International Journal of Educational Research and Management Technology
ISSN: 2545-5893 (Print) 2545-5877 (Online)
Volume 3, Number 1, March 2018
http://www.casirmediapublishing.com

Challenges of Effective Science Teaching in Multicultural Classrooms in Nigeria: Implication for Nation Building

Adedamola A. A. Kareem, *Ph.D*
Department of Science and Technology Education
University of Lagos, Lagos, Nigeria
damkar2005@yahoo.com

ABSTRACT
Science is a search for meanings or explanation of events in nature. It's an attempt by human beings to organize their experiences about nature into meaningful systems of description, explanations and predictions. Science is the bedrock of development in nation building. The basic knowledge and skills acquired in science through science teaching are useful for scientific and technological development of a country. With uncontrolled migration and relocation of people with diverse cultural backgrounds within and across countries especially Nigeria, in recent times, one wonders if the objectives of science teaching is successfully achieved. This study examined the challenges of teaching science in multicultural classrooms in Nigeria. An ex-post facto research design was employed with all the science teachers in Ogun State, Nigeria. An instrument titled Challenges of Science Teaching in Multicultural Classroom (CSTMC) was designed and validated (r= 0.78) by the researchers was used to collect data. The data were analysed using percentages, mean and standard deviation. Findings were that challenges in multicultural classrooms included communication problems ($\bar{X}$ =2.87), difficulties in utilization of instructional materials (X=2.90), classroom interaction ($\bar{X}$ =2.63). The result also revealed that the methodology science teachers regularly used is lecture method ($\bar{X}$ =2.97). Recommendations were among others that incorporation of multicultural science education during science teacher preparation, in-service training for science teachers on multicultural education, formulation of government policy on multicultural science education in secondary schools to ensure quality assurance of science teaching for consistent nation building and national development.

Keywords: *Science teachers, Multicultural education, Classroom, Challenges, Nation Building*

INTRODUCTION
Science could be described as an attempt by human beings to organize their experiences about nature into meaningful systems of description, explanations and predictions. Omorogbe (2013) defined science as an organized body of knowledge inform of concepts, laws, theories and generalizations. In the contribution of Webster (2007), science is defined as a system of knowledge covering general truth especially as obtained and tested through scientific methods. Science studies and interprets nature and natural phenomena. Therefore, it could be regarded as an important aspect of human existence. Supporting this view, Wasagu (1999) remarked that science does not only affect our daily experience but it digs and pursues us. It was also opined by Nwachukwu (2012) science contribute to the quality of life in such areas as health, nutrition, agriculture, transportation, material and energy production and industrial development. Basically, science is referred to as the bedrock of development in any nation. The growth of any nation economically, socially and politically is determined to a great extent by its advancement in science and technology. The

basic knowledge and skills in science is acquired through science teaching for useful scientific and technological development of a country. This is achieved through science education.

Science education is the act of teaching science in order to acquaint learners with basic knowledge, skills and attitudes needed in science and science related fields. However, Oniyide (2005) defines science education as the sharing of science content and process with individuals who are not considered traditionally to be members of the scientific community; the individuals could be students, farmers, market women or a whole community. Science education is very important to the development of any nation. Part of the goals of teaching science as stated by Ajaja (2009) is having clear explanations for societal issues through increasing interest in science literacy and societal goals. In view of this, there must be quality teaching of science. Quality teaching is effective teaching in which learners learn and achieve many scientific goals, not just being able to repeat scientific knowledge. In such instance, learners learn how to learn and develop conceptual skills which can assist them to change their intuitive, and explain the world around them with scientific concepts and ways.

Considering the individual and national advantages of teaching science, and the fact that the growth of any nation is a measure of its level of science education, every learner is important in the achievement of the objective of teaching science especially at the senior secondary school level. Unfortunately, the teaching of sciences has been observed by researchers to experience diverse challenges shaking its root of efficiency in Nigeria. Such problems identified include lack of application of different teaching methods, non-application of improvisation knowledge in instruction, lack of laboratory facilities, large class size of science students with few teachers, non-coverage of the content in the scheme (Ajaja, 2009; Omorogbe, 2013). The authors observed that the teaching skills science teachers have been exposed to before certification are not put to practice. This may be due to lack of facilities to work with, the learning environment, or the science educational system in the country. Studies also revealed problems of teacher- student ratio. There are many science students compared to the available number of teachers. The lower ratio of teachers could affect the efficiency in the classroom performance of such teachers as it will increase the workload. This eventually must have resulted into the problem of non-coverage of the syllabus. When the workload is high the teacher may not be able to cope, hence manage teach only for the sake of monthly salary.

The problems above identified by researchers may due to the setting of a country such as multiculturalism. Multiculturalism involves people of different cultural background existing together within an environment. Therefore, in Nigeria which is a culturally diverse country, secondary school classrooms may likely be filled with learners from different cultural background each of which is important in the scientific development of the country. Such classrooms may be characterised by certain constrains during teaching and learning process. Some scholars (Bank, 2004; Goski, 2009 & Bode, 2009), have suggested multicultural approach to teaching referred to as equity pedagogy in such classroom. This is modification

of teaching styles and approaches which facilitate academic achievement of every learner irrespective of their cultural background.

Statement of the Problem

Science is an interpretation of nature and natural phenomenon. The acquisition of its knowledge and skill determines the development of a country. Hence, the need for the teaching of science subjects in schools. The efficient teaching of sciences in Nigerian secondary schools seems to be negatively affected by some factors. The problems may be traceable the multicultural setting of the country. In Nigeria which is a multi-ethnic country, one wonders if the teaching and learning of sciences is not affected by the cultural backgrounds of learners since science teachers are not trained based on cultural backgrounds. This study therefore investigated the challenges experienced by science teachers in multicultural classrooms in Ogun State, South West Nigeria.

Research Questions

The study is guided by the following research questions:

1) Which strategies of teaching are identified among science teachers in multicultural classroom?
2) Which strategy of teaching is identified by science teachers to be effective in teaching science in multicultural classroom?
3) What are the problems experienced by science teachers in multicultural classrooms?

METHODOLOGY

The study adopted the descriptive survey design method of the ex-post facto type.

Population

The population for this study comprised of all science teachers in all the secondary schools in the local government area of Ogun state.

Sampling technique and Sample

Ogun State was purposively selected for this study due to its closeness to the Nigerian border. All the science teachers in all public senior secondary schools in the state made up the sample for the study. A total of 507 science teachers participated in the study.

Instrumentation

An instrument titled Challenges of Science Teaching in Multicultural Classroom Questionnaire (CSTMC) was used to collect data for the study. The instrument comprised of 20 items that elicited responses on strategies of teaching identified and challenges science teachers experience in the teaching of sciences in multicultural classrooms. This is a four point response format as: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was given to two experts in the department of teacher education, University of Ibadan for necessary corrections and suggestions. The reliability was determined by administering the instrument to a sample of 25 science teachers in

another local government area (Akowonjo local government in Lagos state) which was not part of the study. Crombach alpha was employed to determine the reliability coefficient which stood at 0.78.

Procedure for Data Collection

The instrument was administered by the researchers with the help of six research assistants due to geographical location of the schools. Five hundred and twenty (520) copies of the instrument were administered but only five hundred and seven copies were correctly filled and returned.

Data Analysis

Data obtained from the study were analysed using descriptive statistics such as mean, standard variation and percentages. The critical mean value of 2.50 was used as cut off mean value. Therefore items with the mean value from 2.50 were accepted as agreed while items with mean value below 2.50 were accepted as disagreed.

RESULTS

The results of this study are presented according to the research questions.

Research Question One: *Which strategies of teaching are identified among science teachers in multicultural classroom?*

Table 1 below shows the teaching strategies identified among science teachers in the teaching of sciences in multicultural classrooms. Three types of teaching strategies were identified among science teachers based on their responses to items on teaching strategies. These are lecture, discussion and collaborative methods.

Table 1: Mean and Standard Deviation of Responses on the Teaching Strategies identified among Science Teachers

S/N	Items	Mean(X)	StdDev
	Lecture Method		
1	Transmit information to students who actively engage in note taking as written on the chalkboard.	2.77	1.11
2	Dictate note to students and explain alongside.	3.16	.95
	Weighted Mean = 2.97		
	Discussion Method		
1	Discuss information with students during teaching and encourages everyone to participate.	2.11	.99
2	Initiates the discussion of information with students and ensures everyone participates and later round off at the end of each lesson	1.99	.86
	Weighted Mean = 2.05		
	Collaborative Method		
1	Students work in groups with the aid of textbooks.	2.41	1.09
2	Separate students into groups in order to gather information which is later submitted by each of the student	2.45	1.06
	Weighted Mean = 2.43		

Research Question Two: Which strategy of teaching is identified by science teachers to be effective in teaching science in multicultural classroom?

Table 1 revealed that the items under lecture method have mean values higher than the critical mean value of 2.50. The weighted mean score (2.97) is higher than the critical mean value. This indicates an agreement of the practice of lecture method among science teachers. All the items under the discussion method have mean values lower than the critical value. Also, the weighted mean score (2.05) of this method is lower than the critical mean value of 2.50. Furthermore, the items under the collaborative method have mean values lower than the critical mean value of 2.50. The weighted average (2.43) is also lower than 2.50 critical mean values. This indicates a non-agreement of the use of the two strategies – discussion and collaborative methods by teachers in the teaching of science in multicultural classrooms. The indication of this result is that lecture method which has the highest weighted mean value is the one with has been identified by science teachers to be the most effective in teaching science in multicultural classrooms.

Research Question Three: What are the problems experienced by science teachers in multicultural classrooms?

Table 2: Mean and Standard Deviation of Responses on the Problems identified by Science Teachers in Multicultural Classrooms.

S/N	Items	Mean(X)	StdDev
	Communication Problems		
1	Students from other tribes different from mine find it difficult to comprehend my pronunciations (accents) during teaching.	2.97	1.03
2	Students are mostly reached through note taking (i.e writing on the chalkboard) than through explanations.	2.65	.84
3	Explanation of perceived difficult concepts in Languages other than English language is impossible.	2.98	.90
	Weighted Mean = 2.87		
	Dsifficulty in Utilisation of Instructional Materials		
1	Need varieties of material resources in order to carry all the Students along during teaching due to cultural differences.	2.79	.54
2	Improvisation of teaching materials is difficult because of Tribal differences of students in the classrooms.	3.37	1.09
3	Use of locally made scientific equipment encourages learning in learners from the tribe of the immediate environment.	2.89	.96
4	Students' interactions with learning materials varies according to the tribal diversity.	2.53	1.06
	Weighted Mean = 2.90		
	Problems of Classroom Interaction		
1	Needs knowledge of ethics and moral code of other tribes apart from mine for successful teaching in a multicultural classroom.	2.89	.96
2	Students' participation in class is limited by understanding and comprehension of scientific concepts during teaching Student to student interaction in class is limited by diversity in language.		
3	Diversity in learning among students in a multicultural classroom slows down teaching activities	2.77	1.06
4	Despite of cultural diversity, students show keen interest in science during teaching.	2.26	.87
	Weighted Mean = 2.63		
	Teacher- Student Interaction		
1	Teacher – student classroom interaction during teaching is limited by gender	2.03	1.07
2	Meeting students from other tribes is interesting but teaching them requires extra effort.	2.37	.99
	Weighted Mean = 2.20		

Table 2 revealed the problems identified by science teachers in multicultural classrooms based on their responses to items on challenges. The problems identified are communication problems, difficulties in utilisation of instructional materials and problem of classroom interaction.

Table 2 shows that all the items under communication problems have mean values that are higher than the critical mean value of 2.50. The weighted mean score (2.87) of these items is also higher than the critical mean value. This is an indication of an agreement of the respondents on the problem of communication in multicultural classrooms. Furthermore, all the items under difficulty in the utilisation of instructional materials have mean values higher than the critical mean value. The weighted mean score (2.90) of the items is also higher than the critical mean value. This shows that science teachers agreed to the problem of difficulty in utilisation of instructional materials. Meanwhile, under the problem of classroom interaction, one of the items have mean value lower than the critical mean value, but the weighted mean score (2.63) of all the items is still higher than the critical mean value of 2.50. This is an indication of an agreement of problem of classroom interaction by the respondents. However, the items under teacher-student interaction have mean values which are lower than the critical mean value. The weighted mean score (2.20) of the items is also lower than the critical mean value. This indicates a non-agreement of the respondents to the problem of teacher-student interaction among teachers.

DISCUSSION OF FINDINGS

This study investigated the challenges encountered and strategies of teaching by science teachers in multicultural classroom. The findings of the study revealed lecture method of teaching as the strategy that is effectively used by science teachers in teaching science. This is in support of the findings of Ajaja (2009) who submitted that science teachers continue to teach using lecture method in spite of other recommended strategies by researchers. Omorogbe (2013) also remarked that the common strategy used by teachers in science classrooms is lecture method. This may be due to the fact that science teachers are used to lecture method or may be the method is more convenient for them, hence the inability to consider the switch to another method. Even in multicultural classrooms the science teachers have not consider the teaching style and each learner's cultural background, hence embark on 'one size fits all' method which was condemned by Bode (2009). 'One size fits all' method could bed is advantageous to learners since it's an approach which fails to consider cultural backgrounds of learners in learning process. However, equity pedagogy which is modification of teaching styles and approaches with the intention of facilitating learning as embraced by Bode (2009) could be better option in a culturally diverse classroom.

The study also revealed some of the problems science teachers encounter in multicultural classrooms. The problems identified include: communication problems, difficulty in the utilization of instructional materials and classroom interaction problems. The problem of communication may be due to lack of proficiency of some of the learners in English language since it's not their cultural language of communication. Banks (2004) remarked that learners may face problems in teaching and learning process in culturally diverse classroom provided the teacher fails to consider the individual learner's cultural background. The problem of communication must have led to the difficulty in the utilisation of instructional materials and classroom interaction. When learners' language problem prevents smooth flow in teaching and learning process it likely affects every other activity in the classroom. This

view is supported by Jegede & Aikenhead (1999) who remarked that lack of proficiency in English language of learners may create lack of instructional support on the side of learners in multicultural classrooms. The learners may find it difficult to comprehend and understand science concepts since it is not communicated in their language nor are the textbooks written in their language.

Implication for Nation Building

In nation building, science teaching is very important since it is the bedrock of national development. An adequate knowledge of science in a country facilitates scientific and technological development. This indirectly enhances the economic growth of such country since the growth of any nation economically, socially and politically is determined to a great extent by its advancement in science and technology. Nigeria is a culturally diverse country with many ethnic groups. All these groups need to be scientifically educated and empowered to contribute to the nation building. Therefore, to achieve this, science teachers may need to employ culturally responsive instructional strategies which consider the cultural identity of individual learners. In such case, the understanding and achievement of learners in science may improve and thus facilitate the scientific development in nation building. The persistent existence of these identified challenges by science teachers may hinder the effective teaching of science in multicultural classroom. In Nigeria where findings have shown that the teaching and learning of science in schools is yet to be effective, a continuous existence of the identified challenges of teaching in multicultural classroom may affect the scientific advancement and economic improvement of the country. Since the growth of any nation is measured by the level of its science education and the twenty first century is characterized by advancement in science and technology, for Nigeria to accelerate its development to global level, there is need for qualitative science education which will embrace equity pedagogy.

CONCLUSION

This study has been able to identify the challenges encountered by teachers in the effective teaching of science subjects in Nigeria. In order to move forward in building the country scientifically and technologically, there is an urgent need to proffer solutions to the identified problems. Here are some suggestions:

- Change in instructional practices by science teachers to the practice that take cognizance of the students' cultural pre conception.
- Generation of information about the students' everyday environment by science teachers to explain natural phenomena. This involves teachers identifying and using indigenous scientific and technological principles, theories and concepts within the students' community to explain science in classroom.
- Assisting students to effectively cross border between their life-world culture and the culture of science in developing effective and sensitive instruction by their teachers

- Science educators should Endeavour to develop innovative programs, new curriculum and creative instruction which will assist students to explore scientific and indigenous knowledge system.

RECOMMENDATION

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

1. Science teachers should use teaching methodologies which consider the cultural background of each learner in multicultural classrooms. This will reduce prejudice and embrace equity pedagogy which facilitates academic achievement among learners.
2. The government should consider content integration of multicultural education into preparation of science teachers in teacher education programmes.
3. Training and retraining of science teachers on multicultural approach to science teaching.

REFERENCES

Ajaja, O. P (2009) Evaluation of science teaching in secondary schools in Delta State 2 – Teaching of the Sciences. *International Journal of Education Science, 1(2)*

Banks, J.A. (2004) Multicultural education: historical development, dimensions and practices. In J.A. Banks & C.A. McGecBanks (Eds), Handbooks of research on multicultural education. 2nd ed. San Francisco: Jossey-Bassy.

Benett, C (2002) "Genre of Research in Multicultural Education; *Review of Educational Research, 71(2).*

Bode,P. (2009) *Multicultural Education*. Retrieved from www.education. com/reference /article/multicultural – education

Federal Government of Nigeria: (1979). *The constitution of the Federal Republicof Nigeria*. Lagos: federal government Publication.

Federal Republic of Nigeria (2007) *National Policy in Education,* Yobe. Federal Government Press

Goski, P. C. (2009). What we're teaching teachers: An analysis of multicultural teacher education course work syllabi.

Jegede, O. J &Aikenhead, G. (1999) Transceeding cultural Boarders: Implication for science teaching. *Paper presented at Pre-conference Workshop of Annual Meeting of the National Association for Science Teaching*. Boston. MA

Juliana, A (2000) "Education and Ethnicity in Nigeria: A case for reconstructionism. *Philosophizing about Africa Education.*Member publisher.

Marvin (2011) ' Science Education in democratic Nigeria: Challenges and the way forward. *Journal of Science Education.1(2).*

Ndirika (2013) Game-based learning: A panacea for better altitude and academic achievement in basic science" *Journal of Educational and Social Research.3(8)*

Nieto, S (2003) Profoundly Multicuturalquestion.*Educational Leadership 60(4)* .

Nwachukwu, C. O. (2012). Revisiting Science education and national development: Nigerian situation and the way forward.Kuwant chapter of Arabian. Journal of Business and Management Review Vol. 1 No. 10.

Omorogbe, E. (2013) Challenges of effective science teaching in Nigerian secondary schools.*Academic Journal of Interdisciplinary Studies. 2(7)*

Oniyide A (2005) – Science Education and Technological Development in Nigeria *International Journal of Research, in Education,* 4 (1&2).

Sharafudin, A (2002) Science Popularization: A review from third world. *Impact of science on society.6(2).*

Wasagu, M. (1999) The Relationship Between Science Students Cultural Belief And Their Academic Achievement At The Secondary School Level In Sokoto State *Journal Of The Science teachers association of Nigeria 34, 1 and 2.*

Webster, (2009) *A teaching middle year rethinking science curricular pedagogy and assessment grows nest.*N.S.W Allen &Unwin.fr