



**THE RELATIONSHIP BETWEEN TEACHER'S
CLASSROOM MANAGEMENT AND STUDENTS'
ATTITUDE AND ACHIEVEMENT IN
CHEMISTRY**

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Abstract

In science teaching and learning, the teacher is perceived as playing the crucial role of harnessing all the resources and evoking students' activity for classroom success. This study investigated students' attitude and achievement in Chemistry as a correlate of teacher classroom management behaviors (TCMB). A random sample of secondary school chemistry students and teachers was selected from five Secondary Schools in the Kaura local government area of Kaduna state. Samples of fifty students and five teachers were selected. Data were collected using direct-observation, instruments and questionnaires. The Pearson product moment coefficient was used to test the null hypothesis for significance at the 0.05 error margin. On the average, TCMB was found to have no significant

correlation with attitude and achievement. However, the TCMB categories: Interest boosting, Student involvement and Varying instruction were found to have a positive correlation with achievement in chemistry ($r= 0.637, 0.641, 0.648$ respectively; $p < 0.05$). The study recommends that teachers should be aware of the different management styles and their relative strengths and weaknesses, so that they can adopt suitable management styles in different classroom sessions. Democratic styles of classroom management should be appraised alongside maintenance management.

Key words: Classroom Management, Attitude, Chemistry Achievement, Correlation.

Introduction

This paper investigates the relationship between Teachers' classroom Management with Students Attitude and Achievement in Chemistry. The Quality of education has been the focus of discourses and reforms in education globally. In Nigeria, the recent review of the state of the education sector highlighted standards and quality assurance as one of the four areas of focus. Increased investment in infrastructure, teacher quality, motivation and retention; curriculum relevance and review; learner support services and information communication technology are viewed as the prerequisite for achieving high performing schools and high achieving students. At the classroom level, greater attention is being paid to process-variables, such as teacher and student behaviors, as determinants of the

quality and quantity of teaching and learning. In science teaching and learning, considering the nature and content of science, as well as the classroom environment, the teacher is seen as playing the crucial role of harnessing all the resources and evoking student activity for classroom success (Gbamanja, 2007). Several studies have been undertaken on the aspect of the role of the classroom teacher in achieving quality work in school (Akabue, 2001; Cangelosi, 2000).

This study sought to ascertain the relationship between teacher management behaviors and students' achievement and attitude towards Chemistry. It considered teacher management behaviors as the observable teacher actions in establishing a suitable teaching-learning climate and harnessing resources for the fulfillment of educational goals and objectives. Specifically, the study sought the relationship between attitude and achievement in Chemistry with each of the 12 identified management behaviors: With-it-nests, Interest boosting, Socialization, Students involvement, Order, Proximal control, Smoothness of lesson Transition and momentum, Varying Instruction, Concurrent Dealings, Waiting, on-Verbal and others. The paper is categorized as follows: Review of related studies, management in the science classroom, Research questions/Hypothesis; methodology; Results; Discussion and Conclusion.

Review of Related Studies

The paper reviewed some related studies and what other researchers have said on the present topic as follows:

Ikujuni (2005) identified instructional, planning and management roles of the teacher. He explains that the teacher's instructional roles include all his preoccupation with content matter/lessons guiding student's learning of lesson content; while his management roles include the establishment of a suitable learning climate and harnessing all the resources for the fulfillment of educational goals and objectives. Studies (Miller & Hall, 2005 and Waggins, 2003) have described strategies for classroom management. Cangelosi (2000) suggested designing and conducting engaging learning activities as a managerial strategy along with confronting discipline problems. According to Miller and Hall (2009), classroom management results in the coupling of order and learning. It includes the strategies teachers utilize to promote order and student engagement and learning. The strategies are categorized into motivation, prevention and reaction. Waggins (2003) categorized classroom management into preventive, maintenance, supportive and corrective discipline/management and offered techniques for each. To him, preventive discipline/management skills involve: assessing, clarifying and communicating the needs and expectations of both teachers and students; creating a warm and nurturing classroom climate; democratically developing a set of rules and consequences; developing a daily routine, yet remaining flexible; making learning more attractive and fun for students. While supportive and corrective discipline/management techniques involved dealing with misbehavior, quickly, consistently and respectfully; when all else fails, respectfully removing the student from the class.

Dunbar (2004) kindles interest in the significance of classroom management. He studied on group responses to a reprimand directed at an individual (the ripple effect) and discipline. Thus, he concludes that effective classroom management techniques should include:

- a. Good Teacher – Student relationship, wittiness (communicating to students, showing awareness of everything that is happening in the classroom);
- b. Learning to cope with overlapping situations (keeping track of and supervising several activities at the same time);
- c. Striving to maintain smoothness and momentum in class activities;
- d. Trying to keep the whole class involved, even when you are dealing with individual pupils;
- e. Introducing variety and being enthusiastic, particularly with younger pupils; and
- f. Being aware of the ripple effect (when criticizing student behavior, be clear, firm, focus on behavior rather than personalities and try to avoid anger outbursts).

Management in the Science Classroom

The nature of science, the science classroom and instructional/teaching styles in science bear great implication for classroom management. Newton and Newton (2011) assert that the way the science teachers

manage the classroom significantly affects the climate, motivation and goal achievement in their classrooms. They referred to effective classroom managers as teachers who have clear expectations/goals and communicate them to students and maintain smooth transitions within lessons. Management in Science teaching-learning requires multidimensional tasks: managing the unique nature of the science subject (the processes, procedures, products of science); handling and managing students' behaviors; arranging and improvising materials, resources for science learning; and managing learning time, laboratory design and controlling hazards.

Cangelosi (2000) suggests the design and conduct of different learning activities for different class sessions as a way of gaining and maintaining /managing students' cooperation. Clear directions for behavior, advanced organizers to direct students thinking, signals (especially non-verbal ones), stimuli variation, voice volume modulation, audio-visual aids, humor, eye contacts, frequent student monitoring and deliberate movements increase student task engagement in lecture-like science teaching. Similarly, Miller et al. (2009) emphasized the importance of indirect or democratic styles to foster on taskness and achievement in science. The classroom in which the teacher exhibited non-directive and non-evaluative behaviors appears to make students more independent and activity-oriented in the school. Also, the modified mastery learning strategy (a science instructional management) positively relates with

achievement and attitude and the on task behavior of chemistry students (Padilla, Okey & Dillashow. 2003).

In the science classroom, instructional, resource and behavior management is inevitable. Thus, Gbamanja (2007) argues that the set-backs in science learning in Nigeria (as with most developing countries) is traceable to the effects of teacher behaviors.

Research Questions: The following questions guided the study:

- i. How is science students' achievement in chemistry correlated with teacher classroom management behaviors?
- ii. How is students' attitude toward chemistry correlated with teacher classroom management behaviors?

Hypotheses: The following hypotheses were tested in the study:

HO₁: There is no significant correlation between teacher classroom management behaviors and student achievement in chemistry.

HO₂: There is no significant correlation between teacher classroom management behaviors and student attitude in chemistry.

Methodology

Underneath techniques were used as the methodology of this study. The methodology is presented as follows:

Research design, sampling technique, instrumentation and procedure of data collection. The study used correlation research design. This allowed the researcher to ascertain if there are any relationships between the variables; how strong the relationship; and the direction of the relationship.

The study involved 05 Chemistry teachers (1 per school) and 50 science students. They were drawn from 5 randomly selected public schools in the Kaura local government area of Kaduna state that offer Chemistry at the Senior Secondary schools level. In each selected school, an intact classroom was studied. However, only 5 students in the class were used for the study. School aptitude/achievement records ensured that the 5 selected students were representative of the class in terms of attitude and achievement in Chemistry.

Data collection procedure involved direct classroom observation and the use of questionnaires. The instruments used include: Teacher Management Behavior Observation schedule (TMBOS); Chemistry Achievement Test (CAT); and Chemistry Attitude Questionnaire (CAQ). The TMBOS is split into intervals. During the lesson period, the observer focused on the teacher for 60s at 3 minutes intervals to observe the manifestation of the management behaviors. Any behavior(s) displayed within the 60s received tally/tallies. No behavior was entered more than once in the same minute. The TMBOS was validated by science education experts. Its reliability was determined by having two observers simultaneously observing and scoring the TMBOS for the same lesson; the inter-raters

reliability coefficient was estimated at 0.66. The Student Chemistry Achievement Test (CAT), a 30-item objective test, was administered to the students (N=60) at the end of the classroom observation session. The 4-option objective questions covered the topics: Acids, Bases, Salts and Carbon/Carbon Compounds [the topics covered by the teachers at the study period]. Science Education experts subjected the test to face validation; while test blueprint ensured content validity. A test-retest reliability coefficient of 0.72 was obtained for the CAT. This was calculated using 25 students who took, at two weeks intervals, two versions of the same test with the test items rearranged [the two sets of scores were compared]. The Chemistry Attitude Questionnaire (CAQ) comprised a 30-item scale with 4 Likert scale from strongly Agreed (SA) to strongly Disagreed (SD). It gave a Cronbach alpha reliability coefficient of 0.68. The CAQ specification includes statements on: Likeness for Chemistry, Emotional climate of the Chemistry classroom, Chemistry curriculum, Chemistry teacher, Physical environment of the chemistry classroom/laboratory, Friends attitude towards chemistry, Achievement motivation, anxiety and Chemistry self-concept. Experts in science education provided face validation for it.

The researcher visited the schools and observed classroom lessons in chemistry. The topics: Acid, Base, Salt and Carbon/Carbon Compounds were taught across the classes/schools observed. During the 45 min lesson, the researcher chose appropriate non-interrupting position in the classroom and focused on the teacher for

60s at 3minutes intervals to observe the manifestation of the management behaviors. Any behavior(s) displayed within the 60s received tally/tallies on the TMBOS. No behavior was entered more than once in same minute. Each teacher was observed three times for the research (at least once each week) for a period of 4 - 6 weeks. Data from the continuously coded observation schedule were analyzed using Pearson product moment correlation. Similarly, the student questionnaires (CAT & CAQ), which were given and collected during the last week of observation, were analyzed using the same correlation and other simple descriptive statistical tools {specifically, SPSS 15.0 for Windows software was used; raw scores for TCMB, CAT and CAQ for each class is provided}. To facilitate analysis, TCMB is treated individually and as composite. That is, for each teacher, T1 – T5 individual scores for each of the 12 behavior categories are entered along with the sum of the score. The $\frac{1}{2}$ max scores expected of individual TCMB and Total TCMB are 8 and 96 respectively for the 46 min class (60s observation taken at 3min intervals). Averages of achievement and attitude are compared with individual TCMBs and Total TCMB for each teacher.

Results

Ho₁: There is no significant correlation between teacher classroom management behaviours and student achievement in Chemistry.

Table 1 presents the Pearson's correlation analysis between TCMB (Total) and achievement; while table 2

presents the correlation between achievement and the 12 categories of TCMB (individual TCMB).

Table 1 Correlations analysis for ‘Total TCMB’ and ‘Achievement’

Total TCMB	Pearson Correlation	Total TCMB	ACHIEVEMENT
	Sig. (2-tailed)	1	0.411
	N	5	0.238
ACHIEVT	Pearson Correlation	0.411	5
	Sig. (2-tailed)	0.238	1
	N	5	5

* r is significant at .05 level; ** r is significant at .01 level (2-tailed)

As shown in table 1, no significant correlation was found between, total TCMB and Achievement ($r = .411$; $p < .05$). Therefore, the H_0 is not rejected. That is, on the total, the teacher's classroom management behavior was found to have no significant correlation with achievement. Insights on the individual contributions of the 12 categories of teacher classroom management behaviors are shown in Table 2.

Table 2 Correlation analysis for ‘Achievement’ and 12 ‘VAR’ Variables (WIT, INT, SOC, STU, ORD, PRO, SMO, VAR, CON, WAI, NON, & OTH)

	WIT	INT	SOC	STU	ORD	PRO	Ttal
TCMB	Prs	0.225	0.637	0.28	0.641	0.039	0.214
	Corrltn		*	5	*		
	Sig. (2-tailed)	0.532	0.047	0.42	0.046	0.915	0.552
	N	5	5	5	5		5
ACHIEVT		SMO	VAR	CON	WAI	NON	OTH
	Prs	0.360	0.684	0.19	0.212	0.075	0.794
	Corrltn		*	4			**
	Sig. (2-tailed)	0.307	0.043	0.59	0.556	0.836	0.006
N	5	5	5	5		5	

* r is significant at .05 level; ** r is significant at .01 level (2-tailed)

Table 2 reveals that INT (Interest Boosting), STU (Student Involvement) and VAR (Varying Instruction) had significant positive correlation with achievement ($r = .637, .641, .648$, respectively; $p < 0.05$). OTH (Others) had a significant but negative correlation with achievement. Only 4 out of the 12 TCMBs were significantly correlated with achievement [more than half of the TCMBs (8) had no significant correlation with achievement]. Therefore, the null hypothesis (H_01) is retained.

H_02 : There is no significant correlation between teacher classroom Management behaviors and student attitudes toward chemistry.

Table 3 Correlation analysis for 'Total TCMB' and 'Attitude'

		Total TCMB	
Attitude			
Total TCMB	Pearson Correlation	1	-0.339
	Sig. (2-tailed)		0.338
	N	5	5
Attitude			
Total TCMB	Pearson Correlation	-0.339	1
	Sig. (2-tailed)	0.338	
	N	5	5

Table 3 presents the Pearson's correlation analysis between TCMB (Total) and achievement. It shows a moderate negative but insignificant correlation between Total TCMB and Attitude ($r = -.339$; $p < 0.05$).

Table 4: Correlation analysis for 'Attitude' and 12 'VAR' Variables (WIT, INT, SOC, STU, ORD, PRO, SMO, VAR, CON, WAI, NON, & 0TH)

		WIT	INT	SOC	STU	ORD	PRO
Total							
TCMB	Pearson Correlation	-0.680(*)	-0.378	-0.085	-0.054	-0.098	-0.608
	Sig. (2-tailed)	0.031	0.282	0.814	0.882	0.787	0.062
	N	5	5	5	5	5	5
		SMO	VAR	CON	WAI	NON	0TH
Attitude	Pearson Correlation	-0.270	-0.028	-0.049	-0.017	-0.137	0.115
	Sig. (2-tailed)	0.450	0.939	0.893	0.962	0.706	0.753
	N	5	5	5	5	5	5

* Correlation is significant at the 0.05 level (2-tailed)

Table 4 shows that all but one (WIT: $r = -.680$) of the management behaviors categories have no significant correlation with Attitude towards Chemistry.

Therefore, the H_0 is not rejected.

Discussion

The findings (Table 1 & 4) revealed that, taken holistically, teacher management behaviors bear no correlation with achievement and attitude. This is quite contrary to the findings from some studies (Newton & Newton, 2011, & Huitt, 2009), which appraise the role of teacher classroom management in school success. It is worth mentioning, however, that these studies isolated and studied only aspects of teacher management behaviors. Thus, Table 2 and 4 give illustration and insight into the correlation of 12 specific classroom management behaviors of teachers with Chemistry achievement and attitude.

Table 2 reveals that teacher management behaviors of Interest Boosting, Student Involvement and Varying Instruction were positively and significantly correlated with achievement in Chemistry. This revelation implies

that student achievement in chemistry is significantly increased when teachers increasingly boost students' interests, vary instructional procedures and get students involved in the teaching–learning transaction. This agreed with the findings of Cangelosi (2000) and Newton and Newton (2011) that teachers' effective instructional management has a positive impact on student achievement.

Table 2 also revealed a significant, but negative correlation between teachers and other non-managerial behaviors (OTH) and Students Achievement in Chemistry ($r = - 0.81$; $p < 0.05$). This implies that some teachers' behaviors (non-managerial) can actually have a negative impact on students' achievement in Chemistry. For example, too much control can hamper attitude and achievement. Thus, Huitt (2009) emphasized the importance of indirect or democratic styles to foster on-taskness and achievement in science.

The H_0 is supported by the result presented in Table 3 & 4. They show an overall weak, insignificant relationship between the teacher management behaviors and students attitude toward Chemistry. This means that any pattern in student attitude observed was a chance occurrence and not necessarily the result of particular teacher management behaviors. A discrepancy in the pattern is however observed in the relationship between Attitude and WITH variable; a significant strongly negative correlation was found, implying that teacher's exhibition of with-it-nests (often perceived by students as policing behavior) tends to lower their attitude towards the Chemistry effect. This observation was also

made by Cangelosi (2000). The study results also give a hint on the teachers' classroom management behaviors for each class. While the $\frac{1}{2}$ maximum expected score for the individual TCMBs is 8, only a few obtained scores (16 scores out of 120) were more than the half maximum expected. This means that the study revealed an overall low manifestation of classroom management behaviors by teachers. This has a great implication for the theory, practice and research in Chemistry teaching and learning.

Conclusion

The instructional as well as managerial roles of the teacher are critical to classroom success and quality in education. Therefore, this study concludes that teachers and teacher trainers should pay more attention to the development and promotion of classroom management behaviours because they have a positive impact on student outcomes in Chemistry.

It is therefore recommended that:

- a. Interest boosting and Student Involvement and Varying Instruction should be emphasized as they increase achievement in Chemistry.
- b. The issuance of commands and orders by teachers should not be frequent as such behaviors negatively affect students' attitude towards Chemistry.
- c. Teachers should be aware of the different management styles and their relative strengths and weaknesses, so they can adopt suitable

management styles in different science classroom sessions. Democratic styles of classroom management should be appraised alongside maintenance management.

- d. Pre-service and servicing teachers should be trained in and exposed to the different categories of management behaviors to improve on their classroom practices.
- e. Teacher classroom effectiveness (including high student achievement and attitude) should be the goal of teacher appraisal and training programmes.
- f. Researchers in science education should build upon the study by isolating the individual management behaviours observed to have a significant correlation with achievement in Chemistry with the view of establishing a cause-effect relationship.

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