TEACHERS' ATTITUDES TOWARDS TEACHING OF BASIC SCIENCE AND TECHNOLOGY AND STUDENTS' ACHIEVEMENT AT JUNIOR SECONDARY SCHOOL LEVEL IN IBADAN METROPOLIS

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Abstract

It might be difficult to understand how to raise the overall quality of classroom teaching. But a good classroom strategy requires full interest and support from teachers and learners. Effective teaching and learning of basic science and technology at the junior secondary school level may depend to a large extent on the attitudes of teachers towards teaching. This is because learners at this age level tend to learn better when being taught by teachers that displayed the right attitudes among others to deal with a different type of classroom challenges. However, available evidence indicates that despite previous efforts and methods used in teaching, performance in basic science and technology is still very low. Hence, this study examined teachers' attitudes towards the teaching of basic science and technology and students' achievement in the subject at junior secondary school three in Ibadan metropolis. The study adopted a descriptive survey method. Data were collected from 40 basic science and technology teachers and 1,600 students made up of 1,060 from Ibadan city and the remaining 540 from Ibadan less city. The researcher used descriptive statistics and inferential statistics for this study. Three hypotheses were formulated and tested and two instruments were used for data collection in this study. The findings showed a positive disposition towards basic science and technology teaching and a significantly positive correlation between teachers' attitudes and students' achievement in basic science and technology. It is recommended that the government and all those concerned with education in the country should get more committed and invest more funds, time, and energy towards making teaching especially science and technology more attractive to teachers.

Keywords: Teachers' Attitudes, Students' Achievement, Basic Science and Technology

Introduction

One fact is clear beyond any doubt: governments, educators and stakeholders alike appreciate the importance of science and its product – technology, to the development of any nation. The importance of technology particularly basic technology in the technological development of a nation cannot be overemphasized. To ensure a meaningful teaching-learning process, the new Basic Education Curriculum is designed to respond to the ideals of the Millennium Development Goals (MDGs), the goals of Education for All (EFA) as well the National Economic Empowerment and Development Strategy (NEEDS). The Basic Education Curriculum lays a strong foundation for basic scientific and technological skills, among others. It can thus be seen that the teacher's attitude is very crucial in curriculum implementation.

Basic science and technology play a vital role in Nigerian Science Education Programme (Oludipe & Oludipe, 2010), because it prepares pupils at the junior secondary school level for the study of core science subjects at the senior secondary school level which in turn brings about students' interest in science-oriented courses at

the tertiary institutions. Despite the government's efforts to encourage science teaching and learning among Nigerian students right from the junior secondary school level, the enrolment of students in core science subjects and science-oriented courses at the senior secondary school level and tertiary institutions level respectively is not encouraging. This is a result of junior secondary school students' poor academic achievement in basic science and technology (Taiwo, 2015).

Research reports indicate that teacher's attitudes and the method of teaching used can greatly influence the student's attitude in a particular subject (Yara, 2009). The attitude of a teacher, consciously or unconsciously, can greatly affect students' academic performance. In the literature, there have been many research studies on the effect of different instructional strategies on student's attitudes (Papanastasiou & Zembylas, 2004; Wong & Nunan, 2011). A common hypothesis concerning teacher's attitudes and student's achievement seems to be like students taught using the right approach or attitude achieved at a higher level because their teachers have displayed the right attitude among others to deal with different types of classroom problems. After all, it has been established that teachers' attitudes highly influence students' interest in learning. A study of teachers' characteristics and students' learning (Rothman as cited in Raimi, 2012) reported that teachers' qualifications, experiences and subject knowledge were positively related to students' learning. In a study conducted by Raimi (2012), the qualification and experience of the teacher influenced the mastery of some integrated science concepts by students. A teacher's attitude is said to affect the way he presents the material to the students, which in turn affects students' achievement (Adedapo, 2013). In a study of the relationship between science teacher characteristics and students' achievement and attitude, Oyediran (2009) reported that teachers' knowledge of the processes of science and teachers' attitudes towards science teaching was positively related to students' achievement in science and students' achievements and attitudes respectively.

Moreover, the personality traits of the teachers are more powerful and influential than the course contents or instructional strategies used in the classroom (Raimi, 2012). If a teacher appears not interested or careful about a particular subject or student, he/she will be unable to foster a supportive learning environment. In addition to that, teachers with negative attitudes may not be as approachable to students as teachers who are positively motivated. So students may find it difficult to approach the teacher in their free time to clear their doubts on the grey areas of the subject he/she teaches.

Basic technology is an integral part of Basic Science and Technology subject which is one of the core subjects in the junior secondary school curriculum is facing an attitudinal challenge that has taken a toll on the teaching and learning effectiveness of the subject. As related to the tenets of this research work, it has been reported that students' academic achievement in basic technology has been lowered by the teachers' poor attitude to the teaching of the subject matter (Taiwo, 2015). One plausible reason for this may be that teachers teach science and technology in junior secondary schools in a way that merely required students to listen, read and regurgitate. This depicts a negative attitude to teaching. The challenge seems not only from the subject teachers and the students but also from the society. Now that the basic technology subject has been fused with basic science and technology subject at the junior secondary school level in line with the new Basic Education Curriculum, these

integrations as good as they are, cannot guarantee a successful or meaningful science and technology programme in our schools without a willingness or a positive disposition on the part of teachers to translate the laudable objectives of such integration into practice in the classroom.

Some inhibiting factors that affect teachers' attitudes towards science-based subject teaching and hence students' poor academic achievement have been identified to include school location and gender inequality and others (Nwogu, 2015). Schools' location means urban and rural schools. Schools in urban areas seem to have electricity, adequate teachers, conducive learning facilities and infrastructure. In a study of school location versus academic achievement in Physics, Macmillan (2012) observed that there was no significant difference in the mean achievement score of students in urban schools that were exposed to learning Physics through Computer-Assisted Instruction (CAI) and students in rural schools that were also exposed to the same treatment. A review of literature on school location influence on academic performance revealed that students that resided in urban centres especially where there are higher institutions like polytechnics or universities are likely to incline higher education than those in the rural setting. It was further asserted that students in an urban setting could have more access to libraries, laboratories, etc. than those in a rural setting. Also, the teacher's gender has been identified as one of the inhibiting factors that affect teachers' attitudes towards basic science teaching and students' performance in the subject. To proffer a solution to this problem, this study was conducted to investigate teachers' attitudes towards students' achievement in teaching basic science and technology in junior secondary schools where students are starting to consolidate their ideas of science and technology and its importance to their lives.

Statement of the Problem

There is public outcry about poor academic performance and 'swing away from science' at the secondary school level in Nigeria. Since only those students who did well in basic science and technology or those who enrolled for science, or science and mathematics can pursue further in scientific and technological education and careers. The decline in the number of science-based students as a proportion of all students eligible for higher education in the country has raised concerns about the nation's scientific and technological development. Students performance in WAEC, NECO and JAMB in the sciences have been discouraging and the trend in enrolment figures of science-based courses have been low compared to the other courses (JAMB, 2012).

Teachers of basic science and technology are instrumental in providing quality learning experiences for students to explore how both their natural and physical worlds and science itself work. Few research studies aim to understand what teachers' attitudes are towards teaching basic science and technology. Much of the studies have focused on students' attitudes towards science and technology with a mention of the teacher as a contributing factor rather than on teachers' attitudes towards teaching per se (Bull, Gilbert, Barwick, Hipkins & Baker 2010; Crooks, Smith & Flockton, 2008; Taiwo, 2015). Given that teachers' attitudes are fundamental to what goes on in the basic science and technology classroom, an investigation into teachers' attitudes at a local level is a humble beginning in this direction. There is equally the need to

examine the predictors' variables of school location and teacher's gender on the academic achievement in basic science and technology.

Objectives of the Study

The objectives of this study are to:

i. examine teachers' attitudes towards basic science and technology teaching in both rural and urban schools.
ii. examine male and female teachers' attitudes towards basic science and technology teaching.
iii. determine if attitudes of basic science and technology teachers relate to students' achievement in the subject.

Research Questions

The following null hypotheses were formulated and tested in this study:

Ho_1. There is no significant difference between the mean attitude scores of teachers in rural and those in urban schools towards basic science and technology teaching.

Ho_2. There is no significant difference between the mean attitude scores of male and female

teachers towards basic science and technology teaching.

Ho_3. There is no significant correlation between teachers' attitudes to basic technology teaching and students' achievement.

Method

The study adopted a descriptive survey design. The study's population is all the junior public secondary school students and basic technology teachers in 11 local governments of the Ibadan metropolis. Thirty junior public secondary schools were randomly selected from a pool of junior public secondary schools in the Ibadan metropolis. Forty basic science and technology teachers, made up of 24 males and 16 females were purposively selected from 30 junior public secondary schools in Ibadan Metropolis, Oyo State, Nigeria. Those selected have been teaching and participating in the marking of the subject during the Basic Education Certificate Examination for the past three years; and are equally willing to participate in the study. Twenty-five of the teachers were basic technology teachers in 20 junior public secondary schools in Ibadan City while the remaining 15 were basic technology teachers in 10 junior public secondary schools in Ibadan rural areas. All the sampled teachers were basic technology teachers of the students involved in the study, to make possible the correlation of teachers' attitude with students' achievement in basic technology. A total number of 1,600 students were purposively sampled, made up of 1,000 males

and 600 females were. Out of 1,600 students, 1,060 students were from urban areas of Ibadan and the remaining 540 students were students from rural areas in Ibadan.

Two instruments were used for data collection in this study. Each of these instruments was described as follow: Teachers' Questionnaire (TQ) and Students' Basic Science and Technology Achievement Test (SBSTAT). The questionnaire consisted of a 5-point Likert type made up of 24 statements ranging from extremely positive attitude towards Basic technology teaching to an extremely negative attitude towards Basic Science and Technology teaching. The items in the teachers' questionnaire covered (i) pedagogy (ii) job satisfaction and (iii) professional development. The Basic Science and Technology achievement test consisted of 25 basic science and technology objective tests constructed after scrutinizing the scheme of work of Oyo State junior secondary school for Class 3. The test items covered the following topics: You and technology, workshop safety rules and regulations, drawing instruments and materials, freehand sketching, energy and power and Basic electronic devices. Items in the TQ were validated by two technical education lecturers of Emmanuel Alayande College of Education, Oyo, Oyo State.

The test items were validated by five experienced and professionally qualified junior secondary school Basic Science and Technology teachers with not below ten years of teaching. The reliability of the instruments used TQ and SBSTAT were determined using the test-retest method on 10 basic science and technology teachers in Oyo township and 80 basic science and technology students of Olivet Baptist High School, Oyo. The Pearson Moment Correlation Coefficient (PPMC) of 0.90 and 0.86 were obtained for the teachers' Questionnaire and students' basic science and technology achievement test. The data collected for the study were analysed using both descriptive and inferential statistics involving t-test to test the hypotheses formulated.

Results and Discussion

Testing Hypotheses

Ho_1: There is no significant difference between the mean attitude scores of teachers in rural schools and those in urban schools towards basic science and technology teaching.

Table 1: Mean attitude scores, standard deviation and t-value of sampled teachers

Teachers	N	X	SD	Df	t-value	t-calculated	Remark
Urban Schools	25	3.377	0.663	38	0.733	0.373	NS
Rural Schools	15	2.258	0.752				

In table 1, the t-calculated (0.373) is not significant so the hypothesis was rejected. Both rural and urban school teachers showed a positive disposition towards basic science and technology teaching. Their mean attitude scores were not significantly different. The finding seems to be at variance with the finding of Faris (2008) who reported a similar study on the attitude of teachers that science teachers in rural and sub-urban areas had a significantly higher mean attitude score than teachers in urban areas. This contradiction may be because, in Nigeria, teachers do not want to work in rural areas.

Ho2: There is no significant difference between the mean attitude scores of male and female teachers towards basic science and technology teaching.

Table 2: Mean Attitude Scores, Standard Deviation and t-value of Male and Female Teachers

Teachers	N	X	SD	Df	t-value	t-calculated	Remark
Male	24	3.288	0.716	38	0.163	0.427	NS
Female	16	3.387	0.72				

In table 2, the mean scores and standard deviation of male and female basic science and technology teachers towards teaching the subject, the t-calculated value (0.427) was greater than the t-value showing that it is significant. Therefore, the null hypothesis did not hold. This conflicts with the finding of Taiwo (2015) who reported that male teachers exhibited a more favourable attitude towards science-related subjects teaching than their female counterparts. The study further revealed a statistically significant difference between the attitude score of teachers with a teaching qualification and those without a teaching qualification.

Ho3: The attitude of teachers to basic science and technology teaching is not correlated with their students' achievement in basic technology.

Table 3: Correlation of Teachers' Attitude with Students' Achievement in Basic Science and Technology

Description	X	SD	r-value	r- cal	Remarks
Teachers' Attitude	3.332	0.463	0.300	0.338*	S*
Students' Achievement	16.735	2.702			

The 'r' obtained was positive and significant, thus the hypothesis of no correlation was rejected. This study revealed a significantly positive correlation between teachers' attitudes and their students' achievement in basic science and technology. Superior attitude of the teachers correlated positively with superior students' achievement. On the other hand, students of teachers who exhibited a negative attitude performed weakly in the basic science and technology achievement test. One plausible reason for this outcome of students of teachers who exhibited a negative attitude could be due to non-prompt payment of salaries and delay in promotions which usually lead to incessant strike action. All this could have affected basic technology teachers' attitudes. This finding is in agreement with the findings of Oyediran (2009) and Raimi (2012). Teachers' attitudes to science have been found to influence other science-related subjects in schools. Onocha and Okpala (as cited in Ogunwuyi, 2002); Ualesi (2018) found that teachers' attitude directly predicts students' achievement in science.

Conclusion and Recommendations

Since teachers' attitudes towards the teaching of basic science and technology are rated to students' achievement, there is the need for the teachers to know their role is to develop the student to become a productive worker and an effective citizen. This revelation is very crucial and underlines the need to mould teachers' attitudes positively towards teaching. Basic science and technology is a practical subject and must be taught practically so that students can acquire the necessary knowledge, skills and attitudes that can make them employable and prepare them for further studies. To accomplish this goal, teachers should be encouraged to develop a more positive attitude toward the subject using positive reinforcement and appropriate pedagogical methods.

Given the above, the government and all those concerned with education in the country should get more committed and invest more funds, time and energy towards making teaching especially science and technology more attractive to teachers.

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