

## CHAPTER 2

# Developing the TIMSS 2015 Context Questionnaires

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The primary purpose of the TIMSS context questionnaires is to study the home, community, school, and classroom contexts in which students learn mathematics and science. To this end, questionnaire data are collected from students, and their parents, teachers, and principals. National Research Coordinators (NRCs) from participating countries provide country-level data. The questionnaire data when analyzed in relation to TIMSS achievement yield insights into factors related to student achievement that can be relevant in developing educational policy.

The context questionnaire results form the basis for seven of the ten chapters of the TIMSS 2015 International Results reports. The descriptive data collected through the TIMSS Curriculum Questionnaires complement each country's chapter included in the *TIMSS 2015 Encyclopedia*.

## Development Process for the TIMSS 2015 Context Questionnaires

Developing the TIMSS 2015 context questionnaires was a collaborative process involving multiple rounds of reviews by staff at the TIMSS & PIRLS International Study Center, policy analysis experts on the TIMSS 2015 Questionnaire Item Review Committee (QIRC), and the NRCs from the participating countries. In broad strokes, the TIMSS 2015 context questionnaire development process for the student, home, school, and teacher questionnaires included:

- Updating the context questionnaire framework for 2015
- Modifying and developing new context questionnaire items by staff at the TIMSS & PIRLS International Study Center
- Reviewing and revising the questionnaires by the QIRC and NRCs
- Administering the TIMSS 2015 field test
- Using the field test results to refine the questionnaires

Developing the Curriculum Questionnaires followed a collaborative cycle similar to other TIMSS questionnaires, including identifying important framework topics, developing questionnaire items, and iterative reviews by NRCs.

Exhibit 2.1 presents the TIMSS 2015 questionnaire development schedule. The development process was directed and managed by the staff of the TIMSS & PIRLS International Study Center at Boston College, including Executive Directors Ina V.S. Mullis and Michael O. Martin, and the TIMSS Questionnaire Coordinator, Martin Hooper. NRCs had an essential role in updating the questionnaires, providing feedback and ideas through an online review and at successive NRC meetings. The QIRC made major contributions in updating the TIMSS 2015 questionnaires with the 1<sup>st</sup> QIRC meeting focused on developing TIMSS items/scales, and the 2<sup>nd</sup> meeting focused on refining the questionnaires in light of the field test results. Exhibit 2.2 lists the members of the QIRC.

**Exhibit 2.1: TIMSS 2015 Context Questionnaire Development Schedule**

Date(s)		Group and Activity
February	2013	NRCs reviewed TIMSS 2011 context questionnaires at the 1 <sup>st</sup> NRC meeting (Hamburg, Germany)
February–May	2013	Staff at TIMSS & PIRLS International Study Center draft the Context Questionnaire Framework chapter
May	2013	NRCs reviewed the Context Questionnaire Framework chapter at their 2 <sup>nd</sup> NRC meeting (Amsterdam, The Netherlands)
May–June	2013	Staff at TIMSS & PIRLS International Study Center revised the draft Context Questionnaire Framework chapter to incorporate NRC feedback and began questionnaire item writing for TIMSS 2015
June	2013	1 <sup>st</sup> meeting of the Questionnaire Item Review Committee (QIRC) to review the draft TIMSS 2015 Context Questionnaire Framework and the draft TIMSS 2015 questionnaires (Singapore)
July–August	2013	TIMSS & PIRLS International Study Center revised the draft context questionnaires to incorporate QIRC/QDG feedback and finalized a draft of the TIMSS 2015 Context Questionnaire Chapter
August–September	2013	NRCs review draft questionnaires online
September	2013	Staff at TIMSS & PIRLS International Study Center published TIMSS 2015 Assessment Frameworks, which includes the chapter on the Context Questionnaire Framework
September–October	2013	Staff at TIMSS & PIRLS International Study Center revised the draft context questionnaires to address NRC comments from the online review
November	2013	NRCs reviewed and approved proposed context questionnaires at 3 <sup>rd</sup> NRC meeting (Budapest, Hungary)
November–December	2013	Staff at TIMSS & PIRLS International Study Center finalized field test context questionnaire instruments
December	2013	Staff at TIMSS & PIRLS International Study Center provided field test context questionnaires to NRCs
March–April	2014	Countries conducted TIMSS 2015 field test
March	2014	NRCs reviewed and provided feedback on TIMSS 2011 Curriculum Questionnaires at 4 <sup>th</sup> NRC meeting (Sydney, Australia)

**Exhibit 2.1: TIMSS 2015 Context Questionnaire Development Schedule (Continued)**

Date(s)		Group and Activity
April–May	2014	Countries submitted field test data for analysis and review
June	2014	TIMSS & PIRLS International Study Center conducted an internal review of field test results
July	2014	QIRC reviewed questionnaire field test data and the TIMSS 2011 Curriculum Questionnaire at 2 <sup>nd</sup> QIRC meeting (Muenster, Germany)
August	2014	NRCs reviewed and approved context questionnaires for TIMSS 2015 data collection at 5 <sup>th</sup> NRC meeting (Paris, France)
August	2014	TIMSS & PIRLS International Study Center distributed TIMSS 2015 data collection context questionnaire instruments to NRCs for translation
October–December	2014	Southern Hemisphere countries conducted TIMSS 2015 data collection
January–March	2015	TIMSS & PIRLS International Study Center drafted TIMSS 2015 Curriculum Questionnaires
March	2015	NRCs approved draft TIMSS 2015 Curriculum Questionnaires at the 6 <sup>th</sup> NRC meeting (Prague, Czech Republic)
April–August	2015	TIMSS 2015 Curriculum Questionnaires administered online to NRCs
March–June	2015	Northern Hemisphere countries conducted TIMSS 2015 data collection

**Exhibit 2.2: TIMSS 2015 Questionnaire Item Review Committee (QIRC)**

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Together with TIMSS at the fourth and eighth grades, TIMSS 2015 included TIMSS Numeracy at the fourth grade and the TIMSS Advanced assessments in mathematics and physics at the final year of secondary school. Countries participating in TIMSS Numeracy administered the TIMSS 2015 fourth grade questionnaires. TIMSS Advanced, however, required separate questionnaires geared toward the context for learning of STEM-track students during their final year of schooling. Although the TIMSS eighth grade questionnaires served as a foundation for developing the TIMSS Advanced 2015 questionnaires, the TIMSS Advanced questionnaires included numerous differences from the TIMSS questionnaires. Additional information on developing the TIMSS Advanced questionnaires can be found in [Chapter 2](#) of *Methods and Procedures in TIMSS Advanced 2015*.

## Background of TIMSS 2015 Context Questionnaire Development

Similar to the development process for the TIMSS 2015 achievement booklets (see [Chapter 1](#)), questionnaire development balanced the dual purposes of maintaining continuity with previous assessments and evolving to reflect the current contexts for student learning. Therefore, the TIMSS 2015 questionnaires can be viewed as the latest evolution of six cycles of TIMSS questionnaires dating back to TIMSS 1995. In particular, the TIMSS 2015 questionnaires are built upon the successes of the TIMSS 2011 questionnaires, with modifications to align the questionnaires with more recent research and policy innovations.

A major methodological innovation in TIMSS 2011 was using context questionnaire scales to measure key educational research topics ([Martin, Mullis, Foy, & Arora, 2012](#)). TIMSS 2015 questionnaire development focused on writing items to strengthen the measurement properties of the TIMSS 2011 scales as well as developing new scales to measure emerging areas of educational research.

In 2011, the TIMSS and PIRLS cycles coincided, and 34 countries chose to administer both TIMSS and PIRLS to the same fourth grade students. Accordingly, the TIMSS 2011 and PIRLS 2011 questionnaires were developed in tandem (see [Methods and Procedures in TIMSS and PIRLS 2011](#) for details). Overall, this joint development process produced a synergy that led to advancements in questionnaire development for both projects, and shared items across TIMSS and PIRLS 2011 allowed results to be compared across projects. TIMSS 2015 made an effort to maintain the consistency with PIRLS by holding the 1<sup>st</sup> meeting of the QIRC with its PIRLS equivalent—the Questionnaire Development Group (QDG). Also, TIMSS 2015 questionnaire development considered the suggested revisions to overlapping TIMSS/PIRLS questionnaire items made at PIRLS NRCs meetings.

The joint administration of TIMSS and PIRLS 2011 to the same students allowed data collected through the PIRLS home questionnaire to be linked with TIMSS questionnaire and achievement data. Consequently, the TIMSS 2011 reports for the first time included data collected

from parents on areas like early childhood numeracy activities, home resources for learning, and language use in the home. Given the wealth of information provided by the home questionnaire, the TIMSS 2015 NRCs decided that a TIMSS-specific home questionnaire, entitled the *Early Learning Survey*, should be developed and administered at the fourth grade.

## Updating the TIMSS 2015 Context Questionnaire Framework

The [TIMSS 2015 Context Questionnaire Framework](#), Chapter 3 of the *TIMSS 2015 Assessment Frameworks*, provided the foundation for updating the TIMSS context questionnaires for 2015. The Framework chapter presents a review of a vast array of educational research that identifies key context questionnaire topics and gives the theoretical justification for asking about these topics within the 2015 questionnaires.

At the 1<sup>st</sup> NRC meeting in February 2013 in Hamburg, Germany, NRCs described topics they thought should be covered in the TIMSS 2015 questionnaires, including which TIMSS 2011 topics should be retained to measure trends. Taking into account feedback garnered in the meeting, the TIMSS Questionnaire Coordinator conducted an extensive literature review and drafted the TIMSS 2015 Questionnaire Framework chapter. Because the primary purpose of the context questionnaires is to identify factors that may contribute to differences in achievement within and between countries, the framework focuses on topics in educational research found to be related to achievement across a variety of settings and contexts.

The NRCs reviewed the draft chapter at the 2<sup>nd</sup> NRC meeting in May 2013 in Amsterdam, and the QIRC reviewed it at their first meeting in June 2013 in Singapore. Staff at the TIMSS & PIRLS International Study Center refined the draft based upon the recommendations received at the two meetings and published the final *TIMSS 2015 Assessment Frameworks* online in September 2013, with printed copies distributed thereafter.

## Field Test Questionnaire Development

With the draft Context Questionnaire Framework at hand, staff at the TIMSS & PIRLS International Study Center focused the questionnaire development process on improving and expanding the TIMSS context questionnaire scales, developing the TIMSS *Early Learning Survey*, and updating items to align with more recent technological innovations.

For many of the scales retained from TIMSS 2011, modifications for 2015 focused on increasing the number of items to optimize reliability and content coverage. For example, a number of new items were written for the School Emphasis on Academic Success scale, with item development influenced by existing scales in the academic optimism literature (Hoy, Hoy, & Kurz, 2008; McGuigan & Hoy, 2006; Wu, Hoy, & Tarter, 2013). Additional items were also included for the student engagement scales, with one item sourced from Fauth, Decristan, Rieser, Klieme, and Büttner (2014).

Staff at the TIMSS & PIRLS International Study Center worked with the TIMSS QIRC/PIRLS QDG at their joint meeting in June 2013 to recast a number of scales. For instance, the QIRC and QDG revamped the teacher job satisfaction scale to integrate insights gained from the *Utrecht Work Engagement Scale* (Schaufeli, Bakker, & Salanova, 2006). The questionnaire committees also revised the Confidence in Teaching Mathematics/Science scales, with item development influenced by the *Ohio State Teacher Efficacy Scale* (Tschannen-Moran & Hoy, 2001).

Although the PIRLS home questionnaire served as a foundation for the development of the TIMSS *Early Learning Survey*, numerous new items needed to be developed to focus the TIMSS questionnaire on the contexts for learning mathematics and science. One new scale included in the *Early Learning Survey* is the Parental Attitude toward Mathematics and Science scale—developed to assess parents’ feelings towards STEM fields.

Finally, updating questionnaires to “keep up with the times” was an essential part of the 2015 development process. Staff at the TIMSS & PIRLS International Study Center worked with the QIRC and QDG to ensure that the questionnaires included items on the availability of prevalent digital resources for education such as ebooks, tablets, and interactive whiteboards.

## Review Field Test Results and Refine Questionnaires for Data Collection

TIMSS 2015 countries administered an ambitious field test, eliciting questionnaire data from 111,194 students, 59,200 parents, 2,775 principals, and 10,165 teachers across 43 countries and five benchmarking entities at the fourth grade, 7 countries for TIMSS Numeracy, and 37 countries and 4 benchmarking entities at the eighth grade.

Following field test administration, staff at the TIMSS & PIRLS International Study Center produced data almanacs and scale summaries to facilitate the review of the field test data:

- Data almanacs document the use of response categories for each context questionnaire item as well each item’s relationship with achievement
- Scale summaries detail each scale’s reliability, dimensionality, fit to the Rasch model, and relationship with achievement

In June 2014, staff at the TIMSS & PIRLS International Study Center reviewed the field test context questionnaire results, proposing revisions to the QIRC. At their 2<sup>nd</sup> meeting in July 2014, the QIRC accepted many of the recommendations and suggested a few additional changes. In August 2014 at their 5<sup>th</sup> meeting, NRCs reviewed the final draft questionnaires and accepted the questionnaires with a few minor revisions. Following the NRC meeting, staff at the TIMSS & PIRLS International Study Center implemented the revisions and posted the final TIMSS instruments on August 28, 2014, so that countries could begin the [translation process](#).

## Developing the TIMSS 2015 Curriculum Questionnaires

The TIMSS Curriculum Questionnaires complement the student, teacher, school, and home questionnaires by collecting information from NRCs about country-level contexts. The Curriculum Questionnaires cover each country's mathematics and science curricula, goals and standards for instruction, and other national or regional policies such as the preprimary education process and the teacher education process.

Similar to the other TIMSS 2015 questionnaires, the process for updating the TIMSS Curriculum Questionnaires started with the TIMSS 2015 Context Questionnaire Framework. Then, NRCs and the QIRC identified the information from the TIMSS 2011 Curriculum Questionnaires that they thought was useful to continue collecting.

Based on the framework, and the NRC and QIRC feedback, staff at the TIMSS & PIRLS International Study Center updated the TIMSS 2015 Curriculum Questionnaires for review by NRCs at their 6<sup>th</sup> meeting in March 2015. Following the NRC meeting, staff at the TIMSS & PIRLS International Study Center finalized the questionnaires, incorporating the suggestions that emerged from the meeting. NRCs completed the online Curriculum Questionnaires between April 23, 2015 and August 31, 2015.

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