The achievement of this can start with the learning and application of science subjects as chemistry, integrated science, biology and physics at secondary school level. Among these listed science subjects, taught in Nigerian secondary schools, only chemistry is discussed because the study is focused on chemistry curriculum.

Chemistry has been defined as a science of nature and one that deals with the properties of non-living substances, whose properties range from the preparation and changes that they undergo when such substances are subjected to adverse conditions of high temperature, high pressure, extreme cold and abnormal contact (Igwe, 2015). According to Brown, LeMay, Bursten, Murphey, Woodward, Stoltzfus, and Lufaso (2018), Chemistry is the scientific study of the properties and behaviour of matter. Every substance, whether naturally occurring or artificially produced, consists of one or more of the hundred-odd species of atoms that have been identified as elements. Chemistry as an integral science subject provides contents in the training of students who want to study medicine, nursing, pharmacy, forestry, fisheries and so on. This study is designed to evaluate the implementation of the curriculum of Senior Secondary School Chemistry.

Curriculum implementation in this study is the teaching of chemistry curriculum content to senior secondary school students. Curriculum evaluation is a process of investigating the availability of chemistry curriculum, the use of recommended teaching methods, the quality and quantity of teachers that implement the curriculum, the evaluation techniques employed, other factors such as current chemistry textbooks, chemistry laboratories, overcrowded chemistry classes, lack of motivation for chemistry teachers, limited time for chemistry lesson, and facilities for meaningful laboratory that may likely affect the effective implementation of chemistry curriculum in senior secondary school in Kogi State by teachers and students and the difference between the mean academic performance of male and female students in chemistry. With current development

in education, many cultural biases have been broken and chemistry teachers try to teach the subject to the best of their abilities but one of the problems is that some of them are not professionals in chemistry, their teaching methods / techniques seem to vary and some of them have never seen chemistry curriculum.

Curriculum, according to Raji (2016), is defined as the organization of learning sequence that is expected to take place during a course or programme with respect to knowledge, skills and attitudes. Curriculum can be viewed as an organized knowledge presented to learners in a school (Odeh & Obinne, 2020). It covers every element in the learning environment and this includes the subject matter to be learned, the students, the teachers and the physical environment in the process of carrying out what has been specified in the curriculum. This process is referred to as implementation.

The implementation of the curriculum is the aspect that concerns the nature and scope of classroom teaching and evaluation of learning achieved by students who were taught. Specifically, the process of curriculum implementation entails interaction between the curriculum planner, the teacher, the learners and the learning environment (Adikwu, Agi, & Asemakaha, 2022). The teacher is the major implementer of the curriculum since what the teacher does with it in the classroom determines whether the set goals would be achieved or not. How well the teacher implements the curriculum is determined by the teachers' knowledge, professional training, competence, initiative, interest and motivation. What happens to the curriculum at its implementation stage will be exposed during the process of curriculum evaluation.

Curriculum evaluation is an effective way of trying to determine the effectiveness of a curriculum after its implementation. The essence is to ensure that the objectives of the curriculum are consistent with the implementation processes. According to Nworgu (2015), evaluation is concerned with the process of seeking, obtaining and quantifying data with the aim of making valued judgment based on an event, an object or a characteristic.

Curriculum can be evaluated in a number of ways using Goal Evaluation Model by Tyler (1950), Provus discrepancy Evaluation Model by Provus (1971) and Stufflebeam Context, Input, Process, and Product model of curriculum evaluation. However, in this study, the Stufflebeam's Context, Input, Process and Product (CIPP) model of curriculum evaluation was used. This model is chosen because it is comprehensive, purposeful and accepted and used by curriculum evaluators in different parts of the world.

One of the major goals of science education in Nigeria is to produce scientists for national development (Federal Republic of Nigeria [FRN], 2014). In spite of

Nigerian government's desire to promote science education programme in the country, the quality of science students produced by the secondary schools seem to be deteriorating. In the particular case of chemistry, one is led to observe that despite the importance of chemistry as a science subject, students perform poorly as reported by chief examiners' report of West African Examination Council (WAEC, 2021) and National Examination Council (NECO, 2021). The implication of poor performance in chemistry is that Nigeria quest of producing scientist in chemistry related fields such as pharmacy, medicine, engineering, pharmacology among others may not be realized and consequently, there is need to empirically evaluate the implementation of the curriculum for senior secondary school chemistry.

The purpose of this study was to evaluate the implementation of the Senior Secondary School Chemistry in Kogi State, Nigeria. Specifically, the study was intended to: Find out the availability of chemistry curriculum in senior secondary schools in Kogi State; Find out the recommended instructional methods used by chemistry teachers in senior secondary schools in Kogi State; Identify the evaluation techniques used by chemistry teachers in the implementation of senior secondary school chemistry curriculum.

Research Questions

The following research questions guided the study:

- 1) What is the level of chemistry curriculum availability in senior secondary schools in Kogi State?
- 2) What are the recommended instructional methods used by the chemistry teachers for implementing the curriculum in senior secondary schools in Kogi State?
- 3) What are the evaluation techniques employed by the chemistry teachers in the implementation of senior secondary school chemistry curriculum?

Hypothesis

HO₁. There is no significant difference in the mean responses of teachers and students on the evaluation techniques used by chemistry teachers in the implementation of senior secondary chemistry curriculum in Kogi State.

Methodology

The study adopted descriptive survey research design. The choice of this design was based on the fact that the study involves systematic collection of data about the implementation of senior secondary school chemistry curriculum in Kogi State, Nigeria from chemistry teachers and students in order to describe, compare opinions, classify, analyse and interpret the existing situation about the implementation of chemistry curriculum. The area of study is Kogi State with the population of 122 chemistry teachers and 1,594 SS11 chemistry students in 254 Public senior secondary schools in Kogi State. The sample for the study

comprised 93 chemistry teachers and 320 SS11 chemistry students using Yamane formula. A multi-stage sampling procedure was used to select the sample and this type of sampling procedure is employed because the selection involves more than one stage. Two instruments were adapted for collecting the data for this study, namely, Evaluation of the Implementation of Senior Secondary School Chemistry Questionnaire (EISSSCQ) for Teachers and Evaluation of the Implementation of Senior Secondary School Chemistry Questionnaire (EISSSCQ) for Students. The teachers' and students' questionnaire were divided into two sections. Section A is concerned with the demographic or bio data of the respondents while section B is concerned with the information required for the study and is divided into four clusters. There are 29 and 23 items in the teachers' and students' questionnaires, respectively. The term and scaling points used in rating the responses of the respondents to the items in the instruments was a modified Likert-type four-point rating scales with the numerical values of Strongly Agreed (SA) = 4, Agreed (A) = 3, Disagreed (D) = 2 and Strongly Disagreed (SD) = 1 for positive items and Strongly Agreed (SA) = 1, Agreed (A) = 2, Disagreed (D) = 3, and Strongly Disagreed (SD) = 4 for negative items assigned to the points is used in seeking answers to the research questions. The cut-off point for the rating scale is 2.50, obtained by dividing the sum of the numerical values by the number of scaling items. The questionnaires were subjected to face validation by two experts in Educational Measurement and Evaluation and one expert in Science Education Department in Prince Abubakar Audu University Anyigba Kogi State, Nigeria. The internal consistency of the instruments was determined using Cronbach Alpha. Cronbach Alpha was applied to instruments that are polytomously scored with reliability coefficients of 0.89 and 0.84 respectively. The questionnaires were administered to the chemistry teachers and students with the aid of 4 research assistants (one from each Local Government Area) and they waited to collect the filled out questionnaires same day to ensure high return rate. Mean and standard deviation was used to answer all the research questions while t- test was used to test the hypotheses at 0.05 level of significance. T-test was used because it is used to compare the differences in mean scores of two independent variables or it is used to evaluate the effect of independent variables upon dependent variables. To interpret the result from the analysis, a benchmark mean of 2.50 was used. Mean responses below 2.50 represented "disagree" while mean responses between 2.50 and above represented "agree". From the t-test, null hypotheses which return a p-values < than 0.05 was rejected whereas those with a p-value greater > 0.05 was retained.

Results

Research Question 1: What is the level of chemistry curriculum availability in senior secondary schools in Kogi State?

Table I: Mean and Standard Deviation of Teachers' Responses on the Availability of Chemistry Curriculum in Senior Secondary Schools in Kogi State.

S/N	Item Statement	Mean	SD	Decision
1.	Chemistry Curriculum is available in my school	3.75	.44	Agree
2.	Chemistry Curriculum is available for teachers and students in the school.	3.50	.51	Agree
3.	Chemistry curriculum has never been seen by the chemistry teachers in my school	1.75	.84	Disagree
4.	School principal keeps Chemistry curriculum in his office	2.75	1.10	Agree
5.	School principal monitors chemistry curriculum	3.25	.84	Agree
Cluster Mean		3.00	0.75	Agree

N= 93 (Teachers); Mean response < 2.50 = Disagree; Mean response ≥ 2.50 = Agree

Table 1 presents findings from analysis of data collected to determine teachers' responses on the availability of chemistry curriculum in senior secondary schools in Kogi State. The result shows that respondents agreed to items 1, 2, 4 and 5, with mean responses ranging from 2.75 – 3.75. This implies that teachers agree that chemistry curriculum is available in their schools, chemistry curriculum is available for teachers, school principal keeps the chemistry curriculum in his office, and the school principal monitors the chemistry curriculum. The respondents however disagreed to item 3 (mean = 1.75, SD = 0.84), indicating that chemistry teachers have indeed seen the chemistry curriculum. The cluster means of 3.00, which is greater than the benchmark mean of 2.50 for "agree" indicates that overall, Chemistry curriculum is available in senior secondary schools in Kogi State. The cluster standard deviation rating of 0.75 indicates that there was little variance in the responses provided by the respondents.

Research Question 2: What are the recommended instructional methods used by the chemistry teachers for implementing the curriculum in senior secondary schools in Kogi State?

Table 2: Mean and Standard Deviation of Teachers' Responses on the Recommended Instructional Methods Used by the Chemistry Teachers for Implementing the Curriculum in Senior Secondary Schools in Kogi State.

S/N	Item Statement	Mean	SD	Decision
1.	Lecture method	2.50	.88	Agree
2.	Project method	2.50	.51	Agree
3.	Demonstration method	3.00	1.24	Agree
4.	Discussion method	2.75	1.10	Agree
5.	Concept mapping	2.75	1.31	Agree
6.	Guided inquiry method	2.25	.44	Disagree
7.	Laboratory	3.25	.84	Agree
8.	Simulation and games	2.50	.88	Agree
9.	Cooperative learning	4.00	.00	Agree
10.	Excursion/field trip	2.00	.00	Disagree
Cluster Mean		2.75	0.72	Agree

N= 93 (Teachers); Mean response < 2.50 = Disagree; Mean response ≥ 2.50 = Agree

Table 2 presents findings from analysis of data collected to determine teachers' responses on the recommended instructional methods used by the chemistry teachers for implementing the curriculum in senior secondary schools in Kogi State. The result shows that respondents agreed to items 1, 2, 3, 4, 5, 7, 8, and 9, with mean responses ranging from 2.50 – 4.00. This implies that teachers agree that the methods used to implement the Chemistry curriculum in Kogi State are lecture method, project method, demonstration method, discussion method, concept mapping, laboratory, simulation and games, and cooperative learning. Respondents however disagreed to items 6 (mean = 2.25; SD = 0.44) and 10 (mean = 2.00; SD = 0.00) indicating that guided inquiry method and field trip/excursion are not used by the chemistry teachers for implementing the curriculum in senior secondary schools in Kogi State. The cluster means of 2.75, which is greater than the benchmark mean of 2.50 for “agree” indicates that

overall, Chemistry teachers utilize recommended instructional methods for implementing the curriculum in senior secondary schools in Kogi State. The cluster standard deviation rating of 0.72 shows that the responses provided by the respondents were very similar.

Research Question 3: What are the evaluation techniques employed by the chemistry teachers in the implementation of senior secondary school chemistry curriculum?

Table 3: Mean and Standard Deviation of Teachers and Students' Responses on the Evaluation Techniques Employed by the Chemistry Teachers in the Implementation of Senior Secondary School Chemistry Curriculum.

S/N	Item Statement	Teachers			Students		
		Mean	SD	Decision	Mean	SD	Decision
1.	Quizzes	2.06	1.31	Disagree	2.33	1.23	Disagree
2.	Oral questioning	2.33	1.06	Disagree	2.26	0.92	Disagree
3.	Essay writing	3.31	1.21	Agree	3.34	1.08	Agree
4.	Objective tests	1.96	1.11	Disagree	2.34	1.15	Disagree
5.	True or false	1.94	1.21	Disagree	2.11	1.10	Disagree
6.	Completion of blank spaces	2.04	1.17	Disagree	2.22	1.12	Disagree
7.	Take Home Assignment	3.33	1.15	Agree	3.37	1.00	Agree
8.	Practical Assessment	3.42	1.09	Agree	3.45	0.96	Agree
Cluster Mean		2.55	1.16	Agree	2.68	1.07	Agree

N= 413 (Teachers and Students); Mean response < 2.50 = Disagree; Mean response ≥ 2.50 = Agree

Table 3 presents findings from analysis of data collected to determine teachers' and students' responses on the evaluation techniques employed by the chemistry teachers in the implementation of senior secondary school chemistry curriculum. The result shows that teachers agreed to items 3, 7, and 8, with a mean response of 3.31, 3.33 and 3.42 respectively, indicating that the evaluation techniques employed by teachers in the implementation of senior secondary school chemistry curriculum are essay writing, take home assignment and practical assessment. Teachers however disagreed to items 1, 2, 4, 5 and 6, with mean responses of 2.06, 2.33, 1.96, 1.94 and 2.04 respectively. This is an indication that the evaluation techniques not employed by the chemistry teachers

in the implementation of senior secondary school chemistry curriculum are quizzes, oral questioning, objective tests, true or false, and completion of blank spaces tests. The result also showed that students agreed to items 3, 7, and 8, with a mean response of 3.34, 3.37 and 3.45 respectively, indicating that the evaluation techniques employed by teachers in the implementation of senior secondary school chemistry curriculum are essay writing, take home assignment and practical assessment. Students however disagreed to items 1, 2, 4, 5 and 6, with mean responses of 2.33, 2.26, 2.34, 2.11, and 2.22 respectively. This is an indication that the evaluation techniques not employed by the chemistry teachers in the implementation of senior secondary school chemistry curriculum are quizzes, oral questioning, objective tests, true or false, and completion of blank spaces tests. The cluster means of 2.55 (for teachers) and 2.68 (for students) which are greater than the benchmark mean of 2.50 for “agree” indicates that overall, teachers and students agree that teachers do employ some evaluation techniques in the implementation of Chemistry curriculum in senior secondary schools in Kogi State. The cluster standard deviation rating of 1.16 and 1.07 for teachers and students respectively indicates a slight variation in responses provided by the respondents.

Hypothesis: There is no significant difference between the mean score responses of teachers and students on the evaluation techniques used by chemistry teachers in implementing senior secondary school chemistry curriculum in Kogi State.

Table 4: T-test Analysis of the Difference in the Responses of Teachers and Students on the Evaluation Techniques used by Chemistry Teachers in Implementing Senior Secondary School Chemistry Curriculum in Kogi State.

Designation	N	Mean	SD	Df	t.	Sig. (2-tailed)
Teachers	93	2.55	0.48	214	-1.723	0.086
Students	320	2.68	0.45			

Table 4 presents data used for testing hypothesis one. The result on table 4 shows that the probability value for the difference in the responses of teachers and students on the evaluation techniques used by chemistry teachers in assessing for feedback from the study is 0.086. Since the probability value of 0.086 is greater than 0.05, the null hypothesis is retained. Thus, there is no significant difference

between the mean score responses of teachers and students on the evaluation techniques used by chemistry teachers in assessing for feedback from the study.

Discussion of Findings

Availability of chemistry curriculum in senior secondary schools in Kogi State

The result of this study revealed that Chemistry curriculum is available in schools for teachers, but the school principals keep the chemistry curriculum in offices and monitors the chemistry curriculum. In essence, while the chemistry curriculum is technically available, its physical and intellectual access is restricted by the school principal's control. Chemistry teachers are often expected to visit the principal's office to consult the curriculum and drop it there before leaving. As a result, teachers cannot fully engage with the curriculum, potentially hindering effective teaching and learning, raising questions about curriculum ownership and fostering an environment of dependence rather than independent exploration. Additionally, it raises questions about transparency and potential for bias in curriculum interpretation, which could ultimately hinder student learning and engagement in the subject.

This finding is in agreement with that of Ihekwoaba, C. Ihekwaba, C. & Ihekwoaba, B. (2022) who carried out a study on evaluation of the implementation of the National curriculum for basic science in upper basic schools in Imo State, Nigeria and found that curriculum document was available in the schools and majority of the teachers had seen the curriculum. This finding is also corroborated those of Raji (2016), Akyeampong (2017), Nevenglosky, E.A., Cale, C., & Aguilar, S.P. (2018). These authors reported in different contexts that the ownership of different subject curricula in a school was claimed by the school principal. As a result, teachers seldom see the curriculum (Akyeampong, 2017) and in other cases, they have to sign out the chemistry document as one would a book in library for a period of time and return it to the principal's office once that time has elapsed (Raji, 2016). Nevenglosky et al (2018) however reported that most teachers get fed up by this situation, use part of their salaries to purchase a copy or sometimes photocopy the curriculum for themselves, so they can use it as guide in developing their lessons. Others however ignore the curriculum and develop their lesson as they please. The findings however do not agree with that of Anugwo, M.N., Nworie, T.J., Nnachi, N.O., Ugama, J.O., Egbe, I., & Ikporo, F. (2023) who reported that subject curricula were readily available in schools and teachers had open access to it.

Recommended instructional methods used by chemistry teachers in senior secondary schools in Kogi State

The findings of the study showed that the methods used to implement the Chemistry curriculum in Kogi State are lecture method, project method, demonstration method, discussion method, concept mapping, laboratory, simulation and games, and cooperative learning. The lecture method is the conventional method of teaching prevalent in Nigerian schools. As a result, it is understandable why teachers will use it because it helps a teacher cover more content in less time and is best suited for teaching large classes. Demonstration, discussion, concept mapping, laboratory, simulation and games, and cooperative learning are less conventional methods but teachers can sometimes use them in certain circumstances to facilitate teaching and learning. However, the most used method for implementing the Chemistry curriculum is the lecture method.

This finding is in agreement with that of Moses (2014) who found out that teachers were mostly using the conventional method of teaching instead of the recommended guided discovery method. Similarly, Achimugu (2016a) and Igboanugo (2019) found out that inappropriate use of teaching methods especially the use of lecture method that borders on memorization inhibit learning, kills students' interests and discourage them to develop positive attitude for effective learning outcomes. This finding is also in agreement with several empirical reports, including that of Ozdemir, B., Cakiroglu, J., &Yildirim, N. (2015), who reported that the teaching methods mostly used by Chemistry teachers is the lecture method. Aikenhead (2016) however posits that Chemistry teachers adopt the demonstration method in teaching chemistry practical. Abd-El-Khalick and Akerson (2019) however reported that concept mapping, cooperative learning and inquiry-based learning are the predominantly used teaching methods by Chemistry teachers, where Yalvac and Yalvac (2014) indicate that simulation games are commonly used in teaching Chemistry. The study's findings however disagree with that of Ifeobu (2014) and Ihekwoaba et al. (2022) who in their evaluation of the implementation of a curriculum revealed that the method used by secondary school teachers is only the conventional method. This is unlike the present study which shows that although lecture method is the predominantly used teaching method, teachers should adopt guided inquiry method to facilitate the implementation of the Chemistry curriculum. Guided inquiry is crucial for chemistry education because it transforms students from passive recipients of knowledge to active constructors of understanding. By posing questions, analyzing data, and drawing conclusions under the teacher's guidance, students develop essential scientific skills like critical thinking, problem-solving, and data interpretation. In essence, guided inquiry empowers students to be like chemists themselves, engaging in the iterative process of discovery that drives the science forward. Considering these benefits derivable from using guided inquiry, it thus remains questionable why teachers fail to use it.

Evaluation techniques used by chemistry teachers in the implementation of senior secondary school chemistry curriculum.

The findings of the study revealed that the evaluation techniques employed by teachers in the implementation of senior secondary school chemistry curriculum are essay writing, take home assignment and practical assessment. The revelation that Senior Secondary School chemistry teachers in Kogi State largely rely on essay writing, take-home assignments, and practical assessments for evaluation highlights a reliance on traditional methods. These methods are mostly used because they are easy to design and faster to implement. As teachers are already being overworked, they opt for these easy evaluation techniques to make their jobs faster. Although these techniques offer valuable insights in the extent to which students have learned a given material, they primarily assess surface-level knowledge and may not fully capture students' deeper understanding of Chemistry concepts. Considering the evolving landscape of education, diversifying evaluation techniques with elements like self-reflection, peer review, or project-based assessments could provide a more nuanced picture of student learning and progress, potentially enriching both feedback and learning outcomes. This finding is in agreement with that of Chapman (2019), as well as Black and William (2018) who reported that teachers rely so much on traditional assessment methods and recommend the integration of innovative formative assessment techniques into the teaching and learning process.

Also, there was no significant difference between the mean score responses of teachers and students on the evaluation techniques used by chemistry teachers in assessing for feedback from the study. The study's findings expose a potential similarity between teacher and student perspectives on chemistry curriculum evaluation. While teachers rely on traditional methods like essay writing, take-home assignments, and practical assessments, a not significant difference in perceived effectiveness arises compared to student because students have gotten so used to those methods that they consider it a norm. This suggests that the current evaluation techniques might not fully capture student learning or provide adequate feedback for improvement. Exploring alternative assessment methods, like self-reflection, peer review, or project-based evaluations, could not be crucial to bridge this gap and ensure a more comprehensive and student-centered approach to assessing learning outcomes in chemistry education.

Conclusion

Based on the findings of the study, the researcher concluded that the implementation of the chemistry curriculum in Kogi State is facilitated by the availability of chemistry curriculum in schools, the use of recommended

instructional methods as in lecture method, project method, demonstration method, discussion method, concept mapping, laboratory, simulation and games and cooperative learning, ignoring guided inquiry method by the chemistry teachers. The study also confirmed that the evaluation techniques employed by teachers in the implementation of senior secondary school chemistry curriculum are adequate as essay writing, take home assignment and practical assessment were employed by the chemistry teachers. Also, there was no significant difference between the mean score responses of teachers and students on the evaluation techniques used by chemistry teachers in implementing chemistry curriculum in Kogi State.

Recommendations

Following from the findings of the study and discussion, the following recommendations were made:

1. School principals should encourage their teachers to employ other techniques as in oral questioning, true or false prompt questions and completion of the blanks type of examinations other than quizzes and essay writing, in the implementation of senior secondary school chemistry curriculum. The principal can do so by organising weekly meetings with the teachers to discuss methods of teaching and assessment.
2. In-service training should be organised by the Ministry of education and made free for teachers to give them the opportunity to keep abreast with modern teaching techniques and strategies for implementing the Chemistry curriculum. Where this happens, school principals should ensure that their teachers attend such trainings.
3. The Ministry of Education should organize seminars, workshops and conferences for Principals and Chemistry teachers to sensitize / train them on how to effectively use the national chemistry curriculum which encompasses all aspects of child development and adhere to it at all times and to ensure the monitoring of the implementation of the recommended method to be used in teaching chemistry

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