

Effects of Teacher's Qualifications and Teaching Experience on Students' Academic Achievement in Basic Science in Junior Secondary School

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Abstract

The study examined the effects of Teacher's and teaching experience on Junior Secondary School (JSS) students' achievement in Basic Science. The survey type of research design was adopted in the study. Four hundred and fifty JSS II students were randomly selected from fifteen purposively selected secondary schools in Ibarapa region in Oyo State. Teacher's qualification and teaching experience were used as criteria for selection of Basic science teachers. Three hypotheses were formulated and tested using t-test statistic at $p < 0.5$. The results showed that there was significant difference in the achievement of students taught by high qualification level teachers and those students taught by low qualification level teachers, between students taught by trained teachers and students taught by untrained teachers and between students taught by long time experienced teachers and short time experience teachers. Based on the findings of the study, it was recommended that only trained and high qualification teachers should be allowed to teach Basic science JSS III classes. While holder of Nigeria Certificate in Education (NCE) should be allowed to undergo higher study either through part time study or study leaves. Likewise, teachers without teaching qualification should be advised to pursue their Post Graduate Diploma in Education (PGDE). This may improve their teaching method in order to improve the achievement of students in Basic Science.

Keywords: *Teacher's Qualifications, Teaching experience, Basic science, Students academic achievement*

Introduction

Science and Technology play a critical role in transforming societies and economies through enhancing efficiency, connectivity and access to resources and service (Bamidele, 2016). The study of science yields both theoretical and practical knowledge about the environment which can be used to manipulate and harness the forces and resources of nature for human development and well-being (Njoku, 2007).

Science which is offered as integrated science in junior secondary school has changed to Basic Science due to recent educational reforms in Nigeria (FRN, 2007). The subject was introduced into the Nigerian secondary schools as a panacea for some of the problem bedeviling science

especially at the junior level, most especially with the revised policy on education with emphasis on acquisition of process skills. The emphasis of the programme is on the development of spirit of enquiry as opposed to rote learning, as well as the development of science process skills and scientific attitudes rather than accepting scientific facts as a dogma (Bamidele, 2014).

According to the National Policy on Education (FGN, 2007), Basic Science is supposed to be presented in such a way that the child:

- i. *Gains the concept of fundamental unity of science (Physics, Chemistry and Biology);*
- ii. *Gains the communality of approach to problem of scientific nature;*
- iii. *Gain an understanding of the role and function of science in everyday life and the world in which he/she lives. pp 3*

From the above, Basic Science serve as the gateway to the teaching and learning of science which provide foundation for the learning of the specialized scientific discipline like Physics, Chemistry and Biology. A credit pass in Basic Science is a pre-requisite for a student to study specialised science subjects at senior secondary school especially Chemistry which stands in a central position among the specialized science subjects. The centrality of Chemistry among other specialized science subjects could be seen in the admission requirements to study courses like Physics, Agriculture, Biology, Medicine as well as Engineering which required a credit pass in Chemistry (Mohammad, 2013; JAMB, 2015). Thus, students' poor performance in Basic Science at junior secondary school can reduce the number of students offering science subjects at senior secondary school level which in turn will affect students' admission into tertiary institutions to study science and science related courses.

Despite the importance of Basic science to furthering study of science there is a gradual decline students' performance in Basic Science in junior secondary school in Oyo state.

Table 1: Performance of Students in Junior Secondary School Certificate Examination in Basic Science in Oyo State (2008 – 2013).

YE A R	NUMBERS OF CANDIDAT E	CREDI T PASS A – C	%	PASSE D P	%	FAILE D F	%	P – F	%
2008	80,070	59,683	74.5 4	14,138	17.6 6	6,249	7.80	20,38 7	25.4 6
2009	85,034	47,087	55.3 7	29,935	35.2 0	8,012	9.43	37,94 7	44.6 3
2010	80,355	61,508	76.5 5	18,081	22.5 0	766	0.95	18,84 7	23.4 5
2011	75,437	44,479	59.2 6	15,640	20.7 3	9,603	12.7 3	25,24 3	40.7 4
2012	89,049	52,899	58.2 6	25,466	28.6 0	10,682	12.0 0	36,14 8	41.5 9
2013	78,733	49,132	59.8 6	20,723	26.3 2	10,878	13.8 2	31,60 1	40.1 4

Sources: Oyo State Ministry of Education, Evaluation Department.

From Table 1 above there is gradual increase in the failure rate of student from year 2011 to 2013. There is a sharp decrease in students' performance in Basic Science in 2010 from 76.55% to 59.26% in 2011.

Sakiyo and Sofeme (2008) noted that students' performance in science is low in both national and states examinations. Many factors had been identified to be responsible for students' poor performance in science subjects, such as poor method of teaching (Njoku, 2007), Teacher preparation (Muhammed & Muhammed, 2007), laboratory inadequacy (Umoru & Bake, 2007), Teacher characteristics (Kosqei, Mise, Odera & Ayugi, 2013)

Teacher play crucial role in the teaching/learning process. The important role of teacher in the learning is unquestionable. Teachers have a lot of influence on their classroom practices. Nwachuckwu (2012) observed that two categories of science teachers exist in Nigeria schools. The first group are the proper professionally trained teachers and educators who lack in-depth knowledge of the science subject content and the other group are those who have mastery of the subject but are not professionally trained teachers. The implication is that most practising science teachers do not possess adequate training for the job. Science is a dynamic subject, this call for training and retraining of science teachers so as to update and upgrade their knowledge on the job and in the contents of science in order to be able to effectively impact the scientific knowledge on students. Since no educational system can rise above the level of its teachers.

Olaleye (2011) states that there were relationship between teacher characteristics and student's performance. According to Akinsolu (2010) the availability of qualified teachers determined the performance of students in school. Wirth and Perkins (2013) indicate that teacher attitude contribute significantly to student's attention in class, however Adesoji and Olatunbosun (2008) states that students' attitude was related to teacher characteristics. Explanation on good or poor students' academic performance have been quite exhaustive, yet controversy still exist among scholar as to what contribute singly or jointly to students' poor performance (Gravestock & Gregar-Greenleaf, 2008). Some of the teachers' characteristic found to be dominant in studies are related to; teacher's qualification, experience, attitude, and personality.

Patrick (2005) explains that scholars and researchers generally agreed that school variables which include teacher characteristics perform a critical role in educational achievements than other variables. However, there has been no agreement on the importance of specific teacher's factors, leading to the common conclusion that existing empirical evidences does not find a strong role for teachers in the determination of student's academic achievement. This study therefore examined the influence of teacher's qualification on academic achievement of junior secondary students in Basic science in Oyo state.

Statement of the Problem

Basic Science is the foundation for learning of specialized science discipline of Physics, Chemistry and Biology. A credit pass in Basic Science is a pre-requisite for learning of these specialized science disciplines especially Chemistry which play a central role in science courses at senior secondary school level. However, there is gradual failing of Basic science by student at the junior secondary school level thereby reducing numbers of students eligible to study science in senior secondary school. Teacher characteristics have been identified to play significant role in student's academic achievement. This study therefore examined effects of teacher's qualification and teaching experience on the academic achievement of students in Basic science in Oyo state.

Review of related Literature

The education system of a nation cannot be greater than the quality of the teachers in that nation. A qualified teacher is one who holds a teaching certificate and/or licenced by the state' owns at least a bachelor's degree from a four-year institution and a well-qualified in his/her area of

specialization (Musau & Abere, 2015). According to Edu and Kalu (2012) academically qualified teachers are those who have academic training as a result of enrolment into educational institution and obtained qualifications such as OND, NCE, HND, BSc, BA, B.Ed., MSc, MA and others while professionally qualified teachers are those who have professional training that gave them professional knowledge, skills, techniques aptitudes as different from the general education. However, Darling-Hammond (1998) defines a well-qualified teacher as one who was fully certified and held the equivalent of a major in the field being taught. The review of related literature shows that there is no agreement on the impact of teacher's qualification on student's achievement in education. For instance, Harris and Sass, 2008 reported that the most important school-based determining factor of student's achievement is the teacher quality. Akisolu (2010) asserted that availability of qualify teachers determined the performance of student in schools. On the contrary, Igwe (1990) investigated the influence of teacher's qualification in Kano and reported that there is no significant relationship between teacher's qualification and student's performance. Huang and Moon (2009) states that teacher's qualification accounted for approximately 40 to 60 per cent of variance in the average of student's achievement in assessment.

Experience is the best teacher. Seweje and Jegede (2005) noted that the ability of a teacher to teach is not derived only from one's academic background but it is based upon outstanding pedagogical skill acquired. Stronge, Ward, Tucker and Hindman (2007) and Kosgei, Mise, Odera and Ayugi (2013) all asserted that there is positive correlation between teachers experience and students' academic achievement. However, Murnane (1996) found that teacher effectiveness improves rapidly in the over the first three years of teaching and reaches its highest point between the third and fifth year but found no substantial improvement after five years.

Therefore, there is need to examine the effects of Teacher's qualification and teaching experience on student's achievement in Basic science in junior secondary school in Oyo state.

Hypotheses

The following hypotheses were stated and tested at 0.05 level of significance

- H0₁: There is no significant difference in the academic achievement of JSS students in Basic science between those taught by teachers with high qualification and those taught by teachers with low qualification
- H0₂: There is no significant difference in the academic achievement of JSS students in Basic science between those taught by trained teachers and those taught by untrained teachers
- H0₃: There is no significant difference in the academic achievement of JSS students in Basic science between those taught by long time experienced teachers and those taught by short time experienced teachers.

Methodology

A descriptive survey type of research design was used in this study, which involved the comparative analysis of student's achievement based on the teacher's qualifications and teaching experience

Population Sample and Sampling Technique

The population for the study consisted of all JSS III students in Ibarapa region of Oyo state that is made up of three local government areas with twenty-seven secondary schools – Ibarapa-East (10), Ibarapa-North (7) and Ibarapa-Central (10). Samples of four hundred and fifty students

were randomly selected from the three local government areas (one hundred and fifty from each local government) from the purposively selected fifteen secondary schools.

Instrumentation

Two major instruments were used in this study are:

Basic Science Teacher's Questionnaire (BSTQ): The BSTQ was developed by the researcher to elicit response for Basic Science teachers. The questionnaire sought demographic information such as; age, sex, highest educational qualification, area of specialization and length of years in service.

Basic Science Achievement Test (BSAT): The BSAT was made up of 60 objective questions selected from past junior secondary certificate examination (JSCE) questions based on the topics treated during the study. The BSAT was subjected to content and face validity to ensure its suitability by two senior lecturers in the department of Integrated Science in The College of Education, Lanlate. The test was administered to 30 students who have similar characteristics with the subjects of this study but did not form part of the study sample. The reliabilities of student's response to individual items were examined on the item-total correlations. Fifty (50) items with the largest item-total correlation were retained in the final version of BSAT. The reliability was estimated using KR-20 to the score obtained from 30 JSS III students. The reliability was found to be high ($r = 0.82$) and the average item difficulty index was 0.41.

Pre-test was administered before the selected topics were taught for six weeks. The Post-test was then administered at the end of the six weeks. The pre-test and post-test scripts were collected and shorted out according to the category of teacher and marked by the researcher.

Method of Data Analysis

The data collected was analysed using simple descriptive statistics of frequency count, mean, while t-test was used to draw the inferences.

Result and Discussion

H₀₁: There is no significant difference in the academic achievement of JSS students in Basic science between those taught by teachers with high qualification and those taught by teachers with low qualification.

Table 1: t-test analysis of Teacher's qualification levels and students' academic achievement in Basic Science

Variables	N	\bar{x}	Df	t _{cal}	t _{tab}	Remark
High Qualification Level	270	68.00	448	12.74	1.98	significant
Low Qualification Level	180	50.42				

Significant at $p > 0.05$.

From Table 1 above, the result shows the achievement of JSS III students in Basic Science taught by teachers with high qualification and those students taught by teachers with low qualification level. From the table, the t-cal (12.74) is greater than the t-table value (1.98). this means that there is significant difference in the achievement of JSS III students taught by teachers with high qualification level and those taught by teachers with low qualification level. Hence the null hypothesis is rejected. The difference might be as a result of in-depth knowledge

in Basic science that teachers with high qualification might have as a result of the length of training they went through. The result is in agreement with the findings of George (2004); Huang and Moon, (2009) and Abe, (2014). They all find out that teacher's qualification affect students' achievement in Mathematics.

H₀₂: There is no significant difference in the academic achievement of JSS students in Basic science between those taught by trained teachers and those taught by untrained teachers

Table 2: t-test analysis of trained teachers and untrained teachers on students' academic achievement in Basic Science

Variables	N	\bar{x}	Df	t _{cal}	t _{tab}	Remark
Trained Teachers	360	72.80	448	8.23	1.98	Significant
Untrained Teachers	90	52.05				

Significant at $p > 0.05$

Table 2 shows the achievement of JSS III students taught by trained and untrained teachers in Basic science. The result shows that the t-cal (8.23) is greater than the t-table. Thus, the null hypothesis is rejected. This means there is significant difference in the achievement of JSS III students in Basic Science between those taught by trained teachers and students taught by untrained teachers. The better achievement recorded by students taught by trained teachers might be as result of exposure of trained teachers to various pedagogical skills in teaching methodology. The result is in agreement with the submission of Seweje and Jegede (2005) that the ability of teacher to teach is not derived only from one's academic background but it is based upon outstanding pedagogical skills acquired. It is also in agreement with the findings of Akinsolu (2010) who asserted that availability of qualified (trained) teachers determined the performance of students in school.

H₀₃: There is no significant difference in the academic achievement of junior secondary school students in Basic science between those taught by long time experienced teachers and those taught by short time experienced teachers.

Table 3: t-test analysis of teacher's years of teaching experience and students' academic achievement in Basic Science

Variables	N	\bar{x}	df	t _{cal}	t _{tab}	Remark
Long Time Experience	200	73.20	98	9.67	1.98	Significant
Short Time Experience	250	68.50				

Significant at $p > 0.05$

The findings in Table 3 revealed that there is significant difference in the achievement of JSS III students taught by teachers with long time experience and students taught by teacher with short time experience because the t-cal ((9.67) is greater than t-table value (1.98). The null hypothesis is therefore rejected. The difference may be due to the richer background knowledge and experience these set of teachers have to draw from and can contribute meaningfully to the cause of teaching. Also, experienced teachers are less dictatorial in classroom and are open to correction. The finding of this study is in line with the findings of Clotfelter et. al (2007) and Kosgei et al (2013). They asserted that there is positive relationship between teacher's experience and students' achievement.

Conclusion

This study examined the effects of teacher's qualification and teaching experience and students' achievement in Basic Science. It can be concluded from the result of the study that teacher's academic qualification only is not enough to positively affect student's achievement in Basic Science, but a professionally trained teacher who had acquired a pedagogical skills in teaching in a specified field of study. The study also revealed that experience played a significant role in teaching/learning process.

Recommendations

Based on the findings of this study, the following recommendations were made; Trained teachers with high qualification should teach Basic Science at JSS III class so that the students can be adequately prepared for Junior Secondary School Certificate Examination. Basic Science teachers without teaching qualification should be encouraged to undergo study in Post Graduate Diploma in Education (PGDE) for effective discharge of their duties. Also, Basic science teachers with low qualification level should be encouraged to undergo higher study through part time study or study leave.

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