



SURVEY OF THE TEACHING OF CHEMISTRY IN SECONDARY SCHOOLS IN SABON-GARI LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA

BY

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Abstract

This study surveyed the teaching of chemistry in some selected secondary schools in Sabon-Gari Local Government Area of Kaduna State. Ten schools were randomly selected by simple random sampling technique. The questionnaire used contains 13 items, which was administered to each of the chemistry teachers in the schools sampled and the total numbers of respondents were 23. Data collected was analyzed using the simple percentage, mean, standard deviations and standard errors. Major findings of the study are: the most frequently used methods are the discussion method followed by demonstration method. Higher percentage of the teachers were found to be qualified (NCE 26.1%, B.Sc. (Ed) 30.4%, and PGDE 13%) making the total of 69. 5%. It is thus recommended that all teachers without education qualification should not be allowed to teach in secondary schools. Teachers should be encouraged to go for in-service training so as to develop new skill and flow with new trend. Private owners should try and employ more chemistry teachers in their schools.

Keywords: Survey, teaching, chemistry, secondary school

Introduction

A body of information, a method of inquiry, and a way of thinking that are all aimed at comprehending nature and phenomena associated with it are together referred to as science. According to Aniodoh (2018), science is a collection of knowledge derived via methodical, systematic procedures based on speculative observation and experimentation. An important part of human society is science. It is acceptable



to state that science has a major role in shaping cultural, socioeconomic, political, technological, and even religious activities. Without science, modern methods of living would not be feasible. Over time, scientific advancements have permeated and impacted every facet of human effort, making it exceedingly difficult for someone who lacks scientific literacy to thrive in modern society (Basilaia, 2020).

Science education is the bedrock of any society and is one of the determinant factors in measuring of nation's growth and development. It is a fundamental component in the pursuit of success in all human undertakings. Undoubtedly, the significance of science education in enhancing the quality of human lives cannot be overstated (Jimenez-Liso, Martinez-Chico, Avraamidu & Lucio-Villegas, 2021). The contemporary landscape is marked by the ever-growing impact of science and Technology, making it imperative for any nation to prioritize science education at every level of academic pursuit as it is an indispensable factor for thriving in diverse fields of human endeavors. Science education emerges as a crucial component for meaningful existence within any society, positioned at the core of generating essential resources for socio-economic, scientific, and technological advancements crucial for national progress. In light of this, the inclusion of science subjects in the secondary schools' curriculum takes on profound significance. It not only moulds students into future scientists but also nurtures the ability to think and act in alignment with scientific principles, an aspect of great importance. Therefore, science education research, inventions, and practices should adapt to the evolving inter-disciplinary Journal of Science Education (IJ-SED) needs and aspirations of society, mirroring its values (Akpan, 2018a). It is essential to recognize that every educational strategy, device or method aims at enhancing students' learning outcomes (Itighise & Akpan, 2022). To actualize this objective, appropriate instructional materials and devices should be used by teachers to impart knowledge effectively to the learners (Itighise & Akpan, 2022; Arop, Umanah & Effiong, 2015).

Chemistry as a branch of science and a prerequisite subject for many fields of learning has been and will continue to be of tremendous importance to mankind. the application of its principles has helped in modern inventions and technological development. The functional role of chemistry as one of the science subjects in both national and global development cannot be overemphasized (Umanah & Etiubon, 2022). Chemistry satisfies our natural curiosity and allows individuals to gain some experiences of the scientific methods which help in everyday life and the study of other science subjects. The knowledge of chemistry can be applied to protect man from sub-standard drugs, unsafe food, and unclean water. Scientific discoveries of how to use natural products in the manufacture of drugs and herbal medicine, dyes,



artificial fertilizers, herbicides, insecticides and pesticides for more productive Agriculture, materials for home building, fuels for transportation, chemicals for road construction and the production of currencies and notes are all driven by Chemistry (Majek, 2018). Chemistry is an experimental science subject that requires a dynamic teaching approach that actively engages students through hands-on, minds-on, and heads-on experiences to develop scientific skills, a positive attitude and promote desired social values thereby preparing students to effectively tackle problems and contribute to national development (Umanah & Etiubon, 2022). Unfortunately, the teaching and learning of Chemistry has faced numerous challenges, hindering many students from performing well in external examinations such as the West African Senior School Certificate Examination (WASSCE) and The National Examination Council (NECO). According to the West African Examination Council Chief Examiner's Report (2022), the performance of students in some concepts in chemistry at the end of secondary education has remained poor. This could be attributed to factors such as the abstract nature of chemistry, poorly equipped laboratories, lack of experienced chemistry teachers and the inability of teachers to utilize instructional resources while teaching.

Statement of the problem

Despite the importance of chemistry in everyday life and its significance in scientific and technological advancements, the teaching of chemistry at the secondary school levels continue to face numerous challenges. Students often struggles to understand chemical concepts, and many develop a negative attitude towards the subject. Furthermore, there is a growing concern about the quality of chemistry education, with many teachers lacking adequate training and resources. Researchers have determined that chemistry is abstract in nature, and that teachers must use appropriate teaching tactics to help pupils understand it (Achimugu, 2016). In view of the above statements and findings, this study is designed to survey the teaching of chemistry in some selected secondary schools in Sabon-Gari Local Government Area of Kaduna state, Nigeria.

Objective of the study

The purpose of this study is as follows:

1. To find out the method used by chemistry teachers in the teaching of chemistry in the sampled schools.
2. To find out how competence the teachers are in their subject matter in terms of qualifications in the sampled schools.

Research Questions

The study intends to find answer specifically to the following questions:

1. What are the various methods adopted by chemistry teachers in the teaching of chemistry in the sampled schools?



2. What are the qualifications of teachers teaching chemistry in the sampled schools?

Methodology

The descriptive research design also called the survey study was used for this study. This kind of research design aimed at determining systematic facts and characteristics of the subject under study. The population of this study includes all the senior secondary schools in Sabongari local government area of Kaduna state. Sabongari local government secondary schools are made up of federal, state government and private schools which are either co-educational or single sex schools. The sample consists of a subset off the population under study. It was drawn by the simple random sampling technique. The simple random sampling technique was used so as to remove bias from the sample collected. The sampled schools were both co-educational and single sexed schools. The data collected was the right representative of the total population. Ten schools were randomly selected at the end. The ten schools selected comprise five private schools, two federal government Schools and three state government (public) schools. The instrument used for data collection was the questionnaire. The questionnaire, titled; Chemistry Teachers Questionnaire, consists of five main parts; section A, B,C,D, and E. Section A was the sampled school information together with the Bio-Data information, section B was the information of the teachers' qualification, duration of their working experience and their specialization, section C was the information on the method the teachers use in teaching chemistry in the sample schools, section D is the information on the laboratory and how often is used by the Chemistry teachers in the sample schools, and section E is the information on the availability of instructional materials and how often they are used by Chemistry teachers in the sampled schools. The questionnaire was validated by two lectures. The experts, who validated the questionnaire, were provided with the title of the study and other relevant information that was needed. The information actually helped the experts to validate the appropriateness of thee language used in the questionnaire. The questionnaire was administered and follow up was done, so as to hasten the work. One questionnaire was administered to each of the chemistry teachers in the sampled schools. The questionnaire was collected for analysis, the method used for data analysis was percentage, mean, standard deviation and standard error. These methods were used so that analyzing the data will be easy. The data collected was the chemistry teachers' responses which were analyzed in percentages, frequencies, mean, standard deviations and standard errors. Tables of distribution were drawn and they were used to answer the research question.



Result

Table 1

Distribution of Respondents by Highest Qualification

Highest Qualification	Frequency	Percentage
NCE	6	26.1
B. Sc.	4	17.4
B. Sc. (Ed)	7	30.4
PGDE	3	13.0
M. Sc.	3	13.0
Total	23	100.0

Table 1 shows that 26.1% teacher have NCE while 4 (17.4%) have B.Sc. as against 7(30%) others with B.Sc. (Ed) certificate while 3 (13.0%) have PGDE and rest 3 representing 13.0% have M.Sc Certificate.

Table 2

Distribution of Respondents by year Certificate was obtained

Year Obtained	Frequency	Percentage
1990-2000	3	13.0
2001-2010	19	82.6
After 2010	1	4.3
Total	23	100

Table 2 showed that 3 of the chemistry teacher respondents obtained their certificate between year 1990-2000, while another 19 representing 82.6% obtained theirs between the year 2001-2010 while the rest 1 (4.3%) obtained their after year 2010.

Table 3

Distribution of Respondents by Area of Specialization

Area of Specialization	Frequency	Percentage
Chemistry	16	69.9
Chemistry and other combination	3	13.0
Other Science Subject	4	17.3
Total	23	100.0

Table 3 shows that 16 teachers (69.9%) are specialized in chemistry: 3 (13%) are specialized in chemistry combined with other subject; and 4 (17.3%) are specialized in other subjects

**Table 4**

Opinions of Chemistry Teachers' Respondents on the Level of Adoption of Various Methods, in the Teaching of Chemistry.

S/N	Teaching Methods	Response	Categories	Not use (1)	Mean	Std. dev	Std. err	Ranking of usage
		Always use (3)	Fairly use (2)					
1.	Lecture Method	5	9	9	1.83	0.778	0.162	4
2.	Inquiry Method	6	13	4	2.09	0.668	0.139	3
3.	Demonstration Method	11	11	1	2.43	0.590	0.123	2
4.	Project Method	2	5	16	1.39	0.656	0.137	5
5.	Field Method	2	4	17	1.35	0.647	0.135	6
6.	Discussion Method	19	3	1	2.78	0.518	0.103	1

Table 4 shows the opinion of respondents on the level of use of the various teaching methods in the teaching of chemistry. According to the Table, discussion method is the most frequently used teaching method. This method attracted the highest mean use of 2.78 with details showing that 19 of them always use it, while 3 fairly use it and only one of them do not use it. The second most use method is demonstration method with mean usage of 2.43 with details showing that 1] always use it, 11 others fairly use it and 1 do not use it. The inquiry method is the third most use method with mean usage of 2.09 with details showing that 6 always use it, 13 fairly use it and 4 others do not use it. Lecture method is the fourth most used method of teaching as it attracted the fourth mean usage of 1.83 with details showing that 5 always use it, 9 fairly use it and the rest 9 do not use it. Project method is the fifth most use method in teaching chemistry with mean use of 1.39 with details showing that 2 always use it, 5 fairly use it and the rest 16 do not use it. The 6th and least use teaching method is the field trip method with the least mean usage of 1.35 with details showing that only 2 of the respondents always use it, while 4 fairly use it and the rest 17 do not use it.

Discussions

Research question 1: what is the method adopts by the chemistry teachers in the teaching of chemistry in the sampled schools?



It can be deduced from Table p-2 that out of the six methods of teaching analyzed; lecture, discussion, demonstration, project, field trip and inquiry methods, the most frequently used method is the discussion method. This method attracted the highest mean use of 2.78 with details showing that 19 out of 23 teachers always using it, while 3 fairly use it and only one of them do not use it at all. The second most frequently used method is the demonstration method with the mean usage of 2.43 with details showing that 11 always use it, 11 others fairly use it and 1 do not use it. The discussion method is mostly used in the teaching of chemistry in secondary schools because; it is both student-centered and teacher-centered. When a proper discussion takes place, students are free to express their view points and they are motivated by the teachers' questions which makes them reason rather than recall (Alumba, 2008). The second most frequently used method which is the demonstration method is being adopted because is a teaching technique that combines oral explanation with doing" to communicate processes, concept and facts. It is particularly effective in teaching a skill that can be observed. A demonstration is usually accompanied by thorough explanation, which is essentially a lecture (Sola and Ojo, 2007).

Research question 2: what are the qualifications of teachers teaching chemistry in the sampled schools?

According to the Table 3.1, 6 of the teachers representing 26.1% have NCE while 4 (17.4%) have B.Sc. as against 7 (30.4%) others with B.Sc. (Ed) certificates while 3 (13.0%) have PGDE and rest 3 representing 13.0% have M.Sc. certificates. Their area of specializations, which can show how qualified they are also differs.

From Table (3.1c), 16 of the respondents representing 69.6% have area of specialization as chemistry while 3 (13.0%) others said their specialization is chemistry and other combination while the rest 4 (17.3%) of the chemistry teachers' area of specialization is in other science subjects like integrated science, mathematics, physics and so on, From the analysis, only those with the knowledge of education and chemistry said to be qualified to teach chemistry. B se Ed (30.4%), PGDE (13.0%) and NCE (26.10), makes a total of 69.5%. The higher percentage of qualified teachers show that they will be able to impact their knowledge of chemistry to the students, they are also aware of the teaching methodology and they have the knowledge on how to motivate the students to learn.

Conclusions

The findings from this study show that there is need to adopt other method of teaching instead of using only discussion method especially; inquiry, demonstration and field trip methods. Teachers with education qualifications should be employed at least B.Sc. (Ed)



Recommendations

1. The government should sanitize the secondary schools by effecting a law, which will make all teachers teaching in the secondary schools to undergo courses in education, so that they can be professionally trained. All teachers without education qualifications should not be allowed to teach in the secondary schools.
2. Teachers should be encouraged to go for in-service training, so as to flow with the new technique and skills developed, both within and outside the country.
3. Private owners should try and employ more chemistry teachers in their schools.

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