

# Quality Schooling with Limited Resources

An International Comparison of Mathematics and  
Science Education in China, Korea and Hungary

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## Abstract

There have been growing concerns on achieving quality schooling with limited resources in many developing countries. This study compares China (People's Republic of China) with Korea (Republic of Korea) and Hungary in Mathematics and Science Education. The general aim of the study is to examine the patterns of relationships between student achievement and background factors between China and the two other high achieving countries that have limited resources.

The target population was 13-year-olds (born in the calendar year 1977) in the three countries. In total, 10,071 students of 373 schools were involved in this study. Half of them were assessed in mathematics, while the rest were in science. A student questionnaire, a school questionnaire, and a national questionnaire were administered. Data was collected in 1991 in the framework of the second International Assessment of Educational Progress Project (IAEP). Multivariate analysis was conducted through LISREL modeling.

It was found that Chinese students achieved higher in mathematics and lower in science than their counterparts in Korea and Hungary. The weakest curriculum topic in China was data analysis, Statistics and Probability in mathematics and Biology in science. Students in the three countries were all positive towards mathematics and science. However, the Korean students were more critical towards mathematics and science learning.

Findings from this study show that parents in the three countries were very supportive toward their children's school learning. The number of books at home and the number of siblings which a student has had significant relations with student achievement. The supportive attitudes of parents (such as encouragement and interest in school learning) were more influential on achievement than family assistance with student homework. Furthermore, student leisure reading exerted positive effect on educational outcomes across the countries. However, TV viewing had negative relation with student achievement in mathematics and science.

At school level, it was found that availability of a school library and laboratories was more influential on achievement than possession of computers. Large schools were usually better equipped than smaller schools. If school equipment was the same, smaller schools had better results. Students in smaller classes achieved better than in larger classes, if equipment was constant. Concerning teaching practice, it was observed that mathematics and science were mainly taught through teachers' presentations. The status of educational provisions differed markedly among the countries under study. The schools in Korea had more physical equipment than their counterparts in China and Hungary, whereas more literary resources, and better trained teachers were available in Hungarian schools. However in China, educational resources were concentrated on only a small proportion of schools that were both well-equipped and well-staffed. As a result, the between school difference in achievement was larger in China than in Korea and Hungary.

This study has implications for educational policy and practice in China, as well as further studies in this field.

Descriptors: Education, Mathematics Education, Science Education, China, Korea, Hungary, Quality of Education, Educational Assessment, Educational Policy Studies, Achievement, Attitude, Student Behavior, Home Background, School Background, LISREL Analysis.

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