



## **Press Release**

### **Trends in International Mathematics and Science Study (TIMSS) 2011**

**Project Leader & Chairman of Hong Kong Centre for IEA Studies:**

**Professor Frederick K S Leung**

**Project Co-leader: Dr. Alice S L Wong**

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#### **(I) HONG KONG CONTINUES TO BE IN THE TOP POSITION OF INTERNATIONAL MATHEMATICS AND SCIENCE ASSESSMENT**

The Trends in International Mathematics and Science Study (TIMSS) 2011 press conference, scheduled today (12 Dec 2012) at LG06 Hui Oi Chow Science Building, HKU, informed the public about the achievement in and attitudes towards mathematics and science of Primary 4 and Secondary 2 students from Hong Kong and over 60 other countries/regions.

TIMSS 2011, being the fifth cycle of the international assessment, tested more than 588,000 students worldwide. The Hong Kong component of TIMSS 2011 involved 3,957 Primary 4 students and 4,015 Secondary 2 students from 136 primary and 117 secondary schools, respectively.

The Chairman of Hong Kong Centre for IEA Studies, Professor Frederick Leung, announced the findings of TIMSS 2011 at the press conference after the official international press release in Amsterdam, the Netherlands, on December 11, 2012. Professor Leung said, "This is the fifth time Hong Kong participated in TIMSS since 1995. Students in Hong Kong, and also in many of the East Asian countries, continue to do very well in mathematics and science in this cycle of the study. TIMSS not only informs us about the prevailing standings of different countries' mathematics and science achievement, but also the changes in achievement across time."

In mathematics, Singapore, Korea and Hong Kong are the top-performing countries/regions in the Primary 4 sample. Their students' mathematics results are significantly higher than the rest of the participating countries/regions. Performance of Chinese Taipei and Japan immediately follow after. At Secondary 2, the top performing countries/regions are Korea, Singapore, Chinese Taipei, Hong Kong and Japan. Students in these East Asian countries/regions outperformed their counterparts in other participating countries/regions as in the previous cycles of TIMSS.

In science, the performance of Primary 4 students in Korea and Singapore is significantly better than other countries/regions in the sample. Students in Finland, Japan, Russian Federation, Chinese Taipei, United States, Czech Republic and Hong Kong also performed well in the study. At Secondary 2, the science achievement of students in Singapore is significantly higher than the rest of the participating countries/regions. Other well-performing countries/regions include Chinese Taipei, Korea, Japan, Finland, Slovenia, Russian Federation and Hong Kong.

## **(II) Other Key Findings for Hong Kong:**

### ***1. Trends in Achievement***

In the past 16 years, the mathematics achievement in Hong Kong has been very consistent across all waves of TIMSS. At Primary 4, the 2011 result is significantly higher than the results in 2003 and 1995. At Secondary 2, the 2011 mathematics achievement is not significantly higher than those identified in many of the previous cycles (2007, 2003 and 1999), except for TIMSS 1995, where students performed significantly lower than the students in this cycle.

For science at Primary 4, the 2011 achievement is significantly lower than that in 2007. However, the performance in the latest study is still significantly better than the performance in 1995. At Secondary 2, the 2011 achievement is not significantly different from the results in 2007 and 1999, and it is significantly higher than the achievement in 1995. The science performance in 2003 was highest among all cycles.

### ***2. International “Advanced” Benchmarks***

Hong Kong has nearly two-fifths of the Primary 4 students reaching the “advanced” benchmark of mathematics. Almost all (99 percent) of our students have passed the lowest benchmark. At Secondary 2, over one-third of Hong Kong students have reached the “advanced” benchmark. For science, there are 9 percent of students at both Primary 4 and Secondary 2 reaching the “advanced” benchmark.

### ***3. Gender and Achievement***

In the current study, there is a significant difference in mathematics and science achievement between boys and girls at Primary 4, with boys performing better than girls in both subjects. A similar pattern on gender difference in achievement has not been found among the students in the Secondary 2 sample.

This is the first time for Hong Kong to have significant difference in mathematics achievement between the two genders. For Primary 4 science, unlike the two previous cycles where difference in achievement between boys and girls were negligible, boys have shown to have better performance this time. At Secondary 2, boys and girls do not differ in their performance in mathematics and science.

### ***4. Attitudinal Results***

It is interesting to note that although Hong Kong and many other East Asian students do very well in their mathematics and science achievement, they are less likely to have positive attitudes towards mathematics and science when compared to students in other parts of the world, especially to students in Africa and the Middle East. Hong Kong students, as well as students in Japan, Chinese Taipei and Korea, are lower than the international averages on their appreciation, values and confidence in learning mathematics and science.

**[A summary of findings is attached to this press release]**

## TIMSS 2011 Participants

The Trends in International Mathematics and Science Study (TIMSS) 2011 is conducted under the auspices of the International Association for the Evaluation of Educational Achievement (IEA). The participating countries/regions include Armenia, Australia, Austria, Azerbaijan, Bahrain, Belgium (Flemish), Botswana, Chile, Chinese Taipei, Croatia, Czech Republic, Denmark, England, Finland, Georgia, Germany, Ghana, Honduras, Hong Kong SAR, Hungary, Indonesia, Iran, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Korea, Kuwait, Lebanon, Lithuania, Macedonia, Malaysia, Malta, Morocco, The Netherlands, New Zealand, Northern Ireland, Norway, Oman, Palestinian National Authority, Poland, Portugal, Qatar, Romania, Russian Federation, Saudi Arabia, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Syrian Arab Republic, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, United States, and Yemen (plus 14 benchmarking participants from Canada, United Arab Emirates and United States, including Alberta, Ontario, Quebec, Abu Dhabi, Dubai, Alabama, California, Colorado, Connecticut, Florida, Indiana, Massachusetts, Minnesota and North Carolina).

### Media Note:

The international reports of TIMSS 2011 can be downloaded at <http://timss.bc.edu>.

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Please visit <http://web.edu.hku.hk/media.php> to view the e-version of the press release. The powerpoint and photo can be downloaded at <http://www.fe.hku.hk/press/20121212/>.



Note for the photo:

Professor Tse Shek Kam, Professor, Faculty of Education, HKU (left); Professor Frederick Leung, Professor, Faculty of Education, HKU (middle) and Dr Alice Wong, Associate Professor, Faculty of Education, HKU (right).

Ends/Wednesday, December 12, 2012

# Trends in International Mathematics and Science Study (TIMSS) 2011

## Summary of Findings

Professor Frederick K S Leung and Dr Alice S L Wong  
Faculty of Education  
The University of Hong Kong  
December 12, 2012

### 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 588,000 Primary 4 and Secondary 2 students from more than 60 countries/regions participated in TIMSS 2011.

The Hong Kong component of TIMSS is conducted by the Faculty of Education, HKU. In Hong Kong, 3,957 Primary 4 students from 136 primary schools and 4,015 Secondary 2 students from 117 secondary schools participated in the study. Schools and classes were randomly selected. Schools, mathematics teachers and science teachers of the sampled students were asked to complete a school questionnaire and a teacher questionnaire. Students were required to complete a test booklet and a student questionnaire.

Areas tested at Primary 4 are:

Mathematics: 1. Number 2. Geometric Shapes and Measures 3. Data Display

Science: 1. Life Science 2. Physical Science 3. Earth Science

Areas tested at Secondary 2 are:

Mathematics: 1. Number 2. Algebra 3. Geometry 4. Data and Chance

Science: 1. Biology 2. Chemistry 3. Physics 4. Earth Science

### Hong Kong Results of TIMSS 2011

#### Mathematics Achievement

##### *Primary 4*

- TIMSS scale score: 602
- International ranking: 3<sup>rd</sup>
- Significant improvement over the performance in 1995 and 2003 but no significant difference from the performance in 2007
- Percentage of students reaching the “Advanced” International Benchmark: 37%  
→ A significant increase of 15% and 20% over the performance in 2003 and 1995, respectively
- Gender difference in achievement: boys > girls

##### *Secondary 2*

- TIMSS scale score: 586
- International ranking: 4<sup>th</sup>
- Significant improvement over the performance in 1995 but no significant difference from the performance in 1999, 2003 and 2007

- Percentage of students reaching the “Advanced” International Benchmark: 34%  
→ A significant increase of 6% and 11% over the performance in 1999 and 1995, respectively
- Gender difference in achievement: No significant difference

## Science Achievement

### *Primary 4*

- TIMSS scale score: 535
- International ranking: 9<sup>th</sup>
- Significant improvement over the performance in 1995 but a significant decrease in performance compared to the performance in 2007
- Percentage of students reaching the “Advanced” International Benchmark: 9%  
→ A significant increase of 4% over the performance in 1995 but a significant decrease in performance compared to the performance in 2007
- Gender difference in achievement: boys > girls

### *Secondary 2*

- TIMSS scale score: 535
- International ranking: 8<sup>th</sup>
- Significant improvement over the performance in 1995 but a significant decrease in performance compared to the performance in 2003
- Percentage of students reaching the “Advanced” International Benchmark: 9%  
→ No significant difference from the performance in 1995, 1999 and 2007 but a significant decrease in the performance compared to the performance in 2003
- Gender difference in achievement: No significant difference

## **Background and Attitudes**

- The GNP per capita for Hong Kong increased from US\$ 29,040 in 2007 to US\$31,570 in 2011
- Public expenditure on education: 5% of Gross Domestic Product (GDP)
- Average age of Primary 4 students tested: 10.1 years old
- Average age of Secondary 2 students tested: 14.2 years old
- Home with more resources for learning is associated with higher mathematics and science achievement
- Hong Kong students’ values of mathematics and science and their confidence in learning the two subjects are rather low. There are more Primary 4 students with positive attitudes towards mathematics and science than students at Secondary 2, however, the percentages of students having positive attitudes towards mathematics and science are all lower than the international averages at both grades.