

ASSESSMENT OF THE RELEVANCE OF SENIOR SECONDARY SCHOOL CHEMISTRY CURRICULUM FOR POVERTY ALLEVIATION AND SUSTAINABLE DEVELOPMENT IN ONDO STATE, NIGERIA

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ABSTRACT

The study assessed the relevance of Senior Secondary School Chemistry curriculum for Poverty Alleviation and Sustainable Development (SD) in Ondo State, Nigeria. Specifically, the study investigated the extent of integration of Education for Sustainable Development (ESD) with a focus on Poverty Alleviation Education contents in Chemistry curriculum of the Nigerian Senior Secondary Schools. The study adopted survey research design. The population for the study consisted of all Chemistry teachers in Senior Secondary Schools in Ondo State, Nigeria. One hundred and twenty eight (128) Chemistry teachers purposively selected from eighty (80) Senior Secondary Schools in the State constituted the sample. The study utilized the Chemistry curriculum content analysis and structured questionnaire developed by the researcher. The data collected were analyzed using simple percentage, mean and standard deviation. The findings of the study indicated that Poverty Alleviation and Sustainable Development Education were not incorporated in the Chemistry curriculum of Senior Secondary Schools.

Keywords: Assessment; Poverty Alleviation; Sustainable Development; Senior Secondary Schools Chemistry Curriculum; Nigeria

INTRODUCTION

Chemistry is a crucial science subject and as such both physical science-oriented and biology-oriented students need a good performance in it to continue with their study in the pure and applied science disciplines. Chemistry, like all sciences, is both empirical as well as conjectural. The study of Chemistry entails the learning of concepts, established principles and a lot of laboratory works. These laboratory experiments are conceived to demonstrate practically some of the principles taught in theory, test the validity of certain empirical chemical laws and illustrate properties of substances taught theoretically in the classroom.

Ondo State has immense potentials for industrial revolution with the application of Chemistry. This is in consideration of its economic status as an oil producing State, availability of agro and agro-allied raw materials for the production of goods, reasonable quantity of solid minerals including high quality deposit of bitumen. All these require a robust and diversified knowledge of Chemistry to tap the various resources the State is endowed with. In order to achieve this, the development of an index of human resources in the teaching and learning of Chemistry is a very vital requirement.

In Nigeria, the senior secondary school Chemistry curriculum covers three classes: Senior Secondary Classes 1-3. It has been developed around four themes: Chemistry and industry, the chemical world, chemistry and environment and the chemistry of life (Nigerian Educational Research and Development Council, 2007).

The desire to be identified with contemporary development worldwide has called for the organization of contents in the curriculum around the four themes. Recently, at the United Nations' summit in 2015, on the 2030 Agenda for Sustainable Development (SD) of the United Nations, a total of 17 Development Goals and associated targets were announced, which demonstrate the ambition to reach Sustainable Development(SD) (UN, 2015).

INTRODUCTION CONT'D

The aim of the 17 Sustainable Development Goals (SDGs) is to secure a sustainable, peaceful, prosperous and equitable life on earth for everyone now and in the future. The goals cover global challenges that are crucial for the survival of humanity. It was envisaged that some forms of education needs to be put in place to address the issue of SD. Therefore, this resulted in the emergence of Education for Sustainable Development (ESD) from 1992 (Barraza et al., 2003). Thus, ESD empowers citizens to take informed decisions and responsible actions for environmental integrity, economic viability and a just society for both present and future generations (UNESCO, 2019).

According to UNESCO (2013), ESD means including key SD issues into teaching and learning. For example, climate change, disaster risk reduction, biodiversity protection, poverty reduction or sustainable consumption. It also requires participatory teaching and learning methods that motivate and take action for SD. ESD consequently promotes competencies like systems thinking, critical thinking, imagining future scenarios, or making decisions in a collaborative way. Sustainable Development Goal 4 (SDG4) is focused on education in which one of the targets specifically aims to ensure that all learners acquire the knowledge and skills needed to promote Sustainable Development (UN, 2015).

Poverty reduction is wealth creation and helping the poor to step out of poverty. However, for effective achievement of poverty eradication programme objectives, Onibokun and Kumuji (1992) suggested that provision of adequate food, stable and healthy shelter, affordable transportation, gainful employment, basic health services, basic literacy, basic human rights to life, accessibility to recreational opportunities as strategies for poverty eradication geared towards sustainable national development. In other words, poverty is now an economic problem in our contemporary society.

INTRODUCTION CONT'D

Todaro and Smith (2009) recognized poverty in pure economic terms as the number of people living below an imaginary internationally specified minimum level of income, called the poverty line, which cuts across international groups.

In addition, chapter 36 of Agenda 21, titled “Promoting education, public awareness and training” (Quarrie, 1992), deals with the need to promote SD through education. Sustainable Development Goal 1 (SDG 1) is focused on ‘No Poverty’ which aims at ending poverty in all its forms everywhere. The Sustainable Development Goals recognize that ending poverty must go hand-in-hand with strategies that build economic development.

UNESCO, as the United Nations’ specialized agency for education, is entrusted to lead and coordinate the Education 2030 Agenda, which is part of a global movement to eradicate poverty through 17 Sustainable Development Goals by 2030.

Education for Sustainable Development (ESD) enables all pupils including those with special needs and disabilities to develop the awareness, skills, understanding and values to participate in decisions about the ways we do things. Individually and collectively, both locally and globally, it will improve the quality of life now without damaging the planet for the future. There are opportunities for pupils to develop their understanding of SD within the school curriculum particularly the senior secondary schools Chemistry curriculum. Therefore, the type of education that should be provided must equip the students with the skills, knowledge and understanding to expand their business world for poverty reduction and Sustainable Development.

INTRODUCTION CONT'D

Poverty has also been described as a condition of material and non-material deprivation, characterized by such poor economic and social conditions as inadequate food, poor accommodation, poor health services, poor education, unemployment, low income, poor technology and dependence among individuals and nations (Okoli & Igwegbe, 2015).

Poverty alleviation education integration and inculcation in the senior secondary school Chemistry in Nigeria is ideal for the future of the Nigerian youth in order to prepare them to be encouraged and prepared to make viable input into the economy in future. Integration of poverty alleviation education in Chemistry curriculum entails the inclusion of poverty alleviation education as a content level of unemployment and poverty level in Nigeria. In recognition of the dehumanizing nature of poverty and all its attendant social problems, many successive governments have introduced one or more programme(s) aimed at alleviating the scourge of poverty among the people of Nigeria. Some of the schemes include National Poverty Alleviation Programme (NAPEP), Youth Empowerment Scheme (YES), Rural Infrastructural Development Scheme (RIDS) and Natural Resources Development and Conservation Scheme (NRDCS). Most of the poverty alleviation measures or initiatives are embedded in entrepreneurship but have suffered several challenges culminating into their failure.

INTRODUCTION CONT'D

Nigeria like most developing nations of the world is faced with myriad of problems which include youth and graduate unemployment, high rate of poverty, bribery and corruption, kidnapping, over-dependency on foreign goods, low economic growth and development, lack of capacity and skills needed to move the economy forward and urbanization. None of these problems is as virulent, persistent and agonizing as the problem of high rate of unemployment among youth and Nigerian graduates. The high rate of unemployment among the youths in Nigeria has contributed to the high rate of poverty and insecurity in the country (Ajufu, 2013). Unemployment has become a cankerworm eating deep among youths in Nigeria. The situation has made stakeholders to express concern about the quality of secondary school graduates in

Nigeria, thereby questioning the relevance of the curriculum vis-à-vis the current and future demands of secondary school graduates in the Nigerian society. This has led to restructuring and reforming of the curriculum in Nigeria for decades now.

Despite these changes and reforms, the situation has remained critical and alarming in the whole world and Nigeria in particular. This problem has been attributed to the poor curriculum structure and implementation, poor policy and attitude of employers of labour (Ogwu, Omeje & Nwokenna, 2014).

From the foregoing, it can be said that the high rate of poverty among the Nigerian youths may be reflecting the inadequacy inherent in the senior secondary school Chemistry curriculum. It also appears from the review of available literature that assessment of the relevance of senior secondary school Chemistry curriculum for poverty alleviation education and Sustainable Development has not been extensively looked into in Nigeria, thus making this study imperative.

STATEMENT OF THE RESEARCH PROBLEM

The problem of high rate of unemployment among the youths in Nigeria has contributed to the high rate of poverty in the country. The situation has made stakeholders to express concern about the quality of secondary school graduates in Nigeria, thereby questioning the relevance of the curriculum vis-à-vis the current and future demands of the secondary school graduates in the country. In view of the increasing rate of poverty in Nigeria, there is a wide perception that the integration of poverty alleviation education and Education for Sustainable Development (ESD) in senior secondary school Chemistry curriculum would be a preparation ground for infusing relevant skills and knowledge which will prepare students adequately for self-reliance and a productive life style.

There has been increasing concern in recent years about education for Sustainable Development in Africa and the world as a whole. And of course, there have been many studies focusing on Sustainable Development in the world. However, there appears to be scarcity of research on senior secondary school chemistry curriculum and its relevance for poverty alleviation and Education for Sustainable Development in Nigeria. Hence, this study.

PURPOSE OF THE STUDY

The study assessed the relevance of senior secondary school chemistry curriculum for poverty alleviation and sustainable development. The specific objectives of the study were to:

1. assess the extent of integration of poverty alleviation and Education for Sustainable Development (ESD) in the senior secondary school Chemistry curriculum.
2. assess the extent to which senior secondary school Chemistry curriculum encourages acquisition of skills, that can help reduce poverty in students' immediate society.
3. examine the teachers' level of awareness of the need for inculcating poverty alleviation education and concepts of sustainable development through the implementation of chemistry curriculum.

RESEARCH QUESTIONS

The study was guided by three main research questions. The research questions were:

1. To what extent is poverty alleviation education and Education for Sustainable Development (ESD) integrated into the senior secondary school Chemistry curriculum?
2. To what extent does the curriculum contents of the senior secondary school chemistry in Nigeria emphasize acquisition of skills, that can help reduce poverty in students immediate society?
3. Are Chemistry teachers aware of the need for inculcating poverty alleviation education and concepts of sustainable development through the implementation of chemistry curriculum?

METHODOLOGY

The descriptive survey research design was used in the study. The descriptive design identifies the opinions people hold about certain phenomena (Coher, Manion and Morrison, 2007). In this study, the phenomena were identified as Education for Sustainable Development (ESD) and poverty alleviation. The population for the study consisted of all senior secondary school Chemistry teachers in Ondo State, Nigeria. One hundred and twenty eight (128) Chemistry teachers purposively selected from eighty (80) sampled senior secondary schools drawn from eight Local Government Areas of the State constituted the sample..

Senior secondary school Chemistry curriculum content analysis, including 20-item questionnaire designed by the researcher titled “Senior Secondary School Chemistry Curriculum and Integration of Poverty Alleviation Education and Sustainable Development” was the main instrument used for the collection of data. The instrument of the study was validated by experts in science education, Chemistry education, measurement and evaluation and curriculum studies. Based on their comments, the instrument was corrected, restructured and hence refined to meet the face and content validity requirements.

Test re-test method was used in determining the reliability of the instrument. A reliability index of 0.75 was obtained. The instrument of the study was directly administered by the researcher with the assistance of eight research assistants. Each research assistant was assigned ten schools. The research questions were answered through the use of frequencies, percentages, means and standard deviation. The response options in the questionnaire were scaled as 4,3,2,1 for Strongly Agree, Agree, Disagree and Strongly Agree respectively. A mean () score value of 2.50 and above will be regarded as accepted while responses below will be regarded as rejected.

RESULTS

The senior secondary school Chemistry curriculum was analysed to determine the extent of integration of poverty alleviation education and Education for Sustainable Development. Means and Standard Deviation were used in answering the research questions. Details of these analyses are presented below.

Research Question 1: To what extent is poverty alleviation education and Education for Sustainable Development (ESD) integrated into the senior secondary school Chemistry curriculum?

RESULTS CONT'D

Table 1: Means and Standard Deviation on the Extent of poverty alleviation education and integration Education for Sustainable Development (ESD) in the senior secondary school Chemistry curriculum.

S/N	STATEMENTS	X	SD	Decision
1	Chemical Industries	3.61	35.64	Accepted
2	Introduction to Chemistry	2.35	57.96	Rejected
3	Particulate nature of matter	2.25	18.23	Rejected
4	Symbols, formulae and equations	2.35	14.63	Rejected
5	Chemical combination	2.44	15.29	Rejected
6	Gas laws	2.35	14.26	Rejected
7	Standard separation techniques for mixtures	3.51	31.25	Accepted
8	Acids, bases and salts	2.26	14.91	Rejected
9	Carbon and its compounds	2.45	14.55	Rejected
10	Periodic table	2.21	14.80	Rejected
11	Chemical reactions	2.41	15.20	Rejected
12	Mass-volume relationships	3.16	24.00	Accepted

RESULTS CONT'D

13	Water	2.60	17.60	Accepted
14	Air	3.59	33.00	Accepted
15	Hydrogen	3.38	29.09	Accepted
16	Oxygen	3.61	3.21	Accepted
17	Halogens	2.41	15.20	Rejected
18	Nitrogen	2.39	14.66	Rejected
19	Sulphur	2.45	15.48	Rejected
20	Oxidation-Reduction(REDOX) Reactions	2.39	14.74	Rejected
21	Ionic Theory	2.34	13.98	Rejected
22	Electrocarbons	2.35	14.11	Rejected
23	Hydrocarbons	3.46	26.74	Accepted
24	Alkanols	2.34	14.36	Rejected
25	Quantitative and qualitative analysis	2.27	13.59	Rejected
26	Petroleum or Crude Oil	3.33	28.43	Accepted
27	Metals and their compounds	3.44	29.87	Accepted
28	Iron	3.24	25.15	Accepted

RESULTS CONT'D

29	Ethical, legal and social issues	2.96	22.41	Accepted
30	Fat and Oil	3.61	31.21	Accepted
31	Soap and detergent	3.19	24.22	Accepted
32	Giant molecules	2.25	18.23	Rejected

Table 1 shows that some topics in the senior secondary school Chemistry curriculum can promote sustainable development and help to reduce poverty in the society while others do not. The mid-point of the four-response scale which was 2.5 was noted. This mid-point value was taken into consideration in the interpretation of the mean scores. Using 2.5 as cut off points, eighteen major topics, namely, introduction to Chemistry, particulate nature of matter, symbols, formulae and equations, chemical combination, gas laws, acids, bases and salts, periodic table, chemical reactions, halogens, nitrogen, sulphur, oxidation-reduction (redox) reactions, ionic theory, electrolysis, alkanols, quantitative and qualitative analysis and giant molecules do not promote the acquisition of skills for Sustainable Development (SD) and poverty alleviation among the students while fourteen topics, namely, chemical industries, standard separation techniques for mixtures, mass-volume relationships, water, air, hydrogen, oxygen, hydrocarbons, petroleum or crude oil, metals and their compounds, iron, fats and oils, soap and detergent promote the acquisition of skills for Sustainable Development (SD) and poverty alleviation among the students.

It can be established based on the research data information that Education for Sustainable Development (ESD) and poverty alleviation is not significantly integrated into the senior secondary Chemistry education in Nigeria. It is therefore necessary for significant integration of sustainability and poverty alleviation education into Chemistry curriculum so that the learners can acquire sufficient skills that would make them self-reliant, prepare them to enter into the labour market which will help to overcome the challenge of youth unemployment, thereby leading to poverty reduction in Nigeria and on the African continent as a whole.

RESULTS CONT'D

Research Question 2: To what extent does the curriculum contents of the senior secondary school Chemistry in Nigeria emphasize acquisition of skills that can help students reduce poverty in their immediate society?

Table 2: Means and Standard Deviation on the Extent to which the contents of the Senior Secondary School Chemistry Curriculum in Nigeria Emphasize Acquisition of Skills for Poverty Reduction.

S/N	STATEMENTS	X	SD	Decision
	The Senior Secondary School Chemistry Curriculum has been structured towards:			
1	Inculcating concepts of Sustainable Development among the learners.	2.38	14.24	Rejected
2	Inculcating poverty alleviation education among the learners.	2.45	14.55	Rejected
3	Developing creative skills and self-reliance in the students.	2.38	14.11	Rejected
4	Encouraging the students to convert natural physical objects in their environment to wealth creation.	2.23	13.01	Rejected
5	Acquisition of scientific process skills in the students.	2.60	17.60	Accepted
6	Reducing poverty and joblessness among students after graduation.	2.41	14.90	Rejected
7	Promoting economic activities in their community.	2.47	14.74	Rejected

RESULTS CONT'D

8	Inculcating entrepreneurial skills in the students.	2.38	15.24	Rejected
9	Integrating concepts of poverty alleviation for job creation and self-reliance.	2.32	13.97	Rejected
10	Creating an entrepreneurial class that will remove the burden of job creation off the shoulder of the government.	2.33	30.45	Rejected

For the purpose of clarity in the interpretation of results, the mid-point of the four-response scale which was 2.5 was noted. This mid-point value was taken into consideration in the interpretation of the mean scores. When the mid-point is less than 2.5, it suggests that majority of the teachers were of the opinion that the senior secondary school Chemistry curriculum as presently constituted, adequately emphasizes students' acquisition of skills that can help in poverty reduction. However, when the mid-point is greater than 2.5, it suggests that majority of the teachers were of the opinion that the senior secondary school Chemistry curriculum, as presently constituted does not adequately emphasize students' acquisition of skills that can help in poverty reduction.

Table 2 indicates that the mean of each of the items except item 5, was below 2.5. Also, the overall mean of all items was 2.39. This suggests that majority of the teachers were of the opinion that the senior secondary school Chemistry curriculum, as presently constituted, does not emphasize students' acquisition of scientific skills that can help in creating wealth and poverty reduction.

An examination of the curriculum shows that more emphasis is placed on acquisition of definitions of concepts, memorization of facts formulae and use of these formulae to solve numerical problems. Less attention is paid to practical and problem solving activities.

RESULTS CONT'D

Research Question 3: Are chemistry teachers aware of the need for inculcating poverty alleviation education and concepts of sustainable development through the implementation of chemistry curriculum?.

Table 3: Teachers' awareness of the need to integrate Poverty Alleviation Education and Education for Sustainable Development (ESD) through the Implementation of Senior Secondary School Chemistry Curriculum.

S/N	Statements	X	SD	Decision
1	I am aware of the integration of the concepts of Education for Sustainable Development (ESD) in Chemistry lessons.	2.18	12.76	Rejected
2	I am aware of the integration of the concepts of poverty alleviation education in Chemistry lessons.	2.21	12.58	Rejected
3.	The curriculum emphasizes poverty alleviation education.	2.41	14.90	Rejected
4.	I have difficulty in preparing lesson to blend with poverty alleviation.	2.47	14.74	Rejected
5.	I stress greatly on poverty alleviation.	2.35	14.11	Rejected

RESULTS CONT'D

6.	There are shortage of laboratory equipment and materials in my school.	2.45	14.53	Rejected
7.	I relate topic taught in theory with practical activities.	3.25	25.38	Accepted
8.	I am being sponsored by the government to update my teaching capability through regular attendance of conferences and workshops.	2.32	13.97	Rejected
9.	Provision of well-equipped laboratory in schools will promote acquisition of skills by the students.	3.61	34.67	Accepted
10.	Teachers' attendance of conferences, workshops and seminars will create awareness on the concepts of Education for Sustainable Development and poverty alleviation education.	3.53	29.79	Accepted

Table 3 shows that in items 1 and 2 with mean values of 2.18 and 2.21 Chemistry teachers were not aware of the integration of the concepts of Education for Sustainable Development and poverty alleviation education. Items 3, 4 and 5 indicate that Chemistry teachers did not integrate the concepts of sustainable development and poverty alleviation education in their lessons. The teachers were not prepared to incorporate sustainability and poverty alleviation education since the curriculum is not prominently integrated with concepts of Sustainable Development (SD) and poverty alleviation contents. Items 6 reveals that there was a shortage of laboratory equipment and materials in most of the secondary schools. Item 7 also indicates that majority of the teachers tried to relate theory with practical aspect of the curriculum.

RESULTS CONT'D

This will enhance meaningful learning on the parts of the students. Item 8 shows that majority of the Chemistry teachers were not being sponsored by the government to participate in conferences and workshops in order to update their knowledge. Item 9 also reveals that provision of well-equipped laboratory in schools will promote acquisition of skills that will make students to be self-reliant. Item 10 indicates that teachers' participation in conferences and seminars will create awareness for Sustainable Development and poverty alleviation education.

DISCUSSION OF FINDINGS

The results of the study shows that out of the thirty two (32) topic in the Senior Secondary School Chemistry curriculum, fourteen (14), namely; chemical industries, standard separation techniques for mixtures, mass-volume relationships, water, air, hydrogen, oxygen, hydrocarbons, petroleum or crude oil, metals and their compounds, iron, fats and oils, soap and detergents promote the acquisition of skills for Sustainable Development (SD) and poverty alleviation in the society. This implies that most of the topics in the senior secondary school Chemistry curriculum have not been structured to incorporate the concepts of sustainable development and poverty alleviation education.

The result of this study is in agreement with the findings of Benson (2015), who found that the curriculum of Junior Secondary School Basic Science has not been structured towards adequately inculcating poverty reduction and sustainable economic values in the junior secondary school students. The findings of this study are also in line with the findings of Olufunmilayo (2018) who investigated the loopholes in the present senior secondary school Chemistry curriculum in Nigeria. The author reported that curriculum themes should be restructured to produce a functional Chemistry education. The researcher stated further that restructuring the Chemistry practical activities to integrate improvisation with locally available materials, introduction of remedial teaching for mastery learning strategy and introducing Science Mini Project (SMP) for senior secondary school students using available local materials as part of senior secondary school certificate examination formative assessment scores would build a solid foundation that would usher in a new era of creative and innovative students (Olufunmilayo, 2018).

DISCUSSION OF FINDINGS CONT'D

The outcomes of this study also corroborate the findings of Oloruntegbe and Agbayewa (2013), Agbayewa, Oloruntege and Ese (2013) who suggested the integration of green chemistry principles for sustainability into the existing senior secondary or high school Chemistry curriculum. The researchers observed that using the Nigerian senior secondary curriculum as a case study for the proposed integration, it was observed that several of the contents could be made to incorporate the principles of green chemistry without much over-burdening.

The findings on the extent to which the contents of senior secondary school Chemistry curriculum emphasize acquisition of skills for poverty reduction reveals that majority of the teachers were of the opinion that the senior secondary school Chemistry curriculum does not emphasize students' acquisition of scientific skills that can help in poverty reduction. The findings are in line with the study conducted by Benson (2015) who found that the curriculum of Junior Secondary School Basic Science has not been structured towards poverty reduction and sustainable economic values in Junior Secondary School students. This may have negative effects on the learners as they may have difficulty in applying their knowledge of chemistry into the real life situations.

The results of the study on teachers' awareness of the need to integrate Poverty Alleviation Education and Education for Sustainable Development (ESD) through the implementation of Senior Secondary School Chemistry generally reveals that teachers are not likely to integrate concepts of Sustainable Development and poverty alleviation education because of the nature of the curriculum which do not emphasize poverty alleviation education. In addition, the laboratory facilities are inadequate in most of the schools.

DISCUSSION OF FINDINGS CONT'D

Therefore, there is the need to restructure the existing senior secondary school Chemistry curriculum and incorporate concepts of Sustainable Development and poverty alleviation education. This will help in poverty reduction in the society. The results of the study is in agreement with the findings of Njoku (2016) who found that there was no sustainable development issues in the teaching syllabus of the Junior Secondary Schools in Port-Harcourt metropolis, Nigeria. According to the researcher, the level of awareness of Sustainable Development issues is low among the students.

CONCLUSION

The findings from this study indicate that most of the topics in the senior secondary school Chemistry curriculum have not been structured to incorporate the concepts of sustainable development and poverty alleviation education. The outcomes of the study also reveal that majority of the teachers were of the opinion that the senior secondary school Chemistry curriculum, as presently constituted, does not emphasize students' acquisition of scientific skills that can help in poverty reduction. The findings of this study also indicate that teachers are not likely to integrate the concepts of Sustainable Development (SD) and poverty alleviation education because of the nature of the curriculum which does not emphasize poverty alleviation education. Teachers' awareness of the Sustainable Development issues is low.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. The existing senior secondary school curriculum should be restructured to incorporate concepts of sustainable development and poverty alleviation education.
2. The Chemistry curriculum should be enriched with poverty alleviation contents and activities with emphasis on practical activities.
3. Frequent engagements of artisans to teach the practical courses and emphasis on individual and group projects for the students should be encouraged.
4. Teachers of Chemistry should be trained qualitatively and retrained in view of emerging contemporary issues. They should be sponsored on a regular basis to attend workshops, seminars and conferences for continuous training in the skills for using the modern teaching strategies that promote acquisition of scientific skills among students and hence prepares them for a self-reliant life and reduce poverty in the society.
5. Teachers and laboratory attendants should be re-trained on how to use indigenous chemicals and improvisation with locally available materials to conduct some practical procedures.
6. Well-equipped Chemistry laboratories should be provided in senior secondary schools.
7. The inculcation of poverty alleviation education would not only make Chemistry education functional, but would equip learners with skills for improving the economy of their nation in future through their creative input.
8. There is an urgent need for governments and private individuals to encourage funding of research in Chemistry in order to focus contemporary issues as poverty alleviation education.

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