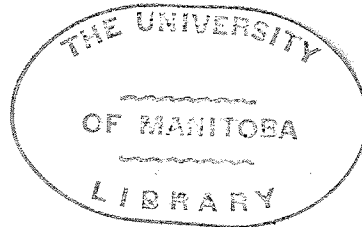


THE UNIVERSITY OF MANITOBA

AN ANALYSIS OF GRADE XI DEPARTMENTAL
EXAMINATION RESULTS OF STUDENTS TAUGHT
BY FULLY QUALIFIED AND PERMIT TEACHERS
FOR JUNE 1956 MATHEMATICS

BEING A THESIS SUBMITTED TO THE COMMITTEE ON
POST-GRADUATE STUDIES IN PARTIAL
FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF
EDUCATION



BY

GEORGINA R. SAMUEL, B.ED.

WINNIPEG, MANITOBA

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THE PROBLEM

This study was concerned with the relative success on the June 1956 Departmental Mathematics Examination, in the lower half of mathematical achievement, of three groups of pupils. The test items on the examination were analyzed with a view to assessing the values assigned questions involving mathematical understanding and those solvable by imitation. Scores made on various items and question types yielded information as to the comparative difficulty and discriminative power of each.

DEFINITIONS OF TERMS USED

"A" Students = those taught by fully-qualified teachers in public schools of School District of Winnipeg Number One.
"B" Students = those instructed by fully-qualified teachers outside District Number One.
"C" Students = those trained by teachers on permit in rural schools.
Source of Data = Grade XI 1956 Mathematics answer-books, selected by the Department of Education as representative of the three groups.

Sample Papers of Lower Half of Mathematical Achievement = samples of the papers from the lower 50% of all pupils in Grade XI (for each group).

Questions Solvable by Imitation = questions similar to those asked for June 1956, or worked out in detail in the texts.

Original Question = one for which there was no parallel on the June 1956 examination, nor a detailed explanatory example in the texts.

Easy Question in Terms of Score = a question on which, on the average, all pupils of one group scored 80% of the possible marks.

Difficult Question in Terms of Score = a question on which, on the average, all pupils of one group scored less than 20% of the possible marks.

Easy or Difficult Questions or Question Types in Terms of Rank - For each group, questions and question types were ranked according to the percentages of possible marks scored. Rank 1 = easiest.

Discriminative Power of a Question or Question Type = the ability to discriminate between students at different levels of achievement.

Percentage Figure for Discriminative Power was obtained by dividing the score of the lowest ranking group ("C") by the corresponding score of the top ranking group ("A").

SAMPLE PAPERS FOR LOWER HALF

The Department of Education supplied 103, or 13.8% of total "A" papers written; 103 or 13.7% of total "B"; and 51 or 39.2% of total "C". The fact that the failure rate (15.5%) for the "A" sample was exactly the same as for the entire "A" population was evidence that a well balanced choice of sample papers had been made. Because the better "A" (32.1%) and "B" (18.8%) were exempted, it was decided to choose samples of papers from the lower half of all three groups. Using Christmas and Easter marks from the largest City High School, figures were produced showing that had exempted students written June tests their scores would not have belonged in the lower half.

EXAMINATION PAPER

In the algebra portion of the examination, 31 marks of a possible 50 were assigned for questions similar to those of the previous June; 10, for examples fully explained in the text; and 9, for 'original' questions requiring one or more statements. In the geometry section, 12 marks were given for propositions; 15, for 'original' blank-filling items; and 23, for 'original' questions requiring more than one statement. Through mastering just the previous June test and examples demonstrated in the texts, a student could have made 31% out of a possible 50% in algebra, and 12% out of 50% in geometry. Two-and-a-half times as many marks were given in the geometry as in the algebra section for 'original' questions requiring several statements. It was concluded that geometry would require a more thorough understanding of mathematical principles than algebra.

COMPARISON OF TOTAL SCORES OF THREE GROUPS

(1) The failure rate of "A" students was half that of "B", and one quarter that of "C".

(2) The order of merit was "A", "B", and "C" for all comparisons made as to total scores for:

(a) algebra and/or geometry (means and percentiles 10, 25, 50, 75, and 100)