ENGLISH LANGUAGE AND MATHEMATICS CONTINUOUS ASSESSMENT SCORES AS PREDICTORS OF PERFORMANCE IN SSCE PHYSICS.

BY
OSU, TANIMU
PRIMARY EDUCATION STUDIES DEPARTMENT
COLLEGE OF EDUCATION, AKWANGA

ABSTRACT

The study was conducted to find out whether the performances of students in the SSCE in Physics could be predicted from their grades in English and Mathematics Continuous Assessment (CA) Scores. Results of 150 students in five secondary schools in Akwanga Inspectorate Office, Nasarawa State were collected and analysed using regression analysis. Results indicated that performances of students in Mathematics Continuous Assessment could be used to predict results of SSCE Physics. It was however found that, results in English Language CA alone had low predictive values for performance in Physics. The researcher suggested that credit pass in English Language should not be made mandatory for students seeking admission for science and applied science.

INTRODUCTION

Understanding of many scientific concepts poses problems for many of our students whose background in English Language is very poor. In some cases, passages are translated into vernacular before many of the students could understand them. This assertion is buttressed by the West African Examinations Council Chief Examiner's reports on the Senior School Certificate Examination May/June 1997, which states that:

The performance of candidates in English Language has been steadily deteriorating in the recent past. The main cause of this downward trend may be traced to inadequate preparation of the candidates by the school. For instance, most of the weaknesses in Part A (Essay) include:

(i) The inability to spell or punctuate correctly
(ii) Incorrect grammar
(iii) The ignorance of the difference between a sentence and phrase
(iv) The inability to express ideas correctly in English.
(v) Immature vocabulary and the use of wrong words out of context P. 4

Researchers in English language (e.g.Adesanoye, 1973; Ayodele, 1981 and 1984) have shown that, the performances of students in the English Language are fast deteriorating, in a corresponding manner to their level of achievement in formal education. Some researchers (Akintola, 1985 and Adesoji, 1997) have also asserted that abilities in English Language do influence knowledge of students in other subjects in the curriculum. Physical sciences like Physics cannot do without Mathematics. Many of the expression used in these subjects are borrowed from Mathematics. According to Ale (1981), a lot of evidence shows a strong association between Mathematics and development of science and technology. Adesoji (1999) and Osu (2005) was of the opinion that the bedrock of the physical sciences such as chemistry and physics is mathematics. Most experiments in physics involve the drawing of graphs and any student who intends to be proficient in physics must possess a strong background in mathematics. Also Osu (2005) in assessing the predictive validity of mathematics CA scores on students SSCE Mathematic result, found a positive correlation.

Unfortunately, a lot of problems exist with the teaching of mathematic~ at the secondary school level. Adepoju (1991) describes the approach used by many teachers of mathematics as one, which does not give room for students to develop their intuition, imagination and creative abilities. Adedayo (1994) gave empirical evidence of the incompetence of teachers of further mathematics.

Secondary education in Nigeria is associated with a declining trend in students' enrolment and achievement in physics (Iroegbu, 1998; Orji, 1998). This situation is not likely to be peculiar to Nigeria as it depicts the general trend worldwide. Also, report by WAEC and JAMB continued to show that performances of students in physics had been on the decline for quite some years now. According to WAEC Chief Examiner's report (1997), some of the weaknesses noticed in the candidates in physics in the SSCE are:

(i) inability to express ideas logically and in clear terms

(ii) lack of adequate knowledge of fundamental of physics and (iii) lack of calculative skills. It could be observed from this report that, beside lack of knowledge of the subject by the candidates, there are problems of English Language and Mathematics. The focus of this paper therefore is to find out whether ability of students in physics could be predicted from their knowledge of English Language and Mathematics.

PURPOSE OF THE STUDY

The study is out to find out whether one could explain performances of students in physics from their grades in English Language and Mathematics Continuous Assessment Scores.

RESEARCH QUESTIONS

Based on the above objectives, the following questions were answered: 1. Are there positive relationship between English language, Mathematics and Physics?

2. Which of the independent variables (English language and Mathematics) better predicts performance in Senior School Certificate Examination (SSCE) in Physics?

METHOD

Research Design: The study is a survey research design using the expost facto type. This is because data were collected from the existing school records and this does not require the manipulation of independent variables.

Population and Sampling Procedure: The target population for the study was all the Senior School Certificate Candidates who offered Physics, English language and mathematics in 2004 May/June WAEC conducted examination in Nasarawa State Nigeria.

The sample was made up of one hundred and fifty students who were randomly selected from five secondary schools in Wamba and Akwanga Local Government Areas of Nasarawa State. Thirty students were selected from each school to make up the sample using stratified sampling method. Seventy-four of the samples were females while seventy-six were males.

Data collection: The collection of data for the study was made by the researcher who went round the selected schools to collect the final Senior School Certificate Examination results of the candidates in Physics in the 2004 academic year and their CA scores in English Language and Mathematics in the same year. The results were collated for analysis.

Analysis of Data: This involved the use of stepwise multiple regression (backward procedure) to examine the relationship between the two independent variables (English Language and Mathematics) and the dependent variable (Senior School Certificate Examination grades in Physics).

RESULTS

The multiple correlations of physics with weighted combination of English Language and

(N = 150)

Variables	Physics	English	Mathematics
Physics	1.000	0.896	0.911
English	0.896	1.000	o.983
Mathematics	0.911	0.983	1.000

Table 2: Composite effects of the independent variables (English Language and Mathematics) on SSCE Results in Physics

Multiple R	R2	Adjusted R2	S.E	F Ratio	Sig.F
0.91112	0.83014	0.82783	0.94172	359.22	0.0000*

* Significant at P<O.05 DF = 2, 147

Table 3: Relative effects of the independent variables (Mock Results in English and Mathematics) on students' performance in SSCE in Physics

Independent variables	B	S.E.B	Beta	S.E	T	Sig T
Mathematics	0.7762	0.1600	0.8962	0.1848	4.850	0.0000
English	0.0152	0.1862	0.0151	0.1848	0.0828	0.9348
(Constant)	2.1247	0.2164			9.816	0.0000

Significant at P< 0.05

ENGLISH LANGUAGE AND MATTHEMATICS MOCK RESULTS AS PREDICTORS

TABLE 4: Effects of Mathematics on students' performance in SSCE in Physics

Multiple R	R2	Adjusted R2	S.E	F Ratio	Sig.F
0.91112	0.83014	0.8289	0.9385	723.29	0.0000*

Significant at P< 0.05

TABLE 5:Relative effect of Mathematics on students' performance in SSCE Physics

Independent variables	B	S.E.B	Beta	S.E	T	Sig T
Mathematics	0.78911	0.02934	0.91112	0.3388	26.894	0.0000*

Significant at P< 0.05

It could be observed from the results in Table 3 that the partial correlation coefficient (8) for English has T-value, which is statistically not significant (probability exceeds 0.05). Therefore, English will not be entered into the equation because only the independent variable with significant T-value will significantly predict students' performance in SSCE in physics (dependent variable). This independent variable is Mathematics. This answers the second question. If English language is ignored, the regression equation could be written by making use of the contribution of only Mathematics.

Where Y = SSCE result in Physics

X = CA scores in Mathematics

Y = 2.12 + O.7762x

The results in Table 4 further established the fact that it was mathematics that could be used to predict results of students in SSCE in physics. The value of R2 obtained after removing English showed no difference from the value obtained when the two independent variables (English and Mathematics) were employed in the equation. This

The findings of this study indicated that CA scores of students in Mathematics could be used to predict their results in Physics. CA scores in English Language were found to be irrelevant as far as predicting students' results in physics is concerned. It is a well-known fact that Mathematics is very useful for the understanding of physical science such as physics. The findings have also challenged the undue emphasis laid on English for students opting for courses in the area of science and applied science. In this case, it should not be mandatory for science students to get a Credit Pass in English Language at the SSCE before they are admitted for Science and related courses in higher institutions of learning.

It should be realized that scientific facts and principles do not require the knowledge of laws governing grammar before one could understand them. Mathematics is an essential ingredient for Physics. In the light of this, teachers of Mathematics would need to be more serious in teaching the subject because of its importance to science and consequently for technological development of the nation.

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