APPLICABILITY OF REGRESSION MODEL IN MODERATING INTERNAL ASSESSMENT SCORES IN SENIOR SECONDARY SCHOOLS IN EKITI STATE, NIGERIA

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ABSTRACT

This study investigated regression model of statistical moderation of internal assessment scores. This is an ex-post-facto research design in which there was no treatment and manipulation of subject instead it involved the collection of data from records. Cluster sampling technique was adopted to select five hundred students that were made up of fifty students each from ten secondary schools. The hypothesis formulated for the study was analyzed using Pearson-product-moment correlation statistical technique. The results revealed that Regression model does not utter the strength of relationships among the internal assessment scores in Mathematics, English language and Biology and at the same time there were significant relationships among the internal assessment scores in the three subjects before and after the statistical moderation by regression model. Based on this finding, the study recommended that regression model should not be used as a means of moderating internal assessment scores because it does not utter the strength of relationship as expected in order to ascertain the quality control of teachers' assessment scores in Nigerian Secondary Schools.

Keywords: Regression Model, Statistical Moderation, Internal Assessment Scores

INTRODUCTION

Statistical moderation is the process of adjusting schools' internal assessment scores to the same standard while maintaining the students rank order given by the school. The examination board use statistical moderation to ensure that the internal assessment scores given by different schools are comparable throughout the State or Country (Bandele, 1989; 1997; Mac Cann,1995; Abe, 1995; 2002; 2004; 2006;2007a; 2008; 2009; Abe & Gbore, 2006; Alonge & Abe, 2007). However, in Nigeria the major problem that be set the internal assessment is comparability of standard which come with differences in entry behavior of pupils, quality of teachers, methodologies, ability of the teachers to motivate students to learn, quality of test and other assessment used in different school (Agwubike & Momoh, 1995).

In anticipation to alleviate these differences, some local governments in Nigerian Secondary schools devised uniform test and marking schemes at

the end of the term in other to maintain equal standard among the student internal assessment scores, but this is still far from achieving the uniform comparable standard state wide. Since the internal assessment differs from schools, how could this mode of assessment be normalized or standardized among schools? (Garguilo, 1986; Bandele, 1989). Also Ojerinde (1985), Abe (1995, 2002, 2006, 2007a & 2007b), Abe and Gbore (2006); Alonge and Abe (2007) raise a number of questions, one of such question is that could the raw score sent by each school be relied upon? How much can we rely on those scores sent by the schools? This corroborates with Ziderman (1984) and MacCann (1995) who argue that in school internal assessment, teachers may tend to under-evaluate or over-evaluate pupils for reasons that are purely non academic. Garguilo (1986), Bandele (1989), MacCann (1995), Abe (1995, 2002, 2004, 2006, 2007, 2008, 2009), Abe and Gbore (2006) and Alonge & Abe (2007), argue that, it would defy psychometric consideration if individual schools internal assessment scores are used by states, WAEC or NECO to issue certificate to all candidates on assumed equivalent standard. In view of this, the possibility of transforming the internal assessment scores into more reliable form had therefore been one of the greatest concerns of stakeholders in education mostly test measurement and evaluation experts and educational practitioners. This necessitated the researcher to verify the applicability of regression model in moderating the internal assessment scores in mathematics, English Language and Biology among the senior Secondary Schools in Ekiti State, Nigeria. According to Smith (1978), Awuwoloye (1986), Bandele (1989) and Abe (2006) the Regression statistical model employs the regression equation to predict internal assessment scores from external assessment scores that is $y = a + b(x - \bar{x})$ where a = intercept of y axis, (x, y) is the centroid and b is the gradient given by

$$b = \frac{\sum (x - \bar{x})\bar{y}}{\sum (x - \bar{x})^2}$$

$$= \frac{\sum xy - Nxy}{\sum_i^2 - Nx^2}$$

Simply put as $y = a + bx + E$ where y = external assessment (dependent or criterion variable), x = internal assessment (independent or explanatory variable), E = error whose expectation is zero from Abe and Gbore (2004). The moderated scores is given by $y = y + b(x - \bar{x})$ where y = straight line value of y as against the observed value of y = the intercept of $(x - \bar{x})$, (x, y) = centroid, b = the gradient of line of best fit which is given by the relation

$$b = \frac{\sum (x - \bar{x})\bar{y}}{\sum (x - \bar{x})^2}$$ and for computational

Simplify $b = \frac{\overline{X}\,\overline{Y} - nXY}{\overline{X}^2 - nX^2}$

The purpose of this study, therefore, is to verify the applicability of Regression Model of statistical moderation as applicable to school - based assessment scores in mathematics, English Language, Biology among the Senior Secondary Schools in Ekiti State, Nigeria. To guide this study a comprehensive proposition was formulated, thus, there is no significant relationship among the internal assessment scores (Internal assessment in senior secondary school one IAS1), Internal assessment in senior secondary school two (IAS2) and Internal assessment in senior secondary school three (IAS3) in the three selected subjects before and after the Statistical Moderation by Regression Model.

MATERIALS AND METHODS

This study is an ex-post-facto research design type in which there was no treatment and manipulation of subjects instead it involved the collection of data from records. This type of design was formulated by Chapin (1955) and expanded by Campbell and Stanley (1966) as an attempt to solve the problem of randomization and control of variables in educational research since there are no real treatments nothing is being manipulated but the variables of interest are merely observed as found and used for the purpose in which the study is designed. The target population consisted of all senior secondary schools in Ekiti State while cluster sampling technique was adopted to select ten schools from the three senatorial districts and simple random technique was used to select five hundred students which were made up of fifty students per school. The researcher made personal contact with all the selected schools and collected the school copy of school-based assessment scores (SS1, SS2 and SS3) for three consecutive years (2001 - 2004). The data were analyzed using EXCEL and SPSS using Pearson product moment correlation statistical techniques. It should be noted that IAS1, IAS2 and IAS3 denote Internal Assessment Scores for SS1, SS2 and SS3 respectively.

RESULTS AND DISCUSSION

Table 1: Strength of Relationship between (IAS1, IAS2, and IAS3) in Mathematics, English Language and Biology before moderation;

Subject	IAS1 and IAS2	IAS1 and IAS3	IAS2 and IAS3
Mathematics	0.61 high and positive	0.58 Moderate and positive	0.65 High and Positive
English Language	0.52 high and positive	0.53 moderate and positive	0.50 Moderate and positive
Biology	0.48 Moderate and positive	0.48 Moderate and positive	0.45 Moderate and positive

Magnitude

0.0 - 0.2 = very low
0.2 - 0.4 = low
0.4 - 0.6 = moderate
0.6 - 0.8 = high
0.8 - 1.0 very high

Table 2: Strength of Relationship between (IAS1, IAS2 and IAS3) in Mathematics, English Language and Biology after Regression moderation Model

Subject	IAS1 and IAS2	IAS1 and IAS3	IAS2 and IAS3
Mathematics	0.61 high and positive	0.58 Moderate and positive	0.65 high and positive
English language	0.52 high and positive	0.53 moderate and positive	0.50 moderate and positive
Biology	0.48 moderate and positive	0.48 moderate and positive	0.45 moderate and positive

Table 3: Correlation coefficients internal assessment scores in three selected subject before moderation

Subject	IAS1 and IAS2	IAS1 and IAS3	IAS2 and IAS3
Mathematics	0.61*	0.58*	0.65*
English language	0.52*	0.53*	0.51*
Biology	0.48*	0.48*	0.45*

P<0.05, Critical value 0.345 (2 tailed tests) is significant as P<0.05, value of 0.345, there was significant relationship between the internal assessment scores (IAS1 and IAS2) (IAS1 and IAS3) and (IAS2 and IAS3) in mathematics, English Language and Biology hence the null hypothesis was not upheld before the application of regression model of statistical moderation.*

Table 4: Correlation coefficients of moderated internal assessment score (IAS1, IAS2 and IAS3) after statistical moderation by Regression Model.

Subject	IAS1 and IAS2,	IAS1 and IAS3	IAS2 and IAS3
Mathematics	0.61*	0.58*	0.65*
English Language	0.51*	0.53*	0.51*
Biology	0.48*	0.48*	0.45*

*At P<0.05, critical value of r is 0.345 (2tailed tests), * significant, Table 4 reveals the same strength of relationship among the moderated internal assessment scores in the three subjects which corroborates the same finding on table3. However, at P<0.05 significant relationship existed between moderated internal assessment score after the application of statistical moderation by regression model on the raw scores; hence the hypothesis was not upheld.*

From table 1, high and positive relationship existed between (IAS1 and IAS2) and (IAS2 and IAS3) in Mathematics while moderate and positive relationship existed between (IAS1 and IAS2) in Mathematics and (IAS1 and IAS3) and (IAS2 and IAS3) in English Language and Biology respectively before moderation. Table 2 illustrates the strength of relationships among the internal assessment score after the Statistical moderation by regression, the table still reveals the strength of relationship before moderation which shows that regression moderation does not utter the strength of relationship among the internal assessment scores. The findings of this study show that the strength of relationship among the internal assessment scores in Mathematics between (IAS1 and IAS2) as well as (IAS2 and IAS3) was high and positive before the moderation, this corroborate the findings of Abe (2004, 2006, 2007a, 2008 & 2009) and the Abe and Gbore (2006) while moderate and positive relationship

existed between (IAS1 and IAS3) in Mathematics, (IAS1 and IAS2), (IAS1 and IAS3) and (IAS2 and IAS3) in English Language and Biology. This is also in line with the findings of Abe (2004, 2006, 2007a & 2007b). The same finding was also upheld after the moderation of the internal assessment scores by regression model. The finding also revealed that, at $P<0.05$, significant relationships existed among the internal Assessment scores before and after the moderation by Regression model. This upheld the principle of statistical Moderation as asserted by Smith (1978), Hornby (1980), Ward (1981), Bandele (1989), Mac Cann (1995) and Abe (1995, 2002, 2006, 2007, 2008 & 2009). Finally regression Model of Statistical Moderation in Mathematics, English Language and Biology does not utter the strength of relationships in internal Assessment Scores in Senior Secondary Schools in Ekiti State, Nigeria.

CONCLUSION AND RECOMMENDATIONS

This study aimed at verifying the applicability of Regression Model of statistical moderation as applicable to school - based assessment scores in mathematics, English Language and Biology among the Senior Secondary Schools in Ekiti State, Nigeria. The findings revealed that internal assessment scores moderated by regression model does not utter the strength of relationship as expected of the model. therefore, it is recommended that this model should not be used for the moderation of internal assessment scores in Nigeria Secondary Schools.

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