

Factors which predict performance in secondary school physics in Ebonyi north educational zone of Ebonyi State, Nigeria

D. U. Onah and E. I. Ugwu

Department of Industrial Physics, Ebonyi State University, Abakaliki, Nigeria

ABSTRACT

Identification of the factors affecting performance in secondary school Physics is the first step in the solution to the problem of poor performance in physics at this level, and subsequently at higher levels. The factors studied in relation to their relative effects on performance, in school physics were teacher qualification, gender, laboratory facilities and resources, school location and interest of students. The study was carried out in 20 secondary schools in Ebonyi North Educational Zone of Ebonyi State. Questionnaires were used in collecting the necessary data for this study. The data was analyzed by using step-wise multiple regression in performance in physics with the five factors studied as predictors. F distribution was used to test the null hypotheses. It was found that school location and interest of students had no significant effects on performance in physics while performance in physics at this level depended on sex (gender), teacher qualification and laboratory facilities.

Key words: performance, Physics, secondary schools, gender, teacher qualification and laboratory.

INTRODUCTION

The present senior secondary school physics curriculum is built on the conception of science as both product and process. As a process, Physics has to do with the skills that are called into play by scientists in carrying out scientific investigation. This implies adopting an enquiry method in the teaching of physics at the secondary school level. As a product Physics is viewed as consisting of scientific facts, principles, laws and generalizations derived from scientific investigations. The new curriculum of science (Physics) adopts a child-centred approach, that is the teacher is supposed to provide guidance to the students who should participate actively in the teaching-learning process [1].

Teaching of science, especially Physics, and performance of students at the secondary school level have been the concern of government and parents. The purpose of this study was to identify the factors which predict performance in secondary school Physics of Ebonyi North Educational Zone, of Ebonyi State. The teacher is one important variable whose functions

can enhance the realization of educational goals [2]. If teachers are deficient in various contents they teach, the quality of learning and performance will be poor [3]. Some people investigated the effects of laboratory facilities and resources on the performance of students in physics at this level. The constraint to quality science education in Nigeria is inadequate laboratory equipment/facilities in our schools [4].

Student's interest in Physics at secondary school level can be influenced by a number of factors. Interest and achievement of students lie within the teacher and students' relationship in a given subject. School and home locations in terms of rural and urban did not seem to have any effect on physics achievement [5]. Girls and women may be regarded as late arrivals in the scene of science in Nigeria. The differences in performance of male and female students in Physics are not significant [6]. Historically, Physics has been taught at the high school and college level primarily by the lecture method together with laboratory exercise aimed at verifying concepts taught [7].

The Research Questions in this Study were:

- To what extent does availability of laboratory facilities and resources in our secondary schools relate to performance in Physics?
- How does sex account for performance of pupils in secondary school Physics?
- How does interest of students relate to their performances in secondary school Physics?
- Does school location determine performance of students in secondary school Physics?

The Hypotheses Stated were:

- There is no significant relationship between student's performance in Physics and availability of laboratory facilities.
- There is no significant relationship between the performance of the students in Physics and their gender.
- The relationship between performance in Physics and interest of students will not be significant.
- School location will not significantly predict student's performance in Physics.
- Qualification of teachers will not be a significant predictor of students' performances in Physics.

METHODOLOGY

This study is a correlational one carried out in Ebonyi North Educational Zone of Ebonyi State. The population was made up of all SSIII students who offered Physics in 2009 WSSCE. The sample was made up of 200 students drawn from 20 secondary schools, and 20 Physics teachers, one from each school. Random sampling by balloting was used and questionnaires were instruments used for data collection. The raw scores of students in Physics were converted into T- scores and F-distribution was used in testing the hypotheses.

DATA ANALYSIS AND RESULTS

The test statistic was calculated from step-wise multiple regression on performance in Physics using: school location, teacher qualification, sex, interest and laboratory facilities as predictors.

DEPENDENT VARIABLE: Performance in Physics.

- School location

$$\begin{aligned}
 \text{Simple } r &= -0.09933 \\
 r^2 &= 0.00798 \\
 \text{Multiple } R &= 0.26063 \\
 R^2 &= 0.06793 \\
 \text{Adjusted } R^2 &= 0.05812 \\
 \text{Standard error} &= 0.85549
 \end{aligned}$$

6.793% of the variance in the criterion variable (performance in Physics) was due to school location and other predictors. Therefore 0.798% of performance was due to effect of school location only. Hence the effect of school location on the performance in secondary school physics was not significant.

- **Teacher qualification:**

$$\begin{aligned}
 \text{simple } r &= -0.36738 \\
 r^2 &= 0.134968 \\
 \text{multiple } R &= 0.27109 \\
 R^2 &= 0.07349 \\
 \text{Adjusted } R^2 &= 0.05378 \\
 \text{standard error} &= 9.87816
 \end{aligned}$$

7.349% of the variance in the criterion variable is contributed by combination of schools location and teacher qualification while 13.497% of performance in Physics is caused by teacher qualification alone. Hence teacher qualification predicts performance in Physics at secondary school level to a very significant effect.

- **Sex (gender):**

$$\begin{aligned}
 \text{simple } r &= -0.89412 \\
 r^2 &= 0.79944 \\
 \text{multiple } R &= 0.27479 \\
 R^2 &= 0.07551 \\
 \text{Adjusted } R^2 &= 0.04569 \\
 \text{standard error} &= 9.92030
 \end{aligned}$$

7.551% of the variance in the criterion variable is caused by combined variance of school location, teacher qualification and sex while 79.944% of performance in Physics is caused by sex (gender) alone. Therefore sex is a very good predictor of performance in Physics at this level. Similar analysis was done for the other two factors studied, which were student's interest and laboratory facilities and resources. It was found that: 0.798%, 13.497%, 79.944%, 0.104% and 46.64% were due to teacher qualification, gender, interest and laboratory facilities respectively.

TEST OF THE NULL HYPOTHESES: $H_0: R_{000} = 0$

The calculated value of $F = 1.495$. The critical value of F with 5 and 91 degrees of freedom at 0.05 level of significance = 8.410

DECISION: The computed value of F is less than the critical value of F . Hence the null hypotheses $H_0 = R_{000} = O$ were not rejected.

CONCLUSION

The five variables studied were found to be predictors of performance in secondary school Physics. School location and interests of students have no significant effects while gender, teacher qualification and laboratory facilities have very significant effects on performance of students in Physics at secondary school level.

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