OUTCOMES OF SCHOOLING: MATHEMATICS ACHIEVEMENT AND ATTITUDES TOWARDS MATHEMATICS LEARNING IN HONG KONG

ABSTRACT. High achievement of cognitive skills and the formation of favourable attitudes towards learning are universally acclaimed outcomes of schooling. The present study utilised the Second IEA Mathematics Study data (N = 5644) to examine which of the ten measured attitude dimensions are pertinent in explaining mathematics achievement variance of Form One students in Hong Kong. Correlational and commonality analysis revealed that students' perception of their ability to do mathematics, the importance of mathematics to society and the concept of mathematics being a creative subject are the most pertinent attitude dimensions. In particular, the perception of students' estimated abilities to do mathematics made a substantial, unique and common contribution to the explained mathematics achievement variance.

INTRODUCTION

In past decades, research workers have tried with some success to explain, evaluate and recommend various practices of schooling, based on hypothesised conceptual learning models. These models represent an important line of development in the mainstream of research on school learning in the two decades from 1960 to 1980 (Noonan and Wold, 1983). Implicit or explicit in these models are some preferred outcomes of schooling which educators and citizens highly value and endorse. Among those which have received the greatest attention are the attainment of academic skills and attitudinal outcomes.

Chesler and Caves (1981) devoted a chapter in their book to elaborate various outcomes of schooling. They asserted that attitudinal outcomes relate to the socialising functions of the schools in compassing the diversity of human personality. School-related and society-related attitudes are the two major groups of attitudes that nearly every school focuses on. Typical examples of these attitudes are the views that students hold about themselves, their peers, their family, the educational processes, the social issues and the broader society. They pointed out that attitudinal outcomes consist of a number of dimensions. For the purpose of this article attitude will refer to affectively toned perceptions of situations in which mathematics is learned as well as to views of mathematics as a subject.

In a review article on attitudes towards mathematics, Aiken (1985) concluded that attitudes towards mathematics begin developing as soon as children are exposed to the subject, but the junior years (age 11–13) appear to be particularly important. He asserted that this is the time when negative
attitudes towards mathematics become especially noticeable. Whether the increase in negative attitudes at this stage of development is due to greater abstractions of the mathematical material to be learned, to social/sex preoccupations, or to some other factor is not clear. The investigation of these attitudinal outcomes may result in the improvement of mathematics learning.

The present study sought to use the Second IEA Mathematics Study data (1980) to examine the relationship between mathematics achievement and attitudes towards mathematics in junior secondary schools in Hong Kong. The specific research questions were:

1. What attitudes towards mathematics learning are most intimately related to mathematics achievement?
2. To what degree does the measurement of such attitudes explain variance in mathematics achievement, uniquely and in common?

SOURCE OF DATA

The sample of students studied in this article was drawn in the Second IEA Mathematics Study (SIMS) which was conducted in Hong Kong in 1980 (Brimer and Griffin, 1985). Data were obtained from 130 Grade 7 classes (Modal age = 13). Within each class all students were tested and achievement test and attitudinal data were obtained for 5644 students. The sampling design permitted analyses at the between-student level where there was a response rate of 94%.

THE OUTCOME MEASURES

Mathematics achievement within the internationally defined curriculum was measured using specifically designed tests by the SIMS International Project Committee. After scaling the tests, a total score which represented the students’ mathematics achievement in their formal curriculum was calculated. The descriptive summary statistics are shown in Table I.

Ten, 5-point Likert scales, with 5 indicating the most positive views towards mathematics were used to elicit student’s attitudes and perceptions on (1) Perceived Home-Support (HSSUP), (2) Perceived Home-Process (HSPRO), (3) Mathematics-Importance (IMPT), (4) Mathematics-Easy (EASY), (5) Mathematics-Like (LIKE), (6) Mathematics-Create (CREATE), (7) Mathematics-Rules (RULES), (8) Mathematics and Myself (MYSELF), (9) Mathematics and Society (SOC) and (10) Sex-Stereotyping (SEX). The scale directions of RULES and SEX have been reversed because