TEACHER MOTIVATION AND CLASSROOM MANAGEMENT AS CORRELATES OF STUDENTS' INTEREST AND ACHIEVEMENT IN BIOLOGY

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Abstract
The study examined teacher motivation and classroom management as correlates of students' interest and achievement in biology in secondary schools in Ibadan North Local Government Area of Oyo State. Fourteen secondary schools were purposively selected and twenty biology teachers were used for the study. The researchers employed a descriptive survey design. Instruments used were Teachers' Motivational Behaviour Observation Checklist, Teachers' Classroom Management Rating Scale, Students' Interest Questionnaire and Biology Students' Achievement Test. Findings revealed that the Teachers' motivational behaviour in the classroom as well as classroom management were poor while students' interest in biology was high. The composite contribution of motivation and classroom management on Biology achievement (F (2,25) = 16.41; P<0.05) and on students' interest to Biology (F (2,25) = 4.39; P < 0.05) were significant. Motivation (β = .35, .40) and classroom management (β = .70; .36) both had relative contribution to students' achievement and interest in Biology. In view of these findings, it is recommended that teachers should adopt more stimulating and effective methods of motivation and classroom management that can enhance effective teaching and learning of Biology.

Keywords: Motivation, classroom management, interest, achievement

Introduction

Biology as a discipline plays a key role in understanding and responding to some of the most pressing issues of the day ranging from the many challenges arising from population growth, genetics, human impact on ecosystems to effects of climate change and environmental sustainability. It has been noted that the performance of biology students at the senior secondary school level has been poor (Abimbola, 2013; Ibe and Maduabum, 2011; Ahmed, 2008).

Some factors have been attributed to this poor performance of students in biology. The major cause of students' poor performance in biology according to Ahmed and Abimbola (2011) and Umai (2011), is the teaching method adopted by science teachers at the senior secondary school level in Nigeria. It is the teacher-centered method where the teacher dominates the class, leaving learners uninvolved and passive in the learning process (Akinsola, 2011). This method of teaching is not interactive and may not be suitable for achieving the set objectives. Hence there is need to look into drastic measures and strategies that enhance students' interest and achievement in biology. One of such measures is by improving teacher-students classroom interactions through motivation and more effective classroom management.

Nwagbo and Okoro (2011), noted that classroom interactions is the sum total of activities, that take place in an organized classroom between the teacher, the learner and the learning materials during teaching-learning process Classroom interaction promotes involvement, enhances learning and motivates the students (Hussain, 2012). This is in line with Alausa's (2007) conclusion that teacher classroom interactions is central to effective curriculum - implementation as it as a strong influence on students' learning outcomes. The categories of teacher-student classroom interaction include questioning, discussion, use of resources, evaluations, motivation and classroom management. When students are motivated in their studies, it arouses their interest and helps to develop further interactions outside the four walls of the classroom. This is supported by Don John (2007), that students need to interact with each other in the learning process, and foster mutual help and interact in carrying out various activities. Students who are motivated to learn exhibit a greater interest that leads to achievement. Terry, (2008), noted that students'

academic achievement best predicts the kind of motivation students derive from their teachers.

The teaching and learning process involves participation in various activities such as class discipline, behaviour management, helping students feel a sense of direction, effective use of equipment and materials, proper use of time, planning and providing student with frequent and engaging learning activities, giving feedback on assessment, organising physical order of the classroom and involving students interactively. Calderon (2013) highlights the functions performed by effective classroom teachers as;

a) Choosing, making and using the most effective instructional strategies;
b) Translating the classroom curriculum in a way that facilitates students learning;
c) Considering the needs of the students collectively and individually and not just relying on prepared textbooks while designing the curriculum and
d) Implementing rules and regulations and imposing discipline actions.

Students tend to understand better when teachers create pleasant and relaxed learning environment. Learning environment that is well coordinated, arranged, effectively equipped and executed enhances students' interest and achievement. Well organised and managed learning environment helps students to develop positive self-concept towards their studies, prompts learner's competence and value-belief and influences students' cognitive structure. Such ' environment helps to set induce the students, gets them ready for the lesson and arouses their interest. Interest is a critical factor in learning in that it facilitates effective learning and creates a more favourable environment (Adam and Gary, 2011). Students' interest in science is the most effective factor contributing to their decisions to study science (Lindahl, 2003). Students' interest in science significantly affects their achievement in science (Reninger, 2006). This is also in line with the assertion made by Zacharia and Barton (2004), that students' achievement and attitudes to science are affected by students' interest levels in science.

Several studies have linked motivation and interest in learning to student achievement in school (Walls, 2012; Friedricks, McColskey,

Meli, Montrosse, Mordica, and Mooney, 2011). Other researchers have examined the influence of teacher-student interaction to students' achievement (Julie, 2014; Odu. Odigwe and Ekpenyong, 2013; Kamaruddin and Mubin, 2012; Ige and Aremu 2005). Most of the studies mentioned above are foreign while only a handful directly linked teacher-students interactions to students' achievement. Also none of them directly observed the relationship between motivation and classroom management on students' interest and achievement in biology. This study therefore examines teacher-students classroom interaction patterns with respect to motivation and classroom management as correlates of students' interest and achievement in biology.

Statement of the Problem
The study investigated the teacher-students' interaction patterns with respect to motivation and classroom management in secondary schools in Nigeria. Moreover, the study focused on the nature of motivation and classroom management, level of students' interest and achievement in biology and the type of interest students develop in biology. The study further examined these interaction patterns of motivation and classroom management during biology classes to see if these correlate with students interest and achievement in biology.

Research Questions

The following research questions guided the study:
1) What is the nature of teacher-students interactions in biology with respect to: Motivation and Classroom management?
2) What is the composite contribution of classroom interactions variables (Motivation and Classroom Management) to students' (a) interest   (b) achievement?
3) What is the relative contribution of classroom interactions variables (Motivation and Classroom Management) to students' (a) interest b achievement?

Scope of the study
The study was delimited to the survey of teacher-students classroom interaction patterns with respect to motivation and classroom

management and how this correlates with students' interest and achievement in biology at the senior secondary school two levels in Ibadan North Local Government Area of Oyo State.

Significance of the study

The study provides information on the types and frequencies of motivational behaviour teachers' exhibit in class as well as the patterns of classroom management. The influence of teacher motivation and classroom management on students' interest and achievement in biology.

Methodology

Research Design

This study employed a descriptive survey design.

Sample and sampling techniques

Fourteen secondary schools from Ibadan North Local Government Area of Oyo State were purposively selected to include both Public and Private owned Secondary Schools.

Instruments used for the study were:
   i. Teachers' Motivational Behaviour Observation Checklist (TMBOC)
   ii. Teachers' Classroom Management Rating Scale (TCMRC)
   iii. Students' Interest Scale Questionnaire (SISQ)
   iv. Biology Students' Achievements test (BSAT)

TMBOC was adapted by the researcher from Motivational Strategies in Language Instruction by Cheng and Domyei (2007), and has been used in several research studies e.g Al- Mahrooqi, Abrar-ul-Hassan, and Asante (2012). TCMRC was designed by the researcher to gather information on the teachers' management techniques in the classroom. Both instruments have 20 items ranging from very good, good, average, poor and very poor that are ticked by the researchers in the classroom. SISQ was designed by the researcher, containing 20 items used to measure the interest of the students in learning biology. BSAT was made up of 25 selective response objective items.

In order to ascertain the reliability of the instruments, the TMBOC and TCMRC were used by four raters to observe the motivational behaviour and classroom management practices of two teachers in two schools not part of the study. An interater reliability index of 0.74 and 0.75 were obtained respectively for the instruments. The SISQ having a four- point Likert scale: Strongly Agree, Agree, Disagree and Strongly Disagree, was administered to forty students from two schools (twenty students from each school) that were different from the research sample, a coefficient of 0.79 each was obtained using Cronbach alpha. The BSAT was trial tested on forty SS 2 students in two schools which were not part of the sample. A reliability coefficient of 0.79 was obtained for the instrument using Kuder-Richardson formular 20. To ensure uniformity in data collection and application of research procedure, two research assistants were trained for the period of one week in the use of the classroom interactions format. Subsequently, the researchers were made to observe two teachers from two different schools teaching on certain topics in SS 2 biology syllabus using the classroom interactions instruments. These teachers were not part of those that were sampled for the study. Data from the observation was used to find out if they have problems using the instruments and to ascertain inter-observer reliability.

In carrying out the final study, the trained observers (including researcher) were involved. Each teacher was observed twice in the classroom by the observers (each observer focused on a particular category of the interaction pattern). Observations were recorded continuously throughout each classroom visit Field notes were made up of descriptions of individual interactions that student initiate towards the teacher or vice versa or towards other students. At the end of observations, students were given the students' interest scale questionnaire and biology achievements test.

Data collected from the study were analysed using mean score of all the classroom interactions observed by the observers and the mean scores of students' achievements test. Also multiple regression was used to establish the composite and the relative contributions of teacher motivation and classroom management to students' interest and achievement.

Results and Discussions

Research Question 1
What is the nature of teacher-students interaction patterns in biology with respect to: Motivation and Classroom management?

Table 1.1a: Nature of Teacher-students interaction with Respect to Motivation

Item	Mean Response	Std. Dev.	Remark
Establish good rapport with students	3.25	.645	Average
Provide students with positive feedback	4.00	.000	Good
Encourage students to try harder	4.21	.418	Good
Bring in and encourage humour	1.18	.772	Very poor
Use a short and interesting opening activity to start each topic	1.36	.951	Very poor
Give clear instructions by modelling	1.25	.928	Very poor
Break routine by varying the presentation format	1.32	.983	Very poor
Make tasks attractive by including novel, and fantasy element	1.07	.262	Very poor
Use of various teaching materials	1.04	.189	Very poor
Avoid social comparison (e.g., socio-economic status. tribe, etc)	5.00	.000	Very good
Promote effort attribution (e.g., encourage them to hear their opinion)	3.11	.416	Average
Allow students to assess themselves.	1.18	.612	Very poor
Recognize students' effort and celebrate their success	4.25	.441	Good
Willing to explain things again	4.11	.416	Good

Arousing the learners' curiosity and sustaining their interest using authentic cultural materials	1.00	.000	Very poor
Show students you care about them	3.29	.659	Average
Teach students learning techniques about the topic(s)	1.14	.525	Very poor
Teach self-motivating strategies (e.g., remembering inspiring stories etc)	1.43	1.136	Very poor
Show your enthusiasm for teaching	1.36	.911	Very poor
Adopt the role of a facilitator	1.39	.916	Very poor
Weighted Mean = 2.30			

Key: Mean response of 1.0 =very poor, 2.0 = poor. 3.0 =average,
4 =good while 5.0 = very good.

Table 1.1a shows the nature of teacher-students classroom interactions with respect to students' motivation. The results revealed that these teachers sampled performed very good in the avoiding social comparison (Mean= 5.00). The teachers were good in providing their students with feedback (Mean= 4.00), encouraging their students to try harder (Mean= 4.21), recognizing their students effort and celebrating their success (Mean= 4.25) as well as willing to explain things again (Mean= 4.11). They performed averagely in establishing good rapport with their students (Mean= 4.25), promoting effort attribution (Mean= 4.11) and showing their students care (Mean= 4.29). Also performed very poorly in bringing in and encouraging humour (Mean= 1.18), starting each topic with short and interesting opening activity (Mean= 1.36), giving clear instructions by modelling Mean= 1.25), breaking routine by varying the presentation format (Mean= 1.32), making tasks attractive by including novel and fantasy element (Mean= 1.07), using various teaching materials (Mean = 1.04), allowing their students to assess themselves (Mean= 1.18), arousing the learners' curiosity and sustaining their interest using authentic cultural materials (Mean= 1.00), teaching their students learning techniques about the topics (Mean= 1.14), teaching self-motivating strategies (Mean= 1.43), showing enthusiasm for teaching (Mean= 1.36) and adopting the role of

a facilitator (Mean= 1.39). This implies that the nature of interaction of teachers with their students with respect to motivation is generally poor (Weighted Mean = 2.30).

Table 1.1b: Nature of Teacher-students interactions with Respect to Classroom Organization and Management

Item	Mean Response	Std. Dev.	Remark
Describes objectives clearly	2.46	.999	Poor
Ability to promote students emotional, social and problem solving skills	1.43	1.069	Very poor
Coach positive social behaviours (helping, sharing, waiting)	2.36	.951	Poor
Ignore misbehaviour that is non-	4.07	.262	Good
Use verbal redirection for child who is	2.32	.863	Poor
Use non verbal signals to redirect child	2.39	.916	Poor
Use anger management strategy for self (e.g., deep breaths, positive self-talk)	3.07	.378	Average
Reward targeted positive behaviours with incentives (e.g., clapping, nodding, smile)	3.29	.659	Average
On the average, students experience high levels of success in their daily work	2.07	.262	Poor
Give clear and stable orders about the instructional materials and activities	1.11	.567	Very poor
Organize and structure students' contributions, looking for	1.04	.189	Very poor
Involves students interactively	3.21	.418	Average
Helping the students feel a sense of direction and the goal of the lesson	2.32	.772	Poor
Making lessons relate to students experiences and needs	3.36	.678	Average

Proper use of equipment and materials	1.11	.567	Very poor
Consistent in managing behaviour	1.32	.983	Very poor
Check students" understanding	3.21	.568	Average
Good command of subject	3.29	.659	Average
Spend sufficient time presenting, demonstrating and/or explaining new content and skills to die students	3.25	.645	Average
Ensure that transition from one activity to another is done with a minimum loss of instructional time	3.36	.678	Average
Weighted Mean = 2.50 .			

Key: Mean response of 1.0 = very poor, 2.0= poor, 3.0 =average,
4.0 = good while 5= very good.

Table 1.1b revealed the result of teacher-students interactions with respect to teacher's classroom organization and management. The result from the table revealed that teachers were good in ignoring misbehaviour that was non-disruptive to class (Mean= 4.07). Teachers performed averagely in using anger management strategy (Mean= 3.07), rewarding targeted positive behaviours with incentives (Mean= 3.29), involving their student interactively (Mean= 3.21), making lessons relate to their students experiences and needs (Mean= 3.36), checking their students' understanding (Mean= 3.32), having good command of the subject (Mean= 3.21), spending sufficient time presenting, demonstrating and/or explaining new content and skills to their students (Mean= 3.29) and ensuring that transition from one activity to another was done with a minimum loss of instructional time (Mean= 3.25). Teachers performed poorly in describing objectives clearly (Mean= 2.46), coaching positive social behaviours (Mean= 2.36), using verbal redirection for child who was disengaged (Mean= 2.32), using non verbal signals to redirect child who was disengaged (Mean= 2.39), making sure that average number of their students experienced high levels of success in their daily work (Mean= 2.07), and helping their students feel a sense of direction and the goal of the lesson (Mean= 2.32). Teachers performed very poorly in promoting their students

emotional, social and problem solving skills (Mean= 1.43), giving clear and stable orders about the instructional materials and activities (Mean= 1.11), organizing and structuring their students' contributions, looking for interrelationship among them (Mean= 1.04), using equipment and materials (Mean= 1.11) and managing behaviour (Mean= 1.32). The general indication from the table was that the interaction level with respect to classroom management was poor (Weighted Mean = 2.50). This implies that teachers in the sampled schools are less skilful when it comes to classroom management and organization which covered the aspects of productivity, effective behaviour management, and instructional management.

Research Question 2
What is the composite contribution of classroom interactions variables (Motivation and Classroom Management) to students' (a) interest (b) achievement?

Table 2a: Composite Contribution of Motivation and Classroom Management to Student Interest

Model	Sources	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	682.583	2	341.292	4.391	.023[a]
	Residual	1943.262	25	77.730		
	Total	2625.845	27			
Model Summary						
Model			1			
R			.510[a]			
R Square			.260			
Adjusted R Square			.201			
Std. Error of the Estimate		8.81649				

Predictors: Motivation, Teacher instruction and Classroom Management Criterion Variable: Students' interest.

From the table 2a, the level of significance of the joint contribution of Motivation and Classroom management to students' interest, shows that R value of .510 was significant (F $(2,25)$ = 4.391, P<0.05). Again the two variables could explain 26.0% of total variance instudent's interest

(R^2 = 0.26), leaving the remaining 74.0% to other factors that were not considered in the study.

Table 2b: Composite Contribution of Motivation and Classroom Management on student Achievement

Model	Sources	Sum of Square	Df	Mean Square	F	Sig.
1	Regression	108.525	2	54.262	16.406	.000[a]
	Residual	82.686	25	.352		
	Total	191.210	27			
Model Summary						
Model		1				
R		.753[a]				
R Square		.568				
Adjusted R Square		.533				
Std. Error of the Estimate	1.81863					

Predictors: Motivation, Teacher instruction and Classroom Management Criterion Variable: Students' Achievement.

From the table 2b, the level of significance of the joint contribution of Motivation and Classroom management shows that R value of .753 was significant (F (2,25) = 16.406, P<0.05) to student's achievement. This implies that the two variables have very strong relationships with student's achievement. Again the two variables could explain 56.8% of total variance in student's achievement (R^2 = 0.568). This leaves the remaining 43.2% to other factors that were not considered in the study.

Research Question 3
What is the relative contribution of motivation and classroom management on students' achievement?

Table 3a: Relative Contributions of Motivation and Classroom Management on Interest Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std.Error	Beta		
(Constant)	81.053	6.315		12.835	.000
1 Motivation	-.244	.106	-.399	-2.307	.030
Management	-.212	.102	-.357	-2.067	.049

a. Dependent Variable: Student's interest

The Table 3a shows that motivation and classroom management made contribution to students' interest (β = -.399, p < 0.05) and (β = -357, p < 0.05) respectively.

Table 3b: Relative Contributions of Motivation and Classroom Management on Achievement Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	14.127	1.303		10.845	.000
1 Motivation	-.058	.022	-353	-2.674	.013
Management	-.112	.021	-.699	-5.294	.000

b. Dependent Variable: Student's achievement

The Table 3b shows that motivation and classroom management made contribution to students' achievement (β = -.353, p < 0.05) and
 (β = -.699, p < 0.05) respectively.

Discussion of findings
The results of the study showed that there is a positive relationship between motivation and students' achievement in biology. The findings above also corroborate the findings of Sikhwari (2014), which show that achievement motivation has significant and positive impact on academic performance. Also confirms the findings of Omenka and Otor (2015), which indicated that motivation significantly influence students' academic achievement. The findings negate the work of Affum-Osei, Eric, Bamie and Forkuoh (2014), that there was a positive relationship

between achievement motivation and academic achievement but the correlation was not significant.

The results of the data analysis also revealed that classroom management has positive relationships on students' achievement in biology. This is in line with the findings of Adeyemo(2012), who concluded that effective classroom management skills or techniques have strong and positive influence on student achievement. According to Oliver and Reschly (2007), there is a high correlation between a teacher's ability to organize classroom, manage the behaviour of his or her students and positive educational outcomes. Itis also the findings of Oliver, Wehby and Reschly (2011), that teacher's classroom management practices have a significant, positive effect on students' achievement. These confirm the assertion made by Chitiavi (2002) that effective management and organization is a prime contributory factor in students' achievement.

The study also revealed that classroom interaction patterns have a positive significant relationship with students' interest. However, it accords the suggestion of Li and Lemer (2011), that teachers should ensure students' participation in a cooperative way as this will enable them develop positive attitude to biology.

Conclusion

Classroom interaction patterns as exemplified by motivation and classroom management when properly handled and deployed in the biology classroom will enhance effective teaching and learning of the subject. These variables have the potentials of eliciting cognitive activities ranging from simple recall to complex inferences. They can also enable students to foster their own comprehension and improve in their achievements academically. In addition, when these variables are diligently applied, they also have the potentials of instilling in students the interest in learning biology.

Recommendations

1. Teachers should acquaint themselves with various patterns of teacher-students classroom interactions that can enhance effective teaching and learning of biology.

2. There is need for the Government, ministry of education, schools and other agencies to ensure adequate supply of teaching aids in schools.
3. Students should develop intrinsic interest in all the subjects as this will help them to be more inclined to learn the subjects.
4. Teachers should encourage and ensure the participation of all students, make more extensive use of praise during class discussions, and treat students' contributions with respect.
5. The school management and authority, as well as, parents should deploy the idea of using counselling and behavioural methods that involves students in examining and correcting their inappropriate behaviours.

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