



The Effect of Teachers' Perception and Students' Perception of Physics Classroom Learning Environment on their Academic Achievement in Senior Secondary Schools Physics

Sunday A. Adeyemo

Department of Sciences and Technology Education University of Lagos

Lagos Nigeria

Tel: 08023810802

E-mail: doc_adeyemo@yahoo.com

ABSTRACT

This study was aimed at investigating the effect of teacher's perception and students' perception of physics classroom learning environment and how it affects their achievement in physics. In order to achieve the objectives of this study, a questionnaire was administered to two hundred and fifty (250) senior secondary school (SSS II) students selected randomly. The data collected were analysed using mean, standard deviation simple percentage analysis of variance (ANOVA).

Major outcomes of this study include the following:

- (a) There exist a significant difference in students' perception of physics classroom learning environment and their academic achievement.*
- (b) There exist a significant difference in teachers' perception of physics classroom learning environment and students' academic achievement.*
- (c) The students' perception and teachers' perception of physics classroom learning environment have an effect on students' academic achievement.*

Based on these result necessary recommendation were made and it was concluded that students' perception and teachers' perception of physics classroom learning environment play an important roles in students academic achievement.

The study indicated that student's perception and teachers' perception of classroom learning environment has an effect on the students' academic achievement.

INTRODUCTION

Physics is the study of matter and energy and how they affect each other. It is also referred to as the study of natural phenomena in its fundamental state. However, the perception of both teachers and students in physics classroom learning environment influence the achievement of students in physics education. According to Harry et al (1969), physics has always been considered a practical subject, yet physics practical work has rarely been allocated more than 15% marks in an examination. Physics is the basis of technology and for effective living in the modern age of science and technology, it is essential that every child should be given the opportunity to acquire at least basic knowledge and the concept of physics as a science. More over in recognition of this fact, the federal government of Nigeria introduced a new system of education in the country known as the 6-3-3-4 system (FME, 1981). The first six year is the primary school education where the child learns to read/write and adapt to its environment. The junior secondary school education involves three years of training which enable the child to apply creative thinking and the use of materials especially around his/her environment which basically applies to the practical approach of science. The senior secondary, which is also three years of training, involves development of the scientific skills learnt in the JSS (junior secondary school) level, while the four years of university education relate to the adaptation of the skills learnt. It is these skills that the individual applies in his daily life to enable him fit into the society.

The fact that a lot of factors are responsible for students' underachievement in physics is not new to researchers but amongst those factors could be teachers and students perception of physics classroom learning environment. Recent studies indicate that there is a substantial impact of the classroom learning environment on students' achievement in physics learning. For example, Jegede (1995) and Brown

Arguaye (2001), have strongly argued that teachers and students perception of the learning environment are very important on the achievement of students in physics and that the knowing the students' perception will help the teacher in shaping their students' class perception and relatively their achievement in physics.

Over the years, a number of research projects on classroom learning environment have been carried out. Examples are the Harvard project and Physics of Walberg project. The interest in the study of learning environment has become more prominent since it has been evident that learning outcomes and students' attitude towards learning were closely linked to the classroom environment. Classroom learning environment refers to a setting or space where teachers and learners interact with each other and use variety of tools and information resources with each other and use variety of tools and information resources in their pursuit of learning activities (Wilson 1996). The nature of classroom environment and psycho-social interaction can make a difference in how the students' learning and achieve their goals (Mc Robbie, Roth and Lucus 1997).

On the other hand, perception refers the way one think about something and ones' idea of what it is like, also it is an ability to understand the true nature of a subject especially as it affects our environment. However both teachers and students perception physics classroom learning environment in different ways hence, learning is a process which produces series of changes in behaviour or it is more or less a change in behaviour that result from activities, training or observation. It is a change in behaviour that confirms learning.

According to Nwabueze (1993) learning is a process which produces progressive series of changes in behaviour or it is more or less a change in behaviour that results from activity. The amount of learning and knowledge imparted such as this, lack proper moral content, and the physical facilities are inconducive to effective learning, being either non-existence or in a deplorable state.

However, there has been a wide range of problem with the available class room learning environment in the senior secondary schools in Nigeria which prevents effective learning to take place. Some of the problems associated with classroom arrangement which include the tall students obstructing the view of the short ones at the back to see the chalk board inadequate chairs and tables which can cause discomfort for students. Another problem is poor classroom with little or no ventilation.

Due to the composition of physics education, most physics teachers believe it should be done practically and theoretically to allow for effective understanding of the knowledge by students. From finding of Mitchell and Dejong (1990) and Thornton (1993) "good learning requires constant variation in the purposeful intellectual activities of the learner and a wide range of pedagogical stratifies". To them many teachers do not have access to didactic materials and modern educational technologies (laboratory, printer, video, multimedia, software etc), which could have made training learner - centred. Researches had been conducted on learning environment in different countries like USA, Australia, Netherlands, Nigeria etc. such researches include the research reported by Lim (1993) who did a study in secondary classroom environments, comparing learning environments in different types of schools (good, average and below) and different educational streams. There was also a study on secondary science laboratory environments using the SLEI (Wong U. Fraser, 1995) that assessed the learning environment form the perceptions of students and teachers.

It is henceforth imperative to study the teachers' and students' perception of physics classroom learning environment in senior secondary schools since science without physics is incomplete and because there can be no technological advancement without physics. This study will be more effective at this time when the country needs more scientists to advance technology.

STATEMENT OF THE PROBLEM

Over the years, the problem of under achievement of science students in physics has been a general problem. For example, many researchers in Nigeria have conducted series of research to actually find out what could be responsible for the problem. Factors such as lack of adequate laboratory equipment, ineffectiveness and lack of teaching proficiency of teachers, lack of qualified teachers and school factors have been identified as major causes of underachievement of science students in physics. Despite all these

efforts, the poor performances of students still exist. However, little emphasis has been laid on the effect of teachers' perception of physics classroom learning environment and students' perception of physics classroom, learning environment. This henceforth justifies the need for the study of the effect of teachers' perception and students' perception of physics classroom learning environment on their academic achievement in senior secondary schools.

REVIEW OF LITERATURE

Several studies have been done and opinions expressed by great scholars in an attempt to explain the factors influencing educational achievement or students' performance in our secondary schools.

Basically, there are general knowledge that environmental factors exert a considerable influence on a child's school progress and academic performance. This view has however been debunked by other researchers who stresses the importance of the environment for effective teaching and learning and eventual better academic achievement by students.

For the purpose of this study, through reviews of relevant literatures were carried out under the following headings:

1. Teaching effectiveness and teaching skills.
2. Teachers' perception of teaching physics.
3. Students' attitude towards physics
4. Parents' attitude and academic performance of students.
5. Students' perception of teaching behaviour and learning outcomes.
6. Students' perception of physics classroom learning environment.
7. Other factors influencing students' academic performance.
8. Summary of review.

The major purpose of science education is to have students construct a deep conceptual understanding of any scientific topic studied. This cannot be achieved if students do not acquire the skills that makes possible the instruction is cognitive, affective and psychomotor oriented. Based on this fact, teachers and students orientation has to be changed to make the best use of skills embedded in any given scientific activities since they are closely associated with habit formation. These skills are related to a logical sequence and any omission of performance skills in a chain can be fatal to development of essential abilities in real life situation.

Usually, effectiveness as assessed by scores of authors such as Baiyelo (1982) and Nwosu (1995) indirectly through perception. In this way, the teacher is at a loss which specific skills and abilities students need to acquire, reinforced, upgraded and improved upon in order to overcome the constraints to effective instructions. This means that students need to be exposed meaningfully and repetitively to the tasks as a pathway to developing, acquiring, performing assessing and evaluating skills which will ultimately change their problem solving ability (Adeyemo 2007).

An awareness and sensitization of the reparative of skills needed to solve the problem posed in any coordinated physics task is one of the minimum requirements of today's teachers if he or she is to successfully plan, prepare and deliver and even assess instruction critically and equally. It is important to note that the relationship between technology (skill performance) and science (Physics) has always been symbiotic and both efforts are necessary for the advancement for knowledge in human endeavour (Kranzberg, 1991).

A more recent and rewarding effort was that of Baiyelo and Adeyemo (2002) who refer to skills of prerequisite enabling, optimizing and valuing as higher other skill performance and that these skills if carefully arranged and surveyed in a given task may go a long way in making the much awaited difference in achievement. Ogunleye (1999) cited Ukeje in his book to have said "poor achievement of students in science especially in physics is due to the teachers who are neither qualified nor interested some teach at the limits of their knowledge while a good many are teaching beyond limits of their knowledge while a good many are teaching beyond limits of their knowledge". His findings was in agreement with that of Nworgu (1988) who investigated that secondary school physics teachers are not proficient in planning, selection methods, teaching skills and resources management.

Despite the numerous constraints to the students' achievement in physics, the teachers' perception of teaching seems to be the most important. The perception of teachers' teaching, to a large extent, determine the level of understanding reached by his students. Most teachers perceive teaching as boring, none interesting and a highly none rewarding profession. In recent years, new research has demonstrated the dramatic effect that teachers can have on the outcomes of students from all academic and social background. In fact, studies have shown that teachers' perception is the most important educational input predicting students' achievement.

Much of the research published has confirmed that the perception of teachers teaching physics raise students performance, Ferguson (1998), Goldbaber (2002), Brewer (1995) and Anderson (1999). Horn and Sanders (1997) also investigated the impact of teachers on students learning. Their findings indicated teachers are the most important educational factor influencing students' outcomes. According to Ajibade (1987) attitude and interest of teachers can influence the students' performance since the teacher is regarded as someone who imparts or give instructions to students to do something. Then such teachers' attitudes and interest plays a prominent role in establishing good relationship with the students for educational development. Hence, for a teacher to be able to select appropriate educational media for the teaching of physics, the idea of what he wants to teach and how he wants to teach must be topmost on his mind before selecting the media that takes into consideration individual differences of students so as to meet their needs and the interest as some of them may learn better by simple explanation in class while others do better when learning with machines. Mile (1975), Abimbade (1997) and Ajelabi (2002) seem to agree that selection of media should be based on students needs.

According to Kobiowu (1994) the peer groups influence their member in so many ways, which could be positive or negative and these includes the following: providing a way in which individual member can become less dependent of family authority, providing children with experience in equalitarian relationship not possible in the family, these knowledge in a way could be highly beneficiary or otherwise towards the individual academic performance in school. Sometimes this knowledge concerns taboo subject such as sex, which the family avoid or at least treat in a formal and unsatisfactory way.

According to Adefuye (2000), the presence of the various learning resources in schools, such as audio-visual aids, arouses students interest towards learning and definitely might have positive effects on performance. Audio-visual aids takes the forms of technological devices, amongst these are: tape recorders, radio broadcasts, public address system, overhead and opaque projectors. As teaching resources, they are useful for the presentation and clarification of information.

Furthermore, the need for adequate supply of books especially textbooks in schools libraries in terms of quality can be of immense importance towards the academic development or performance of the students (Onuoh 1986).

In view of the above reviewed literatures, it is very clear that efforts had been made by the people of concerned minds in the past and also in present time to improve the performance of students in physics. Research studies have been carried out on teacher effectiveness, students' attitudes, administrators, curriculum planning and of course the parents. This is because everyone has a role to play in the child's social, psychological physical and intellectual development. Hence, the success or failure of our secondary school in terms of outcome of the performances of physics students depend largely on how positively or negatively each factor or variable performs its duties, roles or responsibilities.

PURPOSE OF THE STUDY

The purpose of this study is to identify the effects of teachers' and students' perception of physics classroom learning environment on students' academic performance in physics.

RESEARCH HYPOTHESES

In this study, the following null hypotheses shall be tested:

1. There will be no significant difference in the students' perception of physics classroom learning environment and their academic achievement.
2. There will be no significant difference in the teachers' perception of physics classroom learning environment and the students' academic achievement in physics.

- The teachers' perception and students' perception of physics classroom learning environment will not differ significantly.

RESEARCH DESIGN

The sample for the study will comprise one hundred (100) male students and one hundred (100) female students. Thirty (30) of the male respondents and twenty (20) of the female respondent will be randomly selected from the senior secondary school II(SS 2) in each of the five schools. Twenty (20) physics teachers will be selected for the study of which four (4) are selected randomly from each of the five (5) schools, irrespective of their gender.

INSTRUMENT

For the purpose of data collection, in order to provide answers to the research questions formulated in chapter one, and to ensure adequate coverage of the target population selected, the instrumentation that will be used will be questionnaires.

The questionnaires will be of two (2) types:

- Teachers' perception questionnaire (TPQ) and
- Students' perception questionnaire (SPQ).

The questionnaires will provide five (5) responses, each borrowing the idea of Likert (1932). The number of respondents giving each type of response will be counted and scored. The five (5) responses that will be used are:

- | | |
|----------------------|----|
| 1. Strongly Agree | SA |
| 2. Agree | A |
| 3. Undecided | U |
| 4. Disagree | D |
| 5. Strongly Disagree | SD |

The teachers' questionnaire will be designed to collect information about the teachers' perception of physics classroom learning environment. The students' questionnaire will be designed to collect information about the students' perception of physics classroom learning environment and various level of academic achievement in physics.

DATA ANALYSIS AND RESULTS

The data analysis and results are presented in this chapter with special reference to the research hypothesis to be tested in the study. To do this we used research hypothesis one.

Ho₁: There will be no significant difference in the students' perception of physics classroom learning environment and their academic achievement.

Analysis of variance (ANOVA) was used to decompose answer research hypothesis one. In the corrected model perception refers to students achievement in physics, the dependent variable was students achievement in physics in this research work. The table below gives the summary of data analysis of research question are:

Table 1: Univariable analysis of variance (ANOVA) showing tests of between subjects effects (students' perception)

Source	Type III sum of squares	DF	MS	F	Sig. (0.05)
Corrected model	332.820	1	332.820	1.747	0.000
Intercept	156688.020	1	156688.020	822.315	0.000
Students' perception of physics environment	332.820	1	332.820	41.747	0.000
Error	9146.160	248	36.8797		
Total	166167.000	250			
Corrected total	9478.980	249			

R.squared = 0.035 (adjusted R.squared = 0.015)

Table 2: Univariable analysis of variance (ANOVA) showing table of between subjects effects (PAT)

Source	Type III sum of squares	DF	MS	F	Sig. (0.05)
Corrected model	1.6209	1	1.620	0.008	0.928
Intercept	156688.020	1	156688.020	793.518	0.000
Students' achievement of physics	1.620	1	1.620	0.008	0.928
Error	9477.360	248	38.215		
Total	166167.000	250			
Corrected total	9478.980	249			

R.squared = 0.000 (adjusted R.squared = 0.21)

Ho₂: There will be no significant difference in the teachers' perception of physics classroom learning environment and the students' academic achievement in physics.

Table 3: Univariable analysis of variance (ANOVA) showing tests of between subjects effects (teachers' perception)

Source	Type III sum of squares	DF	MS	F	Sig. (0.05)
Corrected model	87.120 ^a	1	87.120	0.805	0.373
Intercept	225523.280	1	225523.280	2091.368	0.000
Teachers' perception of physics environment	87.120	1	87.120	61.808	0.000
Error	5775.600	248	38.215		
Total	230786.000	250			
Corrected total	5262.720	249			

R.squared = 0.017 (Adjusted R.squared = 0.004)

Table 4: Univariable analysis of variance (ANOVA) showing tests of between subjects effects (Learning environment)

Source	Type III sum of squares	DF	MS	F	Sig. (0.05)
Corrected model	208.080 ^a	1	208.080	1.976	0.000
Intercept	225523.280	1	225523.280	2141.620	0.000
Learning environment	208.080	1	208.080	1.976	0.000
Error	5054.640	248	20.382		
Total	230786.000	250			
Corrected total	5262.720	249			

R.squared = 0.017 (Adjusted R.squared = 0.004)

The table 3 and table 4 shows that there exist significant difference in the teachers' perception of physics classroom learning environment and the students' academic achievement in physics and it is significant at 0.05 level of significance.

RECOMMENDATIONS

Based on the results of the findings, the following recommendations were made:

School administrators should constantly provide the necessary resources for physics learning environment in order to treat topics that require practical approach for effective learning to take place. They should also make sure that these resources are available and function properly.

School owners should improve the standard of their school environment. Teachers should learn to encourage their students and motivate them to learn by adopting the stimulus response theory whereby

when questions are asked by the teacher, the students response should be appreciated be it right or wrong in order not to make the students' perceive themselves as academic failures. Teachers should learn how to improvise so as to make up for the unavailable equipments. The problem under funding of the education sector by the federal and state government should be reviewed in order to carter for the building of proper school environment, provision of infrastructural facilities needed to study physics and other science subjects effectively. Proper and well equipped laboratories should be built and maintenance scheme are to be ensured so as to reduce the failure rates of students in SSCE physics practical examination. They should not see physics as irrelevant and hard to their life but rather as a necessity for improvement of their way of life.

DISCUSSION AND CONCLUSION

The following conclusions were reached based on the results obtained in this research. The perception of teachers' on the physics classroom learning environment exerts a great influence on students learning outcomes in physics.

The learning environment and the availability of infrastructural facilities contribute to a positive learning outcome. The students' perception of physics classroom learning environment affects the quality or learning effectiveness. The academic achievements of physics students depend on both the teachers and students perception of physics classroom learning environment.

Physics teachers need to undergo further training to update their skills in teaching effectively. During training, importance of students' perception and teachers' perception should be highly emphasized. Activities are not solely about what the score is, how many wins or losses are attained or what place is won at an examination. They provide and instruct students' lesson that will last them a life time.

DISCUSSION OF OUTCOMES

The research shows that the teachers' and students' perception of physics classroom learning environment plays a significant role in the achievement of the students.

The outcome of the study shows that there exists a significant difference in the students' perception of physics classroom learning environment and their academic achievement in physics. The difference is significant at 0.05 level of significance. This implies that students' perception of learning environment determines to a great extent their academic achievement in physics.

Murray (1938), introduces the term alpha press to describe the environment as observed by a detached person and beta press to describe the environment as observed by a detached person within that environment. The ideas extended by Stern, Stein and Bloom (1956) to include perceptions of the environment unique to the individual (called private beta press) and perceptions of the environment shared among the group (called consensual beta press). Hence, it was recognized that the perceptions of persons form different perspectives could lead to different interpretations of that environment. Confirming the outcomes, it is obvious that students' perception of physics classroom learning environment plays a significant role in students' academic achievement. Poor classroom learning environment, abstract way of teaching physics gives rise to poor academic achievement and vice-versa.

Also, Ajibade (1987) stated that students' poor performance in physics is due to a lot of factors which vary from teachers' perception, attitude and interest of teachers' method of teaching etc.

Hainshek, Kain and Rivkin (2002) confirmed that teachers' perception is the most important schooling factor responsible for students' poor achievement in senior secondary school physics. Confirming, the outcomes, it is obvious that teachers' perception plays an important role on students' academic achievement, since the teacher is regarded as someone who impacts or gives instructions to students to do something and also students' perception and teachers' perception of physics classroom learning environment plays a key role in influencing the amount of exposure to physics a students' experience.

IMPLICATIONS TO SCEINCE TEACHING AND LEARNING

Education is a tool that enhances national development. According to Ukeje (1986) education is universally accepted as one of the catalysts for social, economic and technological development. In this global era of information technology, it's therefore necessary for a nation that wants to advance in science

and technology development to invest adequately on resources for the effective teaching and learning of physics and other science subjects.

According to Ogunleye (1999) one of the major objectives of teaching science in secondary schools is to ensure that students acquire scientific skills and this can only be done if the teacher is proficient and effective as evidences in the students' learning in terms of classroom availability, students' class-ratio, instructional materials availability, teaching aids etc.

The implication of this to science teaching and learning are:

- (i) If students perceive their learning environment not conducive, their science teaching cannot be effective.
- (ii) It implies that teachers should have a good perception of physics classroom learning environment in order to encourage students.

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