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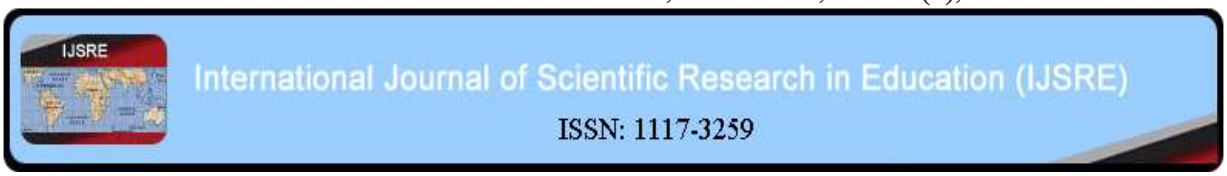

Some Determinants of Basic Science Learning Outcome at the Junior Secondary School Level

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Abstract

Science is an indispensable tool for human and national development and adaptation. The study was necessitated by dwindling fortune of students passing Basic Science at the Junior Secondary School Certificate Examination (JSSCE). The study was therefore aimed at examining some determinants Junior Secondary School Students' learning outcome in Basic Science. Six variables out of many believed to be indicators of students learning outcome were selected by the researcher. The research adopted a survey design with a sample of three hundred (300) students selected from Obio/Akpor and Port-Harcourt Local Government Area of Rivers State through stratified random sampling for the study. Three valid and reliable instrument were used for data collection and they are Basic Science Achievement Test (BSAT), School Demographic Data Questionnaire (SDDQ) and Student Attitude and Socioeconomic Status Questionnaire with r=0.67, 0.77 and 0.71 respectively. Data collected were analyzed using regression analysis. The results shows that all the affecting students' learning outcome in Basic Science explain 49.0% of the variance in learning outcome. The study further revealed the variable which effect learning outcome the most is students' socioeconomic status followed by students attitude, teacher qualification and school location. It was suggested that curriculum planner and school administrator should give adequate consideration to the school variable.

Keywords: Determinants, Basic Science, Learning Outcome, Secondary School.

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INTRODUCTION

The applications of science have provided essentials such as clothing's, drugs, fuel, food, television, telephone, etc. thus it has improved the standard of living. Nevertheless, government's efforts at uplifting science and technology have not been quite encouraging and this is because of the poor achievement in science subjects and mathematics.

In as much as junior secondary science education is considered as the bedrock for subsequent specialist science study, it could then be assumed that low achievement and poor attitudes towards science can be linked with the outcome of learning difficulties or deficiencies in integrated science education. A solid foundation in integrated science would directly or indirectly contribute to the much needed scientific and technological advancement of the Nigerian Society. The National Policy on Education (NPE) (2004), stressed the importance of science by making one of the objectives of Junior Secondary Science education to be the laying of a sound foundation for scientific and reflective thinking. The policy also captures the appropriate use of instructional strategies in the teaching and learning of Basic Science which is me to be practical, explanatory and experimental.

Science as a discipline stands out as a major factor in the economic development of a nation (Adesoji, 2002). Its knowledge is used in the production of materials that reduce people's stress, suffering and hunger, protects as well as make life more enjoyable and secured. It therefore, implies that for any meaningful national growth and development to be achieved, Science and Technology must be an essential part of the nation's culture (Afolabi, 2005). Science is also one of the ways through which man search for the truth and achieves understanding of the environment and the universe.

Another of the student features that have an important effect on the learning process is student's attitudes towards the lesson (Okoruwa, 2007). Attitude is a combination of positive or negative, learned and consistent behaviours towards a specific object. It can also be viewed as the predisposition to respond positively or negatively towards an object or phenomena. One of the important goals of science teaching is to promote positive attitude towards science. Students with positive feelings towards science achieve more and will also likely incorporate science into their daily lives when they appreciate its importance. Since positive attitude have been found to correlate positively with achievement in science, teachers should endeavour to develop attitude towards science in their students. Scientific attitude are a composite of a number of mental habits or tendencies to react consistently in certain ways to a novel or problematic situation. These include: rationality, curiosity, open mindedness, aversion to superstition, objectivity, intellectual honesty, humility and suspended judgement. Therefore to develop scientific attitude in students, they should be provided with hands on experiences (Ogunsanwo, 2003)

School type in this study is defined in terms of ownership, whether it is owned by private individuals or by government. Schools are established for the purpose of teaching and learning. The studies of school effects on student achievement show that schools do matter to the performance of students in high school. In particular, the studies typically show that students at private schools have better academic performance than their counterparts at public schools. The reasons advanced include differences in resource levels, academic organization, normative environments and academic experiences (Movahedzadeh, 2011).

The idea of a positive private school effect culminated from a body of research that suggests private schools outperform public schools in that private schools assign more homework than public schools and have strict policies meant to encourage students to complete all of the homework assigned. Hill & Taylor (2004) found a Catholic school academic advantage, which they attributed to a more cohesive academic and social environment in the Catholic schools. Afolabi (2003) investigated the extent to which school location and school type have significant impact on students' achievement in English language. Their findings reported significant differences in achievement of students in urban and rural locations and public and private schools. School type and location on students' achievement and attitudes towards geography. They revealed that students from private schools performed significantly better than students from public school.

In Nigeria today, socioeconomic status is a main factor that determines the type of life: a child will lead: an educated, privileged life, or one of struggles and educational difficulties (Ogunshola & Adewale, 2012). Though this is not to say that every child growing up in a. poor family will never obtain a good education, or that a wealthier student is destined to be successful. A family's SES is based on family income, parental education level and parental occupation (Suresh-Kumar, 2012). It has been noted that child outcomes are associated with parent SES. Parents with better education, higher occupations and greater income can invest more in their offspring and provide other stimuli to child development (John & John, 2012). The socioeconomic status of a family can play a very important role in a child's, education. SES affects what opportunities children will be exposed to, limiting children of low SES to fewer opportunities and giving students with higher SES a chance at being better- rounded (Ahmad & Khan, 2012).

In addition, families with high socioeconomic status often seek out information to help them better prepare their young children for school. On the other hand, parents on the lower side of the socioeconomic status scale are at a great disadvantage. Families with low socioeconomic status often lack the financial, social, and educational supports that characterize families with high socioeconomic status. Low SES can produce parents who know very little about community resources, or even basic things like childhood immunizations and nutrition. Sadly enough, often times when parents of low SES want to help their child in school; they cannot because they simply lack the knowledge of how to do so (Ahmad & Khan, 2012).

The incessant poor performance of students in science in both primary and junior secondary school certificate examination has brought to light the need for further research and the attention of educators, parents, government and other stakeholders in finding lasting solutions to the issue. Many studies (Afolabi, 2005; Tsai, 2006; Van Voorhis, 2000), have been conducted in Nigeria and abroad on how to improve the academic achievement of students in science effectively. However, effects of such research findings are still not satisfactory. This unsatisfactory effects of research findings are noticed in the areas of: the use of inappropriate, non-effective teaching methodology persistent poor performance in science subjects, fall in standard of science education at the junior secondary school level. In addition, the level of achievement of secondary school students in science subjects has consistently remained low despite all researches focused on strategies to improve the standard of teaching and learning of science subjects in schools. Innovations in teaching and learning of science are increasingly needed in order to foster greater achievement in science at the Junior Secondary School level. One of such innovations is what this study is seeking to investigate.

Statement of the Problem

It is quite pertinent to note that a number of studies have focused on the causes and consequences of underachievement in Basic Science at the junior secondary level. However, some school variables have not been given the kind of attention they deserve in order to understand the degree to which they contribute to the discovering level of achievement in Basic Science such variables which have not been adequately covered includes; school type, school location, year of establishment, student attitude, teacher qualification and student socioeconomic status. This study sought to investigate the effect and contribution of these variables to students achievement towards Basic Science at the Junior Secondary School (JSS).

Research Questions

The study provided answers to the following questions

- What is the composite effect of all the independent variables on students' achievement in Basic Science?
- What is the relative effect of all the independent variables on student achievement in Basic Science?

METHODS

Research Design

Survey design was used for the study.

Variables of the study

The independent variables comprised of school type, school location, year of establishment, student attitude, teacher qualification and socioeconomic status while the dependent variable is the achievement (learning outcome) in Basic Science.

Population, Sampling Techniques and Sample

The population for the study comprised of all Junior Secondary School Two (J.S.S 2) students in Port Harcourt and Obio/ Akpor local government area of Rivers State. Stratified random sampling was used to select fifteen (15) school. 10 public and 5 private schools from the two local government area of the state. From each school, 20 JSS II student were randomly selected, making it a total of 300 students.

Instrumentation

Three sets of instruments were sued to collect data for this study.

Basic Science Achievement Test (BSAT)

This was a 35 item objective test adopted from a past Basic School Certificate Examination for a period of 4 years backward. The instrument was revalidated and the research using test-retest and a reliability coefficient of 0.67 was obtained

School Demographic Data Questionnaire (SDDQ)

This instrument (SDDQ) was prepared by the researcher and was used to collect information of a general nature concerning the school. Some of the information collected included; school type, school location, number of student, Basic Science Teachers, Educational qualifications of the Basic Science teacher, number of period for Basic Science. This was completed by the principal or subordinate. The instrument was validated after trail and a co-efficient of 0.77 was obtained.

Student Attitude and Socioeconomic Status Questionnaire (SASESQ)

The SASESQ instrument included sections seeking information on the home status variable, students attitude to Basic Science as a subject. The instruments were pilot t-tested in two non-participating schools in Obio/Akpor L.G.A. the results of the trial testing exercises provided some measure of experience for the researcher. A reliability co-efficient of 0.71 was obtained using Crobach-Alpha

Data Analysis

Analysis of data was done using multi-regression showing the inter relationships between the variables.

RESULTS

Research Question One: What is the effect of the independent variable on students learning outcome in Basic Science?

Table 1: Summary of Regression Analysis on students learning outcome in Basic Science

Model		**Sum of sqaures**	**df**	**Mean of sqaure**	**F**	**Sig**
	Regression	291.888	6	62.315	2.212	0.001
	Residual	171.982	12	18.922		
	Total	473.870	18			
R = 0.668						
R-square-0.490						
Adjusted r-square = 0.399						

*Significant at p<0.05 alpha level

Table 1 shows the prediction of all the six independent variables to the dependent variable. That is the students' learning outcome score positively correlated with the six predictor variables. The table also shows a coefficient of multiple correlations (R) of 0.668 and a multiple R^2 of 0.490. This implies that 49 percent of the variance in the students achievement score is accounted for by the six predictor variable taken as a composite contribution was tested at p<0.5 using the regression of the regression F-ratio at the degree of freedom (df=6.12). The table also showed that the analysis of variance for the regression yielded an F-ratio of 2.212 significant at 0.001 level (F = 2.212 p<0.05). This implies that the joint contribution of the independent variable was significant and other variables not included in this model may have accounted for the remaining 51 percent variance

Research Question Two: What is the relative effect of the independent variables on students' learning outcome in Basic Science?

Table 2: Test of significance of the Regression coefficient

Variable	**SEB**	**Beta**	**t**	**Sig**	**Remark**
School location	-5.872	-0.408	1.572	0.004	Sig
School type	-3.772	0.191	1.261	0.251	NS
Year of establishment	0.035	-0.511	2.429	0.041	NS
Student attitude	1.966	0.252	0.668	0.003	Sig
Socio-economic status	-8.872	-0.709	3.223	0.002	Sig
Teacher qualification	-6.331	-0.611	2.624	0.001	Sig

Key: Sig = Significance

Table 2 shows the relative contribution of the six independent variables to the dependent variable expressed as beta weights. Using standardized regression Beta coefficients to determine the relative contributions of the independent variables to the dependent variable, student socio economic status contributed the most ($\beta = 0.709$; $t=3.223$; $p<0.05$). next to socioeconomic status in contribution to students learning outcome in Basic Science, teacher qualification ($\beta = 0.611$; $t= 2.624$; $p<0.05$), School location ($\beta= 0.408$; $t=1.572$; $p<0.05$) followed by student attitude ($\beta= 0.252$; $t= 0.668$; $p<0.05$). The order of degree of contribution of the remaining independent variables though not significant are school type ($\beta=0.191$; $t=1.261$; $p>0.05$) and year of establishment ($\beta= -0.511$, $t= 2.429$; $p>-0.05$)

DISCUSSION OF RESULTS

The results revealed that the prediction of the school variables (school location, students' attitude, socio economic status and teacher qualification) were positively predicted on the independent variable learning outcome achievement in Basic Science. In the major factors affecting achievement and enrolment in science, it clearly brings out the fact that the urban schools performance better achievement many school subjects over the rural school in mainly due to the deficiency to essential education amenities usually associated with rural schools.

The study also revealed that students' socio economic status influence achievement in Basic Science, it corroborated the views of Hill and Craft (2003) that socio-economic status of parents do not affect the academic performance, but also make it impossible for children from low background to compete with their counterparts from high socioeconomic background under the same academic environment. Adesoji (2002) found that the status of the home also contributed to the level of achievement in science. No doubt, home process variables such as the use of books, library facilities at home as well as parent assistance give their ward positive influence at school.

The findings of this study also shows qualification correlate positively with students learning outcome in Basic Science and the teacher no doubt plays an essential role in learning of any subject matter, the emphasis that he scarcity of qualified teachers is recorded major sources of problems of teaching and learning in the secondary school. Furthermore, the finding of this study revealed that student attitude correlate positively with achievement in Basic Science. It is equally necessary to note that student who rated the subject as difficult viewed that the subject is less interest interesting and not very easy to comprehend. The relevance of some topics and activities in Basic Science to daily life application, affect students attitude and interest. They both hold a strong view that student who are academically successful hold a positive attitude toward school and are well adjusted emotional and socially.

CONCLUSION

Some of the determinant of secondary school students' learning outcome in Basic Science are school type, school location, teacher qualification, year of establishment, students attitude and socio-economic status. All the variables combined explained .490 or 49.0% of the variance in achievement. The relative effect of school variables on students learning outcome to Basic Science when tested together were not all significant at $p<0.05$. it was observed that underachievement in Basic Science were as a result of school location, student attitude teacher qualification and students' socioeconomic status and some other identified school variables.

Recommendations

Only professionally and academically qualified teachers should be made to teacher basic science in the secondary school. Parents should show adequate interest in the academic pursuits of their wards. Curriculum planner, teachers, parents and school administrator should give adequate consideration to the school variables investigated in this study to improve learning outcome in Basic Science in secondary school.

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