

## ABSTRACT

able to rate the teachers on measuring their experience and level of qualification. Teacher effectiveness was rated by their

The aim of this study is to examine some of the psychological and principals or education officers using a modified form of Yuan's Assessment environmental variables which are related to the mathematical achievement Scale. Importance of the school's location was rated on a scale based of third year students in Jamaican post-primary schools in order to on criteria given in P.O. Levert's Inventory and Classification of Urban Settlements in Jamaica.

used to explain their variation in performance in mathematics.

Number of hypotheses were formulated and tested and the following Mathematics achievement was measured by a 70 item instrument designed inference drawn - that mathematics achievement is significantly related by the investigator which is similar to the Grade Nine Achievement Test in (at the .01 level) to:

Mathematics of the Ministry of Education, Jamaica. Besides the criterion

test a number of other instruments were administered to the subjects,

their mathematics teachers, and the principals or education officers of

these teachers during May and June 1971. The 546 subjects were selected

from the third year student population in 16 post-primary schools -

7 All-Age, 4 Junior Secondary, 2 private secondary, 3 High Schools.

For this population, there is:

Subjects' scores on the variables were determined as follows:

- (i) English Language achievement was measured by a modified form of the Ministry of Education's Grade Nine Achievement Test in English (1970);
- (ii) verbal mental ability by L.H.E. Reid's Mental Ability Test II-J6, Part I;
- (iii) non-verbal mental ability by L.H.E. Reid's Mental Ability Test II-J6, Part 2;
- (iv) self-concept of mathematical ability by a modified form of the Brookover Self-concept of Ability - Specific Subjects (Form B) scale;
- (v) attitudes to mathematics by an instrument based on items from the three attitude scales used in the International Study of Achievement in Mathematics;
- (vi) socio-economic status was rated on a modified form of E. Miller's Occupational Coding Scheme.

From the questionnaire administered to the teachers the investigator

was able to rate the teachers on scales measuring their experience and level of qualification. Teacher effectiveness was rated by their principals or education officers using a modified form of Ryan's Assessment Blank. Importance of the school's location was rated on a scale based on criteria given in P.O. Levert's Inventory and Classification of Urban Settlements in Jamaica.

A number of hypotheses were formulated and tested and the following inferences drawn - that mathematics achievement is significantly related (at the .01 level) to:

- a) English Language achievement ( $r = .786$ );
- b) verbal mental ability ( $r = .801$ );
- c) non-verbal mental ability ( $r = .630$ );
- d) self-concept of mathematical ability ( $r = .360$ );
- e) attitudes to mathematics ( $r = .240$ );
- f) teacher assigned school grades/marks ( $r = .625$ );
- g) school location ( $r = .438$ );
- h) teacher experience ( $r = .321$ );
- i) teacher effectiveness ( $r = .331$ );

that, for this population, there is:

- j) no significant relationship between teacher qualification and mathematics achievement;
- k) a significant difference between the mathematical performance of subjects in the upper and lower social classes;
- l) not a significant difference between the mathematical performance of boys and girls;
- m) not a significant difference between the mathematical performance of subjects taught by men and those taught by women.

From the multivariate analyses of the data it was shown that the scales measuring the affective variables of self-concept and attitudes did not make a significant contribution to the predictor equation for mathematics achievement as the criterion, with the cognitive and affective scores as the independent variables. A post-hoc inference was that these affective variables are probably related in a curvilinear manner ( $p < .01$ ) to mathematics achievement in this sample.

Using factor analytic techniques the correlation matrix of the variables was used to produce a principal factor pattern which was then rotated by the varimax method to give an orthogonal solution of four factors, which were interpreted as follows:

- 1) Factor one, which was loaded mainly on school type and socio-economic status, and to a lesser extent on the cognitive variables, was designated the "Social Environment of the School and Home";
- 2) factor two which was loaded mainly on the affective variables and teacher assigned school marks was designated "Perception of Mathematics and Mathematical Ability";
- 3) factor three which was loaded mainly on school size and its location was designated "The School and its Environs";
- 4) factor four which was loaded mainly on teacher experience and effectiveness was designated "The Teacher".

These four factors accounted for over 30% of the variance in the mathematical performance of the subjects. This led the investigator to conclude that the environmental factors which are mainly determined by the social class of the subjects, the type of school they attend and the degree of urbanisation of the community in which they attend school, mask the variation in mathematics achievement which might be due to the cognitive abilities and academic aptitudes of these subjects. However some of the variation in mathematics achievement can be attributed to those affective psychological characteristics of the subjects associated with their learning of mathematics, as well as the personality characteristics of their mathematics teacher.