British Journal of Arts and Social Sciences
ISSN: 2046-9578, Vol.9 No.II (2012)

http://www.bjournal.co.uk/BJASS.aspx

Isolation of Teaching Effectiveness Factors from Nigerian Senior Secondary School Chemistry Students' Point of View

Dr. (Mrs.) Toyin E. Owoyemi
Adeyemi College of Education Ondo, Ondo - State ,Nigeria.
email: toyinowoyemi2006@yahoo.com

Dr. Francis A. Adesoji
Teacher Education Department, University of Ibadan, Ibadan Oyo - State , Nigeria
E-mail: francisadesoji@yahoo.com

Abstract

Establishing the specific criteria by which effective teaching can be evaluated is a vital step in the teaching learning process. Students' evaluation is commonly used in developed countries to provide information that could be used by teacher to improve his/her teaching and by administrators to make personnel decisions like promotion . Although students' evaluation of teaching is one area of educational research that is becoming increasingly emphasized in recent times in Nigeria, but limited attention is still given to the identification of teaching effectiveness factors from students' point of view, in order to develop a valid and reliable instrument. This study therefore analysed secondary school students' evaluation of teaching effectiveness factors in chemistry. The study adopted survey research design of ex-post facto type. Two thousand nine hundred and eighty eight SSII chemistry students participated, using multistage and stratified random sampling techniques from the six states in the Southwest geopolitical zone of Nigeria. Data collected through validated and reliable "Students' Evaluation of Teaching Effectiveness Scale (0.78)" were analysed using factor analysis. The major findings of the study was the isolation of nine teaching effectiveness factors from chemistry students' point of view. Chemistry students regard teacher-student interaction as the most important teaching effectiveness factor, while giving assignment is the least important. Educational planners, policy makers and administrators are therefore urged to work out modalities for the development and implementation of students' evaluation of teaching effectiveness instrument for use at the secondary level of education.

Key Words: Teaching, Effectiveness, Factors, Chemistry, Students, Secondary School

Introduction

The quality of education at any level depends largely on the quality of the teachers. Thus, the National Policy on Education (2004) states that no educational system can rise above the quality of its teachers. Science teacher occupies an important position in science teaching and learning activities. He engages in interactive behaviour with learners, effecting cognitive, affective and psychomotor changes in them (Imhanlahimi and Aguele, 2006). The science teacher is an engineer in the teaching and learning of science as he selects the instructional objectives, contents, method, learning experiences, organizes the experiences and evaluates the outcome of instruction with respect to the stated objectives (Nicholl and Nicholl, 1980). Therefore the personality, behaviour and attitude of science teacher are of great importance in effecting desirable scientific behaviour in learner.

One of the common ways of assessing the quality of teachers is the performance of students (Adesoji, 1999). This assessment method might be defective in that many factors have been found to associate with the effectiveness of a teacher and consequently his teaching (Druva and Anderson, 1983; Imhanlahimi and Aguele, 2006). In this regard, it is pertinent to look closely into the teacher as an individual – his personality traits and also the performance of his duties and the environment in which teaching is being performed. The closest audience where teaching is being done are the students. Therefore, it would be a profitable venture if students are asked to evaluate effectiveness of teaching, in this case, in the chemistry classroom.

Chemistry is a key science subject through which we explain the workings of our universe through an understanding of the properties and interaction of substances that make up matter. Studying chemistry assists the development of knowledge, skills and attitudes, which enrich people's lives, and allows them to be scientifically capable members of the society.

In Nigeria today, serious concern has been expressed by parents, teachers, employers of labour and the entire society about the performance of students in the SSCE especially chemistry. Several reasons have been suggested by researchers for the poor quality of performances (Okebukola, 1990; Adeyegbe, 1993). One of the ways to find out the sources of problems in chemistry education is to evaluate the effectiveness of the teaching and learning processes.

Interest in evaluating teaching effectiveness has increased over time and acceptance of the need to evaluate teaching has continued to grow (Salsali, 2005). This new approach emphasizes not what one believes to be good teaching, but the emphasis is on characteristics and teacher behaviour that are conducive to expected learning outcomes for students (Papandreon, 1995). An overview of recent literature on teaching effectiveness reveals no standard or commonly agreed upon definition or list of effective teaching qualities (factors). Most studies tend to emphasize instructors' qualities such as knowledge and organization of the subject matter, skills in instruction and personal qualities and attitude that are useful when working with students (Cashin, 1995). When personal qualities are emphasized, effective instructors are described as enthusiastic, energetic, approachable, open, imaginative and possessing a high sense of humour. When teaching skills and mastery of subject matter are emphasized, effective instructors are described as being masters of the subject matter, organized and emphasizing important concepts, able to clarify ideas and point out relationships, able to motivate students, able to pose and elicit useful questions and examples, creative or imaginative, and reasonable and fair. No wonder Sikora (1997) said that there is no scientific method of separating what and how much a pupil learned from the teacher, due to all other extraneous list of traits attributed to the teacher. This statement was confirmed by Palmer (1998) as follows:

Reduce teaching to intellect and it becomes a cold abstraction;
Reduce it to the spiritual and it loses its anchor to the world…
Good teaching cannot be reduced to technique; good teaching
Comes from the identity and integrit of the teacher (p4, 10).

As for the qualities of effective teachers, Stronge (2002) synthesizes research to identify specific teacher behaviours that contribute to students' achievement. Rather than looking at outside

factors like demographics, district leadership, he focuses specifically on how teachers can control their own preparation, personality and practices. There have been strong suggestions in some higher institutions that professional abilities of teachers as those who impact knowledge to students be constantly evaluated for the purpose of achieving better teaching effectiveness (Kaufman, 2002).

Student evaluation of teaching effectiveness is one of the popular approaches of measuring teaching effectiveness of teacher/instructor. Since students are the direct beneficiaries of instruction, and given that they spend a great deal of time with teachers, they can offer useful inputs in identifying flaws during instruction and also found ways of remediation.

Students' evaluation of teaching is one area of educational research that is becoming increasingly emphasized in recent times (Nwosu, 1995; Onocha, 1996; Ogunniyi, 2004; Orji, 2004; Imhanlahimi and Aguele, 2006). This could be as a result of the quest for quality education with a view to arresting the perceived fall in the standard of education (Ogunniyi, 2004). Although it is not yet an official way of measuring the university teaching in Nigeria. But at the secondary school level of education in Nigeria evaluation of the teachers is based on the comments of the Principal, Vice-Principal, the Head of Department and the teacher being reported upon. In the developed countries for example, in American educational research, students' evaluation of the teacher instruction has been a prominent area of interest for several decades (Marsh, 1987; Marsh and Dunkin, 1991; Seldin, 1999).

Students' evaluation of the teacher instruction is usually used in higher education especially in developed countries to improve instruction, enhance the professional growth of the academic staff and used as a measure of observed instructional performance of the instructor/teacher from the student standpoint (Joshua, 1999). However, other researchers have asserted that the ratings could be applied at secondary and at even elementary school levels (Fox, Peck, Blattstein and Blattstein, 1983; Aubrecht, Hanna and Hoyt 1986). Aubrecht, Hanna and Hoyt (1986) for example, specifically patterned their research on Marsh's University research to determine whether the findings generalized to the high school level. High school teachers and their students completed the commercially available high school version of the IDEA instrument. Factor analyses of both sets of responses revealed similar factor structures. Aubercht *et al.* (1986) concluded that these results provide support for the validity of high school student ratings of instruction' p (123) and predicted that Students' Evaluation of Teaching Effectiveness Scales (SETS) will find a place in high school merit pay systems and professional development activities as they have at University level. Similarly, Fox, Peck, Blattstein and Blattstein (1983), sought to test the generalizability of University findings to the elementary school level. They concluded that the SETS by sixth grade students "appear to be reliable, valid, useful measure of teacher behaviour" (p. 21).

Thus, considerable body of research shows that Student Evaluation of Teaching Effectiveness Scales (SETS) are also multidimensional (Marsh, 1987; Marsh & Dunkin, 1992). Information from SETS depends upon the content of the items hence, SETS are often criticized as lacking validity. This is due to the fact that instruments in use have no universal criteria for effective teaching. Factors, which may appear to be very important in America for instance, may not be appropriate in Nigeria. No wonder that Watkins (1994) asserted, "it is still very possible that culture of specific aspects of teaching effectiveness exists". Moreover, Darling, Hammond and Godwin (1993) asserted that effective techniques vary according to subject, levels, teaching objective and student characteristic. There are evidently problems of reliability, validity and biases against their use in Nigeria since they were developed in different cultural backgrounds (Ogunniyi, 2004). Therefore, the need to analyse student evaluation of teaching effectiveness factors in senior secondary school chemistry classroom.

Statement of the Problem

In view of the crucial role of science teachers in science teaching and the need to stimulate and sustain students' interest in science, teaching effectiveness has long been a topic of popular and academic interest in the developed countries. Of all the methods used in evaluating teaching

effectiveness, student evaluation is the most common followed by self-assessment. Evidence abounds that there is controversy over the use of teachers' self-assessment in evaluating teaching effectiveness. This study therefore, isolates students' evaluation of teaching effectiveness factors in chemistry classrooms.

Research Questions

The following research questions were addressed in the study.

1 ***What factors are rated by the senior school chemistry students as indicators of teaching effectiveness in chemistry classroom?***

2 ***What are the underlying relationships among the loaded items on factors as rated by the chemistry students?***

3 ***What is the level of importance of each factor of teaching effectiveness as rated by chemistry students?***

Scope of the study

The study was geared towards isolating students' evaluation of teaching effectiveness factors in the chemistry classrooms. It covered chemistry students in both public and private schools in the South-West geopolitical zone of Nigeria.

Research Design

This study is an ex-post facto type with a survey design. This is appropriate since the researcher has no direct control of the independent variables as their manifestations have already existed.

Population and Sampling Technique

The target population of the study was Senior Secondary School Class two (SS II) chemistry students in the six South Western States of Nigeria. The sample size was 2988. The researcher made use of multistage sampling technique and stratified random sampling to obtain the required sample for the study.

Students Evaluation of Teaching Effectiveness Scale (SETES)

The development of the instrument was based on previous research works on students' evaluation of teaching effectiveness (March, 1982, Onocha, 1996). A large pool of items was obtained from literature together with interviews held with teachers and students about what makes up effective teaching. These were used to select items and the items selected covered all the major variables identified from the review of past literature on teaching effectiveness. SETES was scored based on a four-point Likert Scale ranging from strongly Agree, Agree, and Disagree to Strongly Disagree. Positive statements are to be rated 4, 3, 2 and 1 respectively while the ratings for negative statements were reversed.

Validation and Reliability of SETES

Experts in item construction and evaluation assisted in the validation of the instrument. The language of presentation, clarity and applicability to the level of the participants were addressed. The instrument was also presented to experts in the field of science education and two secondary school chemistry teachers for content and construct validity. Based on their comments the initial 75 variables of SETES were reduced to 50. The instrument was again subjected to reliability test using a comparable sample who did not take part in the main study. The scores were analysed using

Cronbach alpha method. The alpha value obtained was 0.781, which was quite high implying that the instrument is reliable.

Procedure for Data Collection

The researcher and two research assistants administered the instruments designed for the study to collect the required data directly from the participants.

Method of Data Analysis.

Data collected were subjected to factor analysis with varimax rotation to answer the research questions raised.

Results and Discussion

Research Question 1: What factors are rated by the senior school chemistry students as indicators of teaching effectiveness in chemistry classroom?

The question was answered by referring to Table 1. Factor Analysis (Principal components with varimax rotation) was used to identify factors underlying chemistry students' perceptions of teaching effectiveness.

Table 1 shows a preliminary factor analysis of the chemistry students' responses to the 50 items on the questionnaire which was conducted to determine number of factors that accounted for the maximum amount of variance. In effect, this analysis was carried out to establish the number of meaningful teaching effectiveness factors.

The preliminary application of the principal component factor extraction procedure resolved the 50 items into 9 meaningful factors after rotation to terminal solution (Table 1b). It was therefore concluded that 9 factors represented the minimum number of factors that accounted for the maximum amount of variance in the teaching effectiveness qualities.

These are the factors considered as peculiar teaching effectiveness factors perceived by the chemistry students. This result is in agreement with Gordon (2005) who used factor analytic procedure to reduce 51 apprenticeship trainers' responses to 10 specific factors of teaching effectiveness. This is also in agreement with Boex (2000) who used factor analysis to reduce 33 items on teaching effectiveness into 6 components factors.

The 9 factors accounted for 45.116% of the total variance. Factor loadings ranged from 0.450 to 0.698. According to Hair, Anderson, Tatham, and Black (1998), loadings of 0.30 are to be considered significant; loadings of 0.40, more significant; and loadings over 0.50, very significant. As indicated above, it is presumed that factors are held together by an underlying theme or concept. This underlying theme provides a basis for their naming. The result is also consistent with the advantage derived from using the factor – analysis procedure as reported by Kerlinger (1986). The advantage results from the analysis of the degree of association between all pairs of items and the number of discreet variables identified as a result of analysis of empirical data rather than as a result of intuition.

Research Question 2: What are the underlying relationships among the loaded items on factors as rated by the chemistry students?

This question was answered by making references to Tables 1 and 2.

A factor is a set of individual questionnaire items that coalesce into an entity on the basis of their intercorrelations, presumably on the basis of their conceptual similarity (Gordon, 2005). Table 1b shows that 9 principal component factors were extracted from the correlation matrices and rotated by the varimax criterion. The resultant 9 factors together, accounted for 45.116% of the total variance on the evaluation profile. Factor loadings ranged from .450 to .698.

That is, the coefficients in the table represent both regression weights and correlation coefficients. It is obvious form this table that most important determinant of Var_1 is factor 8 and that of Var_{13}, Var_{21}, Var_{27} and Var_{29} is factor 1. Interestingly too, all the variables indicates factorial complexity of 1. Twenty variables (variables 7,11,14,15,16,17,18,20,22,25,28,30,31,32,33,34,36,38,45,and 49) have no significant correlation with any of the 9 identified factors. This makes the identification and naming of the factors simple (Norman, Hull, Jean, Karin and Bent, 1975). An analysis of each of the 9 factors cluster of items resulted in factor's name being assigned, which best conceptualized each factors high loading items.

Research Question 3: What is the level of importance of each factor of teaching effectiveness as rated by chemistry students?

A components matrix is one of the results of factor analysis and this is shown in the table of coefficients that expresses the relationship between the measures and underlying variables. The entries in the matrix are called factor loadings as can be seen in Table 1. In the evolution of Students' Evaluation of Teaching Effectiveness Factors, factor analysis revealed 9 factors which accounted for 45. 116% of the total variance explained as teaching effectiveness factors. The factors are as follow: (1) Teacher - student interaction (2) Knowledge of the subject matter, (3) Student motivation (4) Proper classroom management (5) Good individual Rapport (6) Dynamism of the teacher (7) Group discussion (8) Statement of objectives and (9) Assignment. The research findings in Students' Evaluation of Teaching Effectiveness Factors are in general agreement with the existing literature. They review that teaching effectiveness is multifaceted. That is there are different components of effective teaching (Marsh, 1987; Marsh, 1998; Frey, 1978; Boyle, 1997 and Ogunniyi 2004).

On a first look, the factors are similar to that of Marsh (1982) who also identified nine factors. His nine factor are as follows; learning/value, Instructor Enthusiasm, Organization, Individual rapport, Group interaction, Breath of coverage, Examination/Grading, Assignment/Reading and Workload difficulty. The factors are also similar to Centra (1993) with 6 factors are as follows; Good organization of subject matter and course, Effective communication, Knowledge of and enthusiasm for subject- matter and Teacher positive attitude towards students, Fairness in examination and grading and Flexibility in approaches to teaching. Other researchers and reviewers who have derived similar set of characteristics include Boyle (1997), and Ogunniyi (2004).

Factor 1: Teacher - student interaction

A unique feature of the identified factors is that secondary school chemistry students regard teacher-student interaction to be of utmost importance with loadings of Var_{13}, Var_{21}, Var_{27} and Var_{29} as seen in Table 2. This factor accounted for 7.271% of total explained variance, thereby producing the highest percentage of the total variance. The heavily loaded variables on factor 1 deal with students' freedom to ask question and analyse their own ideas while the teacher helps to explain any difficult concepts in a helpful manner in chemistry class. Each variable that loads high on this factor has a correlation (r) ($0.502 \leq r \leq 0.632$) with the factor. Also, factor 1 accounted for between 25.20% and 39.94% of the variance in each variable.

From the findings, examination of the teacher—student interaction factor indicated that it was dominant, explaining 7.271% of the variance. It was also revealed that the items in this factor for the most part, refer to a process of encouragement and involvement of students in learning activities. In the survey of people nominated for the 1999 AU – USA Teacher Team, respondents reported that interaction with students and influence of students' lives ranked highest among items that teachers found to be rewarding about their Jobs (DeBarros, 1999). This result is in agreement with Gordon (2005) who found out that Faculty – Student interaction had the highest percentage of the variance explained (29.7%) of the selected factors of teaching effectiveness from Apprenticeship trainers point of view.

Table 1: Rotated Component Matrices for Teaching Effectiveness Factors[a]

	Component								
Variables	1	2	3	4	5	6	7	8	9
Var1								0.698	
Var2		0.450							
Var3								0.456	
Var4		0.603							
Var5						0.554			
Var6		0.502							
Var7									
Var8		0.566							
Var9						0.675			
Var10		0.555							
Var11									
Var12		0.588							
Var13	0.538								
Var14									
Var15									
Var16									
Var17									
Var18									
Var19							0.639		
Var20									
Vra21	0.632								
Var22									
Var23							0.648		
Var24					0.565				
Var25									
Var26					0.533				
Var27	0.487								
Var28									
Var29	0.502								
Var30									
Var31									
Var32									
Var33									
Var34									
Var35				0.570					
Var36									
Var37				0.498					
Var38									
Var39				0.562					
Var40									0.467
Var41				0.455					

Var42			0.491						
Var43				0.493					
Var44			0.464						
Var45									
Var46			0.619						
Var47				0.563					
Var48			0.507						
Var49									
Var50			0.539						

Table 2: Level of Importance of the Isolated Teaching Effectiveness Factors based on Correlations as rated by Students.

Factors	Variables	Loadings	Statements
1	Var13	.538	Explain difficult concepts in a helpful way
	Var21	.632	Make students feel free to ask questions and express their ideas
	Var27	.487	Be available to give help to students
	Var29	.502	Treat everybody in the class equally
2	Var2	.450	Identify what he/she considers important
	Var4	.603	Present current developments and applications relevant to the content of the lesson
	Var6	.502	Put his/her materials across in an interesting way
	Var8	.566	Explain clearly and give notes.
	Var10	.555	Coordinates lab exercises well with topics taught in class
	Var12	.588	Apply the theories discussed in the teaching period during lab exercises
3	Var42	.491	Explain test items after an examination
	Var44	.464	Tell students when they have done a particular good job
	Var46	.619	Effectively use assignments to enhance learning
	Var48	.507	Systematically supervise homework
	Var50	.539	Reward students in a variety of ways
4	Var35	.570	Explain clearly the rules of proper classroom behavior
	Var37	.498	Pay attention to each students accurate use of language
	Var39	.562	Ensure that Examinations allow students to adequately demonstrate what they have learned.
	Var41	.455	Give adequate instructions concerning assignments
	Var43	.493	Help students to find a way to associate what is being taught to what they know

	Var47	.563	Provide feedback on students' progress
5	Var24	.565	Have genuine interest in students
	Var26	.533	Relate to student as individual
6	Var5	.554	Use audiovisuals in a way that will improve students understanding of the chemistry content
	Var9	.675	Summarise major points
7	Var19	.639	Encourage class discussion
	Var23	.648	Be good at facilitating group discussion
8	Var1	.698	Inform the students of the objective at the beginning of the lesson
	Var3	.456	Present origins of ideas and concepts
9	Var40	.467	Give adequate assignments after each lesson

Factor 2: Knowledge of the subject matter

This factor accounted for 7.025% of the total variance. Most of the variables under that factor lean towards level of treatment of the subject matter and ability of the teacher to communicate in an effective way. The highly loaded Var_4 (0.603), Var_{12} (0.588) and Var_8 (0.566) Var_{10} (0.555) Var_6 (0.502) and Var_2 (0.450) are concerned with in-depth of treatment of learning activities in such away that students would see the relevant of scientific theories in practical situations within and outside the four walls of the classroom through effective communication. Each variable has factorial complexity of 1 and has at least correlation of r = 0.450 with factor 2. The importance of this factor was emphasized by Rinye (1993) who asserted that communication and breath or organisation are essential tools for helping students understand cognitively what they are doing, and what they should and should not be doing, and what adjustments should be made. This factor is common among other instruments, although given another name like organisation or breadth. It is first in Centra (1993) and the sixth in Marsh (1982).

Factor 3: Student motivation

This factor explained 6.792% of the total variance. The three most highly loaded variables on this factor centered on students' motivation as one of the most important teaching effectiveness factors. This finding showed that in general terms, each of us has a variety of needs that must be met so that we can work efficiently and enjoy life and this implies students' motivation cannot be overlooked in any teaching learning situation. According to Gordon (2001) helping students meet their own needs is of utmost importance to enhance their learning opportunities and to maintain our own longevity in the classroom. On the subject of meeting students' needs Abraham Maslow's hierarchy of needs often used as a reference point (Maslow, 1968). Herbert Grossman recaps students' basic needs and the order in which those needs must be met to produce full-balanced members of society (Grossman, 1990). The following is offered as a summary of student need: Physiological satisfaction; taking care of hunger, thirst, and rest; Safety: Avoiding injury, physical attack, pain and psychological abuse; Nurture: receiving love and acceptance from others and having a feeling of belonging to a group; A sense of personal value: experiencing self – esteem, self – confidence and a sense of purpose and empowerment and Self – actualization: realising one's full potentials (Grosman, 1990). There

appears to be an inextricable relationship among these needs. All these students' needs as to do with motivation and in all the teacher should has the potential to create a learning environment that is humane, fair, consistent, and devoid of criticism, condescension, power plays, and favouritism.

According to Gordon (2001) students' motivation is a basis for planning classroom management. No wonder chemistry students rated this factor higher than classroom management which immediately follows this factor. Accordingly, it is the teacher's responsibility to establish a classroom environment that allows for a high degree of student achievement. Ultimately, high levels of student achievement serve as a powerful motivator for both student and teacher (Bulger, Mohr and Walls, 2002).

Factor 4: Proper classroom management

The variables that grouped together under the factor measure proper classroom management. Var_{35}, Var_{47} and Var_{39} have loadings of 0.570, 0.563 and 0.562 on the factor respectively while the factor itself accounted for 32.49%, 31.70% and 31.58% of the variances in the variables respectively. This factor explained 6.619% of the total variance. The loading of Var_{35} showed that there is a need for the teacher to intimate the students with rules of proper classroom behaviour. Gordon (2001) saw the need for this rules, she opined that both professional and personal reasons underlie the need for a specific classroom management system. According to her, first virtually little or no learning can occur in a classroom bereft of effective management and discipline. Second, effective classroom management and discipline help to teach students responsibility and self control. And third, successful classroom management can set the stage for optimal learning, as well as reduce stress on the teacher.

Factor 5: Good individual Rapport

The factor accounted for 4.842% of the total variance; it consisted of the highly loaded variables bothering on the teacher's relationship with students as individuals. The two variables (Var_{24} and Var_{26}) variances accounted for by this factor are 31.9% and 28.4% respectively. The finding shows that rapport between teacher and learner is another necessary condition for effective teaching. Richard and Hay (1989) argued that without this rapport the student cannot attend completely to the task of learning. The finding also supports that of Gordon (2001) who said that learning environment should devoid of favouritism. This implies all the students should have equal right and sense of belonging in any teaching learning situation.

Factor 6: Dynamism of the teacher

The factor dynamism accounted for 3.335% of the total explained variance. The highly loaded variable reflects the ability of the teacher to summarize cogent points of the lesson. This finding is in agreement with Richard and Hay (1989) who opined that a balanced combination of knowledge and personality are needed for effective teaching even if the student does not require the former to sustain the illusion that he has learned. The implication of this to teaching is that teachers as agents of change because of their position in the teaching learning situation must be dynamic. This is in line with the finding by Kathy (2000) and Gideon (2000) who claimed that science curricula should be handled by teachers with sufficient exposure and training in both content and pedagogy.

Factor 7: Group discussion

This factor explained 3.280% of the total variance. The two highly loaded variables on this factor centered on facilitation of group discussion. This result shows that no human can live in isolation of others. According to Gallagher (1988), group living, group working and general participation with others in various activities form a significant part of life and in educational system grouping occurs at all levels. As a social process, learning and learning tasks require social interaction in order to stimulate its activities (Reynolds, 1994). The school classroom is a forum for socialization and children learn through interaction with both peers and the members of staff (French, 1990).

Through development of group discussion, teachers are to mirror and reinforce the values of democratic society (Reynolds, 1994). From this factor point of view of teaching effectiveness, students see themselves as co-partners with teachers in making new and different inferences which is the hallmark of reflective thinking in the teaching of science.

Group discussion not only results in exchange of useful information and idea but establishes such a relationship that can determine how much that is learnt and the quality of what is learnt (Reynolds, 1994).

Reynolds (1994) sums up rationale for group work as being motivational, educational and ideological. According to him, it's motivational with the view that people learn more when they are involved, enjoy themselves and are more engaged. It is educational in the sense that together in group discussion/work, teachers and students examine and explore materials in the spirit of collaborative inquiry, and finally ideological for the reason that the process of collective inquiry in teaching and learning prepares people for a society based on democratic principles. Solomon (1994) identifies some merits of group discussion in science instruction as negotiation of knowledge, negotiation of doing work, removal of tension, construction of measuring and rendering of help and assistance.

Factor 8: Statement of objectives

This factor accounted for 3.046% of the total variance. The highly loaded on this factor centered on the statement of objectives of the lesson at the beginning of the lesson. This result shows that students viewed stating objectives to be achieved in a lesson would enhanced teaching learning process. Although clearly stating specific objectives to be achieved in any lesson is not new to the academic community. Curriculum specialists were already advocating the need for specificity of objectives over 40 years ago (Popham, 1969). Glancing through teacher-oriented journals, most of the authors are strong proponents of the behavioral objective movement; a small group of educators has resisted this surge and put to question the value of the process (Ebel, 1979). This present study shows the position of students on the issue on empirical ground than on purely logical/rhetorical ground. Some research evidences had attended to the use of behavioural objectives (Bryant, 1970). Behavioral objectives have been viewed to serving three main instructional functions; (a)direction for teaching and curriculum development (b) guidance in evaluation and (c) facilitating of learning

Factor 9: Assignment

This factor accounted for 2.907% of the total variance. The assignment construct is a specific factor was composed of a single questionnaire item. In a short sense, a single item cannot constitute a factor (Gordon, 2005). However, "assignment" for chemistry students must in this content be taken as a special case – an important outlier. The fact that it did not correlate with other questionnaire items did not diminish its value. This result is in agreement with that of Gordon (2005), who found "*respect factor"* having a single questionnaire item in a factor analysis of Apprenticeship Trainers' perception a of Teaching Effectiveness. Given adequate assignments after each lesson was rated as one of the important factors for teaching effectiveness in chemistry classroom. As a result of the volatility nature of the subject, if students are engaged even after the lesson on related activity to the topic treated during the lesson or to be treated in the next lesson through assignment. It would enable them to revise and read more on the topic. More also, they would be able to have more understanding of the subject through consultation of different sources of information on the subject.

Conclusion

The study revealed that the students' ratings of what constitute teaching effectiveness factors brought out nine factors that need to be seriously considered for effective and properly developed students' evaluation of teaching effectiveness instrument. Development and introduction of students' evaluation of teaching effectiveness instrument would also provide useful feedback to the teacher for diagnosing strengths and weakness and such feedback could provide the impetus for professional

development aimed at improving teaching. The fact that the findings in this study indicated those Nigerian students' ratings of what constitute teaching effectiveness compare favourably with those of experts/researchers showed the level of preparedness of Nigerian Secondary School Students in the effective assessment of their teachers. It is thus recommended that students' evaluation of teaching effectiveness be introduced in Nigerian senior secondary schools.

References

Adesoji, F.A. (1990). Knowledge of Integrated Science as Pre-requisite capability for first year senior secondary school sciences and implication for Teacher Education in Abimbade, A. (ed). Teaching and Teacher Preparation in the Twenty First Century Development of Teacher Education 77-81.

Aubrecht , J.D., Hanna, G.S., & Hoyt, D.P. 1986. A comparison of high school Student Ratings of Teaching Effectiveness with Teacher Self ratings: Factor Analysis and Multitrait-Multimethod Analyses. *Educational and Psychological Measurement* 46(1), 233-31.

Bassey, B.A. (2002). *Students' evaluation of instruction, attitude toward mathematics and mathematics achievement of SS3 students in Southern Cross River State of Nigeria.* Unpublished Masters' thesis, University of Calabar, Calabar, Nigeria.

Boex, L.F.J. (2000). Attributes of Effective Economics Instructors: An Analysis of Student Evaluations. *Journal of Economic Education,* 31, 211-227

Bulger S.M.; Mohr, D.J.; and Walls R.T. (2002). Stack the Deck in Favour of Your Students by using the Four Aces of effective Teaching. Journal of Effective, Vol.5, No.2.

Cashin, W.E. (1995). Student Rating of Teaching: The research revisited. *IDEA Paper (32), Centre for Faculty Evaluation and Development.* Kansas State University.

Centra J.A. (1979). *Determining faculty effectiveness: Assessing teaching, research, and service for personnel decisions and improvement.* San Francisco: Jossey-Bass.

DeBarros, A. (1999, Oct. 13). Smaller classes better than money: What top teachers think. The USA Today, P.6D.

Druva C.A. & Anderson, R.D. (1983). Science Teacher Characteristics by Teacher Behaviour nd by Student Outcome: A Meat-Analysis Research. *Journal of Research in Science Teaching*, 20(5), 467-479.

Federal Republic of Nigeria. (2004). *National Policy on Education*. Lagos: Federal Ministry of Education.

Federal Republic of Nigeria. (2004). *Guidelines for Appointments, Promotion and Discipline*. Abuja: The Federal Civil Service Commission..

Fox, R., Deck, R.F., & Blattstein, D. (1983). Student evaluation of teacher as a measure of Teacher Behaviour and Teacher Impact on Students. *Journal of Educational Research*, 77(1), 16-21.

Frey, P.W., Leonard, D.W., & Beatty, W.W. (1975) Student Ratings of Instruction: Validation Research. American Educational. *Research Journal*, 12**,** 237-336.

Gallagher,P. (1988). Teaching Students with Behaviour Disorder. Denver Colorado: Lover Publishing Company.

Gordon H.R.D. (2005). Selected factors of Teaching Effectiveness: Perceptions of Apprenticeship Trainers. The Journal of Technology Studies.

Hair J.F., Jr., Anderson, R.E., Tatham, R.L., and Black, W.C. (1998). Multivariate data analysis (5th Ed.). Upper Saddle River, NJ: Practice Hall.

Imhanlahimi E.O., & Aguele, L.L. (2006). Comparing Three Instruments for Assessing Biology Teachers' Effectiveness in the Instructional Process in Edo State, Nigeria. *Journal of Social Science,* 13(1), 67-70.

Joshua M.T., Joshua A. M., & Kritsonis, W.A (2006). Use of student Achievement Scores As Basis for Assessing Teachers' Instructional Effectiveness: Issues and Research Results *National Forum of Teacher Education Journal, 17*(3).

Marsh, H.W. (1982). "SEEQ": A reliable, valid and useful instrument for collecting data on teaching effectiveness. *Journal of Educational Psychology,* 52, 77 – 95.

Marsh, H.W. (1984). Students' evaluation of University Teaching: Dimensionality, Reliability, Validity, Potential biases, and utility. *Journal of Educational Psychology,* 76(5), 707 – 754.

Marsh, H.W. (1987). Students' Evaluations of University Teaching: Research Findings, Methodological Issues, and Directions for Future Research. *International Journal of Education Research,* 11(3), 252 – 390.

Marsh, H.W., & Dinkin, M.J. (1992). Students Evaluations of University Teaching: A multidimensional perspective. In J. Smart (Ed), *Higher Education: Handbook of theory and Research*(pp87-106). Agathon, New York.

Nicholl, H. and Nicholl, A. (1980). *Development a Curriculum: A Practical Guide.*3rd Ed. London: George Alen and Unwin Norman, H.N. ; Hull, C.H; Jean, G.J; Karin, S. and Bart, D.H. (1975). Statistical Package for the Social Science. United States of America. Mchraw – Hill, Inc. 2nd

Nwosu, E.C. (1995). *Development, Validation and Application of a Model for Assessing Teacher Effectiveness in Secondary School Chemistry*. Unpublished doctoral dissertation, University of Lagos.

Ogunniyi, M.A. (2004). *Development, Validation and Use of University Students Evaluation of Teaching Effectiveness Scale (USETES).* Unpublished doctoral Dissertation. University of Ibadan, Ibadan.

Onibokun, M. (1981). Factor Analytic Study of McCarthy Scales of children, Abilities in the Nigerian Culture. African Journal of Educational Research. $, (1 and 2) 141-148.

Onocha, C.O. (1995). Students Evaluation Research in Nigeria: Validity Research in Nigeria. *Nigeria Journal of Clinical and Counseling Psychology,* (1), 31-39.

Onocha, C.O. (1996). Students' evaluation of educational quality: validation research in Nigeria. *Nigerian Journal of Clinical and Counseling Psychology,* 1, (1), 85-98.

Orji, O.E. (2004*). Personal and School factors as determinant of Students Perception of Teaching Effectiveness in Nigeria Colleges of Education.* Unpublished doctoral dissertation, University of Ibadan.

Palmer, P.J. (1998). *The Courage to Teach: Exploring the Inner Landscape of a teacher's Life*. San Francisco Jossey – Bass.

Papandreou, A.P. (1995). *Mia spouthi apotelesmatikis didaskalias (An effective teaching study*). Nicosia: Institute of Education.

Reynolds, M. (1994). Group work in Education and Training: Ideas in practice; kagon Page Ltd.

Salsali, M. (2005). Evaluating Teaching Effectiveness in Nursing Education: An Iranian Perspective: *BMC Medical Education*, 5, 26 –34.

Seldin, P. (1999). *Changing Practices in Evaluating Teaching. A practical guide to improved faculty performance and promotion/ tenure decisions.* Bolton, M.A.: Anker Publishing.

Sikora, D.A. (1997). *Observable Teaching Effectiveness and Personality types of family and Consumer Science Teachers.* Unpublished doctoral dissertation, University of Tennessee, Knoxville.

Solomon, J. (1994). Group discussion in the classroom R. Lerinson (Ed). Teaching Science (pp.76-84). London: Routledge.

Stronge, J.H. (2002). Qualities of effective teachers. *Association for Supervision and Curriculum Development,* 129.

Watkins, D. (1994). Student Evaluation of University of Teaching: A Cross Cultural Perspective. *Research in Higher Education,* 35(2).