

# TIMSS 2007

Michael O. Martin and Ina V.S. Mullis

48<sup>th</sup> IEA General Assembly

Hong Kong SAR

8-11 October, 2007

**TIMSS2007**

Trends in International Mathematics and Science Study



**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College

# TIMSS 2007

- Mathematics and Science
- Grades 4 and 8
- Trends 1995, 1999, 2003, 2007
- Baseline for New Countries

*Nearly 70 Countries!*

# Major Accomplishment

Since Last General Assembly:

**Completed Data Collection!**

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# Countries in TIMSS Data Collection

3

Algeria 4,8  
Armenia 4,8  
Australia 4,8  
Austria 4  
Bahrain 8  
Bosnia 8  
Botswana 8  
Bulgaria 8  
*Canada, Alberta 4*  
*Canada, B.C. 4,8*  
*Canada, Ontario 4,8*  
*Canada, Quebec 4,8*  
Chinese Taipei 4,8  
Colombia 4,8  
Cyprus 8  
Czech Republic 4,8  
Denmark 4  
Egypt 8  
El Salvador 4,8  
England 4,8  
Georgia 4,8  
Germany 4  
Ghana 8  
Hong Kong SAR 4,8  
Hungary 4,8  
Indonesia 8  
Iran 4,8  
Israel 8  
Italy 4,8  
Japan 4,8  
Jordan 8  
Kazakhstan 4  
Korea, Rep. of 8  
Kuwait 4,8  
Latvia 4  
Lebanon 8  
Lithuania 4,8  
Malaysia 8  
Malta 8  
Moldova 4,8  
Mongolia 4,8  
Morocco 4,8  
Netherlands 4  
New Zealand 4  
Norway 4,8  
Oman 8  
Palestinian Auth. 8  
Qatar 4,8  
Romania 8  
Russian Federation 4,8  
Saudi Arabia 8  
Scotland 4,8  
Serbia 8  
Singapore 4,8  
Slovak Republic 4  
Slovenia 4,8  
Sweden 4,8  
Syrian Arab Republic 8  
Thailand 8  
Tunisia 4,8  
Turkey 8  
Ukraine 4,8  
United States 4,8  
Yemen, Rep. of 4  
  
*Spain, Basque Country 8*  
*UAE, Dubai 4,8*  
*U.S., Massachusetts 4,8*  
*U.S., Minnesota 4,8*

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# Growth of TIMSS

- Trends for More Than 50 Countries
- Becoming Incorporated into Assessment Strategies
- Impetus to Revise Curricula
- Model for Large-scale Assessments
- Learning by Doing on a Global Scale

# TIMSS 2007 SMIRC

## Mathematics Experts

Kiril Bankov, Bulgaria

Hanako Senuma, Japan

Khattab Mohammad Abu Lebdeh, Jordan

Robert Garden, New Zealand

Liv Sissel Gronmo, Norway

Mary Lindquist, United States

# TIMSS 2007 SMIRC

## Science Experts

Ahmed Mohammed Rafea, Bahrain

Chen-yung Lin, Chinese Taipei

Jophus Anamuah-Mensah, Ghana

Gabriela Noveanu, Romania

Galina Kovaleva, Russian Federation

Jackie Heaton, Scotland

Audrey Champagne, United States

# TIMSS 2007 QIRC

Sue Thomson, Australia

Serge Baillergeon, Quebec

Solaiman El-Khodary El-Sheikh, Egypt

Martina Meelissen, The Netherlands

Boey Kok Leong, Singapore

Barbara Japelj, Slovenia

Patrick Gonzales, United States



# TIMSS 2007 Assessment Specialists

- Mathematics Coordinator
  - Graham Ruddock, NFER
- Science Coordinator
  - Christine O’Sullivan, K-12 Consulting
- Special “Task Force” Consultants in Mathematics and Science
  - Intensive Week-long Working Sessions

# TIMSS 2007 Assessment Specialists

- Staff at TIMSS & PIRLS ISC
  - Content/Measurement Experience
  - Production/Graphics Experience
- IEA Secretariat and DPC
- Statistics Canada
- NRCs – National Research Coordinators
  - Wealth of Knowledge and Experience

# Mathematics Content Domains

<b>Fourth-Grade</b>	Percentages
Number	50%
Geometric Shapes and Measures	35%
Data Display	15%
<b>Eighth-Grade</b>	
Number	30%
Algebra	30%
Geometry	20%
Data and Chance	20%

# Science Content Domains

<b>Fourth-Grade</b>	Percentages
Life Science	45%
Physical Science	35%
Earth Science	20%
<b>Eighth-Grade</b>	
Biology	35%
Chemistry	20%
Physics	25%
Earth Science	20%

# Cognitive Domains

	Percentages 4 <sup>th</sup> Grade	Percentages 8 <sup>TH</sup> Grade
<b>Mathematics</b>		
Knowing	40%	35%
Applying	40%	40%
Reasoning	20%	25%
<b>Science</b>		
Knowing	40%	30%
Applying	35%	35%
Reasoning	25%	35%

# Scope of the Assessment

## Eighth Grade

- Total Assessment Time - 10 hours 30 minutes
  - 427 Items
    - Half Mathematics (215), Half Science (212)
    - Half Trend (189), Half New (238)
- Assessment Time per Student – 90 minutes
  - 14 Student Booklets
    - Each Booklet – Two Blocks Math, Two Blocks Science

# Scope of the Assessment (cont.)

## Fourth Grade

- Total Assessment Time - 8 hours 45 minutes
  - 350 Items
    - Half Mathematics (177), Half Science (173)
    - Half Trend (154), Half New (196)
- Assessment Time per Student – 72 minutes
  - 14 Student Booklets
    - Each Booklet – Two Blocks Math, Two Blocks Science

## Scope of the Assessment (cont.)

Encyclopedia – Chapter for Each Country

Questionnaires at Grades 4 and 8

- Students
- Teachers – Mathematics and Science
- Schools
- Curriculum – Mathematics and Science

12 questionnaires in all!



# Major Activity – Instrument Production

- Country Translation
  - Arabic Version, Translation and Production
- Translation Verification
- Layout Verification
- Printing and Distribution

# Major Activity – Scoring Guide Development and Training

- TIMSS Task Forces Finalized Scoring Guides
- Prepared Scoring Training Materials
  - Example and Practice Papers
- Southern Hemisphere Scoring Training
  - October 2006, Melbourne, Australia
- Northern Hemisphere Scoring Training
  - March 2007, Amman, Jordan

# Major Activity – Preparing for Data Collection

- IEA DPC Conducted Data Management Seminar, September 2006, Hamburg
- IEA Secretariat and TIMSS & PIRLS International Study Center Conducted Training Seminar for International Quality Control Monitors
  - September 2006
  - January 2007 – two sessions

# Major Activity – Data Collection

- Southern Hemisphere
  - October-December 2006
- Northern Hemisphere
  - March-June 2007
- Curriculum Questionnaires
  - Administered Online to National Research Coordinators (NRCs)
  - August-September 2007

# TIMSS 2007 Assessment

	<b>Grade 4</b>	<b>Grade 8</b>
Participants	45	58
Languages	28	35
<i>Anticipating Data from:</i>		
Students	240,000	320,000
Teachers	11,000	27,000
Schools	7,000	9,000

# Major Activity - TIMSS 2007 Encyclopedia

## One Chapter per Country

- Country Context
- Curriculum in Primary and Lower Secondary Grades in Mathematics and Science
- Instruction in Primary and Lower Secondary Grades
- Teachers and Teacher Education
- Examinations and Assessments

# Major Activity – TIMSS 2007 Encyclopedia

- NRCs Complete Encyclopedia Chapters
  - February 2008
- TIMSS Encyclopedia Published
  - September 2008
- TIMSS Encyclopedia Distributed
  - General Assembly 2008

# Major Activity – Preparing for Scaling and Analysis for 2007 and Trends

- Overall Achievement in Mathematics and Science at Grades 4 and 8 (4 in all)
- Content Domains
  - Mathematics Grades 4(3) and 8(4)
  - Science Grades 4(3) and 8(4)
  - 14 Content Scales in all
- Cognitive Domains Grades 4 and 8
  - Knowing, Applying, Reasoning
  - 12 Cognitive Scales in all



# Major Activity – Prototype Tables for Two International Reports

- Mathematics: Grades 4 and 8
- Science: Grades 4 and 8

## Contents of Reports

Ch. 1: Achievement Overall

Ch. 2: International Benchmarks

(Advanced, High, Intermediate, Low)

Ch. 3: Content and Cognitive Domains

# Major Activity – TIMSS 2007 International Reports

## Contents of Report (cont.)

Ch. 4: Students' Backgrounds and Attitudes

Ch. 5: Curriculum – Intended and  
Implemented

Ch. 6: Teachers' Education and Experience

Ch. 7: Classroom Characteristics and  
Instruction

Ch. 8: School Contexts

# Major Activity – TIMSS 2007 International Reports

- NRCs Review Analysis Plans and Report Outlines at 7<sup>th</sup> NRC Meeting
  - December 2007, Salzburg, Austria
- Achievement Scaling Completed
  - April 2008
- SMIRC Conducts Scale Anchoring
  - May 2008, Kaoshiung, Chinese Taipei

# Major Activity – TIMSS 2007 International Reports (cont.)

- NRCs Review Drafts at 8<sup>th</sup> NRC Meeting
  - June 2008, Gabarone, Botswana
- TIMSS 2007 Mathematics and Science International Reports and TIMSS 2007 Technical Report Published
  - November 2008
- International Press Release
  - December 9, 2008, Boston College

# Major Activity – TIMSS 2007 International Database

- Database Training at 9<sup>th</sup> NRC Meeting  
– February 2009
- TIMSS & PIRLS International Study  
Center Distributes International  
Database and User Guide  
– May 2009

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