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Quality School Participation (QSP) Variables as Determinants of Secondary School Students' Achievement in Biology in South West Nigeria

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Abstract
Trends of students' performance in Biology in external examinations indicated that less than 50% of candidates usually pass the subject at minimum of credit level. Empirical studies that investigated causes, focused on teachers' ineffectiveness and inadequate learning and teaching facilities. The extent to which school process variables such as students' quality school participation variables affect students' academic performance especially in Biology is yet to be established. This study examined the predictive influence of quality school participation variables on students' achievement. Adopting the Ex-post facto design, a total of 1,725 students were randomly selected among the secondary school students in the state capitals in South-West Nigeria. Quality School Participation Scale (QSPS) r=0.78 and Biology Achievement Test (BAT) r=0.80 were used for data collection. Significant relationship exist between students'' attendance in school and achievement in Biology (r=0.126). Also punctuality to school (r=0.113), Class assignment (r=0.87,); home assignment (r=0.88,), availability of learning materials for study (r=0.080) correlate positively with achievement in Biology. The result reveal that QSP variables allowed reliable prediction of students' achievement in Biology ($F_{(5,}1798_{)}$ =25778.852, aside home assignment, the other variables namely: availability of learning materials ß = .578, t = 171.484, class assignment ß = .542, t = 160.539, $p<0.05$ and' punctuality ß = .007, t = 2.472, $p<0.05$ were significant. Recommendations include requesting parents to ensure they procure all necessary basic learning materials for their wards, as well as ensure their participation in school activities.

Keywords: Quality school participation (QSP), Punctuality, Home and school assignment, Attendance in school

INTRODUCTION
Biology is one of the subjects studied in secondary schools, that is concerned with life, its processes and the survival of the individual. A good grasp of biological sciences is necessary for human survival. Biology, with its multidisciplinary nature, contributes to the training of specialists in disciplines like agriculture, medicine, diseases control, industry and research. . Biology contains unifying concepts on science, and so may be well suited for developing scientific literacy. As a science subject that is important to life and life processes, Biology exposes students to the world of self-knowledge and knowledge of their immediate and distant environments. The 21st Century has actually been called a "Biology" century because of the many advances in human understanding of the basic processes and components of life. Biology offers great scope to meet these challenges, especially in the assurance of food security, and in the use of biology to meet the 4 F's , that is, the needs for more food, fuel, fiber and animal feed [1]

Some of the achievements that have been made through biological sciences include application of genetics in agriculture for production of hybrid crops and farm animals with desirable qualities and early maturing varieties of plants and animals; the use of biological method instead of chemical method in the control of agricultural pest; the use of naturally occurring bacteria to clean up oil spills and toxic chemicals [2].

In spite of the importance of Biology, studies have shown continuous under-achievement in the subject at the secondary school level over the years. Indeed, as important as the subject is, students' performance in the subject is consistently poor. This is worrisome and calls for investigations. Many researchers (e.g. [3] [4]) in and outside Nigeria have been concerned about this problem of under achievement in this all important subject.

WAEC Chief Examiners' Report [5] affirmed the state of poor performance especially in Biology practical, and highlighted the observed weakness of candidates thus:

- Poor understanding and lack of higher order cognitive skills, to handle questions such as those that are more typically encountered in Section C of the examination,
- Shallow knowledge of the subject and rote learning,

- Lack of deep understanding of biological processes or the sequential steps in experimental procedures,
- Lack of specific knowledge and an inability to explain, interpret and apply biological principles,
- Confusing similar-sounding or similarly spelled terms in biology to the extent that a completely different biological meaning is conveyed, and
- Reliance on a key word or words from a term while attempting to define or explain that term [5].

Apart from these students' weaknesses, empirical studies on students' achievement in Biology reveal that some variables have been identified to be responsible for students' consistent under-achievement in senior secondary school Biology. Among these are lack of qualified and certified teachers [6]; use of traditional teaching method which encourages rote learning [7], students' poor attitude and poor self-esteem [8]; [9], poor teaching methodology [10], poor funding of school/laboratory and inadequate laboratory facilities and exposure [11], among others.

It should be noted that students' performance or achievement in any subject is the resultant overall performance in some quality school participation (QSP) variables. Quality school participation indices (such as student's attendance, commitment to home/class assignment, availability of reading materials and student's punctuality) consider child's experience in school activities and are found to explain larger percentage of variances that occur in students' scholastic achievement [26].

Students' engagement in some home activities such as buying and selling could hamper students' participation in school activities. Though there appears to be a relationship between student engagement in home activities, students' attendance in school, punctuality to school and students' commitment to home and class assignment; these relationships only provide indirect measures of the educational consequences of the child's involvement in some house chores. In fact, in certain cases, it is shown that children who engage in economic home activities usually attend school but lack active engagement in such school activities as class and home assignment. This suggest that effects of students' economic activities on academic performance are linked to the students' classroom activities [12].

Research on relationships between attendance and students' performance indicated that students' attendance in school is a predictor of future academic performance [13]. Also, total amount of time that students report studying has often been examined as a potential predictor of success in school. It can be said that the more time students spend studying, the better grades they receive [14]. Also, reported [15] is ,that attendance, which is critical throughout a student's period of schooling, can have significant impact when chronic absences occur in the early years during the period when basic academic skills are being developed.

Another quality school participation variable that is rarely researched among scholars in the field of education is punctuality to school. Lauby, [16] reported that the attendance and punctuality policy in the United States of America clearly states that "regular and punctual attendance is of paramount importance in ensuring that all students have full access to the curriculum". Valuable learning time is lost when students are absent or late. Romero [17] reported the following results for students with punctuality problem in kindergarten: ten times as likely to be chronically absent in kindergarten and first grade; weaker academic performance in mathematics, reading, science, and world knowledge compared to the performance of peers who are never tardy. Johnson [18] also observed that punctuality is an important aspect of school. A student who does not show up punctually is considered tardy. Tyre [19] defined tardiness as "student's failure to be in an assigned seat at the sound of the final transition bell or tardy bell". Not being punctual or tardiness is considered to be an academic problem as shown in the study conducted by [20].

Another important factor that provides indirect measure of academic achievement is students' attention to class and home assignment. Not only is there paucity of studies on the impact of assignment on academic achievement of students in Biology, results so far also are conflicting. Assignments that are graded, with the score used as part of the final grade, are expected to improve students' performance. This is because students will be motivated to work on the graded assignment and will learn from it. Consequently, their test scores will improve.

Grove [21] found that a grade incentive to complete assignments boosted the academic achievement of academically average students but not those who were academically above or below average, or of any other class standing. Geide-Stevenson [22] found that graded assignments had no impact on academic performance. The personal observation of the authors of this article (Emeke and Ojetunde) revealed that students' commitment differ based on the nature of assignment. Students tend to be more committed to class assignment than take-home assignment, probably because class assignment is supervised by teacher and that it could be used as part of continuous assessment, compared to a situation where students are left alone, and the assignment is mainly for academic exercise.

In addition, studies have shown that effective learning cannot take place without availability of basic relevant learning materials. In addition to private studies, where teachers give the students tutorial, exercises and homework, the need for learning materials is imperative. Ogunshege [23] posited that books are veritable vehicles of communication and transmission of education, learning and culture in any society. Akujuo [24] emphasise that books and other learning materials have been the basics tools for any educational development. Shuaibu [25], observed that for effective and meaningful learning to take place, three factors are indispensable, these include: the teacher, the pupils and the learning materials alongside conductive environment. Also, Biology as a subject requires high level of students' participation due to its dual (theoretical and practical) aspects. There appears to be no known study that relate students' school participation variables with their achievement in Biology. Therefore, this study examined the predictive influence of quality school participation variables on secondary school students' achievement in Biology in the South West states in Nigeria.

Statement of the Problem

Students' academic achievement is a critical outcome of school academic activities. The review of the literature shows that majority of studies in education tends towards examination of what students have learnt in order to substantiate the huge investment in education. In recent time, the Nigerian government stresses the need for education stakeholders to invest much in the area of science and technology education which has implication on teaching and learning of science subjects. As an eversion to this venture, trends of students' performance in Biology in external examinations indicated that less than 50% of candidates usually pass the subject at minimum of credit level.

However, most studies that examined the extent of students' learning with respect to students' school and home variables concentrate much on school facilities, students, parents and teachers' personal characteristics without adequate consideration of school process variables that are likely to impede students' learning and consequently affect their performance.

More so, empirical studies on school process variables revolve around teaching methods and classroom management. The extent to which students' school process variables such as punctuality to school, attendance in the class, commitment to school and home assignments affects students' academic achievement in Biology are not much examined. This underlies the main reason why this study examined the influence of students' aspect of school process variables (quality school participation) on students' academic achievement in Biology in South-West Nigeria.

Research Questions

1. What is the magnitude and direction of relationship that exist between students' quality school participation variables and students' achievement in Biology?
2. Does the model that explain the relationship among quality school participation variables and students' achievement in Biology allow reliable prediction of students' achievement in Biology?
3. Among quality school participation variables, which of the predictor variables is the most influential on students' achievement in Biology?

Significance of the Study

The result of the study provides empirical information on the influence of some school process variables on students' achievement in Biology. It also serves as eye opener to parents on the need for increasing supports for their wards in terms of provision of learning resources and home-school assistance that contribute significantly to students' success in their academic endeavor. The findings also serve as enlightenment to students on magnitude of effects of punctuality to and attendance in the school on their overall performance. In addition, the result is useful to help policy makers develop actionable strategy to manage various school learning resources alongside curriculum content for better students' performance.

METHODOLOGY

The study adopted a non-experimental research design, of correlational type. The research design was chosen because the researchers did not have control over the variables, since their manifestation had already occurred. The population of the study comprised all senior secondary school I & II students in state capitals with distinct rural and urban secondary schools in South West Nigeria. Using the multi-stage sampling procedure to select participants for the study, three States (whose state capitals have distinct urban and rural settings) were purposively selected: The selected States are Osun, Ogun and Oyo. These selected States were stratified along location (Urban/Rural) and 21.0% of the secondary schools from each location was selected at random. At the second stage, 25 senior secondary school students were randomly selected from the sampled schools (69 secondary schools out of 329) to make the total sample size of 1725 participants. The instruments used for the study were Quality School

Participation Scale (QSPS) r=0.78 and Biology Achievement Test (BAT) r=0.80. The data collected were analyzed using Pearson Product Moment Correlation and Multiple Regression analysis at 0.05 level of significance.

RESULTS AND DISCUSSION

Research Question 1: What is the magnitude and direction of relationship that exist among students' quality school participation variables and students' achievement in Biology?

Table 1: Relationship among Quality School Participation Variables and Students Achievement in Biology

Variable	Attendance	Punctuality	Home Assign.	Class Assign.	Learning Materials	Achievement in Biology
Attendance	1					
Punctuality	.048*	1				
Home Assign.	.123**	.093**	1			
Class Assign.	.101**	.103**	.568**	1		
Learning Materials	.152**	-.016	.066**	.065**	1	
Achievement in Biology	.126**	.113**	.871**	.887**	.080**	1

Table 1 presents the result on magnitude and strength of relationship that exist among selected school participation variables and students' achievement in Biology. The result reveals that a low, positive but significant linear relationship exist between students' attendance in the school and achievement in Biology ($r=0.126$, $p<0.05$). Students' punctuality to school correlated positively with students' achievement in Biology ($r=0.113$, $p<0.05$); Class ($r=0.87$, $p<0.05$) and home ($r=0.88$, $p<0.05$) assignments highly correlated with achievement in Biology among students in the sampled secondary schools.

Also, there is low, positive but significant relationship between availability of learning materials for study and students' achievement in biology ($r=0.080$). From the result of the analyses, inferences could be made that punctuality to school, students' attendance in the school as well as availability of learning resources have low positive linear relationship with students' achievement whereas, the correlation between home and class assignment with students achievement in Biology is high. This could probably be because majority of the respondents had low attendance status in the school, lacked punctuality, as well as lacked basic learning materials. On the other hand, the high correlation between class and home assignment could be as a result of the fact that most assignments given, whether home or class are used as part of continuous assessment or it could be that both parents and teachers alike monitor the students' assignment.

Research Question 2: Does the model that explain the relationship among quality school participation variables and students' achievement in Biology allow reliable prediction of students' achievement in Biology?

Table 2: Joint Contribution of Quality School Participation Variables on Students' Achievement in Biology

Model		Sum of squares	Df	Mean Square	F	Sig.
1	Regression	20410.629	5	4082.126	25778.852	.000[b]
	Residual	284.716	1798	.158		
	Total	20695.345	1803			

Model Summary

Model	1
R	.993[a]
R Square	.986
Adjusted R Square	.986
Std. Error of the Estimate	.39793

Table 2 shows the joint contributions of quality school participation variables to students' achievement in Biology, presenting the values of R, R^2 (model summary) and ANOVA. The result from the Table revealed multiple correlation of 0.993 between independent and dependent variables. This implies that the independent variable could influence students' achievement in Biology to a very large extent. The R^2 of 0.986 is an indication that the independent variables (school attendance, punctuality to school, home assignment, class assignment and availability of learning resources) account for 98.6% of the total variance observed in the dependent variable (student's performance in Biology) leaving the remaining 1.4% to other factors that were not considered in the study. Table 2 equally shows that the combination of all the independent variables allowed reliable prediction of students' achievement in Biology ($F_{(5,}1798_{)}$ =25778.852, $p<0.05$). Hence, the combination of all quality school participation variables allow reliable prediction of students' achievement in Biology.

The results of the analyses reveal that the combination of all quality school participation variables allow reliable prediction of students' achievement in Biology. This could be due to the fact that students' performance or achievement in any subject is the resultant performances in some quality school participation variables or the resultant effect of the emphasis laid on the need for students' involvement in such school participation variables as: attendance at school, punctuality to school, compliance with doing assignments, and availability of basic learning materials. The result is in alliance with the report of [17] who observed that kindergarten pupils with punctuality problem are likely to be: ten times chronically absent in kindergarten class and first grade; have weaker academic performance in mathematics, reading, science, and world knowledge compared to the performance of peers who are never tardy. The result also corroborate that of [21] who found that a grade incentive to complete assignments boosted the academic achievement of academically average students but not those who were academically above or below average, or of any other class standing

Research Question 3: Among quality school participation variables, which of the predictor variables is the most influential on students' achievement in Biology?

Table 3: Relative Influence of Quality School Participation Variables on Students' Achievement in Biology

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.547	.080		-6.875	.000
Attendance	.000	.002	.000	.065	.949
Punctuality	.007	.003	.007	2.472	.014
Home Assign.	.003	.003	.003	1.127	.260
Class Assign.	.972	.006	.542	160.539	.000
Learning Materials	1.063	.006	.578	171.484	.000

a. Dependent Variable: Students' Achievement in Biology

Table 3 reports the Unstandardized Coefficients (B) and Standardized Coefficient (weight), t, and p values of each independent variable. The result revealed that of all the independent variables, availability of learning materials made the highest contribution to student's achievement in Biology ß = .578, t = 171.484, $p<0.05$ which was significant followed by students' attention to class assignment ß = .542, t = 160.539, $p<0.05$ which was also significant and then students' punctuality ß = .007, t = 2.472, $p<0.05$ which was also significant. It could be observed that the contributions of students' attendance and attention to home assignment were not significant. The result revealed that for a unit change in availability of learning materials, students' attention to class assignment and punctuality, there is corresponding 0.578, 0.542 and 0.07 increase in student's achievement in Biology. To determine the predictors that may not be useful in the model, the t-values in Table 3 that are less than 2.0 in magnitude indicate that the predictor is not significant. This shows that three variables constitute strong predictor of student's achievement in Biology.

The result in Table 3 shows that learning materials, class assignment and punctuality to school made significant contribution to students' achievement in Biology. From the result availability of learning materials which seemed to have low positive relationship with students' achievement made significant highest contribution to students' achievement. This may be as a result of the fact that availability of learning materials enhance other quality school participation variables such as class and home assignments. It may also affect students' punctuality to school as well as attendance because students who lack basic learning materials tend to be tardy or may not even attend classes because they try to avoid being beaten or ridiculed by their teacher. The contribution of class assignment to students' achievement was next in magnitude to availability of learning materials probably because most students who value class assignment tend to attend classes and also strive to be punctual to class and they also try not to miss their home assignment, which in turn increase their achievement in Biology.

CONCLUSION

Based on the results of the analysis and the discussion, it could be concluded that quality school participation (QSP) variables provide indirect measures of students' achievement in Biology as they allow reliable prediction of students' achievement and also account for larger percentages of the variances observed in students' achievement in Biology. It could also be inferred that the quality school participation variables of availability of learning materials, class assignment, and punctuality to school are the most influential QSP variables because they could explain how other QSP variables influence students' achievement.

RECOMMENDATION

Flowing from the results and the discussion of findings, it is recommended that;

- Class teachers and school administrators alike should reiterate the importance of students' full participation in school activities to both students and parents.
- Parents should take it as a matter of necessity for them to procure all basic learning materials for their wards.
- Government should formulate or activate attendance policy to make students stay and participate fully in all school activities.

- Class teachers should find a way of incorporating indicators of quality school participation such as (punctuality, attendance, class and home assignment as well as availability of learning) resources as part of continuous assessment.

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