Environmental Effects on the Performance of Secondary School in Science Subjects

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ABSTRACT

The purpose of this study was to investigate environmental effects on the performance of secondary schools in science subjects, a case study of some selected secondary schools in Akure Ondo State. The researcher is interested in this study because of the increase in low academic performance of students in science subjects in secondary schools at both internal and external examinations, such as NECO, WAEC, JSCE, NABTEC respectively. Based on these problems, the researcher raised five research questions and five null hypotheses to guide the study. There was literature review to cover; conceptual frame work, concept of academic performance; school environment, family background, self-efficacy belief and locus of control as variables. There was empirical review of literature and also appraisal of literature review. The sample size was 292 students from 27 sampled public schools. Data for the study were collected using researcher's structured and developed instrument titled: environmental effects on the performance of secondary schools in science subjects. It has face and content validity. Cronbach alpha reliability procedure was used to assess reliability of the instrument at 0.05 level of significance. Research questions were answered with regression analysis. The regression statistical analyses were also applied to test the five null hypotheses at 0.05 level of significance. The data analyzed, showed the following findings: The school environment showed a positive significant relationship with academic performance of students. The family background showed positive significant relationship with academic performance of students. The self-efficacy belief did not show any significant relationship with academic performance of students. The locus of control showed positive significant relationship with academic performance of students in secondary schools. Based on these findings, some recommendations were made in this research work. The teacher–student relationship should be cordial within the school environment in order to promote good learning outcome. This study also unfolds its implication to education and counseling practice. There were contributions to knowledge at the end of the study.

Keywords: Education, Environmental Effects, Academic Performance, Secondary Schools, Science Subjects

INTRODUCTION

Background to the Study

Education is the acquisition of knowledge for both national development and advancement of mankind. The essence of general education in Nigeria is to improve, enhance, attain worthwhile and suitable life and adapt to the changing society.

Science subjects is a compulsory subject in Nigerian education. At all levels of education, (primary, post-primary and tertiary institutions) students are faced with problems of poor attitude, lack of interest and lack of zeal towards studying science subjects. This is as a result of negligence by stakeholders on the importance and usefulness of Science subjects to the achievement of all other subjects in the educational system.

The concept of academic performance is being determined by the success achieved in different subjects. It varies in definitions. Rodriquez (2000) considers academic performance in Science subjects as a situation in which the student attains expected achievement according to his abilities.

This result to his/her personality trait that affects all aspect of life. Feingold (2003) stated that, academic

performance is affected by host of factors. They includes: learners house hold characteristics, such as student's ability, motivation, childhood training and experiences, socio-economic status (SES), schools location, peer influence, teachers teaching style, biological inherited traits, behavioral attitudes and gender differences.

The academic performance of students in Science subjects affects all aspects of acquiring knowledge for the improvement of life. The poor Science subjects' skill acquisition due to antecedent factors might have sprung up to affect linguistic- cultural backgrounds of learners. This deficiency leads to mental poverty, spiritual poverty, mindset poverty and a state of life failure. The challenges of attaining poor academic performance by secondary school students are very rampant. Their performances in Science subjects equally affect the performances of other subjects, leading to school dropout, high failure in public examinations and high incidence of academic under achievement in higher institutions. Unoh (1982) ascertained that failure of most students in most subjects is as a result of poor reading skills which culminated from Science subjects' deficiency.

Academic performance could be defined as the display of knowledge attained or skills developed in school subjects designated by test and examination scores or marks assigned by the subject teachers. It could also be said to be any expression used to represent student's scholastic standing. Campuzuno (2001) found that students themselves attribute academic performance to ability and distinguishes those required to repeat a school year from those being promoted because they passed. Insufficient acquisition of language skills for communication may lead to poor academic performance. Edwards (2002), in his studies, attributes that self-concepts was found to better predict performance than variables such as age or student gender. The other factors noticed were; lack of resource materials, unstable academic session, non-compliance to examination instructions, and health status.

Adell (2002) considers family background as the most important and most weighty factor in determining academic performance by students in science subjects. Unoh (1982) said that Nigerians are reluctant readers. The reluctant reading and learning of Science syndrome is, in essence, a tendency to limit one's reading to what is especially required for the achievement of one's limited objectives. For example; success in specific examination or procurement of jobs. Other manifestations of this syndrome are; inadequacy and poorly developed reading interest, and skills in Science subjects texts and a tendency to look for short-cut to acquire knowledge as a means to an end.

The performance of students in Science subjects in Secondary Schools in Nigeria is not encouraging. There is significant growing rate of failure and subsequent drop-out in Nigerian Secondary Schools. This growing failure rate could essentially be noticed in the yearly decline in students' performance in all subjects especially in Science subjects. Tapia (2002) ascertained that a student fails if he/she cannot perform credibly well, both in class work activities and examinations. It has become necessary to assess how family background of the students influence performance in Science. This is to show that students in attentive and non participation in class work can cause negative performance in academic pursuits.

Many researchers, psychologists and educationists like, Feingold (2003), Rodriguez. (1986), Ugoji (2008) had identified some of the variables that have effects on students' academic performances. This work intends to ascertain the relationship of self-efficacy belief to academic performance.

Academic performance is individual inherent potentials in terms of intelligence combined with other sociological factors. Adediwura and Tayo (2007) in their study, identified personality factors such as anxiety, achievement, motivation and level of interest as factors that influence academic performance of students in Secondary Schools. Locus of control, according to Rotters (2000), refers to it as the extent to which an individual believes he/she can control events that affect them. Individuals with a high internal locus of control believe that events result primarily from their own behaviors and actions.

This work intends to view the relationship between the family background of students and their academic performance in Science subjects. There are several problems that may affect academic performance of students from the attitude of parents towards their children. The first major role of parents is to guide their children right. Parents should teach their children and help them to avoid life full of problems. Also parents can

influence their children's character either negatively or positively. Parents are to keep lines of communication open to their children and also supervise their work from the school.

The prevailing correlate variables as; school environment, family background of students, self-efficacy belief, locus of control, may have relationships to the academic performance of students in Science subjects in Secondary Schools. It is of the view of the researcher to take these variables together for better understanding of its relationship with academic performance. Therefore, the researcher intends to investigate the relationship of these variables and academic performance.

RESEARCH METHOD

Research Design

The study is descriptive survey. It is descriptive survey because it uses people's opinion. It is correlation in nature. It determines the relationship of these variables: School Environment (SV), Family Background (FB), Self-Efficacy Belief (SEB), Locus of Control (LOC), as correlates of academic performance of students in Science subjects in Secondary School. The correlation design is preferred because it predicts the relationship between variable and performance of students.

Population of the Study

The population for this study consisted of all public Secondary School classes of SSII in Akure

Table 1. Population of schools and students in each local government area of Ondo State

S/N	Name of L.G.A	No of S/S/Schools	Population of Students
1.	Akure South	17	3,751
2.	Akure North	15	2,751
3.	Ifedore	16	2,683
4.	Idanre	18	916
5.	Owo	16	2,035
6.	Ose	18	1,633
7.	Akoko South West	9	7,850
8.	Akoko North West	8	2,981
9.	Ondo East	12	2,832
	Total = 9	129	27,432

Source: Planning, Research & Statistics Department of Post Primary Education Board (Headquarters) Akure.

Sample and Sampling Procedure

The study used selected SSII students of Public Secondary Schools in Akure, Ondo State. The proportionate

sampling technique was used to select a sample size of 292 subjects from the population. The sampling procedure involves all the public secondary schools in Akure. 27 selected secondary schools in nine local government of Ondo State.

Table 2: Sampled Schools and Number of Respondents

L.G.A	No of Schools	Proportionate Sampled Schools	Population of Students	Ratio for selection of Respondents	No of Respondents
Akure South	17	3	3,751	94:1	40
Akure North	15	3	2,751	94:1	29
Ifedore	9	3	2,683	94:1	29
Idanre	8	3	916	94:1	10
Owo	16	3	2,035	94:1	22
Ose	18	3	1,633	94:1	17
Akoko South West	12	3	7,850	94:1	84
Akoko North West	18	3	2,981	94:1	31
Ondo East	16	3	2,832	94:1	30
Total	129	27	27,432		292

Source: Researcher's Information Services.

The researcher equally used proportionate Ratio of 94:1 in selecting respondents from the population of students in each local government area. The respondents selected from each school were either urban or rural areas. Two (2) schools from urban secondary schools and 1 (one) from rural secondary schools were used in the sample.

In the school's type, 1 boy's school, 1 girl's school (urban) and I mixed (boys and girls) from rural schools. The ratio1:1:1 were used for selection of schools type from each local government area.

The selection gave impetus to consideration of male 50% while female 50%. The urban schools were 66% of the sample while the rural schools were 34% of the sample. The respondents were randomly selected from public secondary schools to determine environmental and personal factors as correlates of academic performance in Science subjects.

Research Instrument

This study uses two instruments to elicit information. The environmental and personal factors as correlates of Academic Performance of Students in Science subjects (EPFCAPSEL) and promotion results (scores) for students in the selected schools. The (EPFCAPSEL) instrument for data collection was divided into two parts.

Part A: sought relevant demographic information on the subjects' gender and academic performance in the previous examination in Science subjects.

Part B- contains 40 items constructed on a 4-point structured format of: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The 40 items in the structured instrument were distributed to

measure the variables of; school environment, family background, self-efficacy belief and locus of control as correlates of academic performance of students in Science subjects in secondary schools at 0.05 level of significance.

Validity of the Instrument

The researcher's supervisor first scrutinized the instruments. The instruments still passed through experts in the department of educational management and planning. The face validity took care of items relevance, sentence structure, clarity and suitability of the items to be intended objectives of the study. Due to the experts' contribution and corrections made, the instrument was considered valid to measure what it tends to measure for the study.

The content and construct validity of the instrument were estimated using the Variance Factor Analysis (VFA). The Principal Component Analysis (PCA) uses the extraction method in estimating the content and construct validity.

The table 1.3 shows each scale as it demonstrates good validity of all items. The total percentage of all items in the scale had shown that table reveals 70.25%, 66.92%, 78.64%, 70.71% and 66.75% respectively.

Conversely, the construct validity of the instrument was estimated by the rotated factor loading matrixes. The Eigen Values of the above one were used to select factors that genuinely measured similar construct. For example the items in the instrument that measured school environment variable ranged between 51 to 88; Family Background between 48 to 89; Self-Efficacy Belief between 45 to 80; and Locus of Control between 41 to 89. All these values are good identification of construct validity.

Reliability of the Instrument

The reliability is concerned with the extent to which the instrument will elicit same information always from the same respondents. It is the degree to which a test consistently measures what it claims to measure. Instructions were read and explanations were made where necessary to respondents. In determining the internal reliability of the structured instrument; the Cronbach alpha method was used. The researcher administered the instrument of (EPFCAPSEL) to 20 students in one of the secondary schools not included in the student sample. The alpha coefficients were obtained for different scales at ($p<0.05$) level of significance. The reliability coefficient showed that the instrument had a good reliability.

For the school environment, scale alpha yielded 0.78.$P\leq0.05$ level of significance. Family Background scale alpha had 0.73. $P\leq0.05$ level of significance. Self-Efficacy Belief scale alpha had 0.74. $P\leq0.05$ level of significance and Locus of Control scale alpha had 0.72. $P\leq0.05$ level of significance.

Method of Data Collection

The researcher personally administered the instrument: Environmental and Personal factors as Correlates of Academic performance in Science subjects (EPFCAPSEL) to Secondary School Students. It was necessary because of instruction, clarity and allowing the respondents to fill the questionnaire on the spot. This method ensured high return rate of questionnaire to the researcher.

Three hundred (300) copies of questionnaire were distributed to secondary school students of class two (SSII). Two hundred and ninety two (292) copies of the questionnaire were recovered from the respondents.

Method of Data Analysis

The data for this study was collected and analyzed. For each variable, school environment, family background, self-efficacy belief and locus of control, the correlation matrix statistics was computed for the research questions.

PRESENTATION OF RESULTS AND DISCUSSION

What extent does school environment relates to academic performance of students in Science subjects in secondary schools?

Table 3: Correlation between school environment and academic performance

Variables	N	R	R^2	R^2 Adjusted	R^2%
School Environment	292	.133	.018	.014	1.4
Academic Performance	292				

Table 3 shows the extent of relationship between academic performance and school environment is R = .133. The nature of relationship is positive. The coefficient of determination is R^2 = .018. While the R^2 adjusted is .014. The R^2 percent is 1.4. This implies that school environment variable has contributed 1.4% to the academic performance of students in Science subjects in Secondary Schools.

What extent does family background relates to academic performance of students in Science subjects in secondary schools?

Table 4: Correlation between family background and Academic performance.

Variables	N	R	R^2	R^2 Adjusted	R^2 %
Family Background	292	.123	.015	.012	1.2
Academic Performance	292				

The table 4 shows the extent of relationship between academic performance and family background is R = .123. The nature of the relationship is positive. The coefficient of determination is R^2 = .015. While the R^2 adjusted is .012. The R^2 percent is 1.2. This implies that family background has contributed 1.2% to the academic performance of students in Science subjects in Secondary Schools.

What extent does self-efficacy belief relates to academic performance of students in Science subjects in secondary school?

Table 5: Correlation between self-efficacy belief and academic Performance

Variables	N	R	R^2	R^2Adjusted	R^2%
Self-efficacy belief	292	.066	.004	.001	0.1
Academic performance	292				

The table 5 shows the extent of relationship between academic performance and self-efficacy belief is R = .066. The nature of the relationship is positive. The coefficient of determination is R^2 = .004. While the R^2 adjusted is .001. The R^2 percent is 0.1. This implies that self-efficacy belief has contributed 0.1% to the academic performance of students in Science subjects in secondary schools.

What extent does locus of control relates to academic performance of students in Science subjects in secondary schools?

Table 6: Correlation between locus of control and academic Performance

Variables	N	R	R^2	R^2Adjusted	R^2%
Locus of Control	292	.122	.015	.011	1.1
Academic Performance	292				

The table 6 shows the extent of relationship between academic performance and locus of control is R= .122. The nature of relationship is positive. The coefficient of determination is R^2 = .015. While R^2 adjusted is .011. The percent is 1.1. This implies that locus of control has contributed 1.1% to the academic performance of students in Science subjects in secondary schools.

What is the degree of relationships between independent variables of; school environment, family background, self-efficacy belief, locus of control and dependent variable of academic performance of secondary school students in Science subjects?

Table 7: Correlation between environmental factors, personal factors and academic performance

Variables	N	R	R^2	R^2 Adjusted	R^2 %
School Environment					
Family Background Self Efficacy Belief Locus of Control	292	.204	.041	.026	2.6
[Academic Performance					

Table 7 shows the degree of relationship between academic performance and school environment, family background, self-efficacy belief, locus of control is 0.204. The nature of relationship is positive. The coefficient of determination is .041. While the R^2 adjusted is .026. The percentage (%) is 2.6. This implies that the variables of school environment, family background, self-efficacy belief, locus of control contributed 2.6 percent (%) to the academic performance of students in Science subjects in secondary schools.

DISCUSSION OF FINDINGS

Academic performance is a product of many variables. The correlate independent variables as; school environment, family background, self-efficacy belief, locus of control had relationship with dependent variable of academic performance positively. This finding agrees with the findings of other researchers such as; Emina (1986), Aghadiuns (1992), Adeyemo and Oduinko (1998) Ebenuwa-Okoh (2011), which used similar correlate variables as; school environment, family background, gender, school's location to have relationship with academic performance of secondary school students.

Relationship between School Environment and Academic Performance

The findings of this study in table 2 and 3 showed that there exists a significant relationship between school environment and academic performance. The regression used for this hypothesis shows that there is a predictive power of school environment on academic performance of students in Science subjects in secondary school. The regression analysis shows good relationship that influences academic performance. This finding confirms previous research outcome campuzano (2001) which shows that school environment has explicative ability in the direction, promotes excessive role in the achievement of student's academic performance.

Similarly, Campuzano 2001, in their various researches agreed that the school environment is like a knob that works through student's cognitive, affective and psychomotor domains with activities and facilities. The under laying theoretical basic is that there is correlation between stimulating environment and mental development, which is academic performance.

The findings stipulate that Science subjects' teachers must be properly trained as professionals in order to impart proper skills and thereby improving students' academic performance. Teachers should have good knowledge of subject matter and use varieties of teaching styles. Good teachers-students relationship will help to build students moral and improve learning skills in Science subjects. Students should be involved actively in all learning activities within the school environment. Teachers are to motivate students in rewards and this will spurn them to learn better in their academic pursuits. These findings are very important to education because it will help improve academic performance of students in secondary school positively.

Relationship between Family Background and Academic performance. The table 3a and 3b shows the family background variable which revealed that there is significant relationship that exists with the academic performance of students in Science subjects. In a home where parents or guardians provides necessary academic needs for their children such as; textbooks, notebooks, uniforms, writing materials and all necessary learning materials as; computer, audio visual materials, resource instructional materials, these students perform better in academic works.

The contributions of this finding is that, parents are to guide their children at home in order to inculcate good study habits and motivate them to have good reading culture. The parents should make the home a conducive environment for learning after school hours. Family members should provide children necessary academic materials such as; textbooks, chairs, tables, computer sets, radio sets, television sets, newspapers, journals, and even a miniature library shelves that is stocked with different books.

Relationship between Self-Efficacy Belief and Academic Performance

The table 4a and 4b shows significant relationship between self-efficacy belief and academic performance of students in Science subjects.

Relationship between Locus of control and Academic performance

The table 5 and 6 shows that there is significant relationship between locus of control and academic performance of students. Locus of control can make students control events that lead them to perform well in their academic works. Whyte (2008) in his research correlated locus of control with academic success of high students who enrolled in a course. Students who are internally controlled believe in hard work and focus resulted to academic progress. This means that students who actually study harder perform better in their academic works.

The contributions of this finding are that, students are to use all available resources materials around to learn. Such resource materials available computer aided learning skills, Radio, Television, Newspaper Publications, Journal and Science subjects' textbooks. Students should form discussion groups while each member of the group is to share ideas in a particular subject area. Students should be involved in drama, debates, news casting, writing of letters and essays. These activities will help to improve Science subjects' academic performance. These findings are very useful since its contributions will help achieve better academic performance in Science subjects.

The Relationship between Correlated Variables and Academic Performance

The relationship between correlated variables and Academic performance. The table 6 and 7 shows that there is significant relationship between correlate (independent) variables – school Environment, family background, self-efficacy belief, locus of control and academic performance (dependent) variable of students in Science subjects. This is in line with the research finding of Ebenuwa – okoh (2010) who used other combined independent variables as age, location, gender, sex, to correlate academic performance. These variables combined had significant relationship with academic performance. Similarly, the research finding of Ehindero

and Ajibade (2000) who used independent variable as, family background, school environment, teachers, knowledge of subject matter and teaching skills also predicted academic performance. These variables tested significant relationship with academic performance of students. The findings of these correlate variables are very important because of its contribution to the improvement of performance of secondary school students in our cultural setting.

Summary

This study was carried out to investigate the environmental effects on the performance of secondary. In order to give the study a direction, five research questions and five hypotheses were formulated and tested at 0.05 level of significance. Two research instruments were used: The findings showed that the school environment had positive relationship and significantly correlated academic performance in Science subjects. Also family background, self-efficacy belief and locus of control, all had positive relationship and significantly correlated academic performance in Science subjects in secondary schools.

CONCLUSION

Based on the findings of this study, it was concluded that school environment, family background, self-efficacy belief and locus of control had significant relationship and correlated academic performance of students in Science subjects. When all the variables were multiple regressed and correlated, they were all significant and had relationship with academic performance of students in Science subjects.

Implications for Education Practice

This study reveals the dimensions of relationship that are predictors and significant correlates of academic performance. These are: school environment, family background, self-efficacy belief and locus of control.

The variables that have been identified as significant correlates have implications for Science subjects' teachers especially in secondary schools. The problems of academic poor performance in Science subjects in secondary schools by students need to be properly addressed. One of the ways in which poor performance in Science subjects can be addressed is for educators to identify and practically provide information that leads to the improvement of student's academic performance.

The Science teachers should help to improve relationship in the school environment and the assist students to shelve away bottle necks that are impediment to learning process within the school environment. Science teachers can employ skill as; Oral pronunciation, Words and meanings, assignments, writing essays, letters in the class and so on. Another area to be addressed is the issue of student's involvement in several activities in both classroom and school environment. Science subjects' teachers are to assist students re-direct their activities to suit their academics and then improve on their learning process. The Science subjects' teachers will also inform students on the use of different literature books in the school library, so as to improve their reading and learning performance.

RECOMMENDATIONS

On the basis of the findings and conclusions of this study, the following recommendations were made:

1. There should be conducive positive relationship between school environment and academic performance. The school environment should be enriched with varieties of resource materials for improved teaching and learning.

2. There should be mutual relationship between parents and children in the supervision and guide for student's reading habits. The parents should also provide conducive home learning environment so as to improve student's academic performance optimally.

3. The relationship of self-efficacy belief with academic performance of students should be improved

when learners are spurned and self-motivated to achieve success.

4. The relationship of locus of control with academic performance of students should be improved for greater success, if students uses resource materials such as; computers, radio, television,

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