

Trends in International Mathematics and Science Study (TIMSS) 2007

Summary of Findings

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December 10, 2008

Background

TIMSS is the largest international study of mathematics and science education in the history of comparative studies. It is conducted under the auspices of the International Association for the Evaluation of Educational Achievement (IEA). TIMSS consists of an international test of student achievement in mathematics and sciences, and it probes into different factors that account for student achievement through a set of questionnaires. Over 424,000 grades 4 and 8 students from more than 60 countries/regions participated in TIMSS 2007.

The Hong Kong component of TIMSS is conducted by the Faculty of Education, The University of Hong Kong. In Hong Kong, 3,791 Primary 4 students from 126 primary schools and 3,470 Secondary 2 students from 123 secondary schools participated in the study. Schools and classes were randomly selected. Schools, mathematics teachers and science teachers of the sampled classes were asked to complete a school questionnaire and a teacher questionnaire. Students were required to complete a test booklet and a student questionnaire.

The areas tested in Primary 4 mathematics and science are: 1. Number, Geometric Shapes and Measures, and Data Display; 2. Life Science, Physical Science and Earth Science. The areas tested in Secondary 2 mathematics and science are: 1. Number, Algebra, Geometry, Data and Chance; 2. Biology, Chemistry, Physics, and Earth Science.

Past Studies

The Third International Mathematics and Science Study (TIMSS) 1995 –

Grades tested: Primary 3 and 4, Secondary 1 and 2, and the last year of secondary education

The Third International Mathematics and Science Study Repeat (TIMSS-R) 1999 –

Grade tested: Secondary 2

The Trends in International Mathematics and Science Study (TIMSS) 2003 –

Grades tested: Primary 4 and Secondary 2

Hong Kong Results of TIMSS 2007

Student Achievement

Mathematics achievement of Primary 4 students

- International ranking among the 43 participating regions: 1st
- Significant improvement over the performance in 1995 and 2003
- Percentage of students reaching the “Advanced” International Benchmark: 40%
 - A significant increase of 18% and 23% over the performance in 2003 and 1995, respectively
 - Also having the highest percentages of students reaching the “high”, “intermediate”, and “low” benchmarks of mathematics among all participants
 - The only participating region with all students passing the lowest benchmark

Mathematics achievement of Secondary 2 students

- International ranking among the 56 participating regions: 4th
- No significant difference from the performance in 1995 and 1999 but a relatively lower achievement than 2003
- Percentage of students reaching the “Advanced” International Benchmark: 31% (same as 2003)
 - A significant increase of 8% over the performance in 1995

Science achievement of Primary 4 students

- International ranking among the 43 participating regions: 3rd
- Significant improvement over the performance in 1995 and 2003
- Percentage of students reaching the “Advanced” International Benchmark: 14%
 - A significant increase of 7% and 9% over the performance in 2003 and 1995, respectively
 - 55% of students have reached the “high” benchmark. That is a significant increase of 8% and 25% over the performance of “high” benchmark in 2003 and 1995, respectively
- No significant difference between boys’ and girls’ achievement

Science achievement of Secondary 2 students

- International ranking among the 56 participating regions: 9th
- No significant difference from the performance in 1999 while there is a significant improvement over the performance in 1995 but a relatively lower achievement than 2003
- Percentage of students reaching the “Advanced” International Benchmark: 10%
 - A significant increase of 3% over the performance in 1995
- Significant difference between boys’ and girls’ achievement no longer exists

Students Background and Attitudes

- The GNP per capita for Hong Kong increased from US\$ 24,960 in 2003 to US\$29,040 in 2007
- The average class size for Primary 4 is 35 students and 37 students for Secondary 2. Both are higher than the international averages of 26 and 29 students, respectively
- Primary 4 students have more books at home now than 2003 but not for the Secondary 2 sample

- A significant increase of 5% of Primary 4 students with more than 200 books and a significant increase of 5% and 6% of Primary 4 students with 101-200 books and 26-100 books, respectively
- 94% of Primary 4 students and 99% of Secondary 2 students have a computer at home, which both are higher than the international averages for Primary 4 (70%) and Secondary 2 (70%)
 - Students' values of mathematics and science and their self-confidence in learning the two subjects are rather low

Conclusion

Hong Kong has maintained at a relatively high position in students' mathematics and science achievement internationally. Although there are fewer Hong Kong students with very positive attitudes towards mathematics and science, their performance is better than many students in other parts of the world. In designing educational policy, the Government should take the results of these international studies into consideration so as to retain our strengths and overcome our weaknesses.