Classroom Activities as Measure of Academic Performance of Senior Secondary School Students in Core Science Subjects

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Abstract

The study investigated classroom activities as measure of academic performance of senior secondary school students in core science subjects. Participants were 54 science teachers and 1,620 SS2 students selected from the Schools across the 16 local Government Areas of Ekiti State using purposive and stratified random sampling techniques. Data were collected using a 28-item interaction schedule and achievement tests in biology, chemistry and physics constructed and administered by the Ekiti State Ministry of Education. The data collected were analyzed using correlation and regression analyses. The findings revealed that there existed significant relationship between students' participation in class lessons and their academic performance, the relationship between the teachers activities in science lessons and the students' Academic performance was significant, positive and very high. The classroom activities in science lessons accounted for 94.5% of the variability in students' academic performance.

Key words: *Science activities, observation, participation and academic performance.*

1. Introduction

It is a common phenomenon that when students perform very well in external examinations in a particular subject, the school authority usually singles out the teacher who taught the subject for honour or commendation. The performance is said to be the result of the effectiveness in teacher's teaching. The issue of effectiveness in teaching is obviously vital in education (Kukuru, 2010). For teaching to be effective, the teacher must stimulate, encourage and maintain active participation of students in science lessons. The use of aid materials is fundamental to active participation of students in science lessons because students have opportunity to torch, weigh, examine, sort, or manipulate learning aid materials. The students' participation in learning process includes contributing ideas, analyzing the factors associated with the ideas, developing possible solutions to problems raised in the class, placing the solutions into actions and evaluating the results of the solution (Yawe, 2011). The activities typical of science classroom lessons include manipulating equipment and materials, writing or drawing on the board or in students note book, asking and answering questions, Explaining or presenting facts, reflecting on scientific concepts, giving and following instructions or giving direction on experimental procedures or how to carry out an activity/exercise, listening or observing, relating with colleagues among others (Omodara and Bandele, 2010). The activities can be broadly classified into cognitive, affective and psychomotor activities or dichotomized into verbal and non verbal, activities.

Omodara (2010,a) found out in a study that more than two third of the time spent in the science class lessons are usually devoted to cognitive activities at the neglect of affective and psychomotor activities. While Inamulla, Naseer and Husain (2008) asserted that there is no provision for the development of intellectual and thinking skills among students who are given little time for active participation and interaction in class lessons.

The science classroom activities are characterized by story telling and parroting, monologue, practical lessons turn to lecture sessions, writing notes and complete absence of teaching aids in the classes. Exercises, assignments and activities that would enhance mastery of concepts are very rare. The few ones given are not marked or thoroughly supervised. Corroborating this was a study which revealed that most science lessons in senior secondary schools in Ekiti and Ondo States of Nigeria were monologue i.e the teacher did the talking and the students were only listening or observing or occasionally writing (Omodara, 2010,b).

In the work of Oguntola (2008) it was revealed that students typically do not ask questions in the classroom discussion, nor are they encouraged to do so. Also in Omodara (2012,b) it was asserted that teachers punctuated the presentation of facts with brief questions only designed to keep the students alert and not necessarily meant to initiate critical thinking or trigger inquiring mind of the students. Under this condition student may not probably perform at high level in subsequent examinations. Study have also revealed that there exists strong linear dependency of students activities on teachers' activities in science classroom lessons (Omodara, 2010, c). This implies that it is the teacher that dictates the level of participation of students in class lessons. Classroom performance of the teacher is an important factor in teaching learning process.

2. Statement of the Problem

It is often reported that students' performance in both internal and external examinations in science subjects is low. The evidence is obviously traceable to classroom situations and practices of which both the teachers and the students' participation in class activities are very vital. It is therefore necessary to access the participation of the teachers and students in science classroom activities Vis-a-Vis the performance of the students in examinations with the view to making classroom teaching more effective and consequently ensure better performance of students in science.

3. Purpose of the Study

The study used activities of teachers and students in science lessons to measure students' academic performance. The use of a systematic observation technique of the category option was employed to record the activities of both the teachers and the students as they occur in science lessons. The observation data obtained were used to measure academic performance of students in SS2 Joint Promotion Examination conducted at the end of the session by the Ekiti State Ministry of Education.

4. Research Hypotheses

1. There is no significant relationship between students' participation in science classroom activities and their performance in SS2 JPE
2. There is no significant relationship between activities of teachers in science lessons and the performance of SS2 students in JPE
3. Activities of the teachers and students' in science lessons will not predict academic performance of the students in JPE

5. Procedure

This study is a descriptive case study type of which teachers and students activities in biology, chemistry and physics classroom lessons served as the predictors i.e the independent variables. While the grades of senior secondary school two, SS 2, students in the JPE conducted by the Ekiti State Ministry of Education was the criterion measure/independent variable. The sample used in the study consisted of 54 teachers (18 Biology, 18 Chemistry and 18 Physics) and 1,620 SS2 science students. The sample was selected using purposive and stratified random sampling techniques from all the senior secondary schools in Ekiti State of Nigeria. The strafication was done along type of school (Male only, female only or mixed schools) and also along rural and urban schools.

The instruments for the study were 28-item science classroom interaction sheet used to collect observation data from SS2 science lessons in the schools during 2010/2011 academic session and a proforma used for the collection of

results of the SS 2 JPE conducted in July 2011. The construct validity coefficients of the observation instrument was established using kerlinger(1979) convergent approach which gave high positive value of 0.989. While the inter-observer reliability coefficients of 0.938, 0.955 and 0.973 were obtained when the scores of three observers (who took records of the same lessons) were correlated pair wise. These values fall within acceptable range of valid and reliable observation instrument.

6. Data collection and Analysis

The researchers and research assistants took the copies of the observation instrument with stop watch to schools, watched the teachers interact with the students and materials in the science lessons. The 28-item interaction sheet was used to record the verbal and non-verbal activities as they occurred in the lessons. The period of observation was 40 minutes. One time unit was 60 seconds. Three observations were made in each class. At the end of the academic session, the results of the Joint Promotion Examination were collected from the school with the use of a proforma showing the distinction, credit, pass and failed levels. The observation data and JPE results collected were subjected to correlation and regression analyses after collapsing the observation data with the use of factor analysis method.

The proportion of students' participation in class activities is total frequency of students' positive activities divided by total frequency of all the class activities for the lesson times 100. The proportion of the teachers activities is total frequency of teachers' activities divided by total frequency of all the class activities for the lesson times 100. For the JPE results a distinction level was assigned 3 points, credit level 2 points, pass level 1 point and failed level 0 point.

7. Research Results/Findings

Hypothesis 1: There is no significant relationship between students' participation in science classroom activities and their performance in SS2 Joint Promotion Examination (JPE) result.

Table 1: *Test of relationship between students' activities in science lessons and their performance in SS2 JPE*

variable	No of cases	r-calculated	r-critical	% of associated variable
Students' activities in science lessons	54	0.432	0.273	29
Joint promotion Examination Result	54			

P < 0 . 05 (result significant)

Table1 showed that r-calculated value 0.432 is greater than r-critical value 0.273 at 0.05 level of significance. Hence, the hypothesis is not accepted. This means that students' participation in science classroom lessons is significantly related to their performance in the SS2 JPE result.

Hypothesis 2: There is no significant relationship between activities of teachers in science lessons and the performance of SS2 students in JPE result.

Table 2: *Test of relationship between teachers' activities in science Lessons and performance of the SS2 students' in JPE*

variable	No of cases	r-calculated	r-critical	% of associated variables
Teachers' activities in science lessons	54	0.970	0.273	94
Joint promotion examination result	54			

P<0.05 (Result-Significant)

Table 2 showed that r-calculated value 0.970 is greater than r-critical value 0.273 at 0.05 level of significance. Hence, the hypothesis is not accepted. This means that there is significant relationship between the teachers' activities in science lessons and students' performance in SS2 Joint Promotion Examination. The r-calculated value in table 2 is positive and very high, while the r-calculated value in table 1 is comparatively low, this means that teachers activities in science lessons are more related to students' academic performance than the students' activities in science lessons.

Hypothesis 3: Activities of the teachers and students in science lessons will not predict academic performance of the students in SS2 JPE.

Table 3: *Contributions of activities of the teachers and students in science lessons on students' academic performance.*

Dependent variable	Predictor variable	Beta	R	R^2
Students' academic performance	Teachers' activities	0.927	0.972	0.945
	Students' activities	0.093		
	Constant	-2.46		

Equation of association.

P = 0.927T + 0.093S – 2.46

A unit increase in P is cause by 0.927 increase in T and 0.093 increase in S. Where P = students' academic performance

T = *Activities of teachers in science lesson*

S = *Activities of students in science lesson*

Table 3 showed that beta weight of teachers' activities is 0.927 which is greater than the beta weight, 0.093, of students' activities. This implies that activities of the teachers in science lessons predicted academic performance of students' better than the activities of students in the science lessons. The R value 0.972 showed that there existed very high multiple relationship between the dependent variable (criterion measure-academic performance of students) and the independent variables (the predictors – teachers and students activities in science lessons). R^2 value (0.945)- degree of determination implies that activities of teachers and students' participation in science classroom activities could account for 94.5 % of academic performance of students in biology, chemistry and physics. These showed that activities of teachers and students in science lessons significantly predicted academic performance of science students in senior secondary schools.

8. Discussion

The Study ravealed that there was significant relationship between students' participation in science classroom activities and their performance in subsequent examination. This implies that active participation by learners in learning activities is necessary. This result supported the work of Oguntola (2008) that active participation by learner in learning activities is preferred to passive reception of the content, the students should be involved in more activities than just teacher dominating the lessons.

It was also revealed that there was significant relationship between the teachers' activities in science classroom lessons and the students' academic performance. There was a very high and positive correlation coefficient between the teachers' classroom performance and students' academic performance. The study corroborated the assertion of Falayajo (1986) that continuous assessment of students does imply continuous assessment of the teachers. In essence the success or failure of students are the direct product of good or bad classroom performance of the teacher. This also agreed with the assertion of Oladimeji (1998) and Aboaba (2001) that classroom verbal behaviours of teacher had positive relationship with the achievement of students.

It was noted that teachers' activities correlated more highly with students' academic performance than students' classroom activities in science lessons. This can be attributed to the fact that the teacher is the determinant and moderator of classroom activities including the subject matter, the use of aid materials and the classroom behaviours of the students. The result is in line with the study of Omodara (2010,c) which reported that students' classroom behaviours linearly depend on the teachers' behaviors in science lessons. The success of class lessons is a reflection of the ability and capability of the teachers to impact knowledge, attitudes and skills to the students.

This study is a proof to the fact that the importance of teacher should not be underscored, but Tsui (1998) observed that policy makers, educators or administrators many a times under score the importance of teachers' performance in students' educational outcomes. What teacher knows and can do is the most important influence on what students learn. Bandele (2003) also asserted that the health of classroom interaction is dictated by the quality of instructions given during the actual lesson periods and the teacher is the key element for successes of school education and change.

The study also revealed that teachers' activities predicted academic performance of students better than the students' participation in classroom activities in science lessons. It was shown that there existed very high multiple relationships between the criterion measure (academics performance of students) and the independent variable (teachers' and students' activities in science lessons). The degree of determination showed that activities of teachers and students participation in science classroom activities could account for 94.5% of the variability in the academic

performance of science students – that is classroom activities could account for 94.5% of success or failure of science students in examination.

9. Conclusion

Based on data analyses and interpretation of results the following conclusions were drawn for the study. Students' participation and teachers' activities in science classroom lessons respectively have significant relationship with students' academic performance. There existed high multiple relationships between students' and teachers' activities in Science lessons and the performance of students in subsequent examination. Also science classroom activities accounted for about 94.5% of the variability in the academic performance of science students.

10. Recommendations

Based on the findings of the study the following recommendations were made.
1. Science teacher should make deliberate efforts to ensure that students participate actively in class lessons for favourable performance in science subjects.
2. There should be provision of teaching instructional resources – laboratory equipment, Libraries, Chairs, Desks, Cabinets and many other teaching aid materials, and the teachers should be encouraged to utilize them effectively for quality teaching which will in turn produce better performed science students.
3. There should be effective supervision and evaluation of the science classroom activities by subject heads, head of department, vice-principals, principals and the Inspectorate Division of the Ministry of Education.
4. Performance award programme for teachers who excel in classroom activities should be instituted to encourage them to put forth their best.

References

Aboaba, R (2001). Effect of instruction on students' performance on knowledge, comprehension and application task in mathematics. African Journal of Education Research 3(2): 42-46

Bandele, S.O (2003). The Universal Basic Education in perspective. Need for formative evaluation. Nigeria Journal of Educational Research and Evaluation 4(1): 54-58

Inamullah, M; Naseer, Uddini M. and Husain, Ishatiaq (2008). Teacher-students verbal interaction patterns at the tertiary level of education. Contemporary issues in Education Research 1 (1): 45-50

Kukuru, Jolly D. (2010). Extent of use of indices of questioning by class teachers. African Journal of Educational Research and Administration 3(2): 127-139

Oguntola, B.M (2008). Classroom interaction analysis in the teaching and Learning of mathematics in Lagelu L.G.A of Oyo State. Unpublished M.Ed thesis. University of Ado-Ekiti.

Oladimeji, O (1999). Educational Management and Evaluation. Lagos. Longman group limited.

Omodara, M.F. (2010,a). A comparative analysis of Cognitive, affective and psychomotor activities in science classroom lessons. International Journal of Sustainable Development 3(1): 73-80

Omodara, M.F (2010,b). Analysis of teacher-student classroom interactions in science lessons in senior secondary schools. African Journal of Education Research and Administration 3(1): 83-88

Omodara, M.F (2010,c). Influence of the teacher on Students' participation in science classroom activities International Journal of Research in Education 2(1): 122-128

Omodara, M.F and Bandele, S.O (2010). Construction and validating of an observation system for classroom science activities in senior secondary Schools. Academic scholarship Journal 2(1): 190-198

Tsui; K.J (1998).Understanding teacher performance: Toward a comprehensive frame work. Asia pacific Journal of Teacher Education and Development 1(2):81-89.

Yawe, A.A (2011). Impact of demonstration and discussion methods instruction on Junior Secondary Schools achievement in Business studies in Makurdi Metropolis, Benue State. NASHER Journal 9(1): 70-73.