A REVIEW OF STUDIES ON FACTORS DETERMINING STUDENTS'ACADEMIC ACHIEVEMENT IN SCIENCE SUBJECTS AT SENIOR SECONDARY SCHOOL IN NIGERIA

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Abstract
Student academic achievement is very important in teaching and learning of science, it is pragmatic that students do not have good indulgence of many of the concepts in the science subjects. Many factors have been identified to be responsible for students' poor academic achievement in science subjects at the secondary school level, but very few on teacher, school and learning environment factors. This study, seek to review previous work done so far and carry out research on Students', Teacher and School Environment factors as determinants of achievement in physics at senior secondary school. The study unveiled the factors affecting students' academic achievement in science subjects at secondary school. Previous studies on factors affecting students' academic achievement in science subjects was also reviewed. It is the hope of the researcher that the findings from the literature reviewed will give credence to teacher and students' achievement in secondary school physics. Also anticipate it awaken teachers consciousness on their pedagogy of instructions in their respective classes, which will motivate the learners to pick interest towards physics.

Keywords: Students, Achievement, Attitude, Academic, Study-habit

Introduction

Education is the primary agent of transformation towards sustainable development. It increases people's capacities to transform their visions for society into reality. All countries strive for quality education for their sustainable development.

In a general sense, education is a form of learning in which the knowledge, skills, and habits of a group of people are transferred from one generation to the next through teaching, training and research. Any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational. Education from all perspective is viewed or aimed at preparing one for life and since it is supposed to prepare one for a better living, one must be certain on what he/she can achieve through it and from what discipline he/she can attain it. Education has some of its principles from psychology, this entails having a good grasp of all theories that influence the teaching-learning process. Also, the quality of education that a teacher provides to students' is highly dependent upon what teachers do in the classroom. Thus, to prepare the students' of today to become successful individuals of tomorrow, teachers needs to ensure effective teaching (Sofeme & Amos, 2015).

Teaching as a scientific process involve the systematic planning and programming of instruction and experience, also the use of technological tools that will lead learners to acquire certain new valuable skills, knowledge and competences, both mental and physical. It is therefore a necessity for academic and professional qualification of teachers not to be overemphasized in effective teaching and learning process (Adu & Adé-Ajayi 2015). The hub of the notable achievements of education is to enable people to utilize their knowledge in problem-solving. In fact, many educationists and philosophers asserted this as the central goal of education, as *Fatin, (2009) concluded that* education refers to experiences or instructions which nurture the capacities (the concepts and skills, the mental operations and dispositions) for subsequent problem-solving and enquiry. Also, Adelowo, Ricardo, and Makinde, in Adu and Ade-Ajayi, (2015), argued that teachers' experience tends to reflect in class control and ability to meet up with the needs of individual students'. The length of teaching experience has been an important factor determining how effective the teaching-learning process in a school has been achieved.

More so, one of the major problems facing teaching today is the question of how current are the professional teachers. The majority of teachers who have been employed in the past decades have been doing the same thing, the same way all along. They have no knowledge of the current ideas and innovations that have taken place in the educational field in the recent past. What account for this is that teachers have not been given the opportunity to re-training (Ogunbiyi, 2004). Ogunbiyi, therefore recommended that teachers should be encouraged to go for workshop training in their areas of specialization. The role of the teacher is very important in any schooling exercise; especially since his/her direct participation can range from complete control over what is learned to minimal intervention. The teacher is the source of all knowledge that children acquire in class. The teacher can impact students' learning in different ways. However, the way and manner the teacher delivers subject or methodology is directly related to learners, that is, teachers' method of teaching (Mekonnen, 2014). Therefore, teachers planning should include: (1) Choice of appropriate teaching material; (2) Choice of appropriate teaching method; (3) Intensive research on the topic to be taught; (4) Determination of the objectives for the lesson, these are applicable to all classroom teaching/learning, particularly science subjects such as physic.

The world is increasingly dependent on physic and fuelled by breakthroughs in physics research. As Technology continually to advance, the beginning to answer questions about the creation and end of the universe persist, and also the discovering of amazing things about the interaction of subatomic particles. But unfortunately, less and less students' are studying physics, which is causing the general public to mitigate their understanding about scientific concepts. Generally Students' rely on the lesson notes, reference and text books, study materials at large to maintain good performance in their studies nowadays. Students'/number in most Schools have been increasing, but at the same time basic facilities are not being increased at the same rate. In this scenario, the rapid growth of students' number in each school as observed, certainly affects the availability of basic facilities on the other hand. The issue of poor academic performance of students' in Nigeria has been of much concern to all and sundry. The problem is so much that it has led to the widely acclaimed fallen standard of education in our States and Nigeria at large (Satilehin, Johnson, Kolawole & Adekunle, 2015). Poor academic achievement in Physics could be attributed to many factors among which teacher's strategy itself was considered as an important factor and also the type of school which they attend. The school one attends is the institutional environment that sets the parameters of students' learning experience (Mekonnen, 2014). It is against this background that this study proposed to investigate Students', Teacher and School Environment factors as determinants of Achievement in Physics at Secondary Schools. Specifically, in Nigeria where it seems to have little studies that attempted to investigate on the proposed subject matter.

Factors Affecting Students' Academic Achievement in Science Subjects at Secondary School

Attitude to Learning: This refers to the positive or negative evaluation of Science, also they are psychological constructs theorized to be composed of emotional, cognitive and behavioural components of the students' and teacher towards the learning environment. Much so, Muli, (2012) attitudes are acquired through learning and can be changed through persuasion using a variety of techniques. Attitudes once established help to shape experiences the individual has with the object, subject or person. Although attitudes can change gradually, people are constantly forming new attitudes and modify old ones when they are exposed to new information and experiences.

Background Knowledge: This refers to what students already know about the content on a particular subject, which is one of the strongest indicators of how well they will learn new information relative to the content. We acquire background knowledge through the interaction of two factors: (1) our ability to process and store information, and (2) the number and frequency of our academically oriented experiences. The ability to process and store information is a component of what cognitive psychologists refer to as fluid intelligence. As described in *Robert* (2004), fluid intelligence is innate. One of its defining features is the ability to process information and store it in permanent memory. High fluid intelligence is associated with enhanced ability to process and store information. Low fluid intelligence is associated with diminished ability to process and store information. Students who have a great deal of background knowledge in a given subject area are likely to learn new information readily and quite well. The converse is also true. These signify the importance of background knowledge in academic achievement.

Study Habit: This is a behavioural style that is systematically formed by students' towards learning and

achievement in an academic environment. Study habits have been found to contribute significantly to students' science achievement. Studies have indicated that study habits make a significant contribution to the prediction of achievement. This implies that if a student exhibits negative study habits (such as lacks concentration, feels bored, tired and sleepy while studying physics, spends little time on physics and does not map out immediate goals to attain), it is likely that the student may lack the impetus to engage adequately in productive physics learning during the allocated school time and during his or her personal study time. Also, added that mastering skills by students makes studying more enjoyable and effective which in turn strengthen the students interest so that he/she spends more time studying (Muli, 2012).

Self Concept: Self-concept is a type of self-appraisal that is created through interaction with one's environment and the influence of significant others (Naseebah,2015). It is one's self perception surmised from attitudes, feelings, and knowledge about one's skills, abilities, appearance, and social acceptance. The development of self-concept starts from birth. This is first evidenced through the emotional attachment of the child and the mother. The quality of interactions may contribute to or weaken the self-concept of the child. Students' positive perception is helpful in achieving success throughout life, while the success in children's lives depends not only on cognitive ability, but also on emotional skills.

Motivation: This refers to the internal or external factors from the students and the school administration that stimulate desire and energy in students to be continually interested in Science. However, Motivation is a fundamental recipe for academic success. It involves internal and external factors that stimulate desire and energy in people to be continually interested and committed to the job, role, or subject, or to make an effort to attain a goal. Reports show that motivation explains why people decide to do something, how hard they are going to pursue it, and how long they are willing to sustain the activity. In order words, "motivation is what gets you going, keeps you going, and determines where you're trying to go". Furthermore, motivational beliefs are very essential to the academic achievement of students because they help to determine the extent to which students will consider, value, put in the effort, and show interest in the task (Charles & Harriett, 2017).

School environment: This includes the school building and the surrounding grounds such as noise, temperature and lighting, as well as physical, biological or chemical agent, (Eze, 2010), School environment can then be seen to include material and human resources, a learning place which consist of the entire interaction. The learning environment is both the natural and provided setting where teaching and learning takes place. Also, referred to as the setting physical and conceptual in which teaching and learning are carried out as deliberately planned. Or learning environment means classroom surroundings, physical facilities in the classroom and teacher – pupil relationship.

School Location: Location of schools could also be a factor that affects science subject achievement. Also, school's location can mean urban and rural schools. Location is a particular place in relation to other areas. Akpan (2008) indicated that schools in urban areas have electricity, water supply, more teachers more learning facilities and infrastructure. To support this, Ezeudu (2012) reported that urban areas are those with high population density, high variety and beauty while rural areas are those with low population, subsistence mode of life, monotonous and burden. School location with its attendant features of instructional spaces planning, administrative places planning, circulation spaces planning, spaces for conveniences planning, accessories, planning, the teachers as well as the students themselves are essential in the teaching-learning process. The extent to which student learning could be enhanced depends on their location in the locality, within the school compound, the structure of their classroom, availability of instructional facilities and accessories. It is believed that a well planned school will gear up expected outcomes of education that will facilitate good social, political and economic emancipation, effective teaching and learning process and academic performance of the students.

Class Size: Classroom learning environment in the senior secondary schools in Nigeria prevents effective learning to take place due to over population of student, inadequate spacing and poor ventilation. Some of the problems associated with classroom arrangement also include the tall students obstructing the view of the shorter ones at the back to see the chalk board, inadequate chairs and tables which can cause discomfort for students.

Laboratory Adequacy: Laboratory adequacy which is a school environment factor has been reported to

affect the performance of students (Adesoji, 2008). Science laboratories or inadequate equipment in science laboratories in schools affect teachers attitudes towards the aims of science experiments in a negative way. Science experiments are inseparable and indispensable parts of learning experiences. The experiments provide both acquiring science concepts and learning scientific method for learning experiences.

Peer Effect: The peer effect is particularly a strong influence in academic achievement, it independent of other factors such as race, ethnicity, gender, income, and other background variables. Also, Family background factors such as household environment and parental education also play an important role in explaining students' achievement in school.

Previous Studies on Factors Affecting Students' Academic Achievement in Science Subjects
Several studies have been conducted on the various factors determining students' academic achievement in senior secondary school. There has been little or no study done on Students', Teacher and School Environment factors as determinants of Achievement in Physics at Secondary Schools.

For instance, Iloba, (2009) investigate the relationship between students' perception of classroom psycho-social environment and their achievement in secondary school geography. To carry out this study, five research questions and three hypotheses were formulated, all derived from the literature review. Two instruments, geography classroom environment scale questionnaire (GCESQ) and cumulative score of SS2 geography students were used to collect relevant data from a sample of 295 SS2 students randomly selected from 10 senior secondary schools in the Ika Local Government Area of Delta State. The schools were selected by stratified random sampling technique. Mean and standard deviation were used to answer the research questions 1 and 2 while Pearson correlation was used to answer research question 3. Stepwise analysis was used to answer research question four, five and also used to test the null hypothesis. The study, among other things revealed that psycho-social classroom environmental factors correlated negatively with students' achievement in senior secondary geography and that location of school, whether urban or rural has little or no effect on students' achievement due to psycho-social factors of the classroom. Hence, there was no significant difference in the achievement between urban and rural students in geography in. In light of the above then, there is a need to embark on a research with the intend to determine the effect of school environment on students' academic achievement in senior secondary school physic students.

However, Adeyemo, (2010) carried out a study on relationship between students' participation in school based extracurricular activities and their achievement in physics. The samples used in the research work were selected randomly from four senior secondary schools in Mainland Local Government Area of Lagos State. A total number of two hundred physics students comprising one hundred females and one hundred male students. Three null hypotheses were postulated and tested at 0.05 level of significance to find the relationship between students' participation in school based extracurricular activities and their achievement in physics. The instruments used were students' questionnaire and physics student achievement test (PAT). The data collected were analyzed using simple regression statistical analysis and the results of the findings showed that school based extracurricular activities having significant influence on students' achievement in physics, which is seems to be in disagreement with the revelation of the present study in respect to students' study-habits as part of extracurricular activities in achievement of physics in secondary schools.

Also, Adeyemo, (2011) carried out an investigation on the effect of teacher's perception and students' perception of the physic 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 analyzed 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 a physics classroom learning environment and their academic achievement. (b) There exists a significant difference in teachers' perception of physics classroom learning environment and students' academic achievement. (c) The students' perception and teachers' perception of the physic classroom learning environment have an effect on students' academic achievement. Based on these results necessary recommendation was made and it was concluded that students' perception and teachers' perception of

physics classroom learning environment play an important role 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. But the study fails to put into consideration; availability of laboratory for adequate practical experience and other environmental factors such as peer group influence and study-habit which the present finding will sick to resolve.

According to Ogbodo, (2010) the problem most students have that contributes to their poor performance in tests and examination is lack of proper study habit. For an excellent performance, there is a need for the student to form good study habits. A student, who wants to study well, needs to choose a suitable place for his studies. Where to study is as important as what to study and how to go about studying. Productive study habits require learners to prepare a personal time-table for themselves allocating a certain length of time for a particular subject, depending on how difficult each subject is. The current study tends to close a gap on student gender, self-concept and peer group influence which are a major ingredient, when it comes to students' study-habit in school generally.

Meanwhile, Akindutire and Olanipekun, (2012) examined factors influencing the choice of Health Science subject by Senior Secondary School students in Nigeria. A simple random sampling technique was used to select eight hundred (800) Senior Secondary School II students in Ekiti State senior secondary schools located in ten local government areas. A questionnaire designed and validated by the researchers was used to gather relevant information. Data collected were analyzed with the use of multiple regression. Findings revealed that the personal interest of the students, availability of school health facilities and equipment, parental decision and school health counselling services were better predictors of the students' choice of health service than the peer group, teachers' personality, class size and West African Examination Council / National Examination Council (WAEC/NECO) requirements. Based on these findings, it was recommended that students' personal interest should be greatly considered in the choice of Health Science subject and the school counsellors should be more enlightened on the relevance of Health Science/ Health Education for the national development. The current study seeks to compare the findings of Health Science to that of physics in secondary school by using different approaches and in different locations.

The study of Sofeme & Amos (2015), investigated the attitude of students toward science subjects in senior secondary schools in Adamawa State. Three objectives were raised and to these objectives one research question and two hypotheses were raised. The target population was all the Adamawa state government secondary school students. The study is survey type which used stratified random sampling technique to select a sample of 250 science students. These students responded to valid and reliable instrument known as Science Students' Attitude Questionnaire (SSAQ). The data obtained were subjected to descriptive statistics as well as t-test and chi-square test. The results showed that students in Adamawa state have positive attitude towards science subjects and gender has a significant effect ($p<0.05$) on their attitude. The results indicated that boys have a more positive attitude toward science subjects than their girls' counterpart. Age difference among boys and girls in the sampled secondary schools in Adamawa state does not have influence on their attitude toward the study of science Subjects. The investigation fails to put study-habit and self concept into consideration as having a major role in the achievement of individual student academic achievement, and on this note the present research seeks to cover up the laps in the area of physics.

Ezeudu and Obi (2013), Conducted an investigation on the effect of gender and location on students' achievement in chemistry in the Nsukka Local Government Area of Enugu State, Nigeria. It was guided by three research questions and three hypotheses. The sample of the study was made up of 827 students comprising 473 males and 354 females. Eight secondary schools were sampled using simple random sampling techniques. A proforma was the instrument which enables the researchers to copy results from the school past records in the respective schools through the help of the school principals was used to collect data for the study. Means and standard deviations were used to answer the research questions and t-test statistics were used to analyze the hypotheses. The findings showed that male students achieved significantly better than the female students in both urban and rural schools. Also, there was no significant difference in the academic achievement of students in urban and rural schools. However, the present study seeks to adopt a similar procedure, but in the area of physics due limited literature reviews in the subject area and also conducting it on a different scope of study entirely.

Isaac *et al,* (2014) observed the activities that went on in physics classrooms in Senior High Schools in Ghana. Specifically, the study investigated the pattern of interaction and instructional methods used for teaching physics and level of coverage of physics syllabus. A survey design was employed for the study in which questionnaire was used for data collection. Participants for the study were physics teachers and final year physics students. Findings from the study suggest that classroom interaction seemed to be mostly teacher-centered and tended not to support inquiry-based teaching and learning which is noted for promoting conceptual change and enhance performance. It is recommended among other things, that physics teachers should be exposed to efficient pedagogies of teaching and presenting information to learners. The traditional way of teaching where teacher decides on what goes on in the classroom has a limited space in the 21st century science classrooms, particularly physics. This present study has found that it is necessary to carry out a similar investigation here in Nigeria, also by closing the gap with findings on Teachers interest in teaching physics, updating him/her self with the current trends in the field/discipline by attending workshops, seminars and conference.

Adesoji and Olatunbosun, (2008) constructed and tested an eight-variable model for providing a causal explanation of achievement of secondary school students in chemistry in terms of student variables - attitude to learning chemistry, background knowledge in Integrated Science, teacher variables - attitude to chemistry teaching, attendance at chemistry workshop and school environment related variables-class size, laboratory adequacy and school location. The study adopted an ex-post facto research type the population was made up of 621 senior secondary III chemistry students and 27 Senior Secondary III chemistry teachers in Oyo State, Nigeria. Four sets of instruments were used, these were chemistry Achievement Tests (SACS), Teacher. Attitude Towards Chemistry Teaching Scale (TATCTS) and Laboratory Adequacy Inventory (LAI). The results revealed that 7.20% of the total effect on achievement in chemistry was accounted for by all the seven predictor variables when taken together. It was also revealed that only four variables -school location (X1) laboratory adequacy (X3), teachers' attitude to chemistry teaching (X5) and teachers' attendance at a chemistry workshop (X4) had direct causal influence and also made significant contributions to the prediction of achievement in chemistry (X8) (the criterion variable). The current study decided to adopt the same topic, same variables, but different subject, scope of study, analysis approach in order to cover the gap in the area of physic.

Conclusion

The findings of this study will be useful to Teachers', Students' and School Administrators in public and private schools; it will also be of great benefit to all tiers of governments in the country, curriculum planners, parents, National and International Educational Development partners. It is the hope of the researcher that the findings will give credence to teacher and students' achievement in secondary school physics.

Results from this work will be of immense benefit to teachers' of secondary schools, because it will provide them with firsthand information on students' attitudes and achievement during and after delivering instruction in the class. Also awaken their consciousness on their pedagogy of instructions in their respective classes, which will motivate the learners to pick interest towards physics.

It is the believe of the researcher that students', particularly in secondary school will benefit from the findings of this study since it will provide basis for awareness and better understanding of how their current study habits, self concept, and peer effect affects their academic achievement. Likewise gives them a more focused and clear perspective on how specific behaviours related to their studies influenced their study habits.

In addition, the fact that this study is will be conducted in public schools, it shares quite a lot of similarities with many other counterparts. In this connection, this study will provides a valuable reference for other schools within and outside the state to reflect upon the school environment as it affect the academic achievement of students' in senior secondary school physics and also engender further empirical studies on specific variables examined in the present study with respect to other subjects or disciplines, this will lead to other findings.

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