TEACHERS' PEDAGOGICAL COMPETENCE AS DETERMINANT OF STUDENTS' PERFORMANCE IN BASIC SCIENCE IN SOUTHWEST NIGERIA

Adegbola, Funmi Florence Ph. D.
Department of Science Education,
Faculty of Education,
Ekiti State University, Ado Ekiti, Ekiti State, Nigeria.
funmiadegbola@gmail.com

Abstract

This paper investigated teachers' pedagogical competence as determinants of students' performance in Basic Science in South- West Nigeria. The study adopted a descriptive research of survey type. The sample consisted of 2160 students which were randomly selected across the four States in South- west Nigeria together with 243 teachers teaching Basic Science in Junior Secondary School which were purposively selected. Data were collected with instruments titled "Basic Science Teachers pedagogical Competence Questionnaire (BSPCQ) and Basic Science performance test (BSPT)". The reliability of the instruments were determined through test re-test method which yielded a correlation co-efficient of 0.87 and 0.92 for BSPCQ and BSPT, respectively at 0.05 level of significance. Mean, Ranking order and Multiple Regression were used to analyze the data. Findings revealed that, teachers' pedagogical competence can significantly influence students' performance in Basic Science. It was recommended that, emphasis should be laid on teachers' mode of teaching in the classroom by recruiting professional teachers. Teachers should also intensify efforts in using various teaching styles which could influence students' performance. In addition; teachers should make use of instructional materials while teaching to motivate students towards good performance in the classroom. Teachers should show their levels of competence that can influence students' performance in Basic Science. Government and other educational stakeholders should arrange for seminars and workshops for their teachers to boost their levels of competence in the classroom.

Keywords: Teachers' pedagogical competence, Students' performance, Basic Science.

Introduction

Teaching and learning at all levels of education involve the development of subject matter expertise and qualified teachers are supposed to be experts in their fields of study. Competent teachers as experts have personal ability to develop student's capabilities towards learning. In other words, any activity undertaken by a person is expected to yield maximum result (Adnan 2015).

Pedagogical competence, according to Suciu and Mata (2011) is either the composition of potential capacities which allow for efficient manifestation of an activity, or a minimum professional standard, often specified by law, which professionals should reach. Also, Popoola (2013) described pedagogical competence as a concept that talks about one's competence in the learning management. Hence, it is the duty of a competent teacher to teach students with teaching styles that appeal to their knowledge. Application of knowledge and skills in the classroom through the use of various teaching styles plays a significant

role in the intellectual development of the students.

Moreover, researches have shown that teachers are instrumental to successful teaching and learning in the classroom. However, for a teacher to be able to deliver effectively, he must be able to provide more learning opportunities for students both in quality and quantity (Akhyak, Idrus and Bakar 2013). Today, many Basic Science teachers are not aware that whatever step taken by them exerts impact on students' performance. Oser, Fritz and Oelkers (2001) stressed that a good knowledge of pedagogical competence will contribute to student's typology and principle of development which will lead to a future successful application in any field. They stressed further that this will also develop interdisciplinary thinking, creativity and managerial qualities of students in any field. This implies that teacher must possess good managerial policy which can positively influence the performance of students.

To ensure and promote pedagogical competence of teachers, Latchem, Odabasi and Kabasi (2006) in an international overview of professional development of teachers, submitted that there is a need for teachers to embrace new forms of educational delivery, such as open, distance, blended and work-based learning and master the latest tools and methodologies of information and communication technology. Teachers are role models to students in the classroom and students copy from them. Therefore, teachers must comprehend both learning and instructional principles in a meaningful way to impart knowledge to them.

Gold Haber and Brewer (2000) reported that a positive relationship exists between teacher's preparation for what they teach and student's performance.

Teacher's knowledge of subject matter is vital to effective teaching and learning. Subject matter comprehension will help a teacher to be confident and vast in transferring knowledge to his /her students. According to Uya (2011), a teacher who has a deep understanding of the concept to be taught, is more likely to be effective in his teaching. In the same vein, Haidir and Ahmad (2015) asserted that planning a good instructional design will give an interesting teaching environment and positive impact to students. The researchers believed that, the inability of a teacher to prepare well will affect student negatively in their performance.

Knowledge of subject matter, according to Eggen and Kauchak in Jose, Claudia and Luis (2006), is divided into three dimensions under which it can be measured. They are: content knowledge, pedagogical knowledge of content and general knowledge. This implies that a teacher has to teach what he or she understands very well.

Teaching without a specific teaching style would amount to no teaching because the influence of teaching is expected to be reflected in the attitude and performance of the students taught. The study by Popoola (2013) confirmed that, input determines output. Also, Hamilton-Ekeke (2013) maintained that a competent teacher is one who engages students in dialogue to achieve genuine learning because when students and teachers are engaged in shared critical dialogue, they mutually create and construct knowledge instead of passively transmitting it, since they can share their experiences, reflect upon them and finally make critical evaluation regarding the

way they themselves have obtained that knowledge and those experiences.

The study of Kosgei, Mise, Odera and Ayugi (2013) revealed that teachers should have and also apply specific abilities for their influence to be reflected in their students' performance. In the same vein, Afolabi (2009) in his study affirmed that among several other factors responsible for poor performance in Basic Science, inadequate teaching style serves as a major factor.

It is very unfortunate that some Basic Science teachers seem not to understand this, and that has been of great concern to policy makers for so many years. The poor performance of students in science subjects has continued to be a major cause of concern to all, particularly those in the mainstream of science education (Akpoghol, 2001).

Communication is very important to teaching and learning of Basic Science and the tool of communication is language. Language reveals a lot of what we think and believe. The inappropriate use of language can transmit negative message to students of Basic Science. For instance, teacher's use of foul language at the beginning of the lesson such as you cannot pass this subject or you are a dullard seems to create fear in some of the students. Students can react to language stimuli spontaneously (Oyinloye and Gbenedio 2010). Foul language can inhibit learning in such a way that could make a student develop negative attitude to the teacher and the subject he teaches.

Again, lack of motivation is observed as one of the challenges affecting students' attitude and performance in Basic Science. Motivation promotes teaching effectiveness and students' learning activity. Prompt payment of teachers' financial benefits motivates them to discharge their duties effectively. The experience of the researcher with what is going on among public secondary school teachers has shown that a teacher who is well motivated is likely to improve in his teaching and this will ultimately affect students' attitude and performance. As posited by Akpohere (2011), lack of adequate motivation in a system has a negative effect on staff performance. He stressed further that, motivation is the force or condition within an organization that compels workers to willingly work for the progress of the organization. Human beings generally require some sort of internal and external drives, incentives, encouragement and satisfaction of basic needs to get the best from them towards the accomplishment of the group's goals and objectives. Educationally, teacher's productivity can be high or low based on the kind of motivation given to them.

Furthermore, instructional materials which also serve as motivated materials can be employed by teachers to facilitate instructional process. Oyedun (2000) believed that, for effective and positive production in any establishment, there must be enough working tools to be used by the personnel, as this creates an enabling environment or medium through which knowledge is transferred from the familiar to the unfamiliar-analogical process. Instructional materials are materials used to improve teaching and learning. They can be real-life objects or improvised materials. These materials are always around us, but some Basic Science teachers do not normally use them while teaching in the classroom. As a classroom teacher, the researcher observed that most Basic Science teachers teach in abstract even though they were supplied with mobile laboratory equipment. They neglect the laboratory activities which

they are supposed to carry out. Teachers cannot provide all the instructional materials needed by them but they are supposed to make use the available materials. This seems to have led to the negative attitude developed by some students towards learning of Basic Science and this as well affects their performance in the classroom. However, Oyedun (2000) and Williams (2004) in their studies confirmed the extent of utilization of instructional materials in secondary schools and found that the use of instructional materials seems not adequate and this leads to poor performance of students in Basic Science. Also, the study of Moronfola (2002) revealed a significant effect of material resources on the students' academic performance. Isola (2010) noted that material resources have significant effect on students' performance in each subject. Teachers are expected to use teaching styles which can influence students' academic performance in the classroom.

Purpose of the study

The purpose of this study is to examine teachers' pedagogical competence (such as teacher's knowledge of subject matter, communication, teacher's teaching style, motivation and the use of instructional materials) as determinants of students' performance in Basic Science. It is also to examine the joint interaction of these variables on students' performance in Basic Science.

Research Questions

The following Questions were raised for the study.

1. What pedagogical competence influence students' performance?
2. Which of the teacher's pedagogical competence would influence students' performance in Basic Science?

Research Hypotheses

The following research hypothesis was tested at 0.05 level of significance.

Teachers' pedagogical competence will not significantly determine students' performance in Basic Science

Methodology

Research design

This study employed descriptive research design of the survey type to describe the influence of teachers' pedagogical competence of (knowledge of the subject matter, motivation, level of communication, teachers' teaching style and instructional materials) as determinants of secondary school students' performance in Basic Science. The design is suitable because it enabled the researcher to gather relevant information from Basic Science teachers and students using qualitative measure of survey.

Sample and Sampling techniques

The sample of the study comprised 2,160 Junior Secondary School students offering Basic Science using multistage procedure. Three States out of six States in South West of Nigeria were selected for the study using random sampling techniques, while three Senatorial Districts were selected of the selected state. The third stage involved the random selection of three Local Government Areas from the three Senatorial districts of each state selected, making a total number of 27 Local Government Areas. The fourth stage involved the use of simple random sampling technique to select three public secondary schools from each of the selected Local Government Areas making a total number of 81 public secondary schools. Stage four involved the selection of at most 40 students from each of the selected schools (making a total of 2160 students) using simple random sampling technique.

The fifth stage involved the purposive selection of three teachers teaching Basic Science in junior secondary school classes from each of the selected schools (making a total number of 243 teachers). In all, the total sample of 2,160 students and 243 teachers were selected for the study.

Research Instruments

Three sets of instruments were used to collect data for the study. These are Basic Science Teachers' Pedagogical Competence Questionnaire (BSTPCQ) and Students' Attitudinal Questionnaire (BSPT). The Basic Science Teachers' Pedagogical Competence Questionnaire (BSTPCQ) contained 25 structured items and Basic Science Performance Test (BSPT) also contained 25-item structured respectively. The Basic Science performance Test (BSPT) has two sections. Section A requested information about the name and sex of the student, and the school location. Section B contained 30-item objective questions which were prepared by the researcher based on the contents of the topics taught by the teachers as at the time of the study. The students were asked to pick the appropriate option on each item. These items were given to three experts in the field of Basic Science and two experts in the area of test, measurement and evaluation from the University for Face and Content validities respectively.

Test-retest was used to determine the reliability of the instruments from which yielded reliability coefficients of 0.87, and 0.92 for BSTPCQ and BSTP respectively. Pearson's Product Moment correlation was used to determine the reliability of the instrument. Each of the items of the BSPT was scored one mark. Thus the total mark obtained by a subject is twenty-five (25) marks. The data collected were analyzed using mean, ranking order and multiple regressions.

Results:

1. What pedagogical competence influence students' performance?

Table 1: Mean and ranking order of teachers' pedagogical competence influencing students' performance in Basic Science

S/N	Teachers' pedagogical competence	N	Mean	SD	%	Relative Ranking
1	Use of instructional materials	2089	3.27	1.024	20	2^{ND}
2	Knowledge of subject matter	2089	3.19	1.011	19.51	4^{TH}
3	Teachers' motivation	2089	3.25	1.014	19.88	3^{RD}
4	Communication style	2089	3.19	1.011	19.51	4^{TH}
5	Teachers' teaching style	2089	3.45	1.212	21.10	1^{ST}
	Total	2089	16.35	5.272	100	

Table 1 showed the mean analysis of the teachers' pedagogical competences influencing students' performance in Basic Science. Teachers teaching style has the highest mean score of 3.45; teachers' use of instructional materials has a mean score of 3.27; teachers' motivation has a mean score of 3.25, while teachers' knowledge of subject matter and communication skill have a mean score of 3.19 each. It can be deduced from the table that the highest variable that can influence students' performance in Basic science is teachers' teaching style.

Hypothesis 1: Components of teachers' pedagogical competence will not

significantly influence students' performance in Basic Science.

Table 2: Multiple regression analysis of teachers' Pedagogical Compe-tence and Student Performance in Basic Science

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std Error	Beta		
(Constant)	29.935	1.524		19.636	0.000
Use of Instructional materials	0.104	0.065	0.027	1.599	0.110
Knowledge of subject matter					
Teachers' Motivation	0.516	0.044	0.197	11.596	0.000
Teachers' communication style	0.925	0.054	0.251	17.130	0.000
Teachers' teaching style	0.509	0.050	0.199	10.273	0.000
	1.440	0.062	0.451	23.162	0.000

P< 0.05 Dependent variable: Students' performance in Basic Science
Multiple R = 0.753 F-ratio = 546.296
R^2 = 0.567
Adjusted R^2 = 0.566
Y = (Group) =29.94 I = 0.104 UIM+
YI = a + bx_1 + c x_1 + dx_3 + ...

Table 2 revealed that there is positive multiple correlation between independent variables and students' performance in Basic Science (R= 0.753). This implies that all the predictor variables are factors that can influence students' performance in Basic Science. The value of the coefficient of determinant ($R^{2=}$0.567)indicated that all the independent variables jointly accounted for 56.7% of the total variation in students' performance in Basic Science while the remaining 43.3% unexplained variation could largely be due to other variables not examined in this study. This implies that there are other variables that accounted for students' performance in Basic Science. The calculated F ratio (546.296) was significant at 0.05 level significance. Thus, the hypothesis is rejected. This implies that the independent variables will jointly provide significant influence on students' performance in Basic Science.

Discussion

The finding revealed that the highest variable that can influence students' performance in Basic science is teachers' teaching style. The findings of Kosgei, Mise, Odera and Ayugi (2013) supported that teachers use and application of specific abilities for their teaching influence their students' performance in the subject. The study of Afolabi (2009) also affirmed that inadequate teaching style serves as a major factor that have been identified to cause poor performance of students in science and science related subjects. The finding also showed positive correlation between teachers' pedagogical competence and students' performance in learning Basic Science. The teacher's use of instructional materials was rated highest among other teachers' pedagogical variables that could determine students' performance in learning Basic Science. This finding is in agreement with Isola (2010) and Popoola (2013) who in their studies asserted that teachers pedagogical skills such as the use of

instructional materials serve as a major factor that determine the performance of students in the subject. On the contrary, the findings of Oyedun (2000) and Williams (2004) also revealed that the extent of utilization of instructional materials in secondary school lead to poor performance of students in Basic Science.

Conclusion

It can be concluded from the findings of this study that of all the teachers' pedagogical competence variables teachers teaching skills has the highest influence on students' performance in Basic Science. The finding also revealed that teachers' pedagogical competence can influence students' performance in Basic Science with the teachers' use of instructional materials.

Recommendations

The following recommendations were made based on the findings:

1. Teacher should adopt the best teaching style which can influence students' performance in Basic Science.
2. Teachers should use relevant instructional material to teach student to influence students' performance in Basic Science.
3. Teachers should show their levels of competence that can influence students' performance in Basic Science.
4. Government and other educational stakeholders should arrange for seminars and workshops for their teachers to boost their levels of competence in the classroom.
5. Teachers of Basic Science should be given opportunities to update their knowledge through in-service training.

References

Adnan, H. (2015). Contribution of competence teacher (pedagogical, personality, professional competence and social) on the performance of learning. *International Journal of Engineering and Science (IJES),* 4(2), 1-12

Afolabi, F. (2009). Teachers' attitude and gender factor as determinant of Pupils' performance in primary Science. *African Research Review: An International Multi-Disciplinary Journal*, 3(1), 326-332

Akhyak, Idrus, M. & Bakar, Y.A. (2013).Implementation of teachers' pedagogy competence to optimizing learners' development in public primary schools in Indonesia. *International Journal of Education and Research*, 1(9), 1-10

Akpoghol, T. (2001). Poor performance in Science subject amongst secondary school students in Makurdi: Causes and possible solutions. Unpublished P.G.D.E. Project, Benue State University, Makurdi

Akporehe, D.A. (2011). The impact of environment on productivity in secondary schools. *African Journal of Education and Technology*, 1(1), 116-122

Goldhaber, D. & Brewer, D.J. (2000). Does teacher certification matter? High school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis*, 22(2), 129-145

Haidir, A. & Ahmad, J.B.S. (2015).Competencies for the classroom instructional designer. *International Journal of Secondary Education*, 3(2), 16-20

Hamilton-Ekeke, J. (2013). Conceptual framework of teachers' competence in relation to students' academic achievement. *International Journal of Networks and Systems*, 2(3), 15-20

Isola, O. M. (2010). Effects of standardized and improvised instructional materials students' Academic Achievements in Secondary School Physics. M.Ed Thesis, University of Ibadan, Ibadan.

Jose, L.A.; Claudia, S. & Luis, F.L. (2006). Pedagogical affect students' interest, and learning performance. *Journal of Business Research* 60, 960-964.

Kosgei, A.; Mise, J.K.; Odera, O. & Ayugi, M.E. (2013). Influence of teachers' characteristics on students' academic achievement among secondary schools. *Journal of Education and Practice*, 4(3), 76-82

Latchem, C.; Odabasi, F.H. & Kabasi, I. (2006). Online professional development for University teaching in Turkey: A proposal. *The Turkish Online Journal of Educational Technology*, 5(3), Article 4.

Moronfola, B. (2002). Effect of instructional resources on the academic achievement secondary school students in Ilorin Local Government of Kwara State. Unpublished M.Ed Research Thesis.

Oser, Fritz & Oelkers, J. (2001). Die wirksamkeit der lerhrerbildungssysteme. Von der all-rounder bildung Zur Ausbildung profesioneller Standards. Zurich: Ruegger Vertag. *International Online Journal of Educational Sciences* 3(2), 411-423.

Oyedun, O.S. (2000). Effects of industrial materials on students' performance in Geography in secondary schools in Ilorin South LGA of Kwara State. Unpublished PGDE Project, UNAD.

Oyinloye, G.O. & Gbenedio, U.B. (2010).Investigating the effects of methods with linguistic packages on secondary school students' achievement and attitudes in expression in essay writing in Nigeria. *Anthropologist*, 12(3), 189-196

Popoola, A.A. (2013). Teachers' pedagogical competence in teaching and learning in perception of teachers' knowledge, attitude and teaching skills as predictor of academic performance in Nigerian secondary schools. *Educational Research and Review*, 2(9), 165-171

Suciu, A.I. & Mata, L. (2011). Pedagogical competences: The key to efficient education. *International Journal of Educational Sciences*, 3(2), 411-423.

Uya, A.O. (2011). Teacher's characteristics and students' attitude towards Mathematics in Senior Secondary of Oron Federal Constituency of Akwa Ibom State. Unpublished M.Ed Dissertation. University of Uyo. AkwaIbom State.

Williams, K.P. (2004). Community participation in finding of education in Nigeria. Paper presented at ANCOPSS Conference held at Hiltop Hotel, Jos 12-14

EFFECTS OF TEACHING BASIC SCIENCE ON YOUTHS' PERFORMANCE IN SKILLS ACQUISITION PROGRAMME IN EKITI STATE

Dr. (Mrs.) K.A. Omotayo & Oniya Toluwa
Department of Science Education,
Faculty of Education, Ekiti State University,
Ado-Ekiti, Ekiti State.
kenomotayo@yahoo.com; oniyatoluwa@gmail.com
08035142826, 08139675488

Abstract

The study sought to evaluate the effects of teaching basic science on skill acquisition. The purpose was to determine what effect the knowledge of basic science would have on in skills acquisition among youth in Nigeria. The study made use of quasi-experimental research design. The sample consisted of eighty youths chosen from two acquisition centres in Ekiti State. The two centres were randomly selected. Two research hypotheses were generated and two instruments were