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Teachers' pedagogical competence as determinants of students' attitude towards basic science in South West Nigeria

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This study investigated teachers' pedagogical competence as determinant of students' attitude towards Basic Science in South-West Nigeria. The study was a descriptive survey type study. Participants were 2160 students randomly selected from 108 secondary schools across four States in South- west Nigeria together. 324 teachers teaching Basic Science in Junior Secondary Schools were purposively selected for the study. Two instruments were used for data collection. The first was a 25 item questionnaire titled "Basic Science Teachers pedagogical Competence Questionnaire (BSPCQ) and the second instrument was also a questionnaire with 25 structured item questions titled "Students' Attitudinal Questionnaire" (SAQ). The reliability of the instruments was determined through test and re-test method which yielded a correlation co-efficient of 0.87 and 0.89 for BSPCQ and SAQ, respectively at 0.05 level of significance. Mean and Ranking Order and Multiple Regression analysis were used to analyze the data. Findings revealed that, teachers' pedagogical competence can significantly influence students' attitude towards Basic Science. It was recommended that, emphasis should be laid on teachers' qualifications while employing Basic Science teachers. Teachers should also intensify efforts in using various teaching styles which could influence students' attitude. It was also recommended that adequate measures should be taken by the teachers to ensure that students benefit from their teaching. In addition, the government and other educational stakeholders should arrange for seminars and workshops for their teachers to boost their levels of competence in the classroom. Teachers should also exhibit positive attitude that can influence students' attitude towards Basic Science.

Key words: Teachers' pedagogical competence, students' attitude, teacher's attitude, basic science.

INTRODUCTION

Education is the bed rock through which any nation can build its citizens. It helps to offer adequate knowledge to life in order to eliminate ignorance and inequality in the society. Specifically, Fadare (2001) noted that this was why late Chief Obafemi Awolowo advocated for free primary education policy in the Western state, Nigeria in

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1955. This policy entitled citizens to equal opportunity for education. In view of this, Kosgei et al. (2013) referred to education as a basic human right, which provides a key to enlightenment, wealth and power. Noting that for every individual to achieve this, the role of teachers towards it can not to be jettisoned. Teachers as role models are expected to impart knowledge to students in order to acquire the necessary information needed to function well in the society. Teachers' pedagogical competence influences what they do and this in turn influence the attitude developed by students.

Teachers occupy an important position in the teaching and learning of any academic discipline. Consequently, Orji (2015) emphasized that teachers' management roles are important for a suitable learning climate which could help them to harness all resources for the fulfillment of educational goals and objectives. The author further noted that the effective management of lessons in the classroom can help students develop positive attitude towards learning.

The appropriate use of teaching methods as opined by Etuk et al. (2013) is to incorporate an ordered way of performing a task. However, professional teaching competency requires the full knowledge of utilizing the right method to adopt by the teacher in order to create professional learning opportunities for students especially in the Basic Science. Another important factor in effectiveness of a teacher is the ability to recognize the variance in the learning situation of students and to choose the best method possible for each student (Liakopoulou, 2011). Teachers teaching style such as teachers' explanation respect to students, aggressive behaviour, and pace of teaching among others could either motivate or not motivate students to learn in the classroom (Sakai and Kikuchi, 2009).

Undoubtedly, that the effectiveness of teaching method makes for retention and high performance of students in any subject. The extent to which a method is effective largely depends on the usage by the teacher. Effective methods of teaching are usually evident in the students' attitude. Competence as described by Popoola (2013) is the underlined characteristics of a person relating to the effectiveness of individual performance on any job. Understanding comprises the skills for planning lessons, making decisions on how learning would be systematic, explaining materials clearly, responding to individual differences and guide students how to learn. Knowledge of subject matter deals with specific information teachers need to present content.

Teachers' pedagogical competence seems to significantly relate to students' attitude towards learning in the school. Gbore (2013) remarked that the ineffective teaching of science in secondary school arises from the quality of teachers recruited to teach science. He reiterated that, the teaching of science subjects by people who are neither interested nor qualified may have led many students in science class, either to end up as drop outs or withdrew them to other discipline. It is obvious that, Basic science teachers need to be professionally competent in order to carry their classroom assignments out effectively. Amoo and Rahman (2004) claimed that the relationship between teachers and students attitudes towards learning is the consequence of a reciprocal influence of student's attitude. Also, Okebukola (2006) argued that the quality of science teachers is a key factor ascribed to the basis of student's constant negative attitude developed towards the subject.

While Huckstep et al. (2003) in their finding affirmed that effective teaching can provide a positive attitude depending on teachers' confidence and in-depth knowledge of the subject matter. The kind of attitude developed by the learner occurs as a result of the observation made by him or her during learning process. Some teachers' teaching styles identified in the classroom (such as lateness, absenteeism, enthusiasm and other positive manners such as mutual respect, rapport among others) can determine the kind of attitude developed by student towards a subject.

Basic Science teachers are supposed to establish a conducive environment for learning to take place but the reverse is the case, as some of Basic Science teachers developed nonchalant attitude towards teaching this subject which has made many students to develop negative attitude towards the subject. Some absent themselves from the class lesson. Students with this experience develop negative attitude towards lesson out of frustration. Wirth and Perkins (2013) noted that teachers' effectiveness contributed significantly to students' attention in the classroom. Students tend to show more interest towards what the teachers teach if they are regular and punctual to their lesson.

A teacher's competence is usually expressed in the classroom in such a way that students take decision in a positive way. Basow (2000) in his own submission concluded that teachers' way of teaching such as warmth, enthusiasm and extroversion apparently separate effective teachers from ineffective teachers. Teachers' commitment to their work plays a significant role in shaping their students' attitude positively towards learning (Wigfield and Eccles, 2000). This is also in line with the findings of Alafiatayo et al. (2016) which revealed that there exists a positive significant relationship among the teachers' abilities on students' attitude towards science subject. Therefore, one could infer that a student's interest may be reliant upon the competence displayed by the teachers' ways of teaching in the classroom.

In line with this, Etuk et al. (2013) affirmed that students' participation in the classroom learning depends on the instructional process and their perception which can presents methodological challenges. Instructional materials used by the teacher play a significant role in

developing positive attitude in the minds of students. The way students interact, think and perceive things determine their interest in the subject.

However, trends in teaching supposed to reflect the professional teaching strategies in the classroom. Teachers supposed to adjust their teaching strategies to enhance students' understanding. With teachers pedagogical competence students tends to achieve adequate knowledge if only they can develop positive attitude towards learning. To claim that teachers are experts in their field of learning, is to judge how good they are at making the instructional system effective. Popoola (2013) described a teacher as someone who supposed to have the competence to teach a particular subject. To her, teacher's efficiency in putting the instructional systems to use, matters a lot in the course of teaching and learning. The researcher went further to describe pedagogical competence as a concept that talks about one's competence in the learning management. Generally speaking, pedagogical competence is the composition of potential behaviours which allows for efficient manifestation of various activities in the classroom. It is a minimum standard which professionals should attain to be effective in his teaching.

Moreover, researches have shown that teachers' pedagogical competences 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 snd Bakar, 2013). Today, some Basic Science teachers are unable to discover that whatever step taken by them exerts impact on students' attitude. Oser and Oelkers (2001) stressed that a good knowledge of pedagogical competence will contribute to student's technical and principle of development which will lead to a future successful application in any field. They added that, students will also develop their ways of thinking and creativity that could help their managerial qualities in any field. This implies that teacher must possess good managerial policy which can highly influence the attitude of students towards learning positively.

To ensure and promote pedagogical competence of teachers, Latchem et al. (2006), in an international overview of professional development of teachers, submitted that there is a need for teachers to embrace and master the latest tools and methodologies of passing information to students. Teachers are faced with a big responsibility in the classroom and whatever they do would affect the students either positively or negatively. Therefore, teachers must comprehend both learning and instructional principles. Teachers who have the understandings of the subject content very well would be thorough and express themselves clearly unlike those teachers with weaker background of subject matter (Abrantes et al., 2006). In line with this, Snezana et al. (2006) believed that competent teachers harmonize the goals of teaching with cognitive abilities of students and try to improve students' learning attitudes.

It appears that numerous factors are in support of negative attitude developed by students in Basic Science. Attitude of students toward learning play a major role in the classroom. The negative attitude often reflected by an individual student usually results to lack of interest (Amoo, 2002). He stressed further that this makes students unable to participate well in any activity related to the subject taught by the teacher. No matter the competence of a teacher teaching a subject, if students' interest towards learning is negative student's academic performance would be impeded.

It is generally believed that the attitude of a person towards a thing has a direct bearing on what he or she is able to do or achieve (Okoro and Uwah, 2013). From this, one would infer that student's positive attitude towards learning is very essential for positive result. Apelgren and Giertz (2010) asserted that having attitude that best promotes students' learning also implies the need for the teacher to ensure good contact with all students. Teachers are thus expected to create good teaching climate by applying skills which could help students develop good study habits, and stimulate them to be active and listening learners.

Purpose of the study

The purpose of this study was 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' attitude towards Basic Science. The study also examined the interaction of each variable of teachers' pedagogical competence on students' attitude towards Basic Science.

Research questions

The following questions were raised for the study.

1. What pedagogical competence influence students' attitude?
2. What is the contribution of each teacher's pedagogical competence in influencing students' attitude?

Research hypotheses

The following research hypotheses were tested at 0.05 level of significance.

1. Will components of teachers' pedagogical competence significantly determine students' attitudes towards Basic

Table 1. Mean and Ranking order of teachers' pedagogical competence influence on students' attitude towards Basic Science.

S/N	Teachers' pedagogical competence	F	Mean	Ranking
1	Use of instructional materials	2089	3.34	1ST
2	Knowledge of subject matter	2089	2.10	4TH
3	Teachers' motivation	2089	2.34	2ND
4	Teachers' communication skill	2089	2.06	5TH
5	Teachers' teaching style	2089	2.26	3RD

Science?

2. Will teachers' pedagogical competence significantly influence students' attitudes towards Basic Science?

METHODOLOGY

Research design

This study employed descriptive research design of the survey type to examine the influence of teachers' characteristics (teachers' experience, qualification, teachers' attitude and gender) and pedagogical competence of teachers (knowledge of the subject matter, motivation, level of communication, teachers' teaching style and instructional materials) as determinants of secondary school students' attitude towards 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

Nigeria has six geo-political zones namely South West, South South, South East, North East, North Central and North West. For the purpose of the study, the researcher focused on South West which is believed to be the hub of education, considering the number of schools and literates in the area as compared to other geo-political zones. The South West comprises of six states, namely Ekiti, Osun, Lagos, Ogun, Oyo and Ondo. The sample of the study comprised of 2,160 Junior Secondary School students and 324 Basic Science that were selected using multistage and purposive sampling procedures. The first stage was the selection of three States (Ekiti, Lagos and Oyo) out of six States in South West of Nigeria using simple random sampling technique. The second stage involved the random selection of three Local Government Areas from each of the Senatorial Districts of each state selected making a total of 27 Local Government Areas. The third stage involved the use of simple random sampling technique to select four public secondary schools from each of the selected Local Government Areas making a total number of 108 public secondary schools. Stage five involved the selection of at most 20 students from each of the selected schools (making a total of 2160 students) using simple random sampling technique. The sixth 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 334 teachers).

Research instruments

Three sets of instruments such as Basic Science Teacher's Characteristics and Pedagogical Competence Questionnaire (BSTCPCQ), Students' Attitudinal Questionnaire (SAQ), and Basic Science Students' Performance Test (BSPT) were used to collect data for the study.

Validity and reliability of the instruments

The questionnaires 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. The reliability of the instruments was ascertained by using test – retest method. Pearson's Product Moment correlation was used to determine the reliability of the instrument. The reliability coefficients were found to be 0.87, 0.89 respectively.

Data collection and analysis

The data collected were analyzed using mean, ranking order and multiple regressions.

Result: Question 1. What teachers' pedagogical Competence influence students' attitude towards Basic Science?

Table 1 showed the mean analysis of different variables of teachers' pedagogical competence which can significantly influence students' attitude towards Basic Science. It can be observed from the table that five variables were identified including use of instructional materials, knowledge of subject matter, teachers' motivation, teachers' communication skill and teachers' teaching style. These are important pedagogical skills that would invariably influence students' attitude towards Basic Science. The mean and the ranking order analysis of these variables revealed that teachers' use of instructional material has the highest mean of 3.34; teachers' motivation has a mean of 2.34; teachers' teaching style has a mean of 2.26; knowledge of subject matter has a mean of 2.10, while teachers' communication style has a mean of 2.06. It can therefore be deduced from the table that all the variables especially the teacher use of instructional materials can influence students' attitudes toward Basic Science. It most importantly influences either positive or negative attitude of students towards the subject. When appropriate and simple instructional materials are used, students tend to create a positive attitude towards the subject. Taking the second position is the teachers' motivation. It was discovered that when teachers are appropriately motivated via incentives and other motivation strategies, they create positive attitude towards teaching, which also influences the students positively towards learning. A well-motivated teacher is a creative teacher. In the third position is the teaching style. A competent teacher should have studied his/her students to determine the teaching style that would be most suitable for them, taking into consideration their ages and background among other variables. A teacher's teaching style

Table 2. Multiple regression analysis of teachers' pedagogical competence and students' attitude towards Basic Science.

Model	Unstandardized coefficients		Standardized coefficients	T	Sig
	B	Std error	Beta		
(constant)	81.581	1.69		48.28	0
Use of instructional materials					
Knowledge of subject matter	0.095	0.072	0.034	1.321	0.186
Teachers' motivation					
Communication style	-0.02	0.049	-0.01	-0.397	0.691
Teaching style	-0.092	0.06	-0.034	-1.544	0.123
	-0.011	0.055	-0.006	-0.202	0.84
	-0.061	0.069	-0.026	-0.879	0.38

P> 0.05 Dependent variable: students' attitude towards Basic Science. Multiple R= 0.051; R^2= 0.003; Adjusted R^2 = 0.000 F ratio = 1.099; P= 0.359.

would make the students to create either positive or negative attitude towards a particular subject. Teacher's knowledge of subject matter and effective communication skill taking the fourth and the fifth positions respectively are also important in influencing students' attitude towards a subject. Brilliant students can easily detect when a teacher is deficient in the knowledge of subject matter, hence a negative attitude can be created towards such subject. Also, when a teacher cannot effectively impart knowledge due to poor communication skills, learners can be discouraged.

Hypothesis 1: Will components of teachers' pedagogical competence significantly influence students' attitude towards Basic Science?

Table 2 revealed that not all the components of teachers' pedagogical competence can significantly determine students' attitudes towards Basic science (R=0.051). This implies that the use of instructional materials is the only predictor variable which can significantly influence student's attitudes towards Basic Science. The value of the coefficient of determinant (R^2=0.000) indicate that all the independent variables jointly accounted for 0% of the total variance in students' attitude towards Basic Science. The F ratio (1.009) is not significant at 0.05 level of significance. This implies that the pedagogical competence variables will not jointly provide a significant explanation for the variation in students' attitudes towards Basic Science. Thus, the hypothesis is accepted. This implies that the components of teachers' pedagogical competence will not jointly significantly influence students' attitudes towards Basic Science.

RESULTS AND DISCUSSION

Table 1 showed that the use of instructional materials was rated the highest among the variables that can influence students' attitude towards Basic Science. This finding is in line with Omebe and Akani (2001)'s assertion that the mastery of Science concepts will not be fully achieved without the use of instructional materials. Onasanya and Omosewo (2011) also added that no matter how well a professionally qualified science teacher may be, if the school lacks instructional materials, he/she would not be able to put his idea into practice and also translate his competence into reality. Also, the findings of Esu et al. (2004) supported that instructional materials facilitate learning. This study therefore further extends the literature on the importance of the use of instructional materials for effective teaching and learning.

Table 2 revealed that the components of teachers' pedagogical competence cannot significantly influence students' attitude at the same way. The table showed that teacher's use of instructional materials in the teaching of the subject will significantly influence students' attitude, which further corroborates the findings in Table 1. The finding also revealed that there is no correlation between some of the teachers' pedagogical competence factors that can determine students' attitude towards Basic Science. This might be due to other variables which are also responsible for influencing students' attitude towards the subject but are not included in this study.

Conclusion

It can be concluded from the findings of this study that of all the teachers' pedagogical competence variables teachers' use of instructional materials has the highest influence on students' attitude towards the Basic Science. The finding also revealed that the components of teachers' pedagogical competence cannot determine students' attitudes towards Basic Science.

Recommendations

The following recommendations were made based on the findings:

(i) Teachers should use relevant instructional materials which can influence students' attitudes towards learning.

(ii) They should intensify efforts in developing their knowledge of subject matter through the attendance of seminars, workshops and in-service training.
(iii) Teachers should develop their communication skills to help students develop positive attitude towards learning of Basic Science.
(iv) Teachers should use various strategies to motivate students towards learning of Basic Science.
(v) They should adopt the best teaching style which can influence student's positive attitude towards learning of Basic Science.
(vi) They should show their levels of competence while teaching in the classroom.
(vii) Teachers' motivational skills should encourage student's positive attitude towards learning of Basic Science.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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