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Relationships of attitudes towards classroom environment with attitude and achievement science: issue in value re-orientation in education

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A B S T R A C T

The study examined the relationship of classroom environment to attitude toward science and achievement in science among Nigeria certificate in Education (NCE) science students. An attitude instrument was administered during the first and second semesters respectively to measure the student attitudes toward science and the classroom environment. The classroom environment measures examined five areas: emotional climate of the science classroom, science curriculum, and physical environment of the science classroom, science teacher and friend's attitudes toward sciences. Student achievement in science was measured from student's semester grade points. The results of the study showed that: Students attitudes toward classroom environment predicted the variance in attitude toward science. Student's attitude toward classroom environment predicted the variance in science achievement.

Introduction

The classroom is the basic structural unit of our educational system. This environment is where a wealth of interaction occurs among students, teachers and curriculum and is where learning takes place. These interactions create an environment that affects both attitudes and achievement of student.

Numerous researchers have investigated the classroom as a learning environment. Students have ranged from characterization of classrooms and the ensuring interactions to examinations of the relationships involving classroom environment with cognitive and affective learning outcomes. Keeves (1989) has suggested an educational paradigm wherein educational outcomes are functions of the type of environment in which an individual learns. Final

performance in school and attitudes toward learning are influenced by initial performance and attitudes, and also by the classroom, the peer group and home environment of a student.

Getzeis and Thelen (1985) developed a model in which the classroom was viewed as a social system. The model is used to explain interactions between personalities, needs, role expectations and classroom climate that influence behaviour.

Simpson and Troost (1982) have reported a study in which they examined relationships among three major categories of variables, self, home and school, with attitudes toward science and achievement in science. They have hypothesized that each of the three categories will have a moderate to strong relationship with both attitude toward science and achievement in science. Recent reports by Ovute and Nworgu (2003), and Simpson and Oliver (1985) have confirmed that strong relationships between individual, home and school variables with attitude toward science do exist. Addition investigations are being conducted concerning the relationship between attitude toward science and achievement in science across time. Analyses will be conducted to determine how attitude toward science at one time of the year will affect achievement in science at subsequent times.

Haladyna *et al.* (1982) have also developed a model that examines the relationships of student, teacher, and the learning environment with attitude toward science. Findings from their studies have indicated that the model can be used to examine relationships in a consistent manner over several class levels. Learning environment was strongly related to attitudes toward science. The science teacher also plays an important role in indicating the effects of the learning environment on student attitudes toward science.

From these studies, it is evident that characteristics of teachers, peers, and classroom environment affect student affective and cognitive learning outcomes. The present study was designed to investigate further how student attitudes toward the environment of the science classroom relate to attitude toward science and achievement in science.

Research question

This research question was developed to examine the relationship between classroom environment and affective and cognitive learning outcomes. 1. What is the correlation between classroom environment and attitude toward and achievement in science? method sample:

One hundred and twenty (120) students that enrolled in the 2003, preliminary Nigerian Certificate in Education (Pre NCE) science programme of the federal college of education Eha-Amufu were sampled for the study.

Instrument

The instrument used in this study was developed by Nworgu and Ovute (1995) to measure the attitudes of students towards science. Content validity of the instrument was established by a five member panel of science educators. The instrument was then administered to 50 sampled students in science departments of the college. Item analyses and suggestions from science teachers and students were used to add delete or modify items. A total of 90 items within 12 subscales were generated. Factor analyses using an oblique rotation were used to reduce the instrument to 26 items

included in the subscales. The subscales included attitude toward science subscale, classroom environment subscale, school environment subscale, home environment subscale and "self subscale.

A measurement of student attitude toward the classroom environment was obtained from the classroom environment subscales: climate curriculum, ptiysica environment, teacher, other students, and friends. The man of student scores on each subscale were used to obtain a scale score for analyses. Means and standard deviations for student responses to the classroom environment subscales are presented in table 1.

Data collection procedures

The achievement measures were calculated for each student by the science teacher (researcher) at the end of each semester, the attitude instrument at the beginning of first semester and at the end of second semester of the college pre- NCE year.

Data analysis

Pearson product moment correlations were calculated to examine relationships between relationships between the components of classroom environment and attitudes toward science and achievement in science.

Results and Discussion

Research question 1 was investigated by examining Pearson product moment correlations. The correlations showed the relationship of each measure of classroom environment, teacher, other students, and friends, to attitude toward science and achievement in science. All of the classroom environment variables were significantly correlated with attitudes toward science as shown in table 2.

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The result of table 2 showed that curriculum showed the strongest relations with attitude toward science OT all the classroom environment variables. Climate and friends also were moderately correlated with toward science and accounted for between 35 10 40% of the variance shared with attitudes towards science. From the results of table 2 above, it appeared that student attitudes toward curriculum, climate and friends were more strongly associated with attitudes toward science than were student attitudes toward teacher, physical environment, and other students.

None of the classroom environment variables were strongly correlated with achievement in-science (see table 3). There was a tendency for these variables to be less correlated with achievement in science at the second semester.

Climate showed the strongest relationship with achievement in science. These analyses indicated that no single classroom environment variable was strongly associated with achievement in science.

The research result of Nworgu and Ovute, (1995) among others have indicated that attitude toward science may play an important role influencing achievement in science. Since classroom environment is related to attitude science (Haladyna *et al.*, 1982), and attitude, toward science is related to achievement science, the relationship between attitude toward science and attitude toward the classroom, environment was thought to have an important relationship with achievement.

Table.1 Means and standard deviations for classroom environment variables, attitude towards science, and achievement arid science

Variable	First semester		Second semester	
Climate	X 3.31	sd 0.74	X 3.35	sd 0.73
Curriculum	3.42	0.91	3.28	0.84
Physical environment	3.28	0.74	4.00	0.99
Teacher	2.71	1.05	3.07	0.94
Other students	3.41	0.59	3.06	0.77
Friends	2.85	0.79	2.80	0.86
Attitude toward science	3.17	0.83	3.22	0.69
Achievement in science	80.10	9.25	71.18	1.72

Table.2 Pearson product moment correlations of Attitude toward science with classroom environment variables

Classroom Environment variables	Attitude If Toward Science 1^{st} semester	2^{nd} semester	
Climate	0.52	0.64	
Curriculum	0.58	0.66	0.66
Physical Environment	0.28	0.39	
Teacher	0.40	0.44	
Other students	0.19	0.15	0.15
Friends	0.47	0.53	0.53

All values are significant at p = 0.0001

Table.3 Correlations of Achievement in science with classroom environment variables

Classroom environment variable	**First semester**	**Second semester**
Climate	0.30	0.18
Curriculum	0.17	0.16
Physical Environment	0.06	0.08
Teacher	0.24	0.17
Other students	0.14	0.16
Friends	0.26	0.14

Conclusion and implications

Classroom environment has a strong toward science. This study suggests that student feelings about the emotional climate and physical environment of the classroom and student interaction with their classmates and all important factors to be considered when examining how individuals feel about science.

The relationship between classroom environment and achievement in science is weaker than the relationship of classroom

environment with attitudes toward science. While student feelings about the emotional climate and physical environment of the classroom, activities within the science classroom, the science teacher, and student interactions with mates all contributed to achievement in science, they did 'not account for a large amount of the variance in achievement. This may be due to the fact that teacher grades do not measure adequately all the important cognitive outcomes of the science classroom as classroom variables maybe better predictors of achievement in science when standardized measures of achievement are used. The weak relationship between attitude and achievement may be explained by the fact that while most conventional attitude measures are abstract and perceptual, most achievement measures are concrete and behavioural. Stronger relationships may be found when researchers are able to refine these measures and correlate aspects of both domains of learning that are fundamentally similar.

Implications

The importance of classroom environment in relation to student attitude toward science has been underscored in this study. If science curricula and activities are developed that enhance student interest in science, and if classrooms are made stimulating, supportive environments which students may question and develop their interests in science, an important educational goal will have been achieved. Student commitment to an interest in science will help facilitate these students, as adults, to make enlightened decisions on science - related governmental policies and social issues.

Another aspect to be considered is the relationship between classroom environment and achievement in science. Attitude toward science play a role in this relationship. By convincing educators of the need to develop a positive, supportive climate with the science classroom, both cognitive and affective outcomes will be enhanced, indeed creating, supportive, stimulating, and interesting environments in which science can be learned and appreciated has important implications for improving education in the future.

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