

Assessment of Chemistry Textbooks Availability and Utilization in SS1 Classrooms in Sabon Gari and Zaria Local Government Areas of Kaduna State, Nigeria

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Abstract

The Study was carried out on Assessment of Chemistry Textbooks Availability and Utilization SS I Classrooms in Sabon Gari and Zaria Local Government Areas of Kaduna State, Nigeria. Descriptive survey research design was adopted for the study. Population of the study comprised of 2,314 SS I Chemistry students and 50 Chemistry teachers from Sabon Gari and Zaria local government areas. A sample of 200 Chemistry students and 18 Chemistry teachers were drawn out of the population using simple random sampling technique. Assessment of Chemistry Textbooks Availability and Utilization (ACTAU) questionnaire was structured validated and used to collect data for the study. Two research objectives and two research questions were used to guide the study. Data collected were analyzed using simple frequency percentage table. Findings from the study revealed that most secondary schools in Sabon Gari and Zaria local government areas do not have adequate Chemistry textbooks. Also, the few available textbooks are not properly utilized for teaching and learning chemistry. Based on the findings, it is recommended among others that educational policy makers should develop and implement policies aimed at promoting equitable access to quality textbooks for all students, regardless of their socio-economic background or school type.

Key words: Chemistry textbooks, availability, utilization, teaching, learning

Introduction

Chemistry is a fundamental science that explores the composition, properties, and interactions of matter. It is a subject that provides the foundation for understanding various scientific disciplines and has practical applications in fields such as medicine, agriculture, environmental science, and materials science (Johnson & Smith, 2017). Okafor and Akpan (2020) viewed Chemistry as a core science subject taught at senior secondary schools that provide students with solid scientific background and equip them with the necessary knowledge and skills to pursue higher education or careers in scientific fields.

According to Ibrahim (2018), effective teaching and learning of Chemistry require access to appropriate textbooks that support the curriculum and engage students in the subject matter. Chemistry reading materials include textbooks, reference books, laboratory manuals, and supplementary resources that provide comprehensive content, explanations, examples, and practice exercises. These materials play a vital role in helping students grasp complex concepts, develop problem-solving skills, and enhance their understanding of chemical principles (Adewole & Jimoh, 2019).

Availability of Chemistry textbooks refers to the ease of obtaining Chemistry reading materials. It encompasses affordability in local bookstores or libraries, accessibility of online resources, and ease of obtaining required permissions or licenses for using digital resources (Ameh, 2021). The availability of Chemistry textbooks is of utmost importance in senior secondary schools as teachers rely on these resources to plan their lessons, deliver content effectively, and design assessments that align with the curriculum. Students, on the other hand, depend on these materials to reinforce their understanding, revise concepts, practice problem-solving, which helps in fostering critical thinking, and promoting academic success (Ogbonna, 2016).

On the other hand, Adewole and Jimoh, (2019) view the utilization of Chemistry textbooks as the extent to which teachers and students actively used the available Chemistry textbooks in the teaching and learning process. It is measured by the incorporation of these materials into lesson plans, the frequency of use during instruction, students' independent reading and study, and their perception of the usefulness of the materials. The strengths and limitations of the available materials, appropriate interventions can be implemented to improve access, relevance, and utilization of Chemistry textbooks, ultimately enhancing the quality of Chemistry education Ibrahim, (2018). Distribution of reading materials in senior secondary schools according to Ameh, (2021) varies significantly across different educational settings due to limited financial resources, outdated curricula, inadequate infrastructure and quality of Chemistry textbooks.

According to Okafor and Akpan (2020) the rapid advancement of scientific knowledge necessitates the regular updating and revision of Chemistry textbooks, to keep pace with current trend in curriculum and enhancement in teaching and learning Chemistry leading to increase in academic performance of Chemistry students. Therefore, the aim of this study is to assess Chemistry textbooks availability and utilization in senior secondary schools in Sabon Gari and Zaria Local Government Areas of Kaduna State, Nigeria.

Statement of the Problem

Chemistry is one of the core science subjects taught at senior secondary school in Nigeria, it is prerequisite for medical sciences, nursing, textile technology, agricultural science, synthetic industry, printing technology, pharmacy, chemical engineering, and other allied science courses at tertiary institution (FGN, 2013). The importance of instructional materials cannot be overemphasized in teaching and learning of Chemistry. However, there have been concerns about Chemistry textbooks availability and utilization SS I classrooms in Sabon Gari and Zaria Local Government areas of Kaduna State Nigeria. Limited access to up-to-date and adequate Chemistry textbooks can hinder effective teaching and learning of Chemistry. Also limited studies on the availability and utilization of chemistry textbooks for teaching and learning of Chemistry affect efficient resource allocation and management to school administrators in making informed decisions regarding the procurement and distribution of chemistry textbooks. (Ameh,2021). Therefore, there is need to assess Chemistry textbooks availability and utilization in teaching and learning process at SS I in Sabon Gari and Zaria Local Government Area of Kaduna State, Nigeria.

Objectives of the Study

The main objectives of the study are:

4. to assess the availability of Chemistry textbooks in SS I classroom in Sabon Gari and Zaria L.G.A of Kaduna State, Nigeria.

5. to ascertain the extent of the utilization of Chemistry textbooks in teaching and learning process of SS I students.

Research questions:

To address the objectives of this study, the following research questions were set to guide the study:

4. What is the availability of Chemistry textbooks in SS I classrooms in Sabon Gari and Zaria L.G.A of Kaduna state, Nigeria?
5. What is the extent of utilization of Chemistry textbooks in teaching and learning Chemistry at SS I in Sabon Gari and Zaria L.G.A of Kaduna state, Nigeria?

Methodology

The research design employed for this study is a descriptive survey. Target population of the study comprised of 2,314 SS I Chemistry students and 50 Chemistry teachers from Sabon Gari and Zaria local government areas. A sample of 200 Chemistry students and 18 Chemistry teachers were drawn from six secondary schools three from Sabon Gari and three from Zaria L.G.As, out of the population using simple random sampling technique. The Assessment of Chemistry Textbooks Availability and Utilization (ACTAU) questionnaire was structured and validated by experts in science education at the Department of Chemistry, Federal University of Education Zaria. The ACTAU instrument was administered to sampled SS I Chemistry students and Chemistry teachers from Sabon Gari and Zaria Local Government Area. Responses on the survey questions were retrieved and analyzed using simple percentage frequency table.

Result

Research Question 1: What is the availability of Chemistry textbooks in SS I in Sabon Gari and Zaria L.G.A of Kaduna state, Nigeria?

Table 1: Availability of Chemistry Textbooks as Reported by Teachers and Students

S/N	Statement	Categories of Respondent	SA		A		D		SD	
			F	%	F	%	F	%	F	%
1	Varieties of Chemistry textbooks are available in the school	Teachers	5	27.7	9	50.0	4	22.2	0	0.00
		Students	26	13.0	89	44.5	71	35.5	14	7.0
2	Chemistry textbooks in the school are easily accessible	Teachers	8	44.4	6	33.3	3	16.7	1	5.6
		Students	95	47.5	11	5.5	83	41.5	11	5.5
3	There are no challenges on the availability of chemistry textbooks in the school.	Teachers	2	11.1	4	22.2	9	50.0	3	16.7
		Students	12	6.0	71	35.5	80	40.0	37	18.5

Result from table 1: shows that five respondents which are teachers representing 27.7% of the respondents and twenty-six respondents which are students representing 13.0% of the respondents strongly agreed that varieties of chemistry textbooks are available in the schools. Nine respondents which are teachers representing 50.0 of the respondents and 89 respondents which are students representing 44.5% of the respondents agreed with the statement, while four respondents which are teachers representing 22.2% of the respondents and seventy-one respondents which are students representing 35.5% of the respondents disagreed with the statement, and no respondents from teachers representing 0.0% of the respondents and fourteen respondents which are students representing 7.0% of the respondents strongly disagreed that varieties of chemistry textbooks are available in the school.

Eight respondents which are teachers representing 44.4% of the respondents and ninety-five respondents which are students representing 47.5% of the respondents strongly agreed that chemistry textbooks in the schools are easily accessible. Six respondents which are teachers representing 33.3% of the respondents and eleven respondents which are students representing 5.5% of the respondents agreed with the statement, while three respondents which are teachers representing 16.7% of the respondents and eighty-three respondents which are students representing 41.5% of the respondents disagreed with the statement, and one respondent which is a teacher representing 5.6% of the respondents and eleven respondents which are students representing 5.57% of the respondents strongly disagreed that chemistry textbooks in the school are easily accessible.

Two respondents which are teachers representing 11.1% of the respondents and twelve respondents which are students representing 6.0% of the respondents strongly agreed that there are no challenges on the availability of chemistry textbooks in the school. Four respondents which are teachers representing 22.2% of the respondents and seventy-one respondents which are students representing 35.5% of the respondents agreed with the statement, while nine respondents which are teachers representing 50.0% of the respondents and eighty respondents which are students representing 40.0% of the respondents disagreed with the statement, and three respondents which are teachers representing 16.7% of the respondents and thirty-seven respondents which are students representing 18.5% of the respondents strongly disagreed that there are no challenges on the availability of chemistry textbooks in the school.

Research Question 2: What is the extent of application of Chemistry textbooks in teaching and learning Chemistry at SS I in Sabon Gari and Zaria L.G.A of Kaduna state, Nigeria?

Table 2: Utilization of the Chemistry Textbooks

S/N	Statement	Categories of Respondent	SA		A		D		SD	
			F	%	F	%	F	%	F	%
1	Chemistry textbooks are can be used to study independently.	Teachers	12	66.7	2	11.1	4	22.2	0	0.00
		Students	76	38.0	32	16.0	55	27.5	37	18.5
2	There are no challenges in utilizing contents from Chemistry textbooks in learning.	Teachers	3	16.7	7	38.9	6	33.3	2	11.1
		Students	32	16.0	48	24.0	63	31.5	57	28.5
3	Chemistry textbooks are helpful in improving understanding and performance of students.	Teachers	8	44.4	5	27.8	4	22.2	1	5.6
		Students	84	42.0	37	18.5	49	24.5	30	15.0

Table 2 shows that twelve respondents which are teachers representing 66.7% of the respondents and seventy-six respondents which are students representing 38.0% of the respondents strongly agreed that the chemistry textbooks can be used to study independently. Two respondents which are teachers representing 11.1% of the respondents and thirty-two respondents which are students representing 16.0% of the respondents agreed with the statement, while four respondents which

are teachers representing 22.2% of the respondents and fifty-five respondents which are students representing 27.5% of the respondents disagreed with the statement, and no respondents from teachers representing 0.0% of the respondents and thirty-seven respondents which are students representing 18.5% of the respondents strongly disagreed that the chemistry textbooks can be used to study independently.

Three respondents which are teachers representing 16.7% of the respondents and thirty-two respondents which are students representing 16.0% of the respondents strongly agreed that there are no challenges in applying the contents from the chemistry textbooks in learning. Seven respondents which are teachers representing 38.9% of the respondents and forty-eight respondents which are students representing 24.0% of the respondents agreed with the statement, while six respondents which are teachers representing 33.3% of the respondents and sixty-three respondents which are students representing 31.5% of the respondents disagreed with the statement, and two respondents which are teachers representing 11.1% of the respondents and fifty-seven respondents which are students representing 28.5% of the respondents strongly disagreed that there are no challenges in applying the contents from the chemistry textbooks in learning.

Eight respondents which are teachers representing 44.4% of the respondents and eighty-four respondents which are students representing 42.0% of the respondents strongly agreed that the chemistry textbooks are helpful in improving the understanding and performance of students in chemistry. Five respondents which are teachers representing 27.8% of the respondents and thirty-seven respondents which are students representing 18.5% of the respondents agreed with the statement, while four respondents which are teachers representing 22.2% of the respondents and forty-nine respondents which are students representing 24.5% of the respondents disagreed with the statement, and one respondent which is a teacher representing 5.6% of the respondents and thirty respondents which are students representing 15.0% of the respondents strongly disagreed that the chemistry textbooks are helpful in improving the understanding and performance of students in chemistry.

Discussion

Results from this study revealed that there are no enough chemistry textbooks for SS I students in the region. This is in line with the findings of Lawal, Rumah and Amadi (2020) who observed that there are no available Chemistry textbooks for teaching and learning. The availability of chemistry textbooks is crucial for teaching and learning process, as they provide a foundational resource for educators and students. Access to a variety of chemistry textbooks allows for diverse perspectives and approaches to the subject matter. The availability of these resources can contribute to the overall effectiveness of the teaching and learning process (Obiyo & Inyama, 2019). It's important to consider the role of supplementary materials and resources. In many cases, textbooks are complemented by online resources, laboratory manuals, and interactive tools that can enhance the learning experience (Omiko, 2016). These supplementary materials can provide additional opportunities for students to engage with the content and apply their knowledge in practical settings (Sutton, 2017).

Another finding from this research is that chemistry textbooks used in teaching and learning at S.S 1 in Sabon Gari and Zaria Local Government Area of Kaduna State are not effectively utilized. This is in agreement with related but separate empirical study by Obiyo and Inyama (2019), who discovered that there were underutilization of the available instructional

material in teaching and learning of chemistry in schools in Nigeria due to the inability of teachers to improvise and their lack of manipulative skills. The abstract nature of chemistry concepts alongside other learning difficulties makes chemistry classes to require high level skilled manpower for proper application (Allen, 2010). The utilization of chemistry textbooks in the teaching and learning process is multifaceted. Educators can use textbooks as a guide for structuring their lessons and developing teaching materials. Students can also utilize textbooks as a primary resource for studying, reviewing, and reinforcing their understanding of chemistry concepts (Abdu-Raheem,2016).

Therefore, collaborative effort of educators, curriculum developers, and textbook authors is essential in creating and utilizing Chemistry textbooks that meet the diverse needs of learners and promote a deep understanding of the subject matter (Barton, 2002).

Conclusion

The assessment of the Chemistry textbooks availability and utilization at the SS1 classroom in Sabon Gari and Zaria Local Government Areas of Kaduna State underscores the critical importance of textbooks as essential learning resources. The scarcity of textbooks, coupled with challenges in their effective utilization, poses significant barriers to students' access to quality education and undermines the overall quality of chemistry instruction in the region.

Recommendations

Based on the findings of the study, the following recommendations are proposed to address the challenges identified in the assessment of chemistry textbooks availability and utilization in teaching and learning at the SS1 classroom in Sabon Gari and Zaria Local Government Area of Kaduna State:

1. Government authorities should prioritize investment in educational infrastructure, including the provision of adequate funding for the procurement and distribution of chemistry textbooks to schools in the region.
2. Educational policy makers should develop and implement policies aimed at promoting equitable access to quality textbooks for all students, regardless of their socio-economic background or school type.
3. Publishers should collaborate with educational institutions and government agencies to develop and distribute high-quality, locally relevant chemistry textbooks that align with the curriculum and cater to the diverse learning needs of students in the region.
4. Teachers should be provided with professional development opportunities to enhance their capacity to effectively integrate textbooks into their teaching practices, including training on how to select, adapt, and supplement textbook content to meet the needs of their students.
5. Non-governmental organizations and civil society groups should advocate for policies and initiatives aimed at improving the availability and quality of chemistry textbooks in SS1 classrooms, as well as for increased investment in educational infrastructure and teacher support programs.

References:

- Abdu-Raheem, B.O. (2016). Effects of Instructional Materials on Secondary Schools Students' Academic Achievement in Social Studies in Ekiti State. *World Journal of Education*. 6(1), 200-210.
- Adewole, M.A., & Jimoh, A. (2019). Enhancing the Teaching and Learning of Chemistry in Nigerian Secondary Schools Through the Use of Appropriate Reading Materials. *International Journal of Education, Learning and Development*. 7(1), 2-27.
- Allen W.H, (2010). Appendix Terminologist Classified by Area. *Audiovisual Communication Review*. 2(1), 841.
- Ameh, G.O. (2021). Challenges to the Availability and Utilization of Chemistry Reading Materials in Nigerian Secondary Schools. *Journal of Educational Research and Practice*. 11(2), 319-334.
- Barton, A. C. (2002). "Teaching Chemistry in a Social Context". *Journal of Chemical Education*. 6(1), 74-83.
- Federal Government of Nigeria (2013). *National Policy on Education*. Lagos: NERDC Press
- Ibrahim, B. (2018). The Role of Chemistry Reading Materials in Enhancing Students' Understanding of Chemistry Concepts. *Journal of Science Education and Technology*. 27(5), 81-495.
- Johnson, R., & Smith, T. (2017). Importance of Chemistry Reading Materials in Secondary Schools: A Review of Chemistry Education Research and Practice. 18 (4), 823-837.
- Lawal Y.R, Rumah A.A, & Amadi J, (2020). Utilization of Instructional Materials in Teaching Chemistry in Senior Secondary Schools in Katsina Metropolis. *International Journal of Environment, Agriculture and Biotechnology (IJEAB)*. 5(1), 231-234.
- Obiyo, N., & Inyama, J. (2019), Underutilization of Instructional Materials for teaching and Learning Chemistry in Nigeria Secondary Schools: Ohafia Education Zone, Abia State. *African Journal of Teacher Education*. 8(1), 261-280.
- Ogbonna, L. N. (2016). Availability and Utilization of Chemistry Reading Materials in Nigerian Secondary Schools. *Journal of Research in Education and Society*. 7(3), 128-137.
- Okafor, C. M., & Akpan, J. P. (2020). Chemistry Education in Nigeria: Challenges and Prospects. *Journal of Chemical Education and Research*. 2(1), 43-58.
- Omiko, A. (2015). Impact of Instructional Scaffolding on Student's Achievement in Chemistry in Secondary Schools in Ebonyi State of Nigeria. *International Journal of Education, Learning and Development (IJELD)*. 3(7), 74-83.
- Omiko, A. (2016). Investigating the Availability and the Extent of Use of Instructional Materials by Secondary School Chemistry Teachers in Nigeria. *International Journal of Education, Learning and Development (IJELD)*. 4(3), 1-11.
- Sutton, C. (2017). "Digital Textbooks: A Critical Review." *The Journal of Academic Librarianship*. 4(3), 167-173.