EMOTIONAL ATMOSPHERE OF CLASSROOM AS PREDICTOR OF STUDENTS' ACHIEVEMENT IN MATHEMATICS

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Abstract
The low level of students' attainment in mathematics in secondary school has been a source of concern to stakeholders in education. This study investigated emotional atmosphere of classroom as predictor of students' achievement in mathematics. The descriptive survey research design was adopted for the study. The population consisted of all secondary schools in Ibadan South West Local Government area in Oyo state, Nigeria. In the study, three hypotheses were tested. Simple random sampling technique was used to select five secondary schools in Ibadan South West Local Government Oyo State, Nigeria and simple random sampling technique was used for the selection of 45 students from each school. A total sample size of 225 respondents participated in the study. Two instruments were developed for the study namely: Mathematics Achievement Test (MAT) and Classroom Emotional Atmosphere Inventory Scale (CEAIS) with the reliability coefficient value of 0.81 and 0.76 respectively. Data was analysed using inferential statistics. The results revealed there is statistically significant effect of emotional atmosphere of classroom on students' academic achievement in Mathematics (F (1,223) = 3.945, P= 0.048. The R^2 also revealed that the independent variable (emotional atmosphere) has positive but low effect on Mathematics Achievement (R^2=0.017). Again, the result revealed that statistically, there was no significant difference in the emotional atmosphere of classroom of male and female students (t (221) = 1.039, P= 0.300. This implies that gender of the students does not determine the emotional atmosphere of classroom. It was therefore suggested that, effective guidance and counseling unit in all secondary schools is necessary, whereby student's social and emotional problems would be addressed.

Keywords: Mathematics, Emotional Atmosphere, Classroom, Students' Achievement

Introduction

Education is a vital tool for national development. Any national that desires and values development cannot but rely on sound educational development since human development leads to national development. There is universally held assumption of the importance of mathematics to the growth and development of humankind (Oni, 2019). Mathematics is a science that study relationship between quantity and space. Mathematics is seen as fundamental to the understanding of other fields of study such as science and technology, social sciences, medicine, etc. The knowledge of mathematics has been proved an indispensable vehicle to train the minds of the learners to think logically, objectively and sensibly in resolving day-to-day glitches. Likewise, Umameh, (2011) in Tshabalala and Ncube, (2013) was of the view that mathematics is bedrock and an indispensable tool for scientific, technological and economic advancement of any nation The teaching and learning mathematics require a proper attitude and deep thinking from the students in terms of their learning styles, as well as teacher's knowledge and behavior in the classroom.

In spite of the relevance of mathematics, and being one of the compulsory subjects in the secondary school without which no student can gain admission into tertiary institution, yet, mathematics is one of the most poorly taught, commonly hated and dreadfully understood subjects in most schools particularly in secondary schools because mathematics is abstract in

nature. This is obvious in the persistent poor performance of students in both internal and external examination. Analysis of students' achievement in mathematics shows that the performance of Nigerian students is not encouraging (Imoko & Jimin, 2016). Many factors have been accountable for this low performance of students in mathematics such as students' negatives attitude to the subject, shortage of educational resources, class size, difficulty in paying attention, inability to practice, inadequate instructional materials, ill-disposed emotional atmosphere of classroom and a host of others.

In a formal education setting, teaching and learning process does not take place in a vacuum. it occurs as a result of interaction among members of the classroom such as relationship between teacher and students, student and student, the learning content, learning process, teaching pedagogy, learning situation and emotional atmosphere in the classroom. Every classroom has its' own unique teaching - learning situations. The teacher is the most important influence of all in the child's environment. Indeed, the teacher makes a school environment conducive for learning. The teacher can change an ordinary classroom into an environment for learning. A teacher in the 21st century must possess skills and tools that will promote inquiry learning, integrate strong communication skills among the learners and have manageable technological skills (Braun, 2010). A classroom environment refers to the teacher and children including the curriculum, actual teaching, classroom management, classroom climate (noisy or quiet), and the physical condition of the classroom (dark or illuminated), (hard floor or sandy floor) and (arrangement of seats e.t.c). In addition, the emotional climate of the classroom is equally important. Most often, this has not been a major consideration but based on theories on emotional development of children and how they have absorbent minds and they are easily influenced by words it is needful to check the language of the classroom (ambience, use of positive words). (Owoyele and Ekine, 2019).

Classroom environment plays a significant role in the life of a child and has a wide and great influence on students' cognitive social and emotional development now and later in life. According to Mudassir, Norsuhaily, Abubakar and Ado (2015), school environment has a vital role to play in the academic performance of students. Quite a lot of educationists explains the term classroom-learning environment. The classroom atmosphere of a class can potentially influence what students learn. Moss and Trickit (1974) in Riaz and Asad (2018) asserted that the classroom learning environment is a dynamical social system which includes not only teachers' behaviour and teacher - student interaction but student – student interaction as well". In this interaction, the teacher is more central as he or she decides who is allowed to talk and what to talk about. The interactions between the teacher and the pupils and between the pupils themselves, as well as the rules guiding teaching and learning mathematics in the classroom, have an effect on the academic achievement of students in mathematics.

A good classroom environment can be achieved through:

(i) Classroom organisation and class size-the number of children in each class should be manageable.
(ii) Physical organisation of the class to ensure good seating arrangement, floor space and placement of the chalkboard at the centre of the classroom.
(iii) The classroom should be well illuminated with enough light and there should be free flow of air through adequate ventilation.

Teachers and children's disposition should reflect cheerful atmosphere. The teacher both male and female should show interest and concern for her children and work. In the classroom the teacher's voice should be audible, controlled and should be heard by every member of the class. A child that is partially sighted should be made to sit in front of the class in order to help him or her see and copy more easily, what is on the chalkboard. During oral reading

exercise, a partially sighted pupil should be placed where there is enough light to see what he or she is about to read. Writing on the chalkboard for such group of children will be of bold character in order to help the child read without much difficulty. Likewise, students with hearing problem should be placed in the front sit where they will be able to listen to teacher without much disturbance and distraction. Besides all these, emotional atmosphere in the classroom also goes a long way in the academic performance of students particularly in mathematics as a subject.

Emotional atmosphere of classroom which refer to as affective interactions within the classroom, also concerns more about the quality of social interaction in the classroom between teacher and students also among student and students. Some of the following characterize positive classroom emotional atmosphere:

(i) Sensitivity of teacher to student's need
(ii) Warmth and caring relationship between teacher and students
(iii) When teacher put student's interest in mind
(iv) Making student's learning environment comfortable and conducive
(v) Reinforcement of student's eminent behavior among others

Therefore, positive emotional atmosphere will enhance learning of mathematical thinking as well as social skills.

Statement of the study

Mathematics i**s** abstract in nature**,** commonly hated and dreadfully understood by students in most schools. It has indeed been observed today that there is persistent poor performance of students in both internal and external examinations in mathematics. Quite a lot of factors are responsible for students' poor performance in mathematics such as negative attitudes of students towards mathematics, poor instructional strategies, language problem, and poor emotional atmosphere of the classroom among others. This study investigated emotional atmosphere of classroom as predictor of students' achievement in mathematics.

Purpose of the study

The major purpose of this study is to investigate emotional atmosphere of classroom as predictor of students' achievement in mathematics in secondary school. The research is designed to achieve the following:

(i) To determine the influence of emotional atmosphere of classroom have influence on students' academic achievement in mathematics
(ii) To determine the significant effect of emotional atmosphere of classroom on students' academic achievement in mathematics

Testing of Hypotheses

Hypothesis One: There is no significant influence of emotional atmosphere of classroom on students' academic achievement in mathematics?

Hypothesis Three: There is no significant effect of emotional atmosphere of classroom on students' academic achievement in mathematics based on: (i) gender, (ii) age

Research Methodology

The researcher adopted a descriptive correlational design. The target population for the study consisted of all secondary schools in the Ibadan South West Local Government area in Oyo State, Nigeria. A simple random sampling technique was used to select five secondary schools in Ibadan South West Local Government Oyo State, Nigeria, and a simple random sampling

technique was used for the selection of 45 students from each school. A total sample size of 225 respondents participated in the study. Two instruments were developed for the study namely: Mathematics Achievement Test (MAT) and Classroom Emotional Atmosphere Inventory Scale (CEAIS) with the reliability coefficient value of 0.81 and 0.76 respectively. In Mathematics Achievement Test (MAT), the Blooms' Taxonomy of the educational objective was used to guide the structure of the items in the instrument. These items were drawn in line with Nigeria's mathematics curriculum for Senior Secondary school (SS ll). This was done to test students' cognitive ability in mathematics. Therefore, a 25-item multiple-choice mathematics achievement test with four options per item was constructed and the duration set for students to answer these questions was 1hour 30 minutes. While, Classroom Emotional Atmosphere Inventory Scale (CEAIS) contained 2 sections. Section A was designed to elicit information about the background of the respondents, such as the name of the school, class, gender, age, etc. Section B has 15 items, which elicited some information on the emotional atmosphere of mathematics class. The respondents responded to the items on a four-point rating scale of strongly agree, agree, disagree, and strongly disagree. Data were analysed using inferential statistics such as t-test, ANOVA and Linear Regression.

Results

Hypothesis One: There is no significant influence of emotional atmosphere of classroom on students' academic achievement in mathematics? To test this formulated hypothesis, linear regression was used and the result presented in below:

Table 1: Regression Model Summary on effect of Emotional Atmosphere of classroom on students' academic achievement in mathematics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.132[a]	.017	.013	3.481

a. Predictors: (Constant), Emotional Atmosphere

Table 1 is the result of the linear regression analysis conducted to ascertain the effect of the emotional atmosphere of the classroom on students' academic achievement in Mathematics. The R^2 also revealed that the independent variable (emotional atmosphere) has a positive but low contribution to Mathematics Achievement (R^2=0.017). This implies that only 1.70% of the variance in achievement can be accounted by emotional atmosphere. The regression coefficient is presented in Table 2.

Table 2: Linear Regression Coefficient between emotional atmosphere of classroom on students' academic achievement in mathematics

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	4.236	1.712		2.475	.014
	Emotional Atmosphere	.078	.039	.132	1.986	.048

a. **Predictors: (Constant), Emotional Atmosphere**

Table 2 shows the regression coefficient for the independent (predictor) variable, the emotional atmosphere of the classroom while the dependent or criterion variable, students' academic achievement.

As presented in Table 1, emotional atmosphere does statistically significantly contribute to mathematics achievement (β = 0.132, t = 1.986, P=0.048). This implies that any increase in

one unit of the emotional atmosphere will cause an increase of 0.78 units of Mathematics Achievement.

Hypothesis Two: There is no significant difference of emotional atmosphere of the classroom on students' academic achievement in mathematics based on Gender.

Table 3: Independent samples t-test on the emotional atmosphere of the classroom on students' academic achievement in mathematics based on Gender

	Gender	N	df	Mean	Std. Deviation		Sig(2-tailed
Emotional atmosphere	Male	96	223	43.96	6.758	1.039	0.30
	Female	129		43.12	5.329		

An independent sample t-test was conducted to ascertain the difference that exists between males and females in relation to the emotional atmosphere of the classroom on students' academic achievement in mathematics. As presented in Table 3, the result revealed that statically, there was no significant difference in the emotional atmosphere of the classroom of male and female students (t (221) = 1.039, p = 0.300. Hence, the null hypothesis is not rejected. This implies that the gender of the students does not determine the emotional atmosphere of the classroom.

Hypothesis Three: There is no significant difference of the emotional atmosphere of classroom on students' academic achievement in mathematics based on age.

Table 4: One Way Analysis of Variance on Emotional Atmosphere of the classroom on Students' Academic Achievement in Mathematics based on age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	258.455	4	64.614	1.846	.121
Within Groups	7699.394	220	34.997		
Total	7957.849	224			

A one-way analysis of variance was conducted to ascertain the difference that exist among different age groups of students in relation to Emotional Atmosphere of classroom. As presented in Table 4, the result revealed that statistically, there was no significant difference in the perception of emotional atmosphere of classroom by students based on their age (F (4,220) = 1.846, P= 0.121. Hence, the null hypothesis is not rejected.

Discussion of findings

It is the desire of every teacher to bring about changes in the behaviour of learners by creating enabling environment for learning to take place. Teachers have a fundamental role in promoting social interaction and a positive atmosphere in their classes, particularly in mathematics class. Emotional atmosphere of classroom is an important factor with respect to student academic achievement in mathematics. The positive emotional relationship between the teacher and the learner do enhance learning of mathematics since mathematics is abstract in nature. From the finding emotional atmosphere statistically does significantly contribute to mathematics achievement. This is in line with Blum-Kulka and Dvir-Gvirsman, (2010) assertion that interaction between teacher and learner are important for learning and development of mathematical thinking, social skills, and positive self-efficacy. The finding of this study also corroborates with Johnson and Johnson (2017) assertion that how teachers' structure student-student interaction pattern has a lot to say about how students learn. It means smooth

interaction among students will boost the learning of mathematics since teacher play a central role in the formation of the emotional atmosphere in mathematics class and the emotional atmosphere can be built up to be positive when the teacher encourages the student's interaction. Students spend most of their time in the school particularly in the classroom, emotional atmosphere of the classroom should be friendly enough to stimulate academic achievement in mathematics. This is in support of Shamaki (2015) who claimed that learning environment could be an essential key determinant to the students' achievement in mathematics. The result revealed that statistically, there was no significant difference in the emotional atmosphere of classroom of male and female students as regard their academic performance. This is in line with the study of Ajai and Imoko (2015) who opined that there is no significant difference in achievement of male and female students in mathematics particularly in Algebra. However, Alordiah, Akpadaka and Oviogboda (2015) claimed that male students performed better than female students in mathematics did. In addition, the result revealed that statistically, there was no significant difference in the perception of emotional atmosphere of classroom by students based on their age. Sometimes, academic achievement of students in mathematics may not have anything doing with age but it may depend on other factors.

Conclusion

The relevance of mathematics cannot be over-emphasised in this age of science and technology. The teaching and learning of mathematics necessitate an appropriate attitude of both student and teacher in the classroom and deep thinking from the students in terms of their learning styles, as well as teacher's knowledge and comportment in the classroom. The social aspect of emotional atmosphere of the classroom such as teacher's behaviour and learner's behaviour (both verbal and non-verbal), teacher classroom management, personality traits, and cultural diversity among others must not be handled with levity in order to improve academic achievement of student in mathematics.

Recommendations

Based on the finding of the study, the following recommendations are made:

(i) Teachers have a fundamental role in promoting social interaction and a positive atmosphere in their classes. Teacher should make mathematics class friendly enough for students to learn better.

(ii) Teacher should be patience with students and be a reinforce of desired emitted positive behaviour.

(iii) Teacher should encourage smooth interaction between student and student in order to share knowledge together.

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