Original Research Article

Teachers' Content Knowledge and Skills as Correlates of Students' Attitude to Biology in Akwa Ibom State

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Abstract: The survey examined the correlation of Teachers' content knowledge and skills on students' attitude in biology in Akwa Ibom State. The teachers were given questionnaires on content knowledge and skills while the students were also given a questionnaire on students' attitude to biology. One research question was formulated to guide this study. Three instruments were used to collect data. These include Teachers' Content Knowledge of Biology Test (TCKBT), Teachers' Skills in Biology Test (TSBT) and Students' Attitude to Biology Questionnaire (SABQ). Six hundred students and fifteen teachers were used for the study. Data collected were analysed using Pearson Product Moment Correlation (PPMC) to determine the relationship among the variables. Results showed that there is a negative, moderate significant relationship between teacher's skills (r = 0.-0.552; p<0.05) and students' attitude to Biology. There is therefore a correlation between teachers' skills and students' attitudes in biology. However, it was recommended that teachers' pay attention to the content knowledge and skills, which affect the skills of students in biology.
Keywords: Knowledge Skills Correlates of Students.

INTRODUCTION

Student's attitudes are predispositions toward certain groups of things or occurrences and their ability to react to them with some degree of assessing consistency. While attitudes are conceptually hypothetical creations, they present themselves in conscious experience, verbal reporting, physical conduct, and psychological system (Yulinda, and Ilma, 2018). According to Gheith and Aljaberi (2015) attitude consist of four components namely, cognition, affective, behavioural and evaluation. Students' attitudes as discussed by Gheith and Aljaberi (2015) have identified many features that influence attitude: gender, structural variables, classroom/teacher, and curriculum. Result also showed that school variables (particularly classroom variables) such as how well students like their teachers, the science curriculum being used, or the science classroom climate are key on attitude toward science with their science teacher (Jakel, 2014). There is a relationship between attitude and other constructs in teaching and learning science, Jolaoso (2012) reviewed other studies and found that attitude affects students' persistence and performance; there are modest positive correlations between students' attitudes to science and their achievement. In addition, activity-based and issue-oriented science instruction

enhance students a positive attitude towards science. Therefore, the quality of school science instruction is a significant determinant of attitude. The word attitude (from Latin word) is defined within the framework of social psychology as a subjective or mental preparation for action. It defines outward and visible postures and human beliefs. Attitudes determine what each individual will see, hear, think and do. They are rooted in experience and do not become automatic routine conduct. Attitude is viewed as the evaluative dimension of concept. Attitude can also be described as a state of readiness, a tendency on the part of the individual to act in a certain way (Awoden, Adekunle and Femi-Adeoye, 2016). Attitudes are acquired through learning and can be changed through persuasion using a variety of techniques. Attitudes, once established, help to shape the experiences the individual has with an object, subject or person. Although attitude changes gradually, people constantly form new experiences Gheith and Aljaberi (2015). Attitude means the individual's prevailing tendency to respond favourably or unfavourably to an object (person or group of people, institutions or events). Attitudes can be positive (values) or negative (prejudice). Social psychologists distinguish and study three components of the responses: Cognitive component, which is the knowledge about an attitude object, whether accurate or not; Affective component:

feelings towards the object and Conative or behavioural component, which is the action taken towards the object.

Teachers' Content knowledge is defined as the concepts, principles, relationships, processes, and applications a teacher should know within a given academic subject, appropriate for him/her and organization of the knowledge (Ozden, 2008). Content knowledge (CK) is knowledge about the actual subject matter that is to be learned or taught. The content to be covered in social studies or algebra is very different from the content to be covered in computer science or art and history. Teachers must know and understand the subjects that they teach, including knowledge of central facts, concepts, theories, and procedures within a given field; knowledge of explanatory frameworks that organize and connect ideas; and knowledge of the rules of evidence and proof (Mishra and Koehler, 2006). To them teachers must also understand the nature of knowledge and inquiry in different fields. For example, how is a proof in mathematics different from an historical explanation or a literary interpretation? Teachers who do not have these understandings can misrepresent those subjects to their students.

Pedagogical knowledge (PK) is deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values, and aims (Mishra and Koehler, 2006). The generic form of knowledge that is involved in all issues of student learning, classroom management, and lesson plan development and implementation and student evaluation, includes knowledge about techniques or methods to be used in the classroom; the nature of the target audience; and strategies for evaluating students' understanding. A teacher with deep pedagogical knowledge understands how students construct knowledge, acquire skills, and develop habits of mind and positive dispositions toward learning. As such, pedagogical knowledge requires an understanding of cognitive, social, and developmental theories of learning and how they apply to students in their classroom. Invariably, the best curriculum and the best instructional method can fail in the hand of an ill-prepared teacher.

A well-groomed teacher is sure to find his bearing even when the other conditions are not as good as they should be. Knowledge bases of teacher education have focused on the content knowledge of the teacher (Mishra and Koehler, 2006). Parker and Heywood (2000) stated that studies have consistently revealed no relationship between subject matter knowledge and pedagogic content knowledge. This therefore, implies that irrespective of a secondary school biology teachers' subject content knowledge, he still needs to develop his pedagogic content knowledge in order to function effectively. The teacher is to impart knowledge to his students', this is important because the teachers' content knowledge is very crucial in impacting the needed knowledge to the students. The teacher has to have the necessary content knowledge to impart successfully to the students' the necessary knowledge in biology. Teachers' access to textbooks, journals, conference proceedings; online materials and eBook will go a long way to improve the content knowledge of the teachers'. Invariably educational discussions also go a long way to improve the content knowledge of the teachers because everything cannot be found in books alone as workshops, seminars, conferences, and lectures go a long way to sharpen the teachers' content knowledge in biology. What the child knows shows the time and energy the teacher had put in the teaching and learning. Finally,

Aina and Olaonipekun (2015) research showed that a teachers' subject content cannot contribute to the professional development of that teacher but a teacher that is very sound in content Knowledge (CK) and can impart well to the students' will teach any concept in the curriculum and bring about the needed achievement in students.

Teachers' skills are done systematically by professionals who have acquired some skills and knowledge either by training or experience or both. To make desirable impact, teaching must aim at total development of the individual, that is, to enhance intellectual capabilities, developmental and cognitive intellectuality, foster psycho-social skills, and draw out neuro-physical aptitude of the learners (Akinmusire, 2012). According to Akanji (2015), the biology curriculum which is in use in Nigeria for teaching and learning in senior secondary school had built in strategy where learners are required to be involved in inquiry and related activities that can develop critical thinking skills. Teachers are charged with the responsibility with respect to improvisation of educational resources and effective use of these resources. If this task would be realized, then, science teachers in schools are faced with the challenge of possessing appropriate skills for the improvisation. For effective improvisation of instructional resources, there are two major types of skills teacher should possess, basically the creative and practical technical skills. Olagunju and Babayemi (2015) defined creative skills to refer to the behaviour such as imaginativeness, originality, flexibility, dynamism, persistence, independence and observance while practical technical skills are developed through the use of some basic tools. Creative skills are the ability of an individual to bring into a purposeful form something which is partly in existence or has never been in existence. For effective instructional performance, science teachers must be creative and resourceful. To be creative is to bring into being something which is never in existence or has gone into extinction. Basic practical skills include graphical, metal-work, wood-work and ceramic skills. Science

teachers are expected to think outside the box so as to be able to perform its duty effectively and teach the students so as not to teach them science as an abstract subject. They have to be creative in bringing these items to showcase to their students so as to improve their knowledge and invariably drive home the needed information to the students. The practical technical skills are developed when both the teacher and students make use of basic tools and will improve the learning abilities of the students.

Practical activities to Usman, Ali, Abdullahi, Linda, Daniel and Ummi (2017) are the method of teaching and learning process in the outdoors for exploration and discovery about the environment using first-hand experience involving all courses of study. Therefore, one can say that outdoor education is that instruction either formal or informal that takes place outside the school class room or laboratory with natural or built materials or places to attain the objective of teaching and learning through direct experiences. Therefore, to summarize, outdoors activities are practical activities or activity-oriented teaching strategy that complements the traditional teaching. It is a lesson on itself that is based in the role of nature and environment. Therefore, Usman *et al.* (2017) noted that when teachers and educators teach science concepts indoors (that are best taught outdoors), the concept is isolated from its natural context, thereby limiting the full use and potential of a child's brain. This may lead to de-contextualization of the concepts. The new curriculum calls for acquisition of basic knowledge and skills in science which can only be achieved by exposing students to more of practical activities when teaching all science concepts. This in turn will equip the learners to apply what they learnt to meet societal need and prepare for further studies. For science to be meaningful and relevant, it must reflect the nature of science. This clearly shows that reflecting nature of science means using activities to explore the processes and products of science. According to Awolere (2015), review of the WAEC Chief Examiners report showed that students' have problems with skills. The Chief Examiner therefore suggested that because of the poor skills demonstrated by the students, there is a need for Biology teachers to help students develop these skills by teaching them better.

Statement of the problem
Students' learning styles varies, as do the methods used to accommodate them. The selection of subject knowledge and the method in which the material is provided are critical to the effectiveness of a lesson since the knowledge that the instructors possess determines the skills that are transferred to the pupils. Having the abilities to convey material is critical to the success of a class since the essential skills displayed by

the instructor demonstrate the teacher's commitment and experience in terms of topic knowledge and skills. Students have been performing below average in biology over the previous 10 years, according to research. Do instructors in diverse schools around the country demonstrate this due to the topic knowledge and abilities? This study therefore sought to examine the correlation between teachers' content knowledge and skills, and students' attitude to biology in Akwa Ibom State.

Research Question
1. What relationship exists between the independent variables (teachers' content knowledge and skills) and students' attitude to biology?

METHODOLOGY
This study adopted a descriptive survey study design to assess the teachers' content knowledge and skills as correlates of students' attitude to biology.

Population and Sample Selection
The population of the study consists of all the senior secondary Biology teachers' and students in Senior Secondary School Two (SS2) in Akwa Ibom State.

There are 31 Local Government areas in Akwa Ibom State. This study covered five (5) local government areas randomly selected from all the Local Government Areas of Akwa Ibom State. A simple random sampling procedure was used to select three secondary schools from each local government area to make a total of fifteen secondary schools in all. A total sample of 600 students and 15 teachers were randomly selected from the 15 schools used for the study. Forty (40) students were randomly selected from each of the 15 schools. Instruments used for the study include Teachers Knowledge of Biology Test (TCKBT) (r=0.75), Teachers' Skills in Biology Test (TSBT) (r=0.77) and Students Attitude to Biology Questionnaire (SABQ) (r=0.72). Experts in science education validated all the instruments. Collection of data lasted for about 4 weeks.

METHOD OF DATA ANALYSIS
Data collected were analysed using Pearson Product Moment Correlation (PPMC) to determine the relationship among the variables.

RESULTS
Research Question: What relationship exists between the independent variables (Teachers Content knowledge and skills) and students' attitude to biology?

Table-1: Correlation Matrix Showing the Relationship between Independent Variables Teachers' Content knowledge and Skills) and Students' Attitude to Biology

Variables	Students' Attitude	Teacher's content knowledge	Teacher's skills
Students' Attitude	1		
Teacher's content knowledge	-0.321 0.243	1	
Teacher's skills	-0.552* 0.033	0.655* 0.008	1
Mean	67.39	67.73	63.20
STD.D	1.670	4.818	3.234

* denotes significant at p<0.05

Table 1 showed that there is a negative, moderate significant relationship between teachers' skills (r = 0.-0.552; p<0.05) and students' attitude to Biology. This implies that teacher's skill is negatively related to students' attitude to Biology. There were negative, non-significant relationship between teacher's content knowledge (r = -0.321; p>0.05 and students' attitude to Biology. This means that teacher's content knowledge is not related to students' attitude to Biology. That is students' attitude to Biology is not influenced by teacher's content knowledge.

DISCUSSION OF FINDINGS

There is a negative, moderate significant relationship between teacher's skills and students' attitude to Biology. The Functional theory by Kartz shows that attitudes and efforts are related to the motivational structure of the individual. This theory focuses on two things, these include: the meaning of the influence situation in terms of both the kinds of motives that it arouses and the individual's method of coping and achieving his goals. Teachers' skill is important as it affects the students' attitude to biology. Therefore, this shows that teachers' skill is related to the students' attitude to biology in senior secondary schools. This means that when teachers have this skill it affects students' attitude to biology in senior secondary schools. When the teachers have the necessary practical skills in biology, it will improve the attitude the students have to biology. This is in line with Awolere (2015) who asserted that practical activities are needed to make the task of a teacher (which is teaching) more real to the students as opposed to abstract or theoretical presentation of facts, principles, and concepts of subject matters. The development of these skills is basic to scientific inquiry and the development of intellectual skills needed to learn concepts and in turn affects their attitude to science. Therefore, skills the teachers' use not only refocuses the minds of the students' to what is being taught but also strengthen the attitude the students' have to the subject. The ways the concepts are expressed to the students are very important as it will give them the right attitude to the subject. When the skill exhibited by the teacher is poor, it will affect their attitude to biology.

In another research carried out by Olagungu and Ogundiwin (2008) on the impact of three modes of instruction and cognitive style on students' environmental attitude towards pollution in biology, they used a pre-test, post-test control group quasi-experimental design. Their result revealed significant main effect of teaching strategies and main effect of cognitive style on environmental attitude towards pollution in biology. The researchers stressed that analogy, field trip and group project strategies be adopted in Nigerian secondary schools in teaching pollution. This means that the teaching strategy incorporated into the teaching of biology is important as it could bring the right attitude to biology. The strategy used improved the attitude the students' had towards pollution as a concept in biology. Therefore, to see the needed positive attitude in students' then the teacher should possess the needed skills that will improve the students' attitude to biology.

In Folaranmi and Laniran (2014)'s survey of secondary students' attitude towards agricultural science, an Interview schedule and structured questionnaire were used in data collection. The findings revealed that male students had favourable attitude towards agriculture as a career than their female counterparts. Their parents on career decision influenced about 57.5%. The result also showed that male students' had favourable attitude towards agriculture as a career (85%) than their female students' counterparts. In addition, there is a positive significant relationship between the parents' socio-economic background and the students' attitude towards agriculture in schools. They recommended that the government should put in place appropriate machineries so that students' would have favourable attitudes towards agriculture thereby increasing the likelihood of students making career in agricultural science. For students to acquire the needed attitude the needed apparatus must be in place to enable the students to utilize thereby increasing the likelihood of having a positive attitude to biology. This is in line with the result gotten that when teachers' possess the adequate skills, that there is a significant relationship between teachers' skills and students' skills in biology.

CONCLUSION

Conclusions drawn from the study include that considering the difficulty in conducting empirical research in this area, are that the content knowledge of teachers should be one of the criteria in the effective teaching and learning of biology in senior secondary schools. Planning lessons, the teacher should have the required content knowledge and the right attitude to biology so that the students will love biology as a subject, which will bring about the right attitude.

RECOMMENDATION

1. Teacher training institutions should emphasise on the acquisition of good content knowledge, good emotional attribute (attitude), good classroom practice, appropriate practical skills in biology and transformation of academic knowledge to school science knowledge of teachers; all these would transform the teacher to be poised to improve the attitude of students' to biology.
2. Biology should not be taught as an abstract subject as the tools to teach effectively is found in our environment. Therefore, the teachers' should utilise the environment in their favour in teaching and learning of biology.

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