Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.4, No.25, 2013

Nigerian Science Teachers' Perceptions of Effective Science Teaching and their Classroom Teaching Practices in Junior Secondary Schools in Lagos State, Nigeria

Okedeyi, Abiodun.S[1*] Ogunmade, Taiwo O[2]. Oginni, Aderonke M.[3] Braimoh Durojaiye S.[4]
1. Physics Department, Adeniran Ogunsanya College of Education, Otto/Ijanikin, P.M.B. 007, Festac Town, Lagos-Nigeria.
E-mail: biodunoked@yahoo.com
2. Chemistry Department, AdeniranOgunsanya College of Education, Otto/Ijanikin, P.M.B. 007, Festac Town, Lagos-Nigeria.
3. Intergrated Science Department, AdeniranOgunsanya College of Education, Otto/Ijanikin, P.M.B. 007, Festac Town, Lagos-Nigeria.
4. Curriculum and Instruction Department, AdeniranOgunsanya College of Education, Otto/Ijanikin, P.M.B. 007, Festac Town, Lagos-Nigeria.

Abstract
This study explores science teachers' perceptions of effective science teaching and their classroom teaching practices. The study was carried out from a population of junior secondary schools in Lagos State, Nigeria. A purposive sample of 78 basic science teachers selected from 61 junior secondary schools from three Education Districts of the state was used for the study. A research instrument tagged effective teaching characteristics questionnaire (ETCQ) was used to elicit information from the teachers. The questionnaire has a test-retest reliability coefficient of 0.83. Data collected were analyzed using frequency counts and simple percentage. The findings indicated that the science curriculum used in schools was overloaded with content to be memorized by learners for examination purposes and that most science teachers engaged students mostly in explanation and demonstration, whole class discussion and note copying. The findings further showed that effective science teaching is characterized by student-centered activities associated with students being attentive, reading notes, doing homework, asking and responding to questions and engaging in regular hands-on practical inquiry-based activity and carrying out their own observations among others. Finally, recommendations for improving science teaching for junior secondary schools in Lagos State were proffered.
Keywords: Effective teaching, teacher-centered, perceptions, practical work, teaching resources

Introduction

In recent times, there has been a growing public anxiety about the teaching and learning of science in Nigerian schools. Studies showed that large numbers of students seem to learn very little science at school, learning tends to be by rote and students find learning of science to be difficult (Adegboye, 2003; Ajileye, 2006). Often times, the quality of science being taught in our schools are questioned by parents, science educators, general public and even by the government (Apata, 2007).

A number of reform efforts have been advanced towards addressing this lingering situation by Science Educators, Science Teachers' Association of Nigeria (STAN), Nigeria Education Research and Development Council (NERDC), Ministries of Education as well as Faculties and Institutes of Education in Nigerian Universities among others (Ivowi, Ajeyalemi, Lawal & Baiyelo, 2005). Yet, teaching of science has continually been criticized as a result of the poor performance of Nigerian students in science subjects relative to their counterparts in other countries. This is evident from the annual reports of poor performance of students in the examinations conducted by the West African Examination Council and also the report of the Second International Science Study in which Nigerian students came last in primary science and second to last in secondary science among the participating countries of the world (Aiyelabegan, 2003).

A number of factors had been adduced to this low performance as reported in various research studies conducted in Nigeria. Shortage of funds for equipment and materials for fruitful practical work, dissatisfaction with the syllabus, and ineffective style of delivery of subject matter among other factors hamper effective science education in Nigeria (Akinola, 2006; Bamidele, 2004; Olaleye, 2002; Ogunmade, 2006).

From the range of evidence in the science education literature, it is very clear that teaching of science in Nigerian schools is faced with numerous problems which need to be arrested for the citizens to cope in the modern scientific and technological world, as formulated in the Nigerian National Policy on Education (Federal Government of Nigeria) (FGN, 2004).

It is therefore imperative for the issues involved to be examined empirically in the context of science education in Nigeria. Thus, gaining the support of the basic science teachers in exploring and revealing their beliefs about

effective science teaching, their classroom practices, the factors hampering their teaching practices in science,and to provide ways forward to improve the teaching of science Lagos State junior secondary schools for students is the focus of this study

Research Questions

The present study specifically examined the following research questions:

1. What are the perceptions of teachers about the characteristics of effective science teaching in junior secondary schools in Lagos State, Nigeria?
2. To what extent are the teachers beliefs reflect on their classroom teaching practices in science classroom in junior secondary schools in Lagos State, Nigeria?
3. What are the limiting factors to attaining effective science teaching by science teachers in junior secondary schools in Lagos State, Nigeria?
4. How can the teachers improve on their teaching practices to attain effective science teaching in junior secondary schools in Lagos State, Nigeria?

Methodology

This study is a descriptive research of the survey type. It involves the gathering of quantitative datausing survey questionnaire fromscience teachers which helps to identify typical practice in curriculum delivery, teaching and assessment in secondary science, and factors limiting effective science education in Lagos State Secondary Schools.

Population and Sample

The study population comprised of basic scienceteachers in junior secondary schools in Lagos state, Nigeria. Samples of 89 basic science teachers drawn from the three Education Districts (EDs) were purposively selected from 61 junior secondary schools in the state.

Research Instrument

A research instrument tagged *effective teaching characteristics survey questionnaire* (ETCQ) was prepared and used by the researchers to elicit information from the teachers for the study. The questionnaire was divided into four sections comprising of A,B,C and D. Section A contains items on demographic information about the respondents such as name of school, sex, age, years of teaching experience and class taught. Section B contains open-ended set of questions to elicit information on the teachers' views of characteristics ofeffective science teaching and learning. Section C seeksteachers' views about their current teachingpractices in scienceon a five-likert scale consisting of 'all the time' (AT), 'most of time' (MT), 'some time' (ST), 'not often' (NO) and 'never' (NE). Section Dfurther contains open-ended questions which seek teachers'views about the constraints they faced in the teaching of science in schools, and how they could be helped to achieve effectivescience teaching in their schools. Research data were personally administered and collected by the Researchers with assistance obtained from the basic science teachers in various schools used for the study.

Validation and reliability of research instrument

The teacher survey questionnaire was prepared by the researchers and validated by three science educators drawn from Faculty of Education from two universities in Lagos State, Nigeria for both content and construct validity. Based on their suggestions, the survey questionnaire was modified to suit the purpose for which it was drawn. In conducting the reliability for the teacher questionnaire, Sections C of the instrument has test-retest reliability of 0.83 over a period of two weeks. This showed that the instrument is consistent and reliable for the study.

Data Analysis

The research data collected from the survey questionnaire were analyzed using descriptive statistical methods involving percentages, means, standard deviations and weighted rank where appropriate. Responses to the open-ended questions were coded into categories and the frequency counts of teachers' responses in each category were determined. Responses on the scale item were also coded in relation to the items so that the number and percentage that responded 'all the time', 'most of time', 'some time', 'not often' and 'never' were calculated using the SPSS 13.0 statistical package.

Results

Table 1: Teacher's belief about the characteristics of effective science teaching (n=78)

Category	**N**	**Per cent of respondents**
Pedagogy		
Students should do more of hands-on group activities	59	75.6
There should be regular interaction between learners and the teacher in the class	35	44.9
Resources		
The class size must be manageable with adequate material resources	39	50.0
There must be sufficient laboratories textbook and equipment and a conducive school environment	19	24.5
Teacher knowledge		
Teachers must have a sound knowledge of the subject matter	28	35.9
Teachers must have relevant skills and approaches to cater for students of differen learning abilities	15	19.2
Teachers should be involved in ongoing professional development improvement t improve their teaching	3	3.8
Support		
Teachers should feel supported by colleagues, school principals and local educatio authorities	3	3.8
Teachers should be recognized and valued by parent and the broader community for thei contribution and scientific literacy of the citizens	2	2.6
Curriculum		
Then curriculum must be relevant to the need of students and their environment	5	6.4

Note: The total percentage is more than 100% since some teachers gave more than one response to the question.

Table 1 revealed that in effective science teaching practices, three-quarters (75.6%) of respondents believe students should do more hands-on group activities (76%) and have regular interaction with the teacher (45%). Fifty percent (50%) however, indicate that the class size must be manageable with adequate material resources and one-quarter (25%) believe that there must be sufficient laboratories, textbooks, and equipment and a school environment free from distractions so that it is conducive for learning. Also, more than one–third (36%) indicate that teachers must have relevant skills and approaches to cater for students of different learning abilities.

Table 2: Teachers' estimates of mean percentage time spent on various teaching-learning activities in 80-minute science lessons (n=78)

Category	**Effective scienc teaching practice**		**Actual scienc teaching practice**	
	Mean	S.D	Mean	S.D
Teacher explaining/ or demonstrating to whole class	26.6	11.3	29.5	11.6
Whole class discussion	18.2	9.6	14.9	7.0
Teacher giving notes to students	15.5	7.6	23.8	10.9
Student working individually including working from text	17.6	7.6	15.8	8.6
Student doing practical and activity in small groups	22.1	8.5	16.0	8.8

In Lagos state, junior secondary school science students have typically 160 minutes of science instructions each week as two 40-minute lessons and one 80-minute lesson. Eighty minutes lesson provides opportunities for student practical work. Analysis from Table 2 revealed that in actual 80-minutes lessons, an average of 68% of lesson time is devoted to teacher-centered activities (explanation demonstration whole-class discussion and giving notes) while only 32% of lesson time is devoted to student-centered activities (individual work and small group practical work). In effective science teaching practices however, the teachers believed that the proportion of student -centered activity would be increased to 40%. In these 80 minutes lesson designed for practical work only 16% of class time is devoted to small group practical work in actual lessons and these would only be increased to 22% under effective science teaching practice.

Table 3: Teachers' rating of frequency of various teaching-learning activities associated with practical work in effective science lessons and their classroom teaching practices (n=78)

Category	Effective science teaching practices			Actual science teaching practices		
	AL+MT	ST	NO+NE	AL+MT	ST	NO+NE
Students do hands-on practical work every week	35.9	23.1	41.0	26.0	19.5	54.6
student must carefully follow teacher's instructions for experiments to reach the correct conclusions	98.8	1.3	0	89.8	9.0	1.3
Students plan their own experiment to investigate their own questions	27.2	52.6	19.2	28.6	31.2	40.3
Whole class discussion occurs at the conclusion of activities to summarize the main ideas.	69.2	16.7	14.1	56.4	23.1	20.5
There is not enough time after the experiment to discuss main findings	19.3	32.1	48.7	18.0	32.1	50.0
Practical work is used to illustrate the concepts that have been introduced.	64.1	25.6	10.3	51.2	25.6	23.0
Practical work is carried out by students before the theory is introduced	14.7	26.7	58.6	13.0	19.5	67.6

Note: AL=All of Time; MT=Most of Time; ST=Some of Time; NO=Not Often; NE=Never

Analysis from Table3 revealed that in actual science teaching practice, only 26% of therespondents believed that students do hands-on practical work every week all or most of the time and more than half (50%) agreed that whole-class discussion occurs at the conclusion of activities to summarize the main ideas all or most of the time. More so, fifty-one percent (51%) of the respondents believed that practical work is used to illustrate the concepts that have been introduced all or most of the time, while 90% believed that students must carefully follow the teachers instruction for experiment to reach correct conclusions all or most of time.

However, ineffective science teaching, only 36% of the respondents believed that students would do hands-on practical work every week all or most of the time and 99% indicated that students would carefully follow teacher's instructions for experiments to reach the correct conclusions all or most of the time. More than two-thirds (69%) believed there would be whole class discussions at the conclusion of activities to summarize the main ideas and almost two-thirds (64%) indicated there would be practical work to illustrate concepts that have been introduced all or most of the time.

Data in Table 4 revealed that in actual science teaching practice, almost all the respondents (92%) strongly agreed or agreed that students were encouraged to ask questions and express their own ideas. More than three-quarters strongly agree or agree that students' existing knowledge was assessed to guide lesson planning. A majority (83%) strongly agreed or agreed that the curriculum was focused on preparing students for life and almost three-quarters (72%) believe that the curriculum was focused on preparing students for study of science in their senior school. More than three-quarters (79.3%) strongly agreed or agreed that teachers must have sound content knowledge and have the knowledge and skills required for teaching by inquiry (72%). Whereasonly 36% strongly agreed or agreed that teachers are recognized and valued by the community.

In effective science teaching practice, however, teachers believed that there would be more student discussion and more time for exploring topics in depth. They also agreed that there would be greater opportunities for teacher professional learning and teacher would have more support from the school administration and the community than under actual science teaching practice.

Table 4: Teachers' rating of frequency of their beliefs about various teaching-learning activities associated with science lessons under effective and actual teaching practices (n=78)

Category	Effective scienceteaching practices			Actual science teaching practices		
	AL+MT	ST	NO+NE	AL+MT	ST	NO+NE
Pedagogy						
Discussion between students is discouraged so that we can cover more contents	24.3	6.4	69.3	36.4	13.0	50.7
Students' existing knowledge is assessed to guide lesson planning	75.6	10.3	14.3	79.5	3.8	16.6
Students are encouraged to ask questions and express their own ideas	94.8	0	5.2	92.4	5.1	2.6
Curriculum						
The curriculum is focused on preparing students for life	82.3	3.8	13.9	83.4	10.3	6.4
The curriculum is focused on preparing students for study of science in the senior school	67.6	9.1	23.4	71.8	11.5	16.7
Teacher						
Teachers have a sound content knowledge	86.8	9.2	3.9	79.3	10.3	10.4
Teachers have the knowledge and skill required for teaching by enquiry	73.1	12.8	14.1	72.0	9.3	18.7
There is sufficient time to explore topics in the depth	38.4	19.2	42.4	25.6	25.6	48.8
We cover a lot of content superficially to complete the scheme of work	55.9	13.0	31.2	61.6	11.5	26.9
Community support						
Teachers are supported by the school administration	58.5	20.8	20.8	47.4	21.8	30.7
Teachers have sufficient opportunity to attend seminars and workshops to improve their teaching	50.0	33.3	16.7	33.8	19.5	46.8
Teachers are recognized and valued by community	50.0	34.2	15.8	35.9	16.7	47.4

Note:SA= Strongly agree; A= Agree; A/D= Agree/disagree; D=Disagree; SD= Strongly disagree

From data in Table 5, the six most important factors inhibiting effective teaching of science mentioned by the respondents include insufficient teaching and learning resources, lack of well equipped laboratories, poor students' attitude to science, non-conducive classroom environment, insufficient time for teaching science and large class sizes. Teachers' lack of subject matter knowledge and inadequate motivation were also mentioned as factors that inhibit effective science teaching in schools.

Table 5: Number of teachers mentioning factors inhibiting effective teaching, their rank of importance and the total weighted rank for each factor

Limiting factors	Number of teachers				
	First (x4)	Second (x3)	Third (x2)	Fourth (x1)	Total weighted rank
Resources					
Insufficient teaching resources including equipment, textbooks, specimens, charts	32	29	6	5	232
Lack of well equipped laboratory	19	8	1	1	103
Non-conducive classroom environment	8	4	6	5	61
Insufficient time for teaching science	3	7	3	11	50
Large class size	4	7	3	3	46
Lack of funds for school building and maintenance	2	5	4	2	33
Lack of laboratory support staff	0	0	2	0	4
Teachers					
Teachers' lack of subject matter knowledge	4	0	2	1	21
Inadequate teachers' motivation	1	1	4	3	18
Lack of professional development for teachers	1	0	2	4	12
Insufficient qualified and dedicated teachers	1	0	3	0	10
Support					
Lack of support from school administrators, parents and community	0	3	2	2	15
Poor remuneration and irregular payment of salary	1	0	3	3	13
Curriculum and pedagogy					
Overloaded science curriculum	2	0	1	0	10
Poor teaching skills and approaches	1	0	2	1	9
Student					
Poor students' attitude to science	5	9	19	3	78
Students' poor communication skills	0	1	2	0	7

Note: The total weighted rank was obtained by multiplying the number of teachers mentioning the factor with the weighting given for the ranks, and then summarizing these weighted ranks.

From the data in Table 6, the most common suggestions for improving science teaching and learning by the respondents include: providing more or better equipment and facilities (78%); better curriculum resources (74%); regular supply of consumables (53%); need for students to develop interest and better attitudes in science (40%); improved maintenance of classrooms (35%), additional funding for new laboratories and classrooms (33%), more and better timing for science in the school timetable (27%), employing more qualified and dedicated science teachers (13%) and more professional development programs for teachers (12%).

Table 6: Teachers' views about the various suggestions for improving teaching of science in schools (n=78)

Suggestions for improvement	N	Per cent of respondents
Resources		
Providing better or more equipment and facilities	61	78.2
Need for more curriculum resources	58	74.4
Need for regular supply of consumables e.g. reagents	41	52.6
Improved maintenance of classrooms	27	34.6
Need for better quality science textbooks for students and in school library	26	33.3
Providing more funds to build science laboratories and classrooms	19	24.4
Reducing the class size	10	12.8
Employing more qualified and dedicated science teachers	10	12.8
Need to reduce group size for practical work	5	6.4
Provision of qualified laboratory assistants in schools	2	2.6
Teachers		
Need for more professional learning programmes for science teachers	9	11.5
Motivating science teachers through incentives like science teaching allowance, housing and car loans etc.	8	10.3
Providing better remunerations and regular payment for teachers	7	9.0
Need for teacher to develop skills for improvisation of equipment not available in schools	2	2.6
Need for teacher to teach subjects in his/her area of specialisation	1	1.3
Need for school administrators and principals to support teachers for acquiring higher degrees	1	1.3
Need for regular supervision of science teaching in schools	1	1.3
Encouraging teachers to show better attitude to work	1	1.3
Curriculum and pedagogy		
Need for more and better timing for science in the school timetable	21	26.9
Need for students to engage in hands-on activities in science	6	7.7
Reducing the science curriculum contents	4	5.1
Giving teachers free hand to operate the curriculum	3	3.8
Need to relate science to students' real life	2	2.6
Improving teacher-student relationships	1	1.3
Need for regular assessments and feedback for students	1	1.3
Support		
Encouraging students to develop interest and better attitudes in science	31	39.7
Need for better community supports for science teaching and teachers	6	7.7
Need for better parental concerns about education of their children and provision of textbooks for their children	5	6.4
Encouraging students to ask and answer questions in science class	2	2.6
Educating students better about the importance of science	1	1.3

Discussion

From the foregoing, the following research findings are gathered from data analysis which provided impetus for the status and quality of science teaching and learning in secondary schools in Lagos State, Nigeria based on the research questions raised in this study.

Research Question 1: What are the perceptions of teachers about the characteristics of effective science teaching in junior secondary schools in Lagos State, Nigeria?

A number of characteristics of effective science teaching proposed by science teachers for Lagos State, Nigeria include that science curriculum would be relevant to the need of students and their environment, would enable learners to be engaged in learning (e.g. being attentive, reading notes, doing homework, carrying out own observation, asking and responding to questions), would have less content for an in-depth learning, would be allocated more time in the school timetable and would involve regular interaction between teacher and learners so that learners could work independently of the teacher including working individually from the text and doing inquiry-based and activity-oriented practical work in small groups for a better understanding of the nature of science.

Research finding 1

For effective science teaching, thescience curriculum should contain less content for an in-depth learning with

more time allocated to science in the school timetable. It must also contain more of student-centered activities tomeet the need and aspirations of the learners and their immediate environment (e.g. being attentive, reading notes, doing homework, carrying out own observation, asking and responding to questions) and students.

Research Question 2: To what extent are the teachers beliefs reflect on their classroom teaching practices in science classroom in junior secondary schools in Lagos State, Nigeria?

The picture of actual science teaching in Lagos State as revealed by teachers include that the curriculum is overloaded with content for the purpose of preparing students for senior secondary education and for careers in science and focuses on the transmission of content to be memorized for examination purposes. Therefore discussion between students is discouraged so that teachers can cover more content. In actual science teaching practice, only 26% of teachers include hands-on practical and activity work every week in their science lesson because teachers lack appropriate skills and approaches for inquiry-based teaching; and consequently science teaching and learning is didactic and theoretical so that learners only develop factual knowledge of science principles and facts.

More than three-quarters of 80-minute lessons are used by teachers for explanation and demonstration, whole class discussion and note copying by students whereas only about one-third of the lesson time is used for student-centered activity including students working individually (e.g. working from text) and students doing practical and activity works in small groups and so teacher-centred and teacher directed activities predominate.

Research finding 2

In actual science teaching practice, the curriculum is overloaded with content and focuses on the transmission of content to be memorized for examination purposes and a greater percentage of class time is forexplanation and demonstration, whole class discussion and note copying by students. **Research finding 2**

Research Question 3: What are the limiting factors to attaining effective science teaching by science teachers in junior secondary schools in Lagos State, Nigeria?

Important factors that teachers mentioned that limit the quality of science teaching and learning include overloaded curriculum content and inadequate time for teaching science; poor teaching skills and lack of effective approaches for inquiry-based teaching; learners' poor communication skills, poor students' background knowledge in mathematics and students' poor attitude to science. The impact of socio-cultural factors in science also limits the quality of teaching and learning in science. Insufficient funding of science, lack of enough well-ventilated classrooms and laboratories, lack of enough teaching resources including modern textbooks further limit the quality of science teaching and learning. More so, lack of enough qualified, dedicated and knowledgeable teachers; insufficient laboratory facilities and equipment; poor maintenance of laboratory facilities and equipment; non conducive physical classroom environment; and large class sizes further limit the quality of teaching and learning of science.

Furthermore, low status of teaching profession in the community, inadequate teachers' salaries and allowances, irregular payment of teachers' salaries and allowances, lack of motivation and opportunities for ongoing professional learning for teachers, lack of collaboration of teachers with colleagues and experts on curriculum materials and policy, low morale and attitude to work and lack of teachers' commitment to the profession also limit the quality of science teaching and learning.

Research finding 3

The most important factors limiting the effectiveness of science teaching in schools include overloaded curriculum content; inadequate time for teaching science; poor teaching skills and lack of effective approaches for inquiry-based teaching; learners' poor communication skills, poor students' background knowledge in mathematics and students' poor attitude to science among others.

Research Question 4: How can the teachers improve on their teaching practices to attain effective science teaching in junior secondary schools in Lagos State, Nigeria?

Various ways for improving the teaching effectiveness of science in Lagos State were suggested by the teachers. These include that the science curriculum content should be reduced and relevant to the needs and aspirations of the learners and their real life physical. They also indicated that there should be more time allocated to science in the school timetable for teacher to do more hands-on inquiry-based practical and activity work for students. More so, they indicated that learners should engage in regular inquiry-based hands-on practical and activity work every week, and that science lessons should relate to students' real life. Also, they believe that there should be regular interactions between teachers and learners, and that teachers should monitor the progress of learners through appropriate assessment and feedback on their learning. The changes will only be possible with more science teaching time, reduced class sizes, and enhanced teacher knowledge and skills.

In addition, they indicated that there should be adequate funding for science to build more classrooms with enough seats for students, more laboratories with facilities and equipment, more curriculum resources including modern textbooks and provision of laboratory consumables such as chemicals. Also there should be provision for laboratory assistants, good maintenance of laboratory facilities and equipment and well managed class sizes

so that teachers would be able to provide more inquiry-based hands-on practical and activity work for students every week. Furthermore, there should be improved teachers' welfare such as payment of adequate salaries and allowances, regular payment of teachers' salaries and allowances, more incentives and scholarships for teachers for further education, and improved recognition and value for science teaching and teachers by the larger community. More so, there should be more qualified, competent, knowledgeable and dedicated science teachers, better or more regular assessment and monitoring for teachers and provision for an internship year for new teachers under a mentor teacher during their initial teacher education to ensure that teachers are competent and dedicated to science teaching and the teaching profession. Also, there is need for students to develop better attitudes in science.

Finally, for effective science teaching in schools, all category of teachers including science teachers should be adequately supported by the school administrators, colleagues, parents and the larger community and also science teachers should have sufficient opportunities for ongoing professional learning activities and collaboration with colleagues and experts on curriculum materials and policy so that they improve their teaching practice .

Research finding 4

Effective science teaching is achieved through reduced science curriculum content for regular inquiry-based hands-on practical and activity work every week. These changes will only be possible with adequate funds, need for more science teaching time, reduced class sizes, support for teachers to enhance their knowledge and skills.

Conclusion and recommendations

From the research findings in this study conducted in three Education Districts of Lagos State, Nigeria, it is vividly evident that there are considerable gaps between teachers' espoused beliefs about effective teaching in Nigerian junior secondary schools and their actual classroom practices. This finding is in agreement with Benjamin (2004) who asserts that teachers'teaching practices is a reflection of their beliefs about effective science teaching and their pedagogical-content knowledge. To promote better understanding of science in schools therefore, the following recommendations provide direction for reform of science education for Lagos State, Nigeria:

1. The science curriculum should be restructured to meet the needs and aspirations of learners, future citizens and the nation such that the curriculum is related to learners' immediate environment and with regular hands-on practical activities for students..
2. There should be significant improvement on resource allocation for education and science education such that nation's annual budgetary allocation to education is 26% of the GDP as recommended by UNESCO.
3. Initial teacher education and ongoing professional learning for teachers should be improved upon by giving scholarships for further studies and as well as sponsorships for attendance at conferences, workshops and seminars both locally and international in order to improve teaching practices.
4. The Teacher Registration Council of Nigeria (TRCN) should make it mandatory for employers of teachers to recruit ONLY qualified teachers and those registered with TRCN as certified teachers.
5. Science teachers should be motivated and supported by colleagues, school administration, parents and the larger community such that science teachers are given salaries and allowances that are commensurate with their responsibilities and science teachers are recognized and valued in the society like that of other professionals.

If the above recommendations are strictly adhered to, there is likelihood that Nigerian students will begin to experience effective science teaching in their classrooms and thus see learningof science as a fun.

References

Adegboye, O.A.(2003). An investigation into secondary school students performances in SSCE mathematics.*Lafiaji Journal of Science Education, 5*(1&2) 25- 31.

Ajileye, O.O. (2006). Towards effective science education; issues in UBE Programme.*Journal of Sports Management and Educational Research* (1(2) 337-345.

Apata, S.F. (2007). *Influence of Teacher's academic qualification and experience on student's performance in senior secondary school Physics in Kwara State*. Unpublished Master thesis, University of Ilorin, Kwara State, Nigeria.

Aiyelabegan, A.J. (2003). Effects of physics practical on student's academic performance in secondary schools physics examinations in Kwara State. *Lafiaji Journal of Science Education*, 5(1&2), 84-89.

Akinola, B.M.A. (2006). Causes of mass failure in senior secondary schools in Ijebu -East L.G.A Of Ogun State, Nigeria. Oro Science Educational Journal, 4 (5&6), 34-41.

Bamidele, L. (2004). Student's poor performance in physics: A Blame to our Nation's technological development. *Nigerian Journal of Science and Practice*, 2(1), 174-180.

Benjamin, M.A. (2004). Nigerian science teachers' beliefs, their pedagogical content knowledge and how these influence their classroom practices. Unpublished Doctoral Thesis, Edith Cowan University, Perth Australia

Federal Government of Nigeria.(2004). *National policy on education* (4th edition). Abuja: NERDC.
Ogunmade, T.O. (2006). *The status and quality of secondary science teaching and learning in Lagos State, Nigeria.* Unpublished Doctoral Thesis, Edith Cowan University, Perth, Western Australia.
Olaleye, E. O. (2002). New training and teaching technologies: Issues, problems and prospects for teacher education programme in Nigeria. *Journal of Science and Movement Education*, 4, 38-49.