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EFFECT OF SCHOOL CLIMATE ON TEACHING AND
LEARNING OF PHYSICS IN SENIOR SECONDARY

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Effect of school climate on teaching and learning of physics in senior secondary schools in Rivers State, Nigeria

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Abstract

Purpose: The study investigated the effect of school climate on teaching and learning of physics in senior secondary schools.

Methodology: The mixed research design, specifically descriptive and exploratory analysis method was employed for the study. 14 Physics teachers and 248 Physics students were purposively selected from four secondary schools in Rivers State, Nigeria. Instruments for data collection includes Questionnaire for Physics Teachers (QPT), Questionnaire for Physics Students (QPS) and two semi-structured interview schedules which are Interview Schedule for Teachers (ISfT) and the Interview Schedule for Students (ISfS). Data were analyzed using mean and percentage for the research questions while hypotheses were tested at 0.05 level of significance using t-test.

Results: The findings of the study revealed that although Physics teachers enjoy a fairly good working relationship with their students, both teachers and students maintained that their school climate were not friendly and conducive for teaching of Physics. The study further revealed that there were no significant differences between male and female Physics teachers and students on their mean responses on school climate related factors affecting the teaching and learning of Physics.

Unique contribution to theory and practice: The study recommended exigent need for synergy among all stakeholders in the secondary school to encourage the prevalence of harmonious relationship that will enhance effective teaching and learning of Physics among others.

Keywords: School climate, Teaching, Learning, Physics, Secondary schools.

INTRODUCTION

In Nigeria, the formal school system is classified into the primary, secondary and tertiary institutions of learning. These institutions are saddled with the responsibility of training and educating the child, providing the required content for the acquisition of right attitude and skills essential for societal development. In the quest towards the actualization of quality Physics education especially at the secondary school level, stakeholders have persistently suggested ways of ensuring best practices in the teaching and learning of the subject. It is evident that in most external examinations conducted by West African Examination Council (WAEC) or National Examination Council (NECO) in Physics, there have been conspicuous variation in performance rate by different secondary schools (Adolphus & Aderonmu, 2013). Several researches have been conducted in proffering solutions to these inconsistencies in students' academic performance in Physics over the years. However, much research concentration has not been placed on school climate and its implications on the teaching and learning of Physics in secondary schools.

School environments may vary significantly sometimes depending on the prevailing socio-economic situations, culture and occupation of the people, legal systems operational in the society and how well these laws are respected, enforced and adhered to. School learning environments that are not friendly or hospitable may not encourage effective teaching and learning which in the long run could negatively affect students' attendance and attainment (Macneil, Prater & Busch, 2009). Loukas (2007) opined that it is difficult to proffer a succinct definition of school climate and that there is a consensus among scholars that it has physical, social and academic dimensions. Although, a very broad and all-encompassing definition and description of school climate was offered by the National School Climate Council (2007) of the United States of America:

“School climate refers to the quality and character of school life. It is based on patterns of school life experiences and reflects norms, goals, values, interpersonal relationships, teaching, learning and leadership practices, and organizational structures. A sustainable, positive school climate fosters youth development and learning necessary for a productive, contributing and satisfying life in a democratic society. This climate includes norms, values and expectations that support people feeling socially, emotionally and physically safe. People are engaged and respected.

Students, families and educators work together to develop, live and contribute to a shared school vision. Educators model and nurture attitudes that emphasize the benefits and satisfaction gained from learning. Each person contributes to the operations of the school and the care of the physical environment” (p.4).

The baseline of the concept of school climate is that of a shared responsibility among students, parents, teachers, school proprietors and school administrators, who engage and support one another for the sustainable development of the school environment, and for the fostering of satisfactory, productive and effective teaching and learning activities. It is therefore important for the attainment of desired educational goals, that learning environments are safe, conducive and inviting with students freely engaging in their work, supportive of one another and interacting positively in inter-personal relationships without fear or intimidation. This kind of classroom or school climate and environment will no doubt encourage effective teaching and learning. Research findings have shown that the quality of school life and interactions of school pupils and staff among themselves, with the facilities and the environment significantly affect students’ learning and attainment (Marshall, 2004; Thapa, Cohen, Guffey & Higgins-D’Alessandro, 2013). Different studies also carried out by (McBer, 2000; National School Climate Council, 2007; Thapa, Cohen, Guffey & Higgins-D’Alessandro, 2013; Cohen, 2014) revealed that positive and sustained school climate promotes students’ learning and ultimately enhances their academic attainment.

More specifically, a positive school climate has been found to improve students’ attainment, graduation rates and retention of teachers and students in schools (Thapa, *et al.*, 2013), encourage the optimum use of learning opportunities that promote students’ participation to learn (McBer, 2000; NSCC, 2007) and also, that positive school climate has been recognized as an intervening variable between the quality of school facilities and attainment of students (Uline & Tschannen-Moran, 2008). It is obvious that a positive school climate that supports effective teaching and learning environment where students, teachers and administrative staff respect and give regards to set norms would be devoid of violent acts and bullying, with a high sense of communality and

acceptable use of school facilities which would support teaching and learning. On schools with unfriendly learning environment, Macneil, Prater & Busch (2009) argued that:

“Unhealthy schools lack an effective leader and the teachers are generally unhappy with their jobs and colleagues. In addition, neither teachers nor students are academically motivated in poor schools and academic attainment is not highly valued” (p 75).

OECD (2013), in its report of the results of the 2012 PISA assessment that involved 65 countries and economies stated that:

“if offered the choice of schools for their child, parents are more likely to consider such criteria as ‘a safe school environment’ and ‘a school’s good reputation’ more important than ‘high academic attainment of students in the school’” (p.18).

The report also stated that secondary schools with higher records of indiscipline and such related school climates are more inclined to having a good proportion of disadvantaged students with a more diverse socio-economic student population. The report further stated that such schools are also characterized by the shortage of qualified teachers. It is no doubt that teaching and learning in such schools where qualified teachers are lacking and where parents would normally not prefer their children to attend may be hampered with resultant low academic attainment. The PISA 2012 assessment, investigated aspects of the learning environment that involve student truancy and school climate, and reported that “systems with larger proportions of students who arrive late for school and skip classes tend to show lower overall performance” (OECD, 2013).

From the foregoing, it is imperative that conscious effort geared and deliberately pursued towards the advancement of a healthy and friendly school climate be made as these have been proven to enhance the morale of teachers and students with the effect of improving students’ participation in the school community and attainment (Macneil, Prater & Busch, 2009). Loukas (2007) opined that beyond understanding that a good school climate results in students and teachers’ willingness to be in school and also improved student outcomes, the mechanism and interaction of factors that

underlie the relationship should be properly understood. School connectedness which explains the perception of students having a sense of belonging and association with other members of the school community has been identified as one of the processes that could explain the effect of school climate on students' learning outcomes. Expatriating upon the mechanism of association between the variables of school climate and student outcomes, Loukas (2007) explained that:

“high-quality school climates cultivate a connection to the school and in this way protect youths from negative outcomes. That is, quality of school climate impacts student feelings of connectedness to the school and, in turn, the level of connectedness is directly predictive of how students behave and feel” (p.2).

The highlight from this explanation is that a safe and friendly learning environment would encourage pupils to want to belong to the school as a teaching and learning community and longing to see each other on the next school day in a friendly atmosphere with teachers and students supporting one another. Students in such an atmosphere make healthy school associations with their peers and teachers with a positive drive to learn. Students would normally learn better in such climate and so are most likely to make positive improvement in their learning outcomes. In light of the above, the study investigated the effect of school climate on teaching and learning of physics in senior secondary schools in Rivers State.

Aim and objectives of the study

The aim of the study was to investigate the effect of school climate on teaching and learning of physics in senior secondary schools in Rivers State. Specifically, the objectives of the study are to;

1. Investigate teachers' perception on school climate related factors affecting the teaching of Physics in secondary school.

2. Ascertain students' perception on school climate related factors affecting the learning of Physics in secondary school.

Research questions

1. What is the perception of teachers on the effect of school climate related factors on the teaching of Physics in secondary school?
2. What is the perception of students on the effect of school climate related factors on the learning of Physics in secondary school?

Hypotheses

H₀₁: There is no significant difference between mean responses of male and female Physics teachers on the effect of school climate related factors on the teaching of Physics in secondary school.

H₀₂: There is no significant difference between mean responses of male and female Physics student on the effect of school climate related factors on the learning of Physics in secondary school.

METHODOLOGY

The mixed research design specifically descriptive and exploratory analysis method was employed for the study. Creswell (2012) explained that the mixed research design is a procedure employed for observation, data collection, analysis and the combination of both quantitative and qualitative research methods in a single study aimed at understanding the research problem. This method was adopted for the study to provide an in-depth understanding of the problem and their consequential solution based on the varied forms of data collection process. The study was conducted in Rivers State, Nigeria. A purposive sampling was employed to select 3 secondary schools which captured three different school types and understanding the outcome of gender. 14 Physics teachers, comprising 9 males and 5 females together with 248 Physics students participated in the study.

The instruments developed for data collection were Questionnaire for Physics Teachers (QPT), Questionnaire for Physics Students (QPS), Interview Schedule for Teachers (ISfT) and the Interview Schedule for Students (ISfS). QPT consist of two sections that provide responses to teachers' characteristics, qualification and activities in the school (school climate) which have been

identified in literature to have some effect to the teaching and learning of Physics (Williams, et al, 2003). The teachers were asked to response the 4-point scale closed ended questions related to school climate following the scale of “A lot”, “To some extent”, “Very little” and “Not at all”. QPS is a 7-item structured instrument developed to obtain responses from the students about the school, students’ experiences in physics classrooms, their perception about their physics teacher and their school climate. Students were asked to respond to the question on school climate related factors on a 5-point scale of Strongly Agree, Agree, Disagree, Strongly Disagree and Can’t say.

The Interview Schedule for Teachers (ISfT) and the Interview Schedule for Student (ISfS) were semi-structured. The ISfT is made up of 9 questions and lasted between 45-60 minutes, while the ISfS composed of 8 questions lasted between 25-45minutes. All questions on the schedules (ISfT and ISfS) were consistent with the research questions and developed by the researcher from extensive search of the literature on possible school climate factors that could affect the teaching and learning of Physics in secondary schools. The response of the interview from the participants were recorded and transcribed for coding, while the thematic content analysis was used to determine common patterns across the data set for both teachers and students.

RESULTS

Research question 1: What is the perception of teachers on the effect of school climate related factors on the teaching of Physics in secondary school?

Table 1: Teachers’ responses to school climate related factors affecting teaching and learning School Climate related factors (% Responses)

Lack of	Disruption of	use of	Poor student-
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Responses	Respect for Teachers	classes by Students	alcohol or illegal drugs	bullying of Students	teacher relationships
A lot	41.7	33.3	50.0	58.3	8.3
To some extent	8.0	25.0	0.0	16.7	41.7
Very Little	50	25.0	16.7	8.3	33.3
Not at all	0	16.7	33.3	16.7	16.7

The result in Table 1 reveals that 41.7% of physics teachers were of the opinion that students' lack of respect for teachers hinders teaching and learning 'a lot'. 33.3% of teachers were also of the opinion that 'disruption of classes by students' hinders the learning of students 'a lot', while 50% of the teachers indicated that students' use of alcohol or illegal drugs affects the smooth running of school activities in the school. 58.3% were of the opinion that 'bullying of students' in school hinders the learning of students. On the effect of 'poor student-teacher relationships', only 8.3% of teachers agree that it hinders effective teaching and learning 'a lot'. However, as much as 41.7% of the teachers agree that it hinders students' learning 'to some extent'. The opinion of teachers on school climate factors as presented above would suggest that their school environments were not friendly and conducive for teaching of Physics. Teachers seem to enjoy a fairly good working relationship in school with their students.

Some qualitative data from the interviews also threw some light on the classroom climate of physics lessons in the participating schools in the study. For instance, on the question about their interactions in physics lessons some of the students expressed a friendly working relationship both with their peers and the physics teacher consistent with the quantitative data.

“some of the students are afraid to ask the teacher in the class when they are confused in a particular topic, they will go to the teacher's staff room because the teacher always tell us whenever we are confused in physics that we should meet him that he is going to teach us on how we are going to go on that topic, so we also meet the teacher and the teacher correct us” (A2P/5.).

The above expression suggests that students work cooperatively in a friendly atmosphere and also have teachers who are friendly and supportive to the learning. The expression ‘some students are afraid to ask’ may not imply a poor student-teacher relationship, but possibly the lack of self-confidence and public speaking in good English which may be a problem of some students especially in the rural areas. This assumption is premised on the fact that the same student also stated that those students who ‘know it’ go to the teacher and that the teacher was always happy to assist and support their learning even outside the normal class periods.

H₀₁: There is no significant difference between mean responses of male and female Physics teachers on the effect of school climate related factors on the teaching of Physics in secondary school.

Table 2: t-test computation of Male and Female Physics teachers’ mean response.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
score	Equal variances assumed	2.330	.153	1.078	12	.302	.79167	.73470	-.80911	2.39244
	Equal variances not assumed			.994	7.386	.352	.79167	.79617	-1.07120	2.65453

Table 2 showed the t-test inferential statistics between male and female Physics teachers mean values on their response on the effect of school climate related factors on the teaching of Physics in secondary school. It was indicated that the calculated t-value obtained at a degree of freedom of 12 at 0.05 level of significance is 0.302. Therefore, the hypothesis implies that there is no significant difference between male and female Physics teachers’ mean response on the effect of school climate related factors on the teaching of Physics in secondary school.

Research question 2: What is the perception of students on the effect of school climate related factors on the learning of Physics in secondary school?

Table 3: Students’ responses to school climate related factors affecting their learning

School Climate related factors (% Responses)

Responses	Students get along well with Physics Teacher	Get help if I need from my physics teacher	School environment friendly for learning	My physics classmates are cooperative and friendly	Adults in my school listen to students' concerns	At close of school I look forward to another school day	There are adequate infrastructure in my school
Strongly Agree	27.9	28.2	27.3	36.4	15.8	46.2	5.3
Agree	45.0	48.6	45.5	44.3	48.9	40.6	9.8
Disagree	8.6	12.0	13.3	12.1	12.2	5.6	40.5
Strongly Disagree	3.6	4.2	9.8	3.6	7.9	3.5	38.6
Can't say	15.0	7.0	4.2	3.6	15.1	4.2	5.8

The result of students' response to issues that are related to school climate as presented in Table 2 indicates that 72.9% of students are of the opinion that 'students get along well with physics teachers' in their schools (strongly agree and agree responses are here considered together). 76.8% of the students expressed that they get help from the physics teachers when they need any, while 64.7% agreed that adults in their schools listen to students' concerns. Adults in this consideration include both teaching and non-teaching staff with whom the students daily interact possibly as lab attendants, library staff, cleaners, etc. in a friendly and welcoming school learning environment. The indication from these 3 elements of the school climate is that students are happy and get necessary learning support from their physics teachers and other members of staff within the school that in one way or the other have dealings with them as regards their life in the school. 80.7% of the student respondents said "My physics classmates are cooperative and friendly", while 86.8% of the students were of the opinion that "At close of school I look forward to another school day". These elements of the school climate are indicative that most students are happy to be school and that there was a reasonable level of cooperation among students in a friendly atmosphere that supports teaching and learning. However, on adequacy of infrastructure, 79.1% (both strongly disagree and disagree responses considered together) of the students opined that the poor state of infrastructure affects the learning of Physics.

On the school environment and its effect on teaching and learning, some students expressed that the poor infrastructure in the school and general poor environment do not promote effective learning.

“well, all that I want to say is that the place that we learn is so ... in our class, the place is so hot that you can’t even concentrate - as you see I’m wearing tie, wearing jacket, wearing singlet, wearing shirt, long sleeve, so everywhere is hot, you can’t even understand what they are teaching so that is a problem” (A2P/5).

The view point of this student is that the poor state of infrastructure in the school – in this case, lack of cooling systems and electricity to power them affect their concentration and may not encourage effective teaching and learning. It is possible that under this scenario as described by this student, some less motivated students and teachers may find reasons to be truant in schools. The possible effect of the school physical environment on both enrolment and learning is probably captured in the expression of another student:

“The environment is not nice and the environment may be harmful to students... so we have to as in beg the government to help us out in this kind of environment. And... some of the people that... as in we don’t have many students is all about the environment because if the environment is so bushy... bushy, some of our parents will be afraid to send the students...em... the children to this school to come and learn because of the environment” (D1P/3).

This student has attributed the low students’ performance in Physics in the school to the poor school environment.

H₀₂: There is no significant difference between mean responses of male and female Physics student on the effect of school climate related factors on the learning of Physics in secondary school.

Table 4: t-test computation of Male and Female Physics teachers’ mean response.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
score	Equal variances assumed	.641	.424	3.938	246	.210	2.24246	.56945	1.12084	3.36409
	Equal variances not assumed			4.179	204.297	.232	2.24246	.53662	1.18444	3.30048

Table 4 shows the t-test computation on the effect of school climate related factors on the learning of Physics in secondary school based on male and female Physics students' mean response. The calculated t value is obtained as 0.210 at a degree of freedom of 246 at 0.05 level of significance. This therefore implies that there is no significant difference between male and female Physics students mean response on the effect of school climate related factors on the learning of Physics in secondary school. The null Hypothesis is therefore upheld.

DISCUSSION OF FINDINGS

Findings on the effect of school climate on teaching and learning of physics in schools from the opinion of students and teachers suggest that they enjoy a friendly and supportive school environment both with their peers and physics teachers which promotes effective teaching and learning. However, teachers' opinion suggests that students' use of alcohol, drugs and bullying negatively affects teaching and learning. The findings are discussed in detail in the next paragraphs of the section.

The result from the analysis of the students' questionnaire on the effect of school climate on teaching and learning tend to suggest that students enjoy a friendly and supportive school environment both with their peers and with the physics teachers and other staff in their schools. However, teachers seem to have expressed a different opinion with that of the students with most of the teachers holding the view that the 'use of alcohol or illegal drugs' and 'bullying of students' for instance, negatively affect teaching and learning activities in the school. The factors in the school environment that teachers have said affect the teaching and learning negatively in the schools, are associated with students. Social desirability effect on the part of students may have

influenced their response to questions on their relationship with their physics teachers and among themselves to account for the disparity between the opinion of the teachers and that of the students.

Also, it is possible that teachers may have responded to the questions with the generality of the student population in mind and not just the physics students; whereas the physics students in their response and as restricted by the questions gave answers with the consideration of only what happens in their physics classes, with their fellow physics students and their physics teachers. Considering the importance of such factors that could affect teaching and learning in the schools for policy, teacher training and development and school management, these differences call for a further investigation into the effect of the school climate on teaching and learning. On the physical school environment, students also expressed the problem of inadequate infrastructure that could negatively influence effective teaching and learning.

The finding of this present study on the friendly and supportive roles of teachers to students in schools agrees with those of Duze & Ogbah (2013) who investigated school climate challenges in Nigeria and reported that teachers give adequate support to students in their studies and that there was a cordial, friendly atmosphere among students that make them happy with their school life. This is very heartwarming within the limits and harsh infrastructural circumstances in which Nigerian teachers operate. This may suggest that with improved working conditions, students are very likely to have better and enriched classroom experiences that would support effective learning. The finding of the present study on the opinion of physics teachers on bullying and other student-related vices in schools, agrees with that report by UNICEF (2009) that bullying and instances where passers-by failed to help attacked students were of concern to many students and that some students stay away from school so as to keep safe as a result of such unwholesome behaviors. Also, the finding on the poor state of the physical school environment in Nigerian schools agrees with those of UNICEF (2009) and Duze & Ogbah (2013). For instance, the UNICEF (2009) country report for Nigeria revealed that most secondary schools in Nigeria had inadequate teaching and learning resources, classroom space, furniture, health, water and sanitation facilities.

Research has shown that the quality of school life and climate affects students' learning and attainment (Marshall, 2004; Uline & Tschannen-Moran, 2008; UNICEF, 2009; Thapa, *et al.*, 2013;

Duze & Ogbah, 2013). It is possible that the unruly behavior of some students like bullying and use of alcohol that disrupts normal learning activities as perceived by some teachers with the effect that some students stay out of school for fear of their safety, may have affected students' learning and attainment. This explanation is consistent with the conclusion of Thapa *et al.*, (2013) that students' attainment, graduation rates together with both teacher and student retention in schools was enhanced by a positive school climate. According the OECD (2013) report of the 2012 PISA, secondary schools that had high record of students' indiscipline were noted to have a paucity of qualified teachers. It is likely that effective teaching and learning may be impeded in schools where qualified science teachers are lacking which possibly could result in low students' attainment. Considering the importance of school climate in the overall objective of the school system to provide a conducive environment for teaching and learning, it is important that the findings on the conflicting views of both students and teachers be further investigated to establish the true state of school climates in Nigerian schools so as to proffer adequate solutions for safer schools in the country that would encourage and support student learning.

Conclusion

The study has evidently shown that school climate has a fundamental effect on the teaching and learning of Physics in secondary schools. Where the school climate is conducive for teaching and learning; teachers, students and other employees of the school will harmoniously function and perform positively aimed at improving students' performance. In the light of the importance of school climate for effective teaching and learning, the different viewpoints of teachers and students indicate the need of further studies on school climate in Nigerian schools with a view of establishing a paradigm shift in-line with best practices for policy and planning.

Recommendation

1. There is exigent need for synergy among all stakeholders in the secondary school to encourage the prevalence of harmonious relationship that will enhance effective teaching and learning of Physics.

2. Government at all levels including the private sector should place education as a priority and adequate funds should be allocated for the provision of infrastructure in creating and sustaining conducive climate for the teaching and learning of Physics in secondary schools.

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