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Factors Affecting the Curriculum Implementation in Teaching of Chemistry in Senior Secondary School in Onitsha Education Zone in Anambra State

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Abstract

The study investigated the factors affecting the curriculum implementation in teaching of chemistry in senior secondary school in Onitsha education zone in Anambra state. The study adopted the descriptive survey research design. Five research questions guided the study. The population of the study comprised all the 98 chemistry teachers in Onitsha Education Zone, Anambra State. A sample of 98 chemistry teachers was used for the study. The instrument for data collection was a structured questionnaire developed by the researchers which was titled 'Questionnaire on factors affecting curriculum implementation in teaching of Chemistry (QFACITC). The instrument was validated by three experts and the reliability of the instrument was obtained using Cronbach Alpha reliability which gave a reliability index of 0.85. Data were collected were analyzed using mean and standard deviation to answer the research questions. The findings of the study revealed the following: that teachers perceive the effectiveness of the current chemistry curriculum effective in meeting educational objectives and student learning needs, the primary challenges faced by teachers in implementing the chemistry curriculum effectively in the senior secondary school, as found by the study include; inadequate laboratory equipment, insufficient textbooks and educational materials limit teaching effectiveness among others, cultural and societal factors influence the implementation of the chemistry curriculum, technology is effective in the delivery and enhancement of the chemistry curriculum implementation, adequate resource allocation, digital resources, clear policy guidelines, real-world applications, periodic curriculum review are strategies that can be implemented to overcome the

challenges affecting effective curriculum implementation in chemistry education in secondary schools. Based on the findings of the study, the following recommendation were made: provision of laboratory facilities should be by a combined effort of the government, Parent Teachers' Association and other education stakeholders; Chemistry teachers and students should improvise instructional materials especially those that involve the use of local materials; philanthropists should invest in the education needs of their community especially in the area of instructional material provision as well as fund assistance; Chemistry teachers should be involved in decision-making and the planning of the Chemistry curriculum.
Keywords : *Curriculum, Chemistry teachers, secondary schools ;*

INTRODUCTION

Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence (Heintz, 2009). The word "Science" comes from the Latin word "Scientia", which means knowing something (Violatti, 2014). Science observes, and understands phenomena that take place around us; the process involving observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena. Science is a system of acquiring knowledge based on the scientific method in order to organize a body of knowledge gained through research. Science is a continuing effort to discover, and increase knowledge. Anaeto et al. (2016) opines that science plays a major role in creating new knowledge, economic development, and wealth creation.

Chemistry is a branch of science that studies the structure, composition, properties and reactions of matter in its different forms (Usselman and Rocke, 2024). Chemistry, therefore, is concerned not with the subatomic domain but with the properties of atoms and the laws governing their combinations and how the knowledge of these properties can be used to achieve specific purposes. Chemistry involves the study of the atomic composition and structural architecture of substances, as well as the varied interactions among substances that can lead to

sudden, often violent reactions (Usselman and Rocke, 2024). Chemistry deals with the composition, properties and uses of matter (Ababio, 2013). Chemistry is one of the subjects that are offered in the Nigerian secondary school curriculum (Kie, 2012). Chemistry is an important part of what is called science and an active, and continually growing science that has vital significance to our world both in the realm of nature and realm of society (Anaso, 2010). According to Edomwonyi-Otu and Avaa (2011) states that chemistry knowledge in particular contributes extensively towards economic, industrial and technological prosperity. As such, proper implementation of chemistry curriculum at any educational level is absolutely critical. This is based on its anticipated catalytic impact on attainment of the desired learning outcomes and consequently the global educational goals.

Chemistry occupies a central locus in the contemporary society (ACS, 2017). Chemistry underpins almost every aspect of modern life. Essentially, the ultimate goal of studying chemistry is to enhance peoples understanding of the composition, structure, properties, and changes of matter while under varied conditions. Ituma (2012) highlights that knowledge of chemistry is required in the provision of services, and production of quality goods. Chemistry is a prerequisite for enrolment into scientifically inclined careers such as medicine, engineering, pharmacy, biotechnology, agriculture and the likes, in post-secondary educational institutions (Njagi and Silas, 2015; Mwangi, 2016). Giginna and Nweze (2014) noted that the study of chemistry has tremendous importance to mankind as the application of its principles has helped in modern inventions. Yet, with the increasing importance of chemistry to the unfolding world, the performance of Nigerian students in chemistry at the secondary school remains a dismal failure (Nbina, 2012). Korau (2006) reported such factors to include curriculum related variables, among others.

The curriculum is a watchdog from which every prospective learner is expected to learn from at a designated academic level. The term curriculum was derived from the Latin word “Currere” which means running a course (Leyendecker, 2012). According to Akubuilo (2019), curriculum is a planned and organized set of formal educational and training intentions geared towards the acquisition of pre-specified

competencies. Curriculum refers to the overall plan or framework for teaching and learning that outlines what students should know, understand, and be able to do in a particular educational program or course. Ugwu (2015) defined curriculum as the experience a school system provides for its students. Agusiobo (2003) described curriculum as an organized framework that sets out the content that children are to learn and the process through which children achieve goal which the curriculum sets for them. It encompasses a wide range of elements, including educational goals and objectives, content, methods of instruction, assessment and evaluation, materials and resources, and framework organization and structure of the sequence, pacing, and integration of content and activities across the educational experience.

Curriculum means a course to be run for reaching a certain goal. Lewis and Alice (2012) defined curriculum as "a set of intentions about opportunities for engagement of persons to be educated with other persons and with things (all bearers of information process, techniques and values) in certain arrangements of time and space." A curriculum means, the total situation (all situations) selected and organized by the institution and made available to the teacher to operate and to translate the ultimate aim of education into reality. Curriculum materials are important resources for teachers to design and conduct teaching activities, which usually include textbooks, teacher's guides, teaching videos, exercise books, and other auxiliary materials. They provide teachers with a guide to think about what to teach, to whom, and how (Stein et al, 2007). It is commonly recognized that the use of curriculum materials is the core component of teachers' work (Lloyd et al, 2009).

Curriculum utilization in the field of Chemistry is a dynamic and multifaceted process influenced by various factors that shape both its content and implementation in educational settings (Olubunmi and Aarinola, 2022). It is an ongoing process that responds to changes in educational theories, societal needs, technological advancements, and feedback from stakeholders. Effective use of curriculum aims to provide a coherent, meaningful, and engaging learning experience for students while preparing them for future challenges and opportunities Darling-Hammond et al. (2019).

Curriculum implementation entails putting into practice the officially prescribed courses of study, syllabuses and subjects (Anwukah, 2011). It is pertinent to note that Chemistry curriculum implementation cannot take place without the teacher and the learner (Akubuilo, 2014). The teacher and the learner are the central figures in the curriculum implementation processes. Teachers are the key agents in curriculum implementation process. Fullan (2015) highlights curriculum implementation as how the planned curriculum is translated by the classroom teacher into syllabus, schemes of work and lessons to be delivered to the students. The judicious and effective implementation of senior secondary school chemistry curriculum becomes imperative in the teaching and learning of chemistry. This goes further to elucidate that the basic reasons for the implementation of senior secondary school chemistry curriculum is to ensure the totality in the achievement of the general objectives of senior secondary school chemistry curriculum as stated earlier. The implementation, as an essential part of curriculum development, brings into existence the anticipated changes.

Relevance of a curriculum is determined only when it is implemented (Ugwu, 2015). Kanno (2014) recognized the fact that the success of any curriculum, significantly, depends on the extent to which the classroom teacher is able not only to interpret the curriculum but implement it. Fullan (2015) opined that if curriculum is not well implemented, all efforts expended in the planning are a waste. Akubuilo (2019) submitted that the success of any curriculum depends on how it is implemented. Therefore, it is pertinent to note that the judicious and effective implementation of senior secondary school chemistry curriculum contributes immensely to attaining technology advancement, and as well a mechanism for the achievement of chemistry objectives.

In Nigeria, the implementation of chemistry curriculum is yet to meet the expected standards. Curriculum overloading is one of the hallmarks of ineffective policy implementation (Omolewa, 2016). Grundskola (2014) affirms that the Nigeria curriculum covers too much information and suggests redesigning its contents to remove unnecessary and irrelevant facts. The Senior Secondary Chemistry

Curriculum has not been well implemented, despite the significance of chemistry in the nation's goal for rapid innovation and this calls to question the responsibilities that chemistry teachers play in its implementation (Igboanugo, 2013; Achimugu, 2016). Chemistry students in secondary schools often believe that chemistry is difficult and in-comprehensive to a majority of the general population and this was the major reason students call Chemistry hard science (knight, 2016). Implementation of chemistry curriculum brings about some negative educational and social consequences among chemistry students such as high failure rates, high drop out in chemistry studies, examination malpractice both in internal and external examinations, truancy and poor job performances, all these borders on the extent to which a particular curriculum is implemented.

Many schools and educational institutions in Nigeria face challenges such as inadequate funding, lack of modern laboratory equipment, and insufficient teaching materials for effective implementation of chemistry curricula. This results in limited practical learning experiences for students, hindering their ability to develop hands-on skills and proficiency in experimental techniques crucial for understanding chemistry concepts. Moreover, there is a disparity in the competence and training of chemistry educators across Nigeria, with shortages of qualified teachers and uneven access to professional development opportunities. This affects the quality of instruction and the delivery of chemistry curricula, leading to variations in teaching methodologies, content delivery, and student learning outcomes.

Nigeria's diverse cultural and linguistic landscape poses challenges for developing chemistry curricula that are inclusive and culturally relevant. There is also a lack of educational materials available in local languages, and differences in cultural perspectives on science which can impact students' engagement and understanding of chemistry concepts. Disparities in access to technology and digital resources among schools in Nigeria limit the integration of digital tools and online learning platforms into chemistry education. Students may thus miss out on opportunities for interactive and multimedia-rich learning experiences, which are essential for enhancing understanding and application of Chemistry principles.

The pace of globalization and advancements in Chemistry globally may not always be reflected in Nigerian Chemistry curricula. There is a risk of Nigerian students being inadequately prepared for global scientific challenges and opportunities, potentially affecting their competitiveness in the global job market and scientific community. Hence, the need for this study to investigate the factors affecting the implementation of chemistry curriculum in secondary schools in Onitsha Education zone of Anambra state.

Research Questions

The following research questions were formulated to guide the study:

1. How do teachers perceive the effectiveness of the current Chemistry curriculum in meeting educational objectives and student learning needs?
2. What are the primary challenges faced by teachers in implementing the Chemistry curriculum effectively in the Senior Secondary School?
3. How do cultural and societal factors influence the implementation of the Chemistry curriculum?
4. What role does technology play in the delivery and enhancement of the Chemistry curriculum?
5. What Strategies can be implemented to overcome the challenges affecting effective curriculum implementation in chemistry education in secondary schools?

METHOD

The study adopted a descriptive survey research design. The population of the study comprise ninety-eight (98) chemistry teachers in all the 32 public secondary schools in Onitsha Education Zone. This consists 23 male and 75 female Chemistry teachers. Out of the 32 secondary schools, 19 are co-educational and 13 are single sex schools. The sample for the study consisted of all the 98 chemistry teachers in the sampled schools. All the chemistry teachers were sampled because the population size is small. The sample for the study consisted of all the 98 chemistry teachers in the sampled schools. All the chemistry teachers were sampled. The instrument was titled ‘Questionnaire on factors affecting curriculum implementation in teaching of Chemistry (QFACITC)’ and is structured based on the research questions guiding the

study, using a 4-point rating scale in some questions while in respondents were expected to tick from the columns. The instrument was validated by three experts, all in Nwafor Orizu College of Education, Nsugbe.

The instrument was trial tested on sixteen (16) Chemistry teachers in Ogidi educational zone that are not part of the study but share similar characteristic with the study area. The data obtained was computed using Cronbach Alpha reliability estimate to determine the internal consistency of the instrument and was found to be 0.85 which shows that the instrument is reliable. This is because the procedure applies to the instruments or items are non-dichotomously scored. The method of data analysis for answering research questions was mean and standard deviation. Interpretation is based on real limit of numbers, where a mean of 3.50 - 4.50 implies Very High Extent (VHE), 2.50 - 3.49 implies High Extent (HE), 1.50 - 2.49 implies Low Extent (LE) and 0.9.50 -1.49 implies Very Low Extent (VLE).

RESULTS

Research Question 1

How do teachers perceive the effectiveness of the current chemistry curriculum in meeting educational objectives and student learning needs?

Table 1: Mean and Standard deviation on how teachers perceive the effectiveness of the current chemistry curriculum in meeting educational objectives and student learning needs?

S/N	ITEM STATEMENT	x	SD	DECISION
1	The chemistry curriculum adequately covers essential concepts	3.69	0.46	Agreed
2	The chemistry curriculum effectively meets educational objectives	3.60	0.62	Agreed
3	The chemistry curriculum addresses students' interest and real-world applications	3.59	0.58	Agreed
4	The chemistry curriculum supports students with special needs	3.55	0.57	Agreed
5	The chemistry curriculum prepares students for future challenges	3.76	0.69	Agreed

	CLUSTER MEAN	3.64	0.37	Agreed

Result presented in table 1 indicates the mean and standard deviation on how teachers perceive the effectiveness of the current chemistry curriculum in meeting educational objectives and student learning needs. The findings showed that item 5 had the higher mean score of 3.76, followed by item 1 with a mean score of 3.69, and item 2 had 3.60, item 3 had 3.59 and item 5 had a mean score of 3.55. The cluster mean of 3.64 with a standard deviation of 0.37 was obtained, which implies that the respondents agreed with the item statement on teachers perceive the effectiveness of the current chemistry curriculum in meeting educational objectives and student learning needs.

Research Question 2

What are the primary challenges faced by teachers in implementing the chemistry curriculum effectively in the senior secondary school?

Table 2: Mean and standard deviation on the primary challenges faced by teachers in implementing the chemistry curriculum effectively in the senior secondary school?

	ITEM STATEMENT	X	SD	DECISION
1	Inadequate laboratory equipment hinders effective chemistry curriculum implementation	3.09	0.70	Agreed
2	Insufficient textbooks and educational materials limit teaching effectiveness	3.09	0.70	Agreed
3	Teachers' limited content knowledge impedes effective teaching of chemistry	3.18	0.50	Agreed
4	High teacher workload reduces time for lesson planning and preparation	3.15	0.52	Agreed
5	Inadequate school infrastructure (e.g., classrooms, laboratories) hinders teaching of chemistry	3.14	0.83	Agreed
	CLUSTER MEAN	3.17	0.40	Agreed

Result presented in table 2 shows the mean and standard deviation on the primary challenges faced by teachers in implementing the chemistry curriculum effectively in the senior secondary school. The findings showed that item 1 had the

higher mean score of 3.28, followed by item 3 with a mean score of 3.18, and item 4 had 3.15, item 4 had 3.14 and item 2 had a mean score of 3.09. The cluster mean of 3.17 with a standard deviation of 0.40 was obtained, which implies that the respondents agreed with the item statements on the primary challenges faced by teachers in implementing the chemistry curriculum effectively in the senior secondary school.

Research Question 3

How do cultural and societal factors influence the implementation of the chemistry curriculum?

Table 3: Mean and standard deviation on cultural and societal factors influence the implementation of the chemistry curriculum

S/N	ITEMS STATEMENT	X	SD	DECISION
1	Cultural beliefs and values impact teachers' implementation of chemistry curriculum	3.58	0.49	Agreed
2	Does students' cultural backgrounds influence students' interest in learning of chemistry	2.54	0.50	Agreed
3	Does societal expectations and pressures influence chemistry curriculum implementation	3.15	0.48	Agreed
4	Parental involvement and support affect chemistry curriculum implementation	2.91	0.72	Agreed
5	Chemistry curriculum addresses relevant societal issues and challenges	2.84	0.37	Agreed
	CLUSTER MEAN	3.00	0.24	Agreed

Result presented in table 3 shows the mean and standard deviation on the cultural and societal factors influence the implementation of the chemistry curriculum. The findings showed that item 1 had the higher mean score of 3.58, followed by item 3 with a mean score of 3.15, and item 4 had 2.92, item 5 had 2.4 and item 2 had a mean score of 2.54. The cluster mean of 3.00 with a standard deviation of 0.24 was obtained, which implies that the respondents agreed with the item

statements on cultural and societal factors influence the implementation of the chemistry curriculum.

Research Question 4

What role does technology play in the delivery and enhancement of the chemistry curriculum implementation?

Table 4: Mean and standard deviation on the role's technology play in the delivery and enhancement of the chemistry curriculum implementation

S/N	ITEM STATEMENT	X	SD	DECISION
1	Technology enhances student engagement in chemistry classes	3.44	0.61	Agreed
2	Digital resources (e.g., simulations, videos) effectively support chemistry teaching	2.89	0.54	Agreed
3	Online platforms (e.g., YouTube, Zoom) facilitate collaborative learning in chemistry	3.12	0.71	Agreed
4	Technology increases efficiency in chemistry lesson planning and delivery	3.10	0.68	Agreed
5	Educational software improves student understanding of complex chemistry concepts	3.16	0.60	Agreed
	CLUSTER MEAN	3.14	0.32	Agreed

Result presented in table 4 shows the mean and standard deviation on the role's technology play in the delivery and enhancement of the chemistry curriculum implementation. The findings showed that item 1 had the higher mean score of 3.44, followed by item 5 with a mean score of 3.16, and item 3 had 3.12, item 4 had 2.10 and item 2 had a mean score of 2.89. The cluster mean of 3.14 with a standard deviation of 0.32 was obtained, which implies that the respondents agreed with the item statements that technology is effective in the delivery and enhancement of the chemistry curriculum implementation.

Research Question 5

What Strategies can be implemented to overcome the challenges affecting effective curriculum implementation in chemistry education in secondary schools?

Table 5: Mean and standard deviation on the strategies that can be implemented to overcome the challenges affecting effective curriculum implementation in chemistry education in secondary schools

S/N	ITEM STATAEMENT	X	SD	DECISION
1	Adequate resource allocation improves chemistry curriculum implementation	2.94	0.55	Agreed
2	Digital resources enhance chemistry teaching and learning	2.53	0.50	Agreed
3	Clear policy guidelines facilitate chemistry curriculum implementation	2.73	0.63	Agreed
4	Real-world applications increase chemistry relevance for students	2.65	0.48	Agreed
5	Periodic curriculum review ensures relevance and effectiveness	2.53	0.50	Agreed
	CLUSTER MEAN	2.68	0.26	Agreed

Result presented in table 5 shows the mean and standard deviation on the strategies that can be implemented to overcome the challenges affecting effective curriculum implementation in chemistry education in secondary schools. The findings showed that item 1 had the higher mean score of 2.99, followed by item 3 with a mean score of 2.73, and item 4 had 2.65, item 2 and 5 had a mean score of 2.53 respectively. The cluster mean of 2.68 with a standard deviation of 0.26 was obtained, which implies that the respondents agreed with the item statements on strategies that can be implemented to overcome the challenges affecting effective curriculum implementation in chemistry education in secondary schools.

Discussions of the Findings

The findings of the study revealed that chemistry curriculum adequately covers essential concepts, chemistry curriculum effectively meets educational objectives, chemistry curriculum addresses students' interest and real-world applications, chemistry curriculum supports students with special needs, chemistry curriculum prepares students for future challenges. This is in line with the finding of Okoro (2020) who reported that curriculum gives teachers the opportunity to use

differentiated learning materials, sorting and selecting materials that suit each student's abilities. The learning objectives are the same in this case, but the ways to achieve them differ. When students with disabilities do not understand the teacher's explanation of the material, students with disabilities are welcome to ask questions or discuss with other friends. The main focus in implementing differentiated learning is to emphasize teacher activity as implementers of the learning process who can analyze the conditions and needs of students in the school (Faiz *et al.,* 2022). Teachers can consider several aspects in implementing differentiated learning: students' interests, level of readiness, and learning styles (Wahyuningsari *et al*., 2022). Also in the same vein, Alex (2021) revealed that the chemistry curriculum is very essential as it promotes students' interest and meets the educational needs of the 21st century.

The study revealed that inadequate laboratory equipment hinders effective chemistry curriculum implementation, insufficient textbooks and educational materials limit teaching effectiveness, teachers' limited content knowledge impedes effective teaching of chemistry, high teacher workload reduces time for lesson planning and preparation, inadequate school infrastructure (e.g., classrooms, laboratories) hinders teaching of chemistry. In Nigeria, ineffective implementation of the subject's curriculum is as a result of inadequate funding, poor teacher motivation, partial curriculum coverage and lack of laboratories (Achimugu, 2016). According to Ijidike and Oyelana (2015) shortage of laboratories contributes to ineffective chemistry teaching in schools. To enhance the conduciveness of the laboratory for teaching and learning, the facility should have adequate water supply, a good power supply system, enough furniture, good ventilation, and a clean environment.

In addition, the facility should be supplied with adequate stock of instructional materials such as chemicals, apparatus, operational equipment, charts and models. According to Gatana (2011) inadequacy of chemical materials and apparatus in the school laboratories contribute to low performance in chemistry. There are many implementation issues in secondary education chemistry curriculum, which include: non-provision of classrooms and laboratory facilities, inadequacy of qualified

chemistry teachers, lack of motivation to chemistry teachers, inadequate provision of instructional materials, paucity of funding, and chemistry teacher non-involvement in decision-making and curriculum planning (Igwe, 2015).

The findings of the study revealed that cultural beliefs and values impact teachers' implementation of chemistry curriculum, students' cultural backgrounds influence students' interest in learning of chemistry, societal expectations and pressures influence chemistry curriculum implementation, parental involvement and support affect chemistry curriculum implementation, chemistry curriculum addresses relevant societal issues and challenges. Olotu and Ugwuanyi (2017) observed that it is essential for educators to understand the fundamental and culturally-based worldviews that students bring to the classroom and how these beliefs are supported by student's culture. They recommended incorporating indigenous techniques that stem from the cultural legacy of the people into science instruction. In their contribution, Konyela and Okigbo (2021) advocated for the incorporation of ethno-chemistry into the subjects, methods, and practices of chemistry education. Odo (2013) continued by pointing out that nations like Japan, India, China, Kenya, Bolivia, Sri Lanka, and Australia have effectively merged western science with their own vast reservoir of knowledge, experiences, and customs to create a path toward distinctive scientific progress. The students observe daily cultural behaviors and knowledge that are rich in chemistry that are present in underdeveloped nations. Students will link the cultural behaviors they engage in at home to their grasp of chemistry as science teachers use them. In fact, the goals of integrating cultural knowledge and practices into teaching and learning chemistry in secondary schools are strongly related to the purpose of constructivist learning theory, which emphasizes prior knowledge. Indigenous people in poor nations like Nigeria have a variety of cultural traditions and knowledge that they practice. These traditions and information are closely tied to several chemical concepts covered in secondary school.

The finding of the study revealed that technology enhances student engagement in chemistry classes, digital resources (e.g., simulations, videos) effectively support chemistry teaching, online platforms (e.g., YouTube, Zoom)

facilitate collaborative learning in chemistry, technology increases efficiency in chemistry lesson planning and delivery, educational software improves student understanding of complex chemistry concepts. The findings of this study is the same with that of Abubakar (2021) who reported that technology can transform chemistry education by providing interactive learning tools, virtual labs, and access to global resources. These advancements can enhance student engagement, improve understanding of complex concepts, and bridge the gap between theoretical and practical knowledge.

Various resources and learning practices are being provided by digital technology in the field of science education, and students have the ability to complete multiple assignments and activities while maintaining their own understanding. These technologies are designed to create involvement in social, educational atmosphere (Private messaging/Online Chat), as well as the students, particularly social networking sites (Facebook, Twitter, YouTube, Instagram, Snapchat), would benefit from the growing use of the technology (Al-Rsa'i, 2013). In addition to the continuous use of mobile devices, technologies are designed to combat the main barriers which the individuals accountable for the education and the upgrading of scientific ability knowledge among the public (Shwartz, Ben - Zvi & Hofstei, 2005). Digital technology is seen as playing an important part in ongoing learning practices since it allows for easy accessibility to all new information anywhere in the globe, irrespective of geographical or time constraints (Kalogiannakis & Papadakis, 2017). As a result, digital technology offers an expanding array of tools for handling digital information and make it available to a diverse set of materials that facilitates the digital age (Keim *et. al.*, 2010), making it a crucial resource for people in the communities to grow their intellectual and technical skills and stay consistent with developed countries.

The findings of the study revealed that adequate resource allocation improves chemistry curriculum implementation, digital resources enhance chemistry teaching and learning, clear policy guidelines facilitate chemistry curriculum implementation, real-world applications increase chemistry relevance for students, periodic

curriculum review ensures relevance and effectiveness. (Oktafiani and Hernawan, 2018; Muskin, 2015 & Mokhele, 2012) reported that one of the important components for curriculum implementation is material. During implementation ensuring all necessary materials in the curriculum will be helpful and necessary if effective implementation would be achieved. Materials that cannot be used or resources that cannot be accessed due to financial limitation results in the curriculum not being fully implemented. For example, as a result of the lack of necessary material for an experiment that should be done in science class, a teacher will pass this experiment without doing this. Or, due to the lack of reading material in a language lesson, teachers may consider this skill to be performed later and move on to the next level (Mkandawire, 2021). Unfortunately, there is no shortage of materials in most of the classroom environments that support the curriculum implementation, for example, easy access to materials in activities and high printing opportunity facilitate implementation (Department of Education and Science, 2015). Therefore, governments should provide schools with necessary materials (Kurniawan, 2015). Yet, materials used by teachers during implementation should be easy to use. Since teachers do not want to have problems while using these materials, it is not possible to continue the flow of the course during lessons with difficult material to use. Moreover, a teacher should be able to use technological facilities in the school. School administration should move away from an overprotective attitude and allow teachers to use materials for even entertainment at the appropriate times (Carey, 2013). It is clear that when there is a lack of material in a classroom, there will be difficulties in implementation, no matter how talented the teacher is (Muskin, 2015).

Conclusion

Based on the findings of the study, the following conclusions were drawn: Teachers perceive the effectiveness of the current chemistry curriculum in meeting educational objectives and student learning needs, the primary challenges faced by teachers in implementing the chemistry curriculum effectively in the senior secondary school include; inadequate laboratory equipment hinders effective

chemistry curriculum implementation, insufficient textbooks and educational materials limit teaching effectiveness among others. Cultural and societal factors influence the implementation of the chemistry curriculum, technology is effective in the delivery and enhancement of the chemistry curriculum implementation. Adequate resource allocation, digital resources, clear policy guidelines, real-world applications, periodic curriculum review are strategies that can be implemented to overcome the challenges affecting effective curriculum implementation in chemistry education in secondary schools.

Recommendation

Based on the findings of the study, the following recommendation were made;

1. Provision of laboratory facilities should be by a combined effort of the government, Parent Teachers' Association and other education stakeholders.
2. Chemistry teachers and students should improvise instructional materials especially those that involve the use of local materials.
3. The government should equally ensure adequate provision of both visual and audio-visual instructional materials.
4. Philanthropists should invest in the education needs of their community especially in the area of instructional material provision as well as fund assistance.
5. Chemistry teachers should be involved in decision-making and the planning of the Chemistry curriculum.

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