TIMSS 2019
Transitioning to eTIMSS

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Since Last General Assembly...

- Completed converting trend items to eTIMSS format
- Completed prepilot versions of digitally enhanced items (PSIs)
- Developed plan for transitioning to eTIMSS and maintaining trends
- Worked with countries to promote eTIMSS participation
- Scheduled many TIMSS 2019 activities (eTIMSS and paperTIMSS)
Infrastructure Already Transitioned to eTIMSS

- Development of both eTIMSS and paperTIMSS managed by the *eTIMSS Assessment Builder*
  - Trend items already imported
  - Use system at 2\textsuperscript{nd} NRC meeting in April to develop new items

- All translation and verification activities will use the *eTIMSS Translation System*

- eTIMSS system will print all paper booklets and questionnaires
Maintaining Trends in 2019

TIMSS has twin goals:

• Maintaining continuity to measure trends
  – PaperTIMSS links to the past

• Innovations to be relevant and take advantage of new technologies
  – eTIMSS links to the future

• PaperTIMSS and eTIMSS achievement scales need to be linked to maintain trends
Transition to eTIMSS Completed in 2023

In order to keep TIMSS up to date

• TIMSS 2019 eTIMSS and paperTIMSS start to diverge
  – 8 item blocks in common, 6 blocks not identical

• By TIMSS 2023, too far apart
  – Just 3 blocks in common, 11 blocks not identical

Enroll now in eTIMSS, if you can!
Benefits of Moving to eTIMSS

Enhanced assessment—provides extended coverage of framework, especially PSIs

- Model complex problems
- Animations
- Simulations

Interactive tasks-more engaging and motivating

- Discover and test relationships
- Manipulate data
- Can reduce reading load
Benefits of Moving to eTIMSS

Provision of tools

- Number pad for numeric entry
- Calculator
- Drawing tool
- Ruler

Capture student processes

- Gain deeper insights into student thinking
- Problem solving strategies
- Inquiry methods
Benefits of Moving to eTIMSS

Take advantage of efficiencies provided by IEA eAssessment systems

- Developing, translating/verifying, printing, delivery, data entry, and scoring
- Secure and accurate data storage

Keep pace with students’ experiences in and out of school

- Students report considerable schoolwork depends on computer
- Social media
Benefits of Moving to eTIMSS

Promise for the future

– Improved accessibility for students with disabilities
– Better match between assessment items and student ability – given wide range of student achievement in TIMSS
– Initial items to target students’ level of achievement to deliver more efficient assessment
– Students have better testing experience
– TIMSS has more precise measurement
– Eventually, reduced testing time
Major Developments to Help Countries’ Transition

- Wider range of platforms
  - Extended to include PC/Windows
  - Greater variety of Android tablets
- Reduced burden to convert to eTIMSS
- Video to promote participation in eTIMSS
  - Accessible from secure website
eTIMSS Promotional Video Confidential
Converting to eTIMSS 2019

eTIMSS each grade, each subject

- 8 trend item blocks from 2015
  - Mostly “nearly identical” between eTIMSS and paperTIMSS

- 6 new blocks of digitally enhanced items, including PSIs
  - Being developed
Adapting PaperTIMSS Items to eTIMSS Format

• 450 trend items
• Essentially identical ≈80%
  - Looks the same on tablet as on paper
• Readily adaptable ≈20%
  - Slight modifications to fit smaller space (rearranging, reducing size of graphics, or use scrolling)
• Two page items – only 5 items at 8th grade

Solid ground!
Essentially Identical
Ryan is packing books into a rectangular box. All the books are the same size.

How many books will fill the box?

Answer: _______
Ryan is packing books into a rectangular box. All the books are the same size.

How many books will fill the box?

Answer: ___________
Readily Adaptable
One evening Peter went outside and made a drawing of a house, a tree, and the Moon. About 2 weeks later, Peter's brother, John, went outside and made a drawing of the same house, the same tree, and the Moon.

When they compared their drawings, they saw that they drew the Moon differently.

Peter's Drawing

John's Drawing

Whose drawing of the moon is correct?

(Check one box.)

☐ Only Peter's drawing of the moon can be correct.
☐ Only John's drawing of the moon can be correct.
☐ Both drawings of the moon can be correct.

Explain your answer.
One evening Peter went outside and made a drawing of a house, a tree, and the Moon. About 2 weeks later, Peter’s brother, John, went outside and made a drawing of the same house, the same tree, and the Moon. When they compared their drawings, they saw that they drew the Moon differently.

Whose drawing of the moon is correct?
(Check one box.)

- [ ] Only Peter’s drawing.
- [ ] Only John’s drawing.
- [ ] Both drawings.

Explain your answer.
Path to eTIMSS 2019

• Sept/Oct 2016 – prePilot – small tryout
• April 2017 – eTIMSS Pilot
  – Item equivalence study for mode effect
  – Counterbalanced design – same students
• April 2018 – Field Test
  – Newly developed eTIMSS items
• Oct 2018 – June 2019 – Data Collection
  – eTIMSS + bridge to paperTIMSS
Prepilot eTIMSS in Sept/Oct 2016

• First effort to pilot eTIMSS tablet and PC approach at 4th and 8th grades
  - 2 blocks converted restricted use items from 2015 (1 mathematics, 1 science)
  - 4 blocks PSIs (2 mathematics, 2 science)

• Each student – “the TIMSS experience”
  - 4 block combination (booklet equivalent) converted 2015 items and PSIs

• 3 countries (English speaking), ≈3 classes per grade
  - Australia (tablet), Canada (PCs), Singapore (both)
eTIMSS Pilot in April 2017

Uses trend blocks from 4th and 8th grade TIMSS 2015 to:

• Conduct an item equivalence study
  – Examine effect of mode of administration between eTIMSS and paperTIMSS

• Tryout the eTIMSS systems
  – Importing translations from 2015 and using the eTIMSS player, data monitor, and online scoring
Counterbalanced design

- Each student takes trend blocks in both eTIMSS and paperTIMSS format
  - Trend items only - not confounded with new material
- Each student gets the full TIMSS experience under each administration mode
  - 4 blocks each (2 math and 2 science)
- Half students take eTIMSS first, half take paperTIMSS first
  - All students take both modes, but different items
Sample

• At each grade, purposive sample of 800 students
  – Range of ability and backgrounds.
  – e.g., 2 classes from about 20-25 schools

• English-speaking countries only
  – 4 PSI blocks per grade in 5 classes ≈100 students
Item equivalence analysis

1. Item-by-item analysis to identify items that may be considered “strongly equivalent”
   - i.e., have identical item parameters under both administration modes

2. Score-level analysis to examine the effect of administration mode on student achievement scores
   - Overall and country by country mode effect
All eTIMSS countries should participate

- Provide better data for item equivalence study
  - More reliable and generalizable results
- Provide countries with analysis of mode effect
  - Performance on eTIMSS vs. paperTIMSS
- Gain experience in using eTIMSS systems
  - Opportunity to recommend improvements
- About 25 countries planning to participate, more welcome!
Country Milestones for Pilot

• Current activities
  – Planning participation and recruiting schools
  – Arranging for devices
  – Locating 2015 trend item blocks

• Jan-March 2017
  – Copy translations into Online Translation System
  – Prepare paperTIMSS booklets

• Mid-March to April 2017
  – Conduct data collection
Field Test in April 2018

• Similar in scope to past TIMSS field tests
  – Need 6 new blocks per subject, field test twice needed

• eTIMSS countries
  – field test the newly developed eTIMSS items

• paperTIMSS countries
  – field test newly developed paperTIMSS items

• Maintain comparability between eTIMSS and paperTIMSS items as much as possible
TIMSS 2019 Data Collection
Oct 2018 – June 2019

paperTIMSS

- Same amount of item blocks as usual - trend items and newly developed items
  - 14 booklets per grade

- Usual TIMSS sample – at least 150 schools, at least one class per school
TIMSS 2019 Data Collection
Oct 2018 – June 2019

eTIMSS

- Same amount of item blocks as usual - trend items and new digitally enhanced items, including PSIs – 14 booklet equivalents
- Usual TIMSS sample – at least 150 schools, at least one class per school
TIMSS 2019 Data Collection
Oct 2018 – June 2019

eTIMSS

- Same amount of item blocks as usual - trend items and new digitally enhanced items, including PSIs – 14 booklet equivalents

- Usual TIMSS sample – at least 150 schools, at least one class per school

Also need bridge to 2015 PaperTIMSS (reduced)

- 8 paper booklets 2015 trend items (as in pilot)

- Expand sample 25% – approx. 1,500 students, an additional class from a subsample of schools
eTIMSS and paperTIMSS 2019 Trend Scaling

- Repeat eTIMSS item-by-item analysis to confirm those trend items considered “strongly equivalent”
  - i.e., have identical item parameters under both administration modes, and can be treated as the same item for measuring trends
  - Non-equivalent items will be treated as new

- TIMSS 2019 scaling – all data together
  - Maintain eTIMSS trends by including both eTIMSS sample and bridge sample
  - Maintain paperTIMSS trends usual way
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