Christened, Renamed, Reformed but No Changes: The Way Out

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Abstract

Despite series of reforms in Nigerian science education curriculum, it is disheartening that achieving the stated objectives in the curriculum have become a mirage. One of the major problems associated with this is the implementation stage of the curriculum. Therefore, the thrust of the study is to investigate the effects of three variables namely: quality of the curriculum, school location and teachers' gender as the predictors of basic science teachers' classroom practices. The research adopted an ex post facto research design and a total number of one thousand five hundred primary four pupils with five hundred and forty teachers participated in the study in three local government areas, Kwara state, Nigeria. The results from the findings revealed, that there is a positive multiple correlations among the three variables on the basic science teachers' classroom practices. Hence, three variables were significant predictable joint effect on teachers' classroom practices. The results also showed that school location has the highest contributing effect. However, quality of the curriculum is the most significant variable that can be used to predict basic science teachers' classroom practices. Various suggestions and recommendations were given.

Keywords: Quality of the Curriculum; School Location, Teachers' Gender; Classroom Practices; and Curriculum Implementation

1. Introduction

In a globalized world of scientific and technological advancement, human quest for knowledge increases daily to meet with challenges of globalisation. Knowledge is regarded as an important and product of education which can be acquired through various means but the most prominent way of acquiring knowledge is through instruction in a formalised educational system; globalisation and the desire for educational system to meet up with the pace of growth and development has become a pressing challenge in Nigeria (Akomolafe, 2011). One of the major problems facing Nigerian government is how to realise the school objectives to meet the needs and aspirations of the society through science and technology as schools are established to serve the society hereby achieving the objectives of science curriculum as stated in the National Policy on Education.

The teaching of science education in Nigeria became more recognised after the recommendation given by Phelp-Stoke commission in 1920 for the inclusion of science subjects in the curriculum of secondary schools as a result of deficiencies noticed in the practised curriculum. At the attainment of independence by Nigeria, in 1960, the quest for formal education increases as more schools were established with special emphasise on science teaching and learning at the secondary level and therefore activities to achieve scientific knowledge through the stated objectives of National Policy on Education began.

National Policy on Education (2004) stated that science education shall emphasise the teaching and learning of science process and principles. The policy further stated that the goal of science and education shall be to:

- cultivate enquiry knowing and rational mind for the conduct of a good life and democracy.
- produce scientists for national development
- service studies in technology and the cause of technology development
- provide knowledge and understanding of the complexity of the physical world, the forms and conduct of life.

More so, as part of the government intervention in making these objectives achievable, the Science Technology Mathematics Education (STME) policy was formulated with the following objectives, namely:

- science shall be taught to all children in primary and secondary levels
- the teaching and learning of science shall be done in such a way as to develop the child in three domains (cognitive, affective and psychomotor) for achievement educational objectives
- equal opportunities in terms of the provisions of curriculum materials, resource persons, and laboratory facilities shall be given to all
- every child shall takes at least one science subject at the end of the secondary school course examinations
- local production of science equipment and the practice of improvisation be pursued vigorously (Adeyemo, 2010)

However, realising the stated objectives have become a mirage (Danmole, 1998, Adeyemo, 2010, Nwanekezi, Onyekuru & Oragwu, 2011).

Despite various reforms that have taken place in Nigerian Science Curriculum in order to make the curriculum relevant to the needs of the society and for the nation to compete favourably with other nations in the world, experts noticed deficiency in the curriculum hindering the achievement of the stated objectives in the National Policy of Education and making STME objectives realisable, therefore, the need for revision of existing curriculum for a better programme.

Searching for the solution to the problem, various curriculum conferences were held between 1969 and 1979, these made various bodies and curriculum planners to see the need to develop science curriculum for both primary and secondary levels of education. Their decisions ushered in a new curriculum 'christened' 6-3-3-4 in 1982 which replaced the old 6-5-4 curriculum. According to experts, the curriculum was designed and introduced to inculcate functionality into Nigerian school system and producing graduates that would be able to use their heads, hands and hearts for the benefit of the society. It is disheartening to know that the curriculum could not achieve its aims (vanguard newspaper, 2012). Samuel, Vanguard newspaper (2012) stated that the curriculum has failed not because of lack of human and material resources but largely due to poor implementation. Also, Adeyemo (2010) reported that science teaching and learning suffered in the hands of teachers and students, as entry and performance at external examination were very poor.

Having realised the weakness of the 6-3-3-4 curriculum, twenty years later, another reform in the curriculum was experienced and renamed christened 9-3-3-4 curriculum system. One of the reasons behind the change in the curriculum policy is the desire for learners to have an outstanding performance which is an indication that the curriculum is effective and efficient in causing permanent changes in the lives of the learners and effecting economic growth. However, no relevant structures and proper implementation were put in place to back up the new curriculum system, therefore, no desirable changes were noticed in the behaviour of learners' on their achievement and their attitude especially in science subjects (Afolabi, 2013).

Garba (2004) viewed curriculum implementation as the translation of the objectives of the curriculum from paper to practice. In the same vein, Ivowi (1993) defined curriculum implementation, in a nut shell, as the translation of theory into practice or proposal into action.

Ayandele (2007) stated that curriculum is a product of focus. It calls for students to transfer, apply and extend what they have learnt to solve problems, address issues and create products that are meaningful and purposeful to the students, which can be achieved through classroom instruction and dissemination of proper contents of the curriculum to the students.

Furthermore, Onyeachu (2008) asserted that no matter how well a curriculum is planned, designed and documented, implementation is important. She stated further that most problems arise at the implementation stage.

Bandele & Faremi (2012) pointed out that the curriculum implementation refers to what actually happens in practice as compared to what was supposed to happen. He stated further that there are two components of any implementation effort that must be present to guarantee that the planned changes in curriculum and instruction are achieved as intended. The components are:

- understanding the conceptual frame work of the content/discipline being implemented and;
- organised assistance to understand the theory, observe exemplary demonstration, have opportunities to practice and receive coaching and feedback focuses on the most powerful instructional strategies to deliver the content at the classroom level (Bandele & Faremi, 2012).

It is obvious that the success of any curriculum policy change depends majorly on the implementation which is determined by the teacher's classroom practices. Oftentimes, curriculum policy makers and designers forget that the success and effective delivery of the content of curriculum centred majorly on the teachers (Akinbobola & Afolabi, 2012). Teachers were not seen as a major stakeholder during the design and planning of the curriculum, which could have resulted in the poor implementation being experienced.

National Policy on Education (Federal Republic of Nigeria, 2004) stated that no education system can rise above

the quality of the teacher which is an indication that you can only give out what you have.

To buttress this statement, Bandele & Faremi (2012) affirmed that teachers are largely responsible for the translation and implementation of educational policies, curriculum or course, curriculum or offering instructional materials packages and assessment of learning outcome at the level of learners. Lassa (2000) claimed that education cannot be provided by just anybody, it requires a teacher who plans and delivers the lesson or instruction in such a way that objectives can be achieved.

Otuka, (2001) concluded that the teacher is the key and well trained and motivated teachers will make the difference in coping with the new curriculum. When new curriculum reform are made, teachers are not equipped for the changes which results in implementers (teachers) developing a negative attitude towards the new content, change the new strategies of teaching the content, change mode of evaluation which may later results into fear and resistance to change in their classroom practices. At times, the contents may appear new and not taught during the process of their training in the tertiary institutions. For a change in curriculum to be effective, teachers must be changed to achieve good classroom practices.

Odubumi in Danmole (1998) observed that a teacher who does not understand the philosophy of a subject might find it difficult to teach the subject. This is a truism with respect to science teaching for the objectives provide the direction for implementation of the curriculum. He explained further that it is not new that a large number of school teachers demonstrate ignorance of the objectives of science teaching, especially at the primary school level, which affect their classroom practices negatively.

Researchers such as Linn (2000), Smithers and Robinson (2009) suggested that teachers that are not well equipped, may not be capable of providing a positive experience to his learners in the classroom. They went further that teachers are made to teach new concepts beyond the scope of what have been learnt during their training period. Thus, when those new contents are taught with negative classroom practices, they are commonly misunderstood by learners.

According to Hattie (2003), for change to be effective, teachers must be able to communicate effectively to the learners, in order for them to be able to formulate and express their ideals effectively leading to a good understanding of the concepts.

Ogunleye (2002) and Kolawole (2000) confirmed that the method of implementing is a significant learning factor. Teachers' teaching methods, availability of instructional materials and facilities are vital for effective curriculum implementation. If a curriculum is deficient in implementation, it often results in an education that incapacitates its recipients in confronting and solving their personal and societal problems, in practical and realistic ways.

UNESCO (2006) reported that only one third of primary school pupils in Africa acquire the knowledge and skills specified in the National primary education curriculum, because of poor implementation.

Markee, (1997) explained that one factor behind the mismatch between curriculum intensions and teachers' classroom practices is that curriculum planners and educational policy makers often focus on the planning and initiation issues, ignoring the dilemmas and obstacles that might evolve during the actual implementation, and that little attention has been given to how teachers implement changes in pedagogy (Carless,2004). However, as Goh (2007) argues curriculum planners must take steps to ensure that after investing so much time and money in disseminating the innovation, the final and most crucial stage, implementation, is not left to chance.

Ajila, (2003); Ajayi, (2004); & Okoruwa, (2007) asserted that teacher quality, curriculum quality, sound knowledge of the subject matter, ability to organise the learning environment, availability of school facilities and assessment among others have effects on pupils' development of critical thinking, problem solving, cognitive and affective skills in science subject and also on teachers' classroom practices.

It can be deduced that through quality curriculum, teachers are equipped with adequate cognitive, affective and psychomotor knowledge that can influence students achievement in science and therefore, teachers are expected to implement science curriculum and influence the achievement of their students but, it is recorded that, up till now, students' achievement is dwindling in science classrooms in Nigeria. Therefore, it becomes more expedient to investigate the classroom practices of teachers, who have been exposed to the basic science curriculum.

In addition to workable curriculum, the availability and adequacy of resources and personnel are factors also affecting the achievement of science students in the classroom. School location (rural and urban) determines the adequacy and availability of resources and personnel for the translation of objectives into reality.

Akinkugbe (1994) reported that several factors including teaching methods, interpersonal relationships among school personnel, nature of curriculum and the school topography could affect the learning outcome of learners.

School location (rural or urban) has been debated by researchers to have different effects on students learning out come in science subjects. Koleoso and Olagunju (2002) reported that school location in favour of urban centres has

significant effect on student' achievement and attitude towards mathematics and chemistry and any other school science subjects. Also, Akintunde (2004) and Falade (2007), contended that schools located in urban areas have recorded better performances than those in the rural settings. Urban students have positive attitude towards science and any other school subjects. This may be due to the fact that more opportunities are given to them in terms of human and material resources, compared to students in rural schools. Hinum (1999) asserted that the quality of facilities has imparted not only on educational outcomes but on the wellbeing of students and teachers. Likewise, Ayodele (2004) opined that availability of adequate school buildings, classrooms, chairs, desks, laboratories, and other facilities is necessary for the accomplishment of any educational goals and objectives.

Osokoya & Akuche (2012) investigated the effect of school location on students' learning outcomes in practical physics. Results showed that school location had a significant main effect on students' cognitive attainment [$F_{(1,526)}$ =50.60; $P <0.05$]; and performance in practical skills [$F_{(1,526)} = 16.62$; $P <0.05$]. In contrast, Olaonipekun (2002) affirmed that school location had no significant effect on students' achievement.

Apart from the school location, another variable that has generated controversy in science students' achievement among researchers is teachers' gender. Researchers such as Thomas, (2006); Weavers, (2004); Taiwo (2007) discovered that male teachers' classrooms are more centrally organised and teacher dominated than female teachers' classroom.

Furthermore, Dean (2000) confirmed the reason for underachievement in science classroom is teachers' gender. He stated further that male teachers are more likely to cite society, culture, lack of role models, and differences in ability or aptitude during classroom practice while female teachers cite lack of interest among girls caused by male-oriented instructions and the abundance of applications of Physics devoted to male- oriented topics. Bernnet (2002) is of the contrary opinion that male teachers seemed more active, more highly structured and more oriented to content mastery while female classrooms are more relaxed.

Einarson (2002) found out that students did more initiating, had more opportunities to respond, gave more incorrect answers, and seems more willing to give unsure answers when taught by a female teacher. Female teachers were found to give praise following correct responses more often than male teachers, while male teachers were more likely to comment on the processes by which responses were produced. However, male teachers were more likely to persist until a student gave an acceptance response while female teachers tend to supply the correct answers or direct the questions to another student.

Gross (2001) identified that quite minimal difference in reaching, science achievement between children taught by male as compared with female teachers. In another research, it was revealed that female teachers were found to have higher scores on a test of science and reaching achievement and also have more positive disposition to schooling. Therefore, lack of consensus on the influence of teachers' gender on students' achievement in science calls for further investigation imperative.

It is therefore, pertinent to investigate the classroom practices of science teachers that are exposed to basic science curriculum and since this alone cannot be used to determine the effectiveness of the teacher, it is paramount to investigate the effects of school location and teachers' gender as they determine the teachers' classroom practices in science classes.

2. Statement of the Problem

Learners' achievement in basic science has been an issue attracting attention of researchers and science educators despite several reforms that has taken place in the curriculum. Several factors have been adduced to be responsible for this trend such as the use of different instructional approaches in teaching the contents but to no avail. However, inadequacies were noticed in the way the teachers handled the curriculum in the classroom which may have contributed to students' poor achievement in basic science. This study therefore, investigated the extent to which quality of basic science curriculum, school location and teachers' gender determine the science teacher's classroom practices in basic science students' achievement in Nigeria.

3. Research Questions

The following questions were used as guide to this study
1. What is the joint effect of quality of science curriculum, school location, and teacher's gender on the classroom practices of basic science teachers?

2. What are the relative effects of quality of the curriculum, school location, and gender on the classroom practices of basic science teachers?
3. Which of the three variables could predict the classroom practices of basic science teachers?

4. Significance of the Study

It is expected that the findings from this study would assist the curriculum planners and the government to take cognisance attention of the implementation stage of the curriculum.

Results that would emanate from this study would enable the government and curriculum planners acquire necessary information on how the quality of the curriculum affect teachers' classroom practices in basic sciences.

The study would provide curriculum planners adequate information on the current situation of implementation of the curriculum in schools.

The findings from this study would provide information to government agencies on the need for workshops and seminars for teachers on the new concepts introduced in the curriculum.

Moreover, the study would inform government agencies on the need for in-service training, through part-time, distance learning and sandwich programmes from recognised institutions for improved performance.

It would enable government to realise the importance of human and material resources in implementing the curriculum and using allocation judiciously for purpose of educational system.

5. Research Methods

The research design adopted for this study was ex-post facto because the researcher did not have absolute control over the independent variables.

The participants for the study were one thousand five hundred primary 4 pupils and five hundred and forty teachers from selected three local government areas in Kwara State. Kwara State was stratified to three zones along the existing senatorial districts, namely; Kwara South, Kwara North and Kwara Central. A simple random sampling technique was used to select one local government area (LGA) from each of the three senatorial districts. A purposive random technique was used to select schools from the three senatorial zones that met the criteria. The following criteria were considered for selection of schools:

i. The school must be Government owned with evidence of having turned out pupils for public examination for at least ten years.
ii. There must be the presence of at least an NCE graduate and experienced Science teacher in the school.
iii. Must be co-educational.
iv. Chosen schools must either be rural or urban

A total number of one thousand five hundred pupils with five hundred and forty teachers were used for the study in two hundred and seventy schools.

Two instruments were used for the data collection namely: Science Teachers Classroom Performance Observation Scale (STCPOS) and Teachers' Assessment of Basic Science Curriculum Scale (TABSC) respectively.

The researcher made instrument Science Teacher Classroom Performance Observation Scale (STCPOS) was used to observe science teachers classroom practice. STCPOS comprised of two sections, Section A sought for the demography information of the teacher to be observed in the classroom while section B comprised of the 38 items covering six main sub headings.

The draft items originally comprised of 72 items with six sub heading this comprised of what the teacher should be able to do in the classroom with the curriculum and was given to three experienced science teachers for construct and face validity of the test items. The recommendations and suggestions from science experts were put into consideration in the final form of the instrument. To further strengthen the validity of the instrument, the thirty-eight (38) items were administered on a trial testing group of (30) thirty teachers who were not part of the main study but who were found to be equivalent in all respects to the teachers used in the study. The researcher made use of one of the schools that met the criteria for sampling but was not used for the main study. The results obtained in this administration were subjected to Kuder-Richardson's formular-21 (K-21) to establish the internal consistency of the items. The result showed reliability co-efficient of 0.78. On the basis of the high reliability index, the instrument was deemed suitable to be used in conducting the study. The scoring was based on a rating scale of 4,3,2 and 1 representing, very good, good ,fair, and very poor respectively for each observed lesson.

Teachers' Assessment of Science Curriculum Scale (TASC) was designed to gather information from basic science teachers on the relevance of objectives, adequacy of the content and the suitability of the learning experiences and evaluation of the science curriculum exposed to them compared to their experience while in training. This instrument comprised of two sections namely; section A and section B. Section A comprised of the demographic information of the teacher while section B comprised of 24 items using likert- scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The scoring was done positively as 4,3,2,1 and where negative answers where given the scoring is reverse as 1,2,3,4 respectively. The instrument was subjected to construct and face validity by given it to experts to validate, there after the instrument was further administered to 25 teachers who were not used for the present study, the reliability coefficient was calculated as 0.88 using Crombach alpha.

6. Research Procedure

The researcher selected twenty-two pre-service N.C.E III teachers from Adeyemi College of Education in the department of integrated science as research assistants to be used for the study. N.C.E II students are familiar with the basic science curriculum and have gathered little experience from their first teaching practice exercise.

The research assistants were briefed given orientation on the objectives of the study and necessary information were provided on the use of STCPOS and the trained lasted for two weeks. Immediately, after the selection of the local government areas to be used the researcher visited the Universal Basic Local Government Education Authorities (UBELGEA) to be used for the study to acquit and sought for the permission to carry out the study. A letter granting the request was issued which allowed the researcher to proceed to the selected schools. The researcher delivered letters personally to each head of the selected schools.

After the approval, the researcher held discussion with teachers handling Basic science subject in each of the selected schools. Thereafter, a brief discussion was held with the teachers to acquaint them with the objectives, nature and requirements of the study. Shortly after this, teachers' assessment of Basic science curriculum (TASC) was administered on the subjects. This was followed by classroom teaching observation of basic science teachers using science teachers classroom performance observation scale (STCPOS). For each observed teacher, the observation lasted for 45minutes by the research assistants, however, the researcher was directly involved with the administration of both instruments. This is to ensure that norms associated with the exercise are strictly maintained. The researcher was present in all the schools to monitor the sessions. The whole experiment lasted for 5 weeks.

Descriptive statistics, inferential statistics and multiple regression analysis were used to determine the relationships among the variables of interest.

7. Results

7.1 Research question 1:

What is the joint effect of quality of science curriculum, school location, and teacher's gender on the classroom practices of basic science teachers?

Table 1: Summary of the Regression showing effects of Quality of the curriculum, School location and Gender on classroom practices.

R	R. Square	Adjusted R. Square	Std. Error of the Estimate
.12	.02	.01	5.74

The result from Table 1 reveals that there is a positive multiple correlation (R value =.12) among Quality of Science Curriculum, School location and Teachers' Gender on their classroom practices. This implies that the factors considered are relevant towards the determination of their classroom practices. The adjusted R^2 value of .01 revealed that the three independent variables accounted for the 1.0% of the total variance in the classroom practices while the remaining 99% could be due to errors and factors not dealt with in this study.

Table 2: Multiple Regression showing effects of Quality of the Curriculum, School location and Gender on classroom practices

Model	Sum of Square	DF	Mean Square	F	Sig.
Regression	271.12	3	90.36	2.74	.04*
Error	17675.51	536	32.98		
Total	17946.64	539			

*Significant at p<.05

Table 2 reveals that the R-value .12 tested was significant (F(3.436)=2.74). Hence, Quality of Science Curriculum, School location and Teachers' Gender were significant predictable joint effect on classroom practices.

7.2 Research Question 2:

What are the relative effects of quality of the curriculum, school location, and gender on the classroom practices of basic science teachers?

Table 3: Estimates of Relative Contributions of Quality of the Curriculum, School location and Gender on the Teachers Classroom Practices

Model	Unstandardized Coefficient		Standardized Coefficient	Rank	T	Sig
	B	Std. Error	Beta			
(Constant)	57.48	3.28			17.53	.00
Basic science Curriculum	-.13	.06	-.10	3rd	-2.42	.02
School location	.23	.51	.02	1st	-.44	.66
Gender	-.89	.62	-.06	2nd	-1.45	.15

*Significant at p< .05

From the table 3, the result showed that school location has the highest contributing effect on basic science teachers classroom practices (β =.02) followed by teachers' gender (β=.-06) and the quality of the basic science curriculum (β=.010) which has least effect.

7.3 Research Question 3:

Which of the three variables could predict the classroom practices of basic science teachers?
From the table 3 above, quality of basic science curriculum (B=-.13, t=-2.42, p<.05) is the most significant variable that can be used to predict basic science teachers' classroom practice while school location and teachers' gender are not strong enough to predict basic science teachers' classroom practices.

8. Discussion of Results

From the analysed results, the findings revealed that there is a positive correlation that exists among the variables examined with the teachers' classroom practices. The variables constituted 1.0% of the variance in the classroom practices. The result also indicated that there is a positive and significant relationship on the effects of classroom practices of basic science teachers. It is also shown that school location has the highest contribution to the classroom practice followed by teacher's gender and quality of the curriculum taken the least. This is in line with the findings of Osokoya and Akuche (2012) that stated that school location has a significant effect. Also, Falade (2007) stated that schools located in the urban areas recorded better performance than those in the rural setting. Akintunde (2004) stated that school location produced significant difference in students' learning outcomes. The result is however negating findings of Olanipekun (2002) that location had no significant effect on pupils' achievement. These findings might not be unconnected with the fact that urban schools are more equipped with facilities and resources that can facilitate effective teaching and learning than their counterparts in rural schools (Olagunju and Koleoso 2000).

Teachers' gender is significant at predicting the teacher classroom practices. This is in agreement with the findings of Fakorede (1999) and Dean (2000) that teachers' gender determining the academic achievement of students in basic science. The results also have it that female science teachers performed better than their male teachers in classroom practices. This finding is contrary to the findings of Hoffman and Oreopoulous (2009) that instructor's gender plays a minor role in determining college student's achievement.

The results showed that the quality of the curriculum has effect on teachers' classroom practices. This is

supported by the finding of Gross (2001) and Weaver (2004) that when curriculum is adequately implemented it influences performances of teachers which in turn influence effectiveness of teachers and enhance students' achievement. The result is also in line with the findings of Erickson (2002), Wiggins and MacTighe (2008) that quality of the curriculum coaches and supports students in developing the skills tools, disposition and processes to become increasingly independent as learners. From the observation of Goldhaber (2002) that teachers' content knowledge depends on teachers classroom practices. This implies that if the basic science curriculum is adequately implemented in schools it will influence the performance of the students' in classroom and likewise the teacher classroom practices.

9. Conclusion

It was found out that quality of the curriculum, school location and teachers' gender are major factors in realising the objectives of the curriculum. The importance of the variable point out to the fact that curriculum focuses squarely on the essential facts, concepts, principles, skills and attitudes that professionals and experts in the discipline value most.

Therefore, appropriate measures should be put into consideration for effective implementation of the curriculum in the schools for the benefits of science teachers and students.

10. Recommendation

Teachers, apart from being stake holders in education are also the key players in matters of curriculum and instructions at the classroom level. Their daily interactions with the learners being them face-to-face with the realities of the educational programme they are given to transact. Their interaction in school will influence their product either positively or negatively. Therefore, the curriculum planner should appreciate and reckoned with teachers whenever any decisions have to be taken on curriculum reform

The government should be aware that the implementation of the curriculum is crucial and factors must be out in place for proper monitoring of the school activities.

Seminars and workshops should be organised periodically for the basic science teacher to acquit them with latest development in the field of science

Federal government should ensure that funds and materials are available for the development of rural schools so that there will be no discrepancies in the facilities available in the urban and rural schools.

Headmasters/headmistress should endeavour to supervise teachers that are under them to ensure that they are doing the right things.

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