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Chemistry Students Assessment of Their Chemistry Teachers Usage of Ncce Pedagogical Methods in Colleges of Education

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Abstract: *This study assessed the students' assessment of their chemistry teachers' usage of the eleven pedagogical methods in the National Commission for Colleges of Education (NCCE) benchmark. It also assessed the influence of college ownership and gender on the usage. The study was carried out in Federal and State owned Colleges in the five States in South-East zone of Nigeria. The sample for the study comprises of two hundred (200) final year chemistry students drawn from the seven Colleges in the five States in the zone. Three research quests and three hypotheses guided the study. 55-item questionnaire constructed by the researcher from the eleven pedagogical methods in the Benchmark was used as instrument for data collection. This instrument was validated by experts in the field and reliability sought and established using Cronbach alph technique and was found to be 87. Data collected were analysed using means and standard deviation for research questions and independent t-test for hypotheses at 0.05 level of confidence. The results obtained showed that out of eleven methods only four (demonstration experimental, discussion and lecture methods) were used regularities by teachers during classroom instructions. All other seven methods were not adequately used. Gender and college ownership have no remarkable influence on the usage of these methods. Recommendation for the usage of all the methods was made.*

Keywords: *Chemistry, assessment, data, pedagogical methods and Benchmark.*

I. Introduction

Today's world is filled with changes and challenges in the area of science technology and skill acquisition. The trend now according to Okolocha (2006), in the society shows that the level of one education does not have a significant effect on one's growth rather, the effect is more pronounced on the level of skill possessed and the ability to apply the skill in the real world of work. This is why Uzoechi (2007) posited that the problems in many third world countries especially in Africa emanate substantially from lack of concern over the scientific and technological development of their citizenry. He continued to say that in such countries, majority of their populace are scientifically illiterate and back desired skills and competences. Hence Atume (2011) maintained that science education and its application to real life problems is the only most powerful instrument for enabling all members of the society to face world challenges and play roles as productive members of the society. Wide gap between the needs of the society and the level manpower to satisfy these needs, that there grew the awareness and strong belief that the development of a sound and worthy science education is worthwhile. Science education occupies a prominent position in the educational set up of different countries of the world (Ogunniyi 2000): not only that it is a veritable instrument for social change and empowerment, but also a powerful tool for any nation to meet its aspiration, goals and to liberate its citizenry from victimization, oppression and poverty (Braimoh, 2002).

Having acknowledged science education as a tool for improvement, the following science education were stipulated in the National Policy on Education (NPE) among others:

- Produce scientist for national development.
- Service studies in technology.
- Provide knowledge and understanding of the complexity of the physical world (FRN; 2004). Of all the subjects in science education, chemistry occupies the central position because of its nature and role to man's survival. Chemistry by its nature and principles, has the task of transforming natural raw materials into finished products for man's consumption. Chemistry if well taught, would equip our citizenry with desired skills and competences needed to face the present global challenges.

Teaching of science and chemistry in particular in Nigeria schools has continued to generate tremendous attention among parents, teachers scholars and policy makers. The problem of this work has been the persistence unimpressive performance of students in science subjects in external examinations. Federal Government of Nigeria (FGN), professional bodies like STAN and some scholars have taken giant strides toward the improvement of science teaching and learning. Some of the measures taken are: provision of innovative pedagogical methods, learning facilities; training and retraining of science teachers through seminars, workshops and conferences. The National Commission for Colleges of Education (NCCE) had recommended in

their benchmark, some pedagogical methods to be used in college for the training of pre-service teachers of sciences. These methods include, demonstration discussion, experimentation, etc. which have been tried out and found efficacious in enhancing teaching and learning of science especially chemistry. Inspite of all these efforts, poor performance are still recorded each year (Olorukooba, 2007) and (Ndioho, 2007). This poor performance of chemistry students in the external examinations may be rightly attributed to what UBEC (2008) reported that qualified and motivated chemistry teacher were lacking in the schools. Again Mohammed, Shehu and Ewandu (2011) reported that 80% of the fresh graduates from colleges have shallow knowledge of subject matter, poor communication and practical skills which are necessary for effective science teaching. This implies that the appropriate chemistry knowledge and practical skill that the students should acquire at the end of course through effective instruction may not be achieved since some of the teachers themselves lack these skills. This is paradoxical in the sense that one cannot give someone else what one does not have. According to Federal Ministry of Education (FME, 2004), in its National Policy on Education, teacher is the most important factor in curriculum delivery since he is responsible for transforming the curriculum objective into reality through his interaction with the students.

Abakpa, Agbo-Egwu, and Takor, (2013), noted that instructional practices employed by teachers may be inimical to the achievement of national science objectives. This made the researcher to consider it necessary to assess the extent to which the chemistry teachers in colleges are using the prescribed NCCE pedagogical methods in the classroom instructions in colleges as a way of preparing future classroom secondary school teachers.

II. Purpose of the study

1. To determine the rating of final year chemistry students on their teachers usage of the each of eleven methods in NCCE bench-mark.
2. To determine the influence of gender on the students rating of their chemistry teachers usage of the each of the eleven methods.
3. To assess the influence of college ownership on the chemistry students' rating on their teachers usage of each of the eleven methods.

Research questions

1. What are the chemistry students mean rating scores on their teachers usage of each of the eleven methods in the NCCE bench-mark?
2. What are the male & female students' mean rating scores on their teachers' usage of each of the eleven methods in the NCCE bench-mark?
3. What are the federal and state chemistry students' mean rating scores on their teachers usage of each of the eleven methods in the NCCE bench-mark?

Research hypotheses

1. There will be no significant difference between the male and female chemistry students mean rating scores on their teachers usage of eleven methods.
2. There will be no significant difference between the mean rating scores of students from state and federal own colleges on their teachers usage of the eleven methods in the NCCE bench-mark.

The study is a descriptive survey carried out in the five states in South-East zone of Nigeria. (Abia Anambra, Ebonyi, Enugu and Imo). The population of the study was two hundred and eighty (280) final year chemistry students drawn from the seven colleges (state & federal) in the five states. Two hundred (200) students out of the total population was used as sample for the study. Instrument for data collection was a questionnaire on teachers' usage of instructional practices for each of the eleven pedagogical methods in the NCCE benchmark constructed by the researchers. The instrument had two sections, section A was on boidata of the respondents (students) which solicited information on sex; year of study and college status. Section B contains 55 items drawn to cover instructional practices expected to be used by chemistry teachers in their classroom instruction on the eleven methods in the NCCE benchmark. These items were close ended questions with 5-point rating scale of always (5), most often (4), sometimes (3), seldom (2), and never (1). Students are expected to respond to these item based on the extent to which their teachers perform these practices during instruction in the class. Final year students were used for this assessment because they have been taught for three years by these lecturers and can give account of their classroom behaviours. Ndukwe (1999) had suggested students' assessment as one of the strong techniques for assessing teachers effectiveness in the classroom. The instrument was validated by two experts in the science education and reliability of instrument sought through pilot study in two colleges outside the study states and was found to be 0.83 alpha using cronbach alpha technique. During the administration of the instrument. The research questions were analysed using means and

standard deviation while independent t-test was used for test of hypotheses at 0.05 level of significance. Mean scores of 3.00 and above indicated usage of method while mean scores of 2.99 and below indicate non-usage of the method.

Table 1: Mean and standard deviation of chemistry students' rating scores of the teachers on their usage of each of the eleven pedagogical methods.

Group statistics

Methods	N=175	Mean	Std Deviation
Demonstration		3.32	.50
Experimental method		3.66	.59
Discovery method		2.35	.66
Discussion method		3.76	.58
Computer method		1.80	.49
Co-operative method		2.67	.62
Concept mapping method		2.53	.58
Analogy method		1.94	.65
Advance organize		1.75	.64
Individualized method		2.69	.60
Lecture method		3.38	.77

Table 1: shows that instructional practices of demonstration, experimental, discussion and lecture methods are performed by their teachers during instructions in the classroom as shown by their mean values which are quite above the mid-point. All other methods were indicated not used by teachers.

Table 2: Mean rating scores, standard deviations and independent t-test for significant difference in the mean rating scores of male and female chemistry students on their teachers' usage of each of the eleven methods.

P<0.05

Method	Sex	N	Mean	Std	T	df	Sig
Demonstration	Male	79	4.13	.65	.48	163	NS
	Female	86	3.91	.62			
Experimental	Male	79	3.21	.75	.30	163	NS
	Female	86	3.34	.57			
Discovery	Male	79	2.98	.46	1.007	163	NS
	Female	86	3.48	.59			
Discussion	Male	79	1.75	.48	2.94	163	S
	Female	86	3.34	.51			
Computer	Male	79	2.10	.31	1.06	163	NS
	Female	86	2.83	.50			
Cooperation	Male	79	2.80	.68	.81	163	NS
	Female	86	1.75	.53			
Concept mapping	Male	79	2.95	.41	.19	163	NS
	Female	86	2.73	.56			
Analogy	Male	79	2.88	.40	.64	163	NS
	Female	86	3.11	.56			
Advance organization	Male	79	2.91	.69	.46	163	NS
	Female	86	2.74	.61			
	Male	79	2.84	.49	2.21	163	S
Individualized method	Female	86	1.29	.67			
Lecturer	Male	79	3.87	.52	1.14	163	NS
	Female	86	4.11	.63			

S = Significant

NS = Not significant

Table 2 shows that both male and female chemistry students rated their chemistry teachers' usage of the methods in the classroom instructions in varying degrees. Though only four methods were indicated actually used by teachers (see table 1)

It also shows that the observed difference in the rating scores of male and female chemistry students on their teachers usage of each of the eleven methods were all not significant except for discussion and individualized methods

Table 3:

Mean rating scores, standard deviation and independent t-test for significant difference in the mean ratings of federal and state chemistry students ratings on their teacher's usage of each of the eleven methods. P<.05.

Method	College Ownership	N	Mean	Std deviation	t	df	Conf.
Demonstration	Fed Students	98	4.09	.53	1.34	173	NS
	State Students	77	3.64	.67			
Experimental	Fed Students	98	3.17	.45	.96	173	NS
	State Students	77	3.28	.37			
Discovery	Fed Students	98	2.19	.99	1.07	173	NS
	State Students	77	2.01	.89			
Discussion	Fed Students	98	3.67	.47	1.38	173	NS
	State Students	77	3.41	.39			
Computer	Fed Students	98	2.71	.65	1.41	173	NS
	State Students	77	1.79	.54			
Cooperation	Fed Students	98	2.20	.61	1.82	173	NS
	State Students	77	2.04	.54			
Concept mapping	Fed Students	98	2.29	.51	1.29	173	NS
	State Students	77	1.96	.54			
Analogy	Fed Students	98	2.84	.68	.86	173	NS
	State Students	77	2.80	.76			
Advance organization	Fed Students	98	1.99	.41	.93	173	NS
	State Students	77	3.43	.59			
Individualized	Fed Students	98	2.77	.61	.04	173	NS
	State Students	77	2.09	.55			
Lecturer	Fed Students	98	3.67	.48	1.01	173	NS
	State Students	77	4.34	.53			

NS = Not Significant

Table 3 shows that there was variation in the mean rating scores of students from federal and state colleges on the teachers usage of the eleven methods. There is also indication that there is no significant difference in their mean rating scores. This shows that college ownership had no influence on the students' rating of their teachers' usage of instructional methods.

III. Discussion of finding

The findings from this study showed that most of the instructional methods stipulated in the Benchmark were not used by chemistry teachers during their classroom instructions. Only four methods demonstration, experimentation, discussion and lecture were mostly used. All the same, the teachers' usage of these four methods shows that teachers exhibit to some extent all the instructional practices connected with these methods and this shows that some practical are done in these colleges.. This finding disagreed with Njoku (2004) who asserted that in most Nigeria science teacher education programme educators only theories about effective methods that have been discovered through researchers. This finding also do not tally with Akpan, 2008 who maintained that teachers leave practical work until student get to their final year. Blame should not be apportioned to teachers in colleges of education as the cause of students in examinations since they actually expose pre-service students to innovative pedagogical methods in the Benchmark. Secondary school chemistry teachers should be held-responsible for the students' poor performance since they refused to use some of these methods they are exposed to in teaching their students.

Findings of this study show that gender had no remarkable influence on the students' rating of their teachers usage of methods and college ownership had no influence on the students' rating.

IV. Conclusion and Recommendation

Science teachers occupy a critical position in the realization of the goal of science education, refinement of the society, provision of quality education and building a virile nation. Science teachers need to have a good knowledge of variety of teaching methods which they are expected to be applying their classroom instructions. They also need in-service training to improve upon their professional expertise and be able to teach difficult and abstract concepts in their area. There is need to expose the pre-service teachers to other methods indicated non-usage because their efficacy have been tried out and confirmed by researchers.

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