

**CLASSROOM INTERACTION LEVELS AND STUDENTS ATTITUDE
TOWARDS BASIC SCIENCE IN JUNIOR SECONDARY SCHOOLS IN ONDO STATE
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Abstract

The study investigated classroom interaction levels and students attitude towards Basic Science in junior secondary school in Ondo State. The study adopted the descriptive survey research design. The population for the study comprised all junior secondary schools students in Ondo State. The sample size consisted of 18 teachers and 361 junior secondary school two (JSII) students in their intact classes who were selected using multistage sampling procedure. Two instruments titled "Basic Science Classroom Interaction Rating Scale" (BSCIRS) and "Students Attitude in Basic Science Questionnaire" (SABSQ) were used for the study. The results showed that 38.89% of the schools in the area had low classroom interaction; 55.5% of the schools had moderate classroom interaction and 5.56% of the schools had high classroom interaction. The result also showed that there was influence of classroom interaction on students' attitude towards Basic Science ($r=0.152$; $n=361$; $p<0.05$). The study concluded that classroom interaction level in Basic Science classrooms in junior secondary schools in Ondo State was average and that there was influence of classroom interaction on students' attitude towards Basic Science in Ondo State.

Key Words: Classroom interaction, Attitude, Basic Science

Introduction

The word science is the systematic study of the nature and behaviour of the material and physical universe, based on observation, experiment, measurement, and the formulation of laws to describe these facts in general terms. Science can be seen as a means for constructing and improving representations of the world, even though increased knowledge of the world is not always immediately usable. It is noted that new scientific insights have the potential to improve our existence (Bello, 2012). Ogunleye (2002) defined science as a dynamic human activity concerned with understanding the working of our world today. Countries all over the world are striving to improve their technological know-how and this can only be achieved through a solid foundation in science and technology studies. There is therefore needs for qualitative and quantitative science education in our schools most especially at the junior secondary schools for Nigeria to realize is accelerated development in this 21st century. Over the last two decades, there have been repeated calls for reforms and innovations aimed at improving science education in Nigeria. Agboola and Olajide (2015) suggested that there are issues in science education in Nigeria and that there is needs to improve science teaching. Among the issues pointed out are the poor academic performance and students' attitude in science subjects coupled with the low educational standard in the country

which are parts of the major reasons why most students shy away from studying science. This negative attitude has encouraged poor performance and low participation of students in science subjects like Physics, Chemistry and Biology at higher level of education (Animola & Bello, 2019).

Basic science is a basic subject that lays the foundation for further study of sciences in the senior secondary school level. Basic science as defined by UNESCO in Igwe (2003) as an approach to science in which concepts and principles are presented so as to express the fundamental unity of scientific thought and avoid premature and/or undue stress on the distinctions between the various scientific fields. It appeared that Basic Science is the major determinant of performance of students and practice of science but regrettably, the teaching of Basic Science in Nigerian schools cannot be said to be effective because of the poor learning outcomes of the students resulting from various problems associated with the teaching of the subject. Many factors have been identified to be responsible for the consistent poor learning outcomes in Basic Science in Nigerian junior secondary schools. They are categorized as teacher-related, student-related, curriculum-related, and material-related factors (Afuwape & Olatoye, 2004). Student-related factors have to do with peer influence, poor background in Basic Science in lower classes, students' level of participation in Basic science lessons and students' attitude towards learning Basic science (Animola & Bello, 2019). Among the student-related factors, students' level of interaction with teacher, fellow students and content is very important since teaching and learning processes are all about interaction.

Thus, sufficient interaction may bring about adequate learning of Basic Science and consequently good performance in the subject. Teacher-related factors include lack of adequate qualified teachers, adherent to old teaching method of teaching, poor remuneration and incentives to motivate Basic Science teachers, among others. Akinwumi and Bello, (2015) opined that attitudes associated with science appear to affect students' participation in science as a subject and impact performance in science. It

is generally believed that students' attitude towards a subject determines their success in that subject. Hence, attitude towards science denote interest or feeling towards studying science. It is the students' tendency to perceived or behave positively or negatively towards items in their environment by solving problems, assessing ideas and making decisions (Adesoji & Idika, 2015). It was further asserted that attitude toward science is known to decrease as students' progress through their school years. He further submitted that attributes such as enthusiasm, respect for students and personality traits have been shown to influence students' attitude toward science as well as in other subjects. From the foregoing, it has been discovered that student' attitudes toward science significantly alter their achievement in science. Therefore, identification of influence of attitudes becomes an essential part of educational research. Kara (2009) stated that,

“Positive attitudes lead to the exhibition of positive behaviours toward courses of study, with participants absorbing themselves in courses and striving to learn more. Such students are also observed to be more eager to solve problems, to acquire the information and skills useful for daily life and to engage themselves emotionally.”

According to a detailed review of Duyilemi's (1996) reports, academic success may be influenced by students' and academic staff's positive attitudes toward science teaching and learning. Olatoye (2002) discovered that a student's attitude toward science directly affects how well they succeed in the subject. An important component that can increase students' academic success is the relationship between the teacher and the students in the classroom. According to Tsui (1995), a classroom is described as a location where more than two people congregate for the purpose of learning, with one person serving as the teacher. The teacher has certain perceptions about his or her role in the classroom. In the classroom, communication between the teacher and students goes on constantly as initiatory or responsive acts. This communication is called “interaction”. Interaction between teacher and students and

students and students are needed in the classroom activities taking communicative approach. It will maintain communication in the classroom, and enhance the smooth running of teaching and learning process. When the teacher and students, students and students' interactions happen, the instruction will reach the target. The gap between teacher and students in the classroom can be minimized through proper teacher-students' interaction. This enable the teaching and learning process to be well balanced between the teacher and the students.

Classroom interaction (CI) is a two-way reciprocal verbal and non-verbal communication which may be initiative or responsive with the teacher as a facilitator. Classroom interactions are categorised into three; teacher-learner (T-L), learner-learner (L-L,) and learner-content (L-C) classroom interaction (Moore, 2005; Ling, 2007). With the rapid development of technology and its reflection on distance education, the categories are four; teacher-learner, learner-learner, learner-content and learner-interface classroom interaction. The fourth category is used in distance learning programmes and it could be synchronous or asynchronous classroom interaction. The student-interface classroom interaction is applicable and used in distance learning programmes. Secondary school education in Ondo State and in Nigeria is not characterized by learner-interface. Therefore, this study did not consider learner-interface classroom interaction.

In a balanced modern classroom, only one category of classroom interaction may not be adequate since the students may be denied of benefits derivable from other types of classroom interaction. Murray, Perez, Geist and Hedrick (2013) opined that interactions of all types enhance the learning process and can be appropriate and effective in all educational venues. For instance, if a teacher uses teacher-learner contact, he or she may wish to use his or her authority as the class's leader to decide whether the environment should be democratic, authoritarian, or laissez-faire. If he or she is authoritarian, the pupils in the classroom will often be subjected to his or her rules, ideologies, approaches, and practices. Since the teacher

regards himself or herself as the embodiment of knowledge and the students assume the role of passive learners, the class may be one of the traditional classrooms. If a teacher has democratic tendencies, they encourage students to express their opinions. While the teacher guides and supports classroom learning, students are free to propose new ideas, rules, and techniques. Students frequently participate actively in the teaching and learning processes in the classroom, which tends to become more interactive. A democratic teacher may encourage students to start and participate in other students' talks in addition to allowing students to respond to teacher-initiated talks. This invariably may lead to learner-learner interaction. In some traditional classrooms, teacher believes much in engaging students with content, which may be exercises (class exercises & home work), copying notes, drawing and construction. This fact points to student-content interaction. So, an effective Basic Science teacher should be able to employ all the first three categories of classroom interaction together in a class.

Studies have been carried out on each of these category's T-L (individualistic approach), L-L (peer tutoring, cooperative, collaborative) differently, but much have not been done combining all together in a classroom. The nature, (types, quantity and quality) of classroom interactions employed by different teachers may be different; different teachers may engage students differently. A teacher may allow very low interaction while another may allow very high. This leads to classroom interaction levels in Basic Science classrooms. Teacher may over use one category of classroom interaction at the expense of the other. To do justice to all the categories of classroom interaction, there is need to investigate the classroom interaction levels on students' attitude towards Basic science in junior secondary schools in Ondo State.

Statement of the Problem

Success of Basic Science teaching and learning depends largely on the efficiency of the teacher since the teacher, with their knowledge domains, is expected to facilitate knowledge acquisition among students. Hence, the nature of interaction that occurs between teacher and students, student

and students and student and learning content adds to both the teacher related and students related factors. Previous studies 'identified poor teaching strategies, inadequate qualified teachers, unfavourable school environment, lack of instructional materials and availability of some perceived difficult topics in Basic Science curriculum among other factors responsible for students' poor performance in the subject. Research studies have proffered solutions with a view to solving students' learning problems in Basic Science yet, students' poor performance still abound in Basic Science examinations. Hence, among all the factors responsible for student's poor learning outcomes in junior secondary school Basic Science are teacher-related and student-related factors which have been worked on. Previous studies have focused on teacher-learner type while they neglected student-student and student-content interactions and learning outcomes, hence this study.

Purpose of the Study

The study aimed at investigating classroom interaction levels on students' attitude towards Basic Science in junior secondary school in Ondo State. Therefore, the specific objectives of the study are to:

- (a) determine the levels of classroom interaction that exist in Basic Science classroom in junior secondary schools in Ondo State; and
- (b) examine the influence of classroom interaction level on students' attitude towards Basic Science in junior secondary school Science in Ondo State.

Research Question

One research question was raised to guide the study;

- (a) What are the levels of classroom interaction that exist in Basic Science classroom in junior secondary schools in Ondo State?

Hypothesis

The following hypothesis was formulated to guide the study;

- H₀₁:** There is no significant influence of classroom interaction levels on students' attitude towards Basic Science.

Methodology

The study adopted the descriptive survey research design. The research design is a type that describes and presents objects and variables under study as they are seen without manipulating anyone in the form of introducing any kind of intervention. The population of the study comprised all the Junior Secondary School Two (JSS II) students and their Basic Science teachers in Ondo State. The sample consisted of (18) Basic Science teachers and (361) junior secondary School Two (JSS II) students in their intact classes in Ondo State. The sample was selected using multistage sampling procedure. All the three senatorial districts in the state were selected. Three LGAs were selected from each senatorial district using simple random sampling technique to make nine LGAs. Two public junior secondary schools were selected from each of the LGAs by using simple random sampling technique to make eighteen (18) public junior secondary schools. Selection of any school in a LGA meant automatic selection of the JSS II Basic Science teachers of the school and the population of a class taught by the teacher were automatic member of the sample. Eighteen (18) JSS II Basic Science teachers were selected for the study with students in their intact classes. JSS II students were used for the study based on the fact that they are in their intermediate class and not in the final junior class where the students will be preparing for their junior examinations such as Basic Education Certificate Examination (BECE).

Two research instruments were used to collect data for the study. They are; 'Basic Science Classroom Interaction Rating Scale' (BSCIRS) and 'Students' Attitude in Basic Science Questionnaire' (SABSQ). The two instruments were validated at different levels. Face and content validity were carried out by giving the instruments to the supervisor, experienced Basic Science teachers and experts in Tests and Measurement to make sure the language is clear, easily understood and within the students' range of vocabularies. Based on their reaction and comments, some test items were deleted since they tested similar concepts, some reworded for clarity and a few others were included to vary the concepts the items examined. Pilot testing was carried out by administering the instruments on

some JSSII students from an intact class of a co-educational secondary school selected outside the study area, but had similar characteristics as the sample schools. For BSCIRS and SABSQ the instruments were administered once; Cronbach's Alpha was used to calculate the reliability coefficient of the two instruments which yielded 0.86 and 0.78 respectively. Data collected were analysed using appropriate descriptive and relevant inferential statistics. The research question was analysed using mean and standard deviation while the hypothesis was tested using correlation analysis. Significance level of 0.05 was used to test the null hypotheses.

Results

Research Question: What is the level of classroom interaction that exist in Basic Science classroom in junior secondary schools in Ondo State?

This research question was answered using mean. As was described in research question one, the total BSCIRS score represented classroom interaction levels (student-student & student-content interactions) for each school and each score have been converted to percentage (%). The sample size for this particular analysis was 18 (n = 18). Tables 1 below display the BSIRS mean for each school.

Table 1: Descriptive analysis of classroom interaction levels that exist in Basic Science classroom in Junior Secondary Schools in Ondo State

School	Mean (X)	Standard Deviation	Remark
School 1	58.70	6.03	Average
School 2	40.10	13.17	Low
School 3	54.60	13.26	Average
School 4	48.90	5.93	Low
School 5	34.00	5.35	Low
School 6	39.50	11.18	Low
School 7	42.00	8.83	Low
School 8	83.80	8.14	High
School 9	69.30	16.68	Average
School 10	70.40	14.17	Average
School 11	68.10	8.88	Average
School 12	49.80	24.33	Low
School 13	53.40	13.63	Average
School 14	56.20	9.18	Average
School 15	56.20	9.88	Average
School 16	55.90	15.73	Average
School 17	59.60	8.00	Average
School 18	46.00	15.19	Low

80> High; 50-79 Average; <50 Low

Student BSCIRS mean value of their responses were evaluated based on the following range: Low interaction was 20 to 50; Average interaction was 51 to 80; High interaction was 81 to 100.

The result in table 1 showed the descriptive analysis of classroom interaction levels that exist in Basic Science classroom in junior secondary schools in Ondo State. It can be observed that, of the 38.89% or 7 schools' classrooms rated their interactions as low; while 55.56% or 10 schools' classrooms that rated their interactions as average and 5.56% or 1 school classroom that rated the interactions as high. The overall rating of these

classroom interaction levels showed that they are average. In order words, the classroom interaction level in Basic Science classroom in junior secondary schools in Ondo State was average.

Testing of hypothesis

H₀2: There is no significant influence of classroom interaction level on students' attitude towards Basic Science.

This hypothesis was tested using a Pearson correlation. As was described in research question one, the total BSCIRS score represented

classroom interaction and the students' Basic Science attitudinal scores were used. Because Pearson correlations are calculated in terms of bivariate pairs, analysis was restricted to only students who had a total score for both variables.

Table 2: Pearson correlation of the relationship of influence of classroom interaction and students' attitude towards Basic Science

Variable	n	Mean	S.D	r	Sig.(2-tailed)
BSIRS Score	361	54.61	22.33	0.152**	.004
Students' Attitude	361	50.37	12.26		

($r = 0.152$, $**p < 0.01$)

Results in Table 2 showed the influence of classroom interaction level on students' attitude towards Basic Science in Ondo State. There was a strong, positive correlation between classroom interaction level and students' attitude towards Basic Science, which was statistically significant ($r = 0.152$; $n=361$; $p < 0.05$). Thus, the null hypothesis that states that there is no significant influence of classroom interaction level on students' attitude towards Basic Science in Ondo State was hereby rejected.

Discussion of Findings

The result of the overall rating of these classrooms interaction levels showed that the classroom interaction level in Basic Science classrooms in junior secondary schools in Ondo State was average. This result supported the findings of Nair and Patil (2012), who submitted that there was good interaction between students in discussion forums and course messages in sharing ideas during lesson. However, this result negated the result of Zhao (2016), who reported a quantitative study conducted on students' turn-getting behaviour and finds that her Asian learners take less turns than the others and have different "bidding" patterns in comparison with the non-Asians in the classroom.

Lastly, the results of hypothesis two revealed that there was a strong and positive significant relationship between classroom interaction level and students' attitude towards Basic Science in Ondo State. The result is in line with Nur and Mohammed (2017) that students have different attitudes (negative & positive) towards the classroom interaction patterns and they also displayed both good and weak knowledge of the

The sample size for this particular analysis was 361 ($n = 361$). The total BSCIRS scores and their attitudinal scores distribution are presented in Table 2 below.

patterns in English language classroom. Likewise, the finding is in conformity with Emmanuel, Ibrahim and Agaptus (2019) that reported significant difference between the mean attitude of students towards dynamic in Physics in teacher-centered and student-centered classrooms interaction strategies with students in student-centered classroom interaction strategy perform better than teacher-centered classroom strategy.

Conclusion

The study concluded that the classroom interaction level in Basic Science classrooms in junior secondary schools in Ondo State was average and there was a significant relationship between classroom interaction and students' attitude towards Basic Science.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Teachers should be provided with the appropriate resources and assistance to meet the needs of their students beyond academic instruction.
2. Teachers should take the time to build positive relationships in the classrooms among the students so that students will be able to develop the desire for success.
3. Schools head should try to identify the forces at play within a child's life and provide a support system to positively interact with these forces for his or her success in school.
4. The study recommended that those in charge of Curriculum Development should develop a curriculum or teaching

methods that seeks to improve students' academic interaction for better academic achievement.

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