

Students' Evaluation of Classroom Interactions of Their Biology Teachers: Implications for Curriculum Implementation (pp. 349-361)

Onwuachu, Winifred C. - Department of Biology, School of Science, Nwafor Orizu College of Education, Nsugbe. Anambra State

Nwakonobi, Felicia E. - Department of Biology, School of Science, Nwafor Orizu College of Education, Nsugbe. Anambra State

Abstract

This correlational study investigated students' evaluation of their biology teachers' classroom interaction and their feelings towards biology lessons. Three research questions guided the study. Copies of a questionnaire containing 48 items were distributed to 1,216 senior secondary two students from nine randomly selected schools in Onitsha education zone of Anambra state. Data analysed using mean scores and multiple regression analyses showed that biology students perceived their teachers mostly as leaders, understanding, admonishing and strict. The students did not perceive their teachers as helpful/friendly, allowing student responsibility and freedom, uncertain or dissatisfied. The students manifested many negative feelings about their biology lessons. Leadership, helping/friendly, and understanding teacher classroom interactions were positively correlated and uncertainty, admonishing, strict, and dissatisfied was negatively correlated with students' feelings towards biology lessons. Implications for curriculum implementation is that, if biology teachers were to display more leadership, helpful and understanding behaviour and less uncertainty, a resultant

positive effect on the students' feelings about their biology lessons would be expected.

Introduction

The National Policy on Education (Federal Republic of Nigeria, 2004) had advocated improvements in the teaching and learning of Science, Technology and Mathematics (STM) in order to create the foundation of technologically oriented workforce in line with the needs of national development. Learning biology as well other sciences is, therefore, becoming more essential not only for the well-being of the individual, but also for the entire society (Odubunmi, 2006). Biology occupies a special position in the senior secondary school curriculum in Nigeria. In the National Policy on Education (FRN, 2004), each senior secondary school student is expected to study at least a science subject (one of Biology, Chemistry, Physics or Health science). In Anambra State of Nigeria, Okoye (2006) noted that Biology is mostly registered for in the Senior Secondary School Certificate Examination (SSCE) of West African Examination

Council (WAEC) and National Examinations Council of Nigeria (NECO)

Science educators (Ikoku, 1989; Uwadiae, 1997) have shown that students perform poorly in science subjects including biology. The results of biology in Senior Certificate Examination in Anambra State taken by approximately 446,321 secondary school students in 2006 showed that only about 41.12% of the students made a grade of credit and above in the subject (Okoye, 2006). Some authors have investigated reasons for students' low achievement in biology. Among the reasons were teachers' instructional techniques and students' inability to understand lessons (Imhanlahimi & Aguele, 2006), students' feelings towards biology, inadequate learning facilities and low teacher quantity (; Farombi, 1998). With these problems, the limits to effective learning of biology may have been minimally set.

Accepted methods to overcome poor academic achievement in science have included the promotion of more effective teaching strategies and creation of more positive attitudes towards the learning of science. It has also been accepted that an effective strategy for achieving better examination results was to create and maintain more effective learning environments through the development of more student-centered classrooms and greater reflectivity in

classroom interactions of teachers (Henderson, Fisher & Fraser, 2000; Scott, 2003).

Classroom interaction of biology teachers refers to the whole range of activities and experiences through which teachers; curriculum, materials, and learners interact. It has to do with the interactive processes through which teachers' implement the curriculum and impart learning to students using available materials (Goh and Fraser, 1998). Studies have shown that teacher classroom interactions is central to effective curriculum implementation as it has a strong influence on students' learning outcomes (Rickards, 1999; Alausa, 2007). Henderson, et al (2000) reported that students' perceptions of their teacher classroom interactions influenced attitudinal outcomes, adding that where students perceive teachers as initiating satisfactory classroom interactions, their feelings, motivation and attainment in the biology curriculum, were positively affected.

Theoretical Framework

In his theory of teacher classroom behaviour, Wubbels (1993) provided a model of teacher classroom interaction in science to include student responsibility and freedom, understanding, helping/friendly, leadership behaviours, uncertain, dissatisfied, admonishing and strict behaviours as shown in Table 1.

To improve the quality of teaching and learning for all learners within the education system, teachers' classroom interactions need to be evaluated from time to time (Scott, 2003; Goh & Fraser, 1998). Evaluation has been defined as a process of gathering valid information on attainment of educational objectives, analysing and fashioning information to aid judgement on the effectiveness of teaching or educational programme (Okpala, Oyedeji and Onocha, 1993). A popular method of evaluating what goes on during actual teaching is students' evaluation of teachers. This involves the use of students' ratings of the teacher (Wubbels, 1993). Although teacher evaluations cannot be based solely on this technique, it can be argued that the students are actually the only direct observers and could reasonably evaluate classroom interaction if asked the right questions (Rickards, 1999). It is against this background that the researcher considers it crucial to investigate the classroom interactions of secondary school biology teachers as they implement the biology curriculum in Anambra State based on students' perceptions.

Research Questions

Three research questions guided the study as follows:

1. How do secondary school students in Anambra State perceive their biology teachers' classroom interactions?
2. What are the feelings of students' about their biology lessons?
3. What is the relationship between students' perceptions of their biology teachers' classroom interactions and their feelings about their biology lessons?

Methods

Research Design, Population and Sample

The study was a correlational study, involving a population of 4,987 senior secondary two (SSII) students in the 32 public secondary schools, in three Local government Areas in Onitsha Education Zone of Anambra State (Onitsha North, Onitsha South, and Ogbaru LGAs). This data was obtained from the Anambra State Education Commission (ASEC) in February 2008.

Using simple random sampling, 3 schools were randomly selected from each of the Local Government Areas in Onitsha Education Zone. A total of nine schools were selected and all the 1, 261 SS2 biology students in these schools participated in the study.

Instrumentation

A questionnaire titled "My Biology Teachers' Classroom Interaction" (MBTCI) was used for data collection. The MBTCI was adapted from the *Questionnaire on Teacher Interaction (QTI)*, which measures classroom interactions (Wubbels, 1993). The instrument contains nine scales. Each of the first eight scales contains five items that represent the interpersonal behaviours of the teacher: Leadership, Helping/Friendly, Understanding, Student Responsibility/Freedom, Uncertain, Dissatisfied, Admonishing and Strict behaviours. The ninth scale had eight items on students' feeling of their biology lessons.

In adapting the instrument, both vocabulary and sentence structure were simplified. For example, "This teacher talks enthusiastically about her/his subject", was changed to "We all listen to this teacher." "This teacher is hesitant" became "This teacher does not seem sure of many of the topics."

Secondly, the response format was simplified from a 5-point Likert scale response format of Strongly Disagree, Disagree, Not Sure, Agree, and Strongly Agree to a 4-point scale of Strongly Agree, Agree, Disagree, and Strongly Disagree.

Two experts in science education and an expert in measurement and evaluation validated the instrument. The Cronbach Alpha procedure for testing reliability was applied. In doing this, the researcher distributed copies of the MBTCI on the twenty SSII students from a secondary school in Awka Education zone in Anambra State. Their scores were analysed using the Cronbach alpha technique. Coefficient alpha values of 0.80, 0.78, 0.82, 0.77, 0.83, 0.78, 0.76, 0.74, and 0.75 were obtained for each of the sub-scales respectively.

Method of Data Collection and Analysis

The researcher distributed copies of the questionnaire with the help of nine research assistants who were teachers in the selected schools. Out of the 1, 261 copies distributed, only 1, 118 (88.66%) were correctly filled and used for data analysis. Mean and standard deviation scores were used in answering research questions 1 & 2. Based on the 4-point rating scale, the midpoint for the scale is 2.50. Therefore, only mean ratings of 2.50 and above were accepted as agree, while mean ratings below 2.50 were regarded as disagree. Research question 3 was answered using simple correlations and multiple regression analysis.

Results

Table 2 shows that only scales 1, 3, 7 and 8 obtained mean ratings above 2.50, the remaining 4 items had mean ratings below 2.50. This shows that the students perceived their biology teachers as leaders, understanding, admonishing and strict. They disagree that the teachers allow student responsibility/freedom, are uncertain and dissatisfied.

Table 3 shows that items 2 and 6 had mean ratings below 2.50. The rest of the items had mean ratings above 2.50. This shows that students agree that they feel worried, learning a lot, bored, lost, confident, and feel like dropping the subject.

In Table 4, with the feeling scale as the dependent variable, three scales (leadership, helping/friendly and understanding) were associated positively with students' feelings about their biology lessons. Five scales (uncertain, dissatisfied, admonishing, strict interactions and student responsibility/freedom) were associated negatively. The multiple correlation, (R) was 0.42, which was statistically significant. This shows that generally, the simple correlations (r , revealed statistically significant associations ($p < 0.01$) between students' feeling about biology lessons and all eight scales of the teacher classroom interaction.

Discussion of Findings

Findings of the study showed that secondary school students perceived their biology teachers as leaders, understanding, admonishing and strict. They however disagreed that the teachers allow student responsibility and freedom, uncertain or dissatisfied and admonishing. This finding is consistent with Scott (2003) who found that Australian students rated their teachers as being strong leaders and understanding. Also Wubbels (1993) compared Dutch and American teachers and found that American teachers were perceived as stricter and Dutch teachers as giving their students more leadership and understanding.

This finding suggest that in as much as the biology teachers were perceived as being leaders and understanding by the students, the teachers have not been able to establish a caring learning environment by being helpful/friendly and allowing students' freedom. This finding may be because the biology teachers are accustomed to teacher-centered teaching in a highly teacher dominated environment (most probably they were lectured that way tertiary institutions). It may also be due to inadequate facilities for teaching and learning in the schools. Hence, the teachers often find it difficult to devolve responsibilities to students. This finding does not augur well for effective curriculum delivery because as Odubummi (2006) critiqued, the central issue in teacher dominated classrooms is the transfer of information by means of facts; students are for the most part passive and teachers have very limited concern about students' ideas and reasoning. A situation where teachers do not allow student responsibility and freedom may not encourage cooperative and participatory learning.

It was also found that the students felt worried, bored, and lost in their biology classes. Many of them did not feel like attending biology classes,

rather they felt like dropping the subject. This finding indicates that many students have negative feelings about the study of biology. The only aspect where they indicated positive feelings had to do their learning and being confident that will do well in biology. Consistent with this study, Okoye (2006) found that most students displayed general negative attitudes to the study of biology to the extent that some students copy notes in other subjects during biology classes, and would prefer that the period spent in teaching biology be better used in teaching other subjects. The major reason for this negative trend may be because of the unfriendly and strict classroom interaction of the biology teachers. Another reason might be because the students, having been used to admonitions from teachers, became bored and uninterested in biology lessons.

Finally, the positive correlations found in this study suggest that when teachers interacted with students in a more leadership helping/friendly and understanding manner, students had more positive feelings about biology lessons. Other interpersonal behaviours impacted less but still statistically significantly such that if teachers were to be less dissatisfied, uncertain, and admonishing, as well as more understanding, students would be expected to have positive feeling and enjoy their biology lessons more. The R^2 value of 0.36 indicated that 36% of the variance in students' feelings about their biology lessons could be attributed to their perceptions of their teachers' classroom interaction. Thus, the teachers' classroom interaction was an important factor in students' feelings about their biology lessons. This finding agrees with Scott (2003) who found positive relationships between teachers' interpersonal behavior and students' outcomes in Brunei. In essence, the more cooperative teachers were, the more students have positive feelings about their biology lessons and students' feelings decreased when teachers were more oppositional in their behaviour. It is also possible that students' feelings, or motivation and enthusiasm, may foster certain interpersonal teacher classroom interaction which in turn increases students' enjoyment of their lessons.

Implications of Findings for Curriculum Implementation

The results from the present study have important implications for curriculum implementation such that biology teachers wishing to facilitate curriculum delivery and enhance students' affective outcomes should strive to display less uncertain, and dissatisfied, as well as more leadership, helping/friendly, and understanding behaviors. Another implication is that

the curriculum delivery practices of biology teachers in secondary schools in Anambra State as depicted through their classroom interactions are in dire need of improvement. Unless teachers learn to use more friendly and helpful classroom interactions, students' enjoyment of biology lessons would continue to be adversely affected. This implies that the teacher should structure classroom activities in such a way that students are allowed freedom to participate in biology classes using a variety of activities, reinforcement and feedback. It is important for teachers to work towards a classroom where responsibilities are shared with students. This does not imply that the teacher has to give up the role of /general class manager, to take on some sort of spurious equal participant role, but it does mean that he/she should encourage learners to manage their own learning, engage in co-operative tasks and learn how to learn.

Recommendations

The following recommendations are made based on the findings:

- 1) Biology teachers should always adopt stimulating methods to stimulate students' interest and positive feelings towards the subject.
- 2) Biology teachers should ensure that during lessons, they:
 - a. Encourage students' participation and collaboration
 - b. Provide help/clarification to students
 - c. Provide direction to the students
 - d. Encourage supportive relationships among teachers and students
3. Biology teachers should be helped through seminars, mentoring, conferences, support supervision, and journal publications, to acquire a range of skills for effective classroom interaction in biology.
4. Ministries of education, Science teachers Association of Nigeria and the State Orientation Agencies should intensify campaigns and jingles to change students' negative feeling towards biology, and emphasize the value of biology.
5. Government should provide schools with high quality science instructional materials. Teaching with instructional materials is likely to improve biology teachers' classroom interactions.

Conclusions

Classroom interactions are a vital part of curriculum implementation that help to make the classroom environment more congenial for students, support students' learning and encourage students to have favourable feelings toward sciences. This study found that biology teachers were mostly

perceived as leaders, understanding, admonishing and strict in their classroom interactions. Students manifested many negative feelings about their biology lessons. Leadership, helping/friendly, and understanding behaviors were positively correlated and uncertainty, admonishing, strict, and dissatisfied was negatively correlated with students' feelings towards biology lessons. Hence, if biology teachers were to display more leadership, helpful and understanding behaviour, a resultant positive effect on the students' feelings about their biology lessons and their academic achievement, would be expected.

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Table 1: Wubbels Model of Teacher Classroom Interaction

Model	Teacher Behaviour	Students' perceptions
Helping/Friendly	...shows interest, behaves in a friendly or considerate manner and inspires confidence and trust.	This teacher helps us with our work.
Understanding	...listens with interest, empathises, shows confidence and understanding and is open with students.	This teacher trusts us.
Student Responsibility And Freedom	...gives opportunity for independent work, gives freedom and responsibility to students.	We can decide some things in this teachers' class.
Uncertain	...behaves in an uncertain manner and keeps a low profile.	This teacher seems uncertain.
Dissatisfied	...expresses dissatisfaction, looks unhappy, criticises and waits for silence.	This teacher thinks that we cheat.
Admonishing	...gets angry, express irritation and anger, forbids & punishes.	This teacher gets angry unexpectedly.
Strict	...checks, maintains silence and strictly enforces the rules.	This teacher is strict.

Source: Wubbels, T. (1993). Cross-national study of learning environments. In D. L. Fisher (Ed.), *The Study of Learning Environments* (7) 112-120. Curtin University of Technology: Perth, Australia.

Table 2: Mean and Standard Deviations of Students perceptions of teachers' classroom interactions (No of students=1118)

Item no	Scale	Mean	Std. Dev.	Decision
1-5	Leadership	2.72	.40	Agree
6-10	Helping/Friendly	2.06	.40	Disagree
11-15	Understanding	2.66	.45	Agree
16-20	Responsibility/ Freedom	1.58	.36	Disagree
21-25	Uncertainty	1.33	.36	Disagree
26-30	Dissatisfied	1.44	.35	Disagree
31-35	Admonishing	2.87	.40	Agree
36-40	Strict	2.95	.54	Agree

Table 3: Mean and standard deviations of students' feeling about their biology lessons (N=1118)

	Items	Mean	Std. Dev.	Decision
1	I feel worried in biology classes.	3.46	.56	Agree
2	I feel like attending biology classes.	1.30	.38	disagree
3	I feel I am learning a lot in the biology class.	3.31	.20	Agree
4	I feel bored in biology classes.	3.29	.48	Agree
5	I feel lost in biology classes.	2.71	.43	Agree
6	I feel that the teacher teaches the subject well.	2.46	.20	Disagree
7	I feel confident that I will do well in biology	2.85	.69	Agree
8	I feel like dropping the subject.	3.33	.52	Agree

Table 4: Simple Correlations (r) and Standardised Regression Coefficients (β) for students' perceptions of their biology teachers' classroom interactions and their feeling about biology lessons (N = 1,118 students)

Scales	r	β
Leadership	.65	.48
Helping/Friendly	.04	.08
Understanding	.16	.12
S R Freedom	-.06	-.02
Uncertainty	-.18	-.04
Dissatisfied	-.21	-.13
Admonishing	-.87	-.19
Strict	-.24	.05
Multiple R ($p < 0.01$)	$R = .42$	$R^2 = .36$