CHAPTER 6

Survey Operations Procedures for TIMSS 2019

Ieva Johansone

Overview

As data-based indicators of countries' student achievement profiles and learning contexts, TIMSS assessments are crucially dependent on the quality of the data collected by each participating country and benchmarking entity. Whereas the development of the assessments is an intensely collaborative process involving all of the partners in the enterprise, the process of administering the assessments and collecting the data is uniquely the responsibility of each individual country or benchmarking participant.

To ensure the consistency and uniformity of approach necessary for high-quality, internationally comparable data, all participants are expected to follow a set of standardized operations procedures. These procedures have been developed through a partnership involving the TIMSS & PIRLS International Study Center, IEA Amsterdam, IEA Hamburg, Statistics Canada, and National Research Coordinators (NRCs) from participating countries. The major steps of the operations and procedures are similar from one assessment cycle to the next. However, with each assessment cycle the operations procedures are updated to enhance efficiency and accuracy and reduce burden, making use of developments in information technology to automate routine activities wherever possible.

Each new assessment cycle also brings something new and unique requiring the operations and procedures to be adapted. For example, the 2019 cycle of TIMSS began the transition to digital assessment (known as eTIMSS) with about half of the participating countries switching from the previous paper-based version (known as paperTIMSS) to the new digital format. Adapting operational procedures for this new assessment mode and integrating the workflow into the existing TIMSS operations was a significant undertaking. In order to control for any assessment mode effects, in addition to the usual nationally representative sample, countries transitioning to eTIMSS were required to administer "bridge" paper instruments to an extra, equivalent sample of students, which also required integrating operations and procedures into the overall TIMSS 2019 assessment administration.

In each country or benchmarking entity, the National Research Coordinator was responsible for the implementation of TIMSS 2019. Internationally, National Research Coordinators provided the country's perspective in all international discussions, represented the country at international meetings, and were the responsible contact persons for all project activities. Locally, National Research Coordinators were responsible for implementing all the internationally agreed-upon procedures and facilitating all of the national decisions regarding TIMSS, including any adaptations for the national context.

The daily tasks of the National Research Coordinators varied over the course of the TIMSS 2019 cycle. In the initial phases, National Research Coordinators participated in the TIMSS 2019 assessment frameworks and assessment development process (see Chapter 1). and collaborated with Statistics Canada and IEA Hamburg in developing a plan to implement the TIMSS 2019 sampling design within the country or benchmarking entity (see Chapter 3).

Following the development of the draft achievement items and context questionnaires, countries conducted a full-scale field test of all instruments and operational procedures in March through May 2018 in preparation for the TIMSS 2019 data collection, which took place in October through December 2018 in Southern Hemisphere countries, and in March through June 2019 in Northern Hemisphere countries. As well as providing crucial data to support finalization of the assessment instruments (achievement items and questionnaires), the field test enabled the National Research Coordinators and their staff to become acquainted with the operational activities. The feedback they provided was used to improve the procedures for the data collection. As expected, the field test resulted in some enhancements to survey operations procedures, especially for eTIMSS which was new for the 2019 assessment cycle and contributed to ensuring the successful execution of TIMSS 2019.

As part of ongoing efforts to improve operations, the National Research Coordinators were asked to complete a Survey Activities Questionnaire (SAQ), which sought feedback on all aspects of their experience conducting TIMSS 2019. The feedback solicited in the SAQ included an evaluation of the quality of the assessment materials and the effectiveness of the operations procedures and documentation. The results of the TIMSS 2019 Survey Activities Questionnaire are presented in the final section of this chapter.

TIMSS 2019 Survey Operations Units, Manuals, and Software

To support the National Research Coordinators in conducting the TIMSS 2019 assessments, the TIMSS & PIRLS International Study Center provided step-by-step documentation of all operational activities. Organized into a series of units, the *TIMSS 2019 Survey Operations Procedures* were made available at critical junctures of the project to ensure that National Research Coordinators had all the tools and information necessary to discharge their responsibilities. Also, the procedures units were accompanied by a series of manuals for use by School Coordinators and Test Administrators that National Research

Coordinators could translate and adapt to their local situations. Often, separate versions of the units and manuals were provided for paperTIMSS and for eTIMSS. The TIMSS & PIRLS International Study Center and IEA Hamburg also provided National Research Coordinators and their staff with intensive training in constructed response item scoring and data management.

IEA Hamburg was responsible for the development of the eTIMSS software system, or "eAssessment System" (see Chapter 4). Hosted on IEA Hamburg's servers, the eAssessment System consisted of an integrated series of software modules for authoring achievement items (eTIMSS Item Designer), translating and verifying assessment instruments (eTIMSS Online Translation System), checking the suitability of computers for eTIMSS (eTIMSS System Check Program), administering the assessment to students (eTIMSS Player), monitoring the upload of student response and process data (eTIMSS Online Data Monitor), and scoring constructed response items (eTIMSS Online Scoring System, also known as IEA's CodingExpert Software).

In addition to the eAssessment System and consistent with the goal of automating and streamlining procedures wherever possible, IEA Hamburg provided National Research Coordinators in both eTIMSS and paperTIMSS countries with a range of custom-built software products to support project activities. These included the Windows® Within-School Sampling Software (WinW3S) for sampling and tracking classes and students; the IEA Online SurveySystem (OSS) for administering school, teacher, and home questionnaires online; the IEA CodingExpert Software for documenting scoring reliability; and the IEA Data Management Expert (DME) software for creating and checking data files.

The *TIMSS 2019 Survey Operations Procedures* units were crucial resources for the National Research Coordinators as the units described in detail the tasks the NRCs were responsible for conducting. In the event that some of these tasks were contracted out to other people or organizations, the units ensured that the NRCs had sufficient knowledge of these matters to supervise the activities of the people contracted to conduct aspects of the assessment in their countries.

The following units, manuals, and software systems were provided for administering TIMSS 2019:

- *TIMSS 2019 Survey Operations Procedures Unit 1: Sampling Schools and Obtaining their Cooperation*

- *TIMSS 2019 Survey Operations Procedures Unit 2: Preparing for and Conducting the TIMSS 2019 Field Test*

  Unit 2 consisted of the following sections: Sampling Classes and Field Test Administration, Preparing the Field Test Instruments (paper or electronic), Scoring the Field Test Constructed Response Items, and Creating and Submitting the Field Test Databases. An eTIMSS supplement describing online scoring of the eTIMSS constructed response items also was included.

Unit 2 was accompanied by field test versions of the School Coordinator and Test Administrator Manuals for paperTIMSS and eTIMSS, instructions on "Preparing Computers and/or Tablets for eTIMSS," and a National Quality Control Monitor Manual.

In addition to the manuals, IEA Hamburg provided field test versions of the WinW3S within-school sampling software, the OSS online survey system for questionnaire administration, and the DME data management software.

eTIMSS countries also were provided with field test versions of the following systems: eTIMSS System Check Program, eTIMSS Online Translation System, eTIMSS Player, eTIMSS Online Data Monitor, and eTIMSS Online Scoring System (IEA's CodingExpert Software).

- *TIMSS 2019 Survey Operations Procedures Unit 3: Contacting Schools and Sampling Classes for the TIMSS 2019 Data Collection*

Unit 3 was accompanied by the main data collection versions of the School Coordinator Manual and the WinW3S within-school sampling software and its manual. eTIMSS countries also received the eTIMSS System Check Program and instructions on "Preparing Computers and/or Tablets for eTIMSS," which provided the necessary information and tools for countries to test their devices for eTIMSS compatibility and prepare them for eTIMSS data collection.

- *TIMSS 2019 Survey Operations Procedures Unit 4: Preparing the TIMSS 2019 Assessment Instruments*

Separate versions of Unit 4 were provided for paperTIMSS and eTIMSS countries; the latter also received a manual on preparing the paper "bridge" booklets. The eTIMSS version provided access to the eTIMSS Online Translation System, which enabled National Research Coordinators to translate the eTIMSS achievement items into their language(s) of instruction. The translated materials were available online for translation and layout verification by IEA Hamburg and the TIMSS & PIRLS International Study Center (see Chapter 5).

Unit 4 was accompanied by the main data collection version of the OSS online survey system for online administration of the school, teacher, and home (Early Learning Survey) questionnaires.

- *TIMSS 2019 Survey Operations Procedures Unit 5: Conducting the TIMSS 2019 Data Collection*

Unit 5 was accompanied by the main data collection versions of the Test Administrator Manuals for paperTIMSS and eTIMSS, the National Quality Control Monitor Manual, and the International Quality Control Monitor Manual.

eTIMSS countries also received the eTIMSS Player for administering the eTIMSS assessment to students and the eTIMSS Online Data Monitor for monitoring the uploading of the

data from the player to the IEA Hamburg data server. Each country's eTIMSS Player was customized to contain the country's translations of the eTIMSS assessment items.

- *TIMSS 2019 Survey Operations Procedures Unit 6: Scoring the TIMSS 2019 Constructed Response Items*

    Unit 6 was accompanied by the main data collection versions of the TIMSS 2019 scoring guides and IEA's CodingExpert Software (online scoring system) and manuals. The CodingExpert Software was used to facilitate eTIMSS online scoring and the trend and cross-country reliability scoring tasks.

- *TIMSS 2019 Survey Operations Procedures Unit 7: Creating and Submitting the TIMSS 2019 Databases*

    Unit 7 was accompanied by the main data collection versions of the DME data management software, codebooks, and manual. The DME software is used for data entry and data verification.

TIMSS 2019 Survey Tracking Forms

TIMSS uses a series of tracking forms to document class sampling procedures, assign assessment instruments, and track school, teacher, and student information, including the participation status of the respondents. The tracking forms also facilitate the data collection and data verification process. Four different tracking forms were used for TIMSS 2019:

- Class Listing Form: This form was completed by each sampled school, listing the eligible classes and providing details about the classes, such as the class stream (if applicable), the number of students, and the names of teachers.

- Student-Teacher Linkage Form: This form was completed for each class sampled, listing the names of the students and their teachers, student birth dates, gender, exclusion codes, and linking the students to their teachers.

- Student Tracking Form: This form was created for each class assessed and was completed by the Test Administrators during test administration. The Test Administrators used this form to verify the assignment of survey instruments to students and to indicate student participation.

- Teacher Tracking Form: This form was completed by each sampled school to indicate the completion of the Teacher Questionnaires.

Operations for Data Collection

The following sections describe the major operational activities coordinated by the National Research Coordinators:
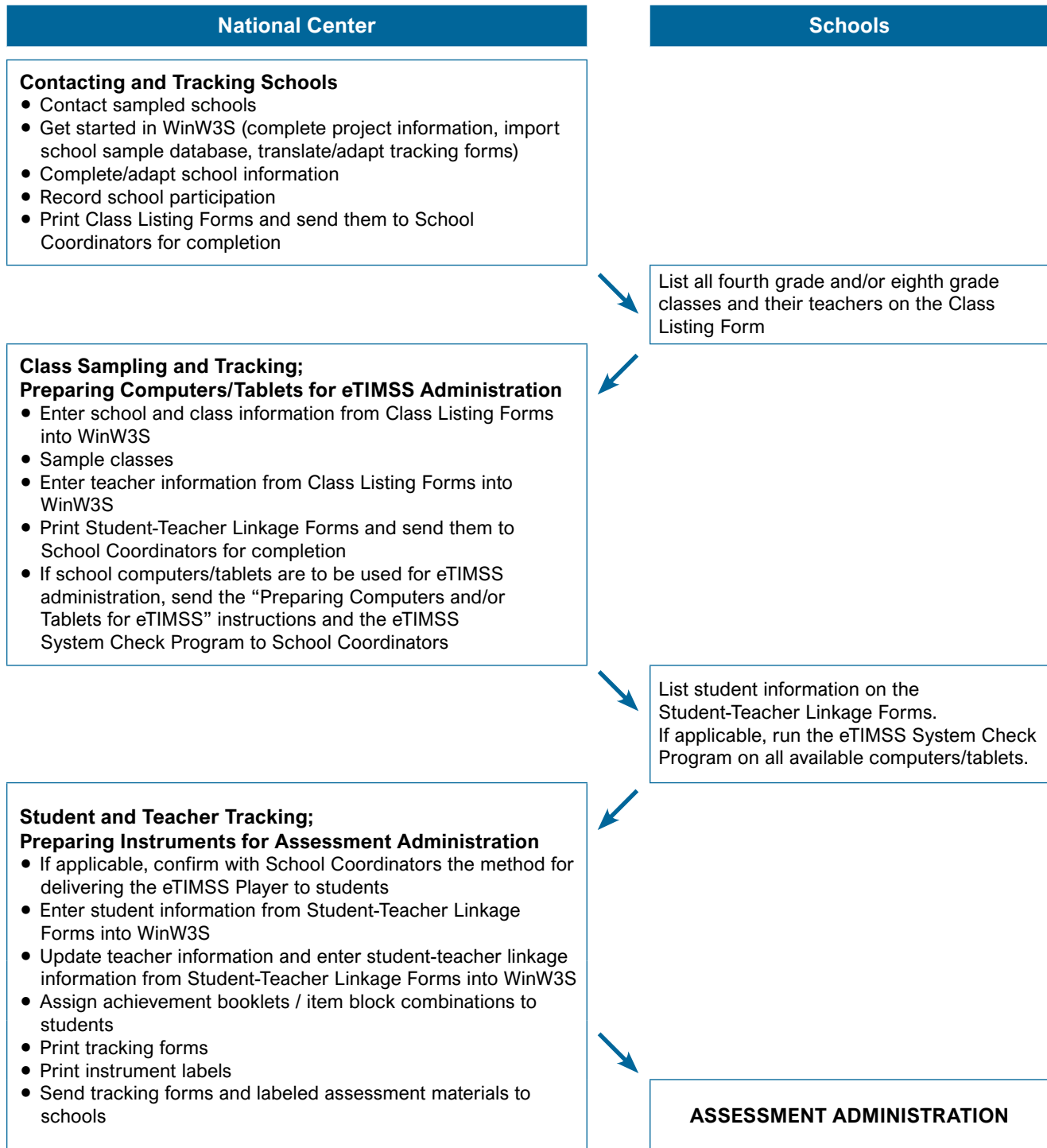
- Contacting schools and sampling classes

- Overseeing translation and preparing assessment instruments

- Managing the TIMSS 2019 assessment administration

- Scoring the constructed response items

- Creating the TIMSS 2019 data files

Two other major TIMSS 2019 operational activities are described in separate chapters of this publication—sampling schools (Chapter 3) and verifying translation and layout of the assessment instruments (Chapter 5).

Contacting Schools and Sampling Classes

Exhibit 6.1 illustrates the major steps in working with schools to sample classes and prepare for the TIMSS assessment administration. Once the school samples were drawn, National Research Coordinators were tasked with contacting schools and encouraging them to take part in the assessments. Depending on the national context, this could involve obtaining support from national or regional educational authorities. Survey Operations Procedures Unit 1 included suggestions on ways to encourage schools to participate in the assessment.

Exhibit 6.1: Diagram of the Sampling Procedures and Preparations for the Assessment Administration Implemented by National Centers and Schools

National Center	Schools

Contacting and Tracking Schools
- Contact sampled schools
- Get started in WinW3S (complete project information, import school sample database, translate/adapt tracking forms)
- Complete/adapt school information
- Record school participation
- Print Class Listing Forms and send them to School Coordinators for completion

List all fourth grade and/or eighth grade classes and their teachers on the Class Listing Form

Class Sampling and Tracking;
Preparing Computers/Tablets for eTIMSS Administration
- Enter school and class information from Class Listing Forms into WinW3S
- Sample classes
- Enter teacher information from Class Listing Forms into WinW3S
- Print Student-Teacher Linkage Forms and send them to School Coordinators for completion
- If school computers/tablets are to be used for eTIMSS administration, send the "Preparing Computers and/or Tablets for eTIMSS" instructions and the eTIMSS System Check Program to School Coordinators

List student information on the Student-Teacher Linkage Forms.
If applicable, run the eTIMSS System Check Program on all available computers/tablets.

Student and Teacher Tracking;
Preparing Instruments for Assessment Administration
- If applicable, confirm with School Coordinators the method for delivering the eTIMSS Player to students
- Enter student information from Student-Teacher Linkage Forms into WinW3S
- Update teacher information and enter student-teacher linkage information from Student-Teacher Linkage Forms into WinW3S
- Assign achievement booklets / item block combinations to students
- Print tracking forms
- Print instrument labels
- Send tracking forms and labeled assessment materials to schools

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In cooperation with school principals, National Research Coordinators were responsible for identifying and training School Coordinators for all participating schools. A School Coordinator could be a teacher or guidance counselor in the school, or National Research Coordinators could appoint a member of the national center to fill this role. In some countries, a School Coordinator from the national center was responsible for several schools in an area. School Coordinators were provided with a School Coordinator Manual describing their responsibilities. The School Coordinator Manual was prepared by the TIMSS & PIRLS International Study Center and translated/adapted by national center staff in each country.

The responsibilities of the School Coordinators included providing the national center with information on the school; coordinating the dates, times, and places for testing; identifying and training Test Administrators to administer the assessments; coordinating the completion of the tracking forms; distributing questionnaires; and when necessary obtaining parental permission. If school computers were used for eTIMSS administration, School Coordinators were provided with the "Preparing Computers and/or Tablets for eTIMSS" instructions and the eTIMSS System Check Program in order to test the computers for eTIMSS compatibility and prepare the compatible computers for testing. School Coordinators also confirmed receipt of all assessment materials, oversaw the security of the assessment materials, and ensured the return of the assessment materials to the national center following assessment administration.

School Coordinators also played a critical role in providing information for the sampling process, providing the national center with data on eligible classes in the school. With this information, the national centers used the WinW3S within-school sampling software to sample class(es) within the school. WinW3S tracked school, teacher, and student information and generated the necessary tracking forms and instrument labels used to facilitate both the assessment administration process and data checking during the data cleaning process.

As TIMSS samples intact classes, one of the roles of the School Coordinator was to ensure that every student in the school was listed in one and only one class. This was necessary to ensure that the sample of classes resulted in a representative sample of students, and that every student at the target grade had a chance of being selected. At the fourth grade in most countries, students are taught mathematics and science in the same classroom and therefore the fourth grade classroom was designated as the sampling unit. At the eighth grade, however, students are grouped differently for mathematics and science instruction in many countries, so that a student may take mathematics with one group of students and science with a different group of students. As the sampling required one set of students who could be considered a classroom, eighth grade classrooms usually were defined on the basis of mathematics instruction for the purposes of sampling.

Overseeing Translation and Preparing Assessment Instruments

National Research Coordinators also were responsible for preparing the assessment instruments (paperTIMSS achievement booklets, eTIMSS item block combinations, "bridge" booklets, if applicable, and context questionnaires) for their countries—a process that included overseeing the translation of the assessment instruments. The overarching goal of assessment instrument preparation was to create internationally comparable instruments that were appropriately adapted for the national context of each participating country.

As described in the TIMSS 2019 Assessment Design there were 14 blocks of assessment items for each subject and grade, and these were assembled into 14 TIMSS achievement booklets/item block combinations per grade, with two blocks of mathematics items and two blocks of science items in each booklet/block combination. eTIMSS had two additional block combinations per grade, incorporating the new Problem Solving and Inquiry Tasks (PSIs). Each block/PSI had to be translated only once, even though it was included in two different booklets/item block combinations. For paperTIMSS, countries used Adobe® InDesign® software to link the translated and adapted assessment blocks to the appropriate booklets. Automating this process through InDesign decreased the chances of human error in the production process.

In addition to the main eTIMSS assessment, countries transitioning to eTIMSS had to prepare eight "bridge" booklets for each grade, which were paper versions of eight eTIMSS item block combinations. The bridge booklets were composed entirely of the eight trend item blocks that were previously used in TIMSS 2015 and kept secure for TIMSS 2019. For the bridge booklets, countries also used InDesign software to link their translated and adapted assessment blocks from TIMSS 2015 to the appropriate bridge booklets.

In addition to the 16 trend blocks at each grade level from previous assessments (eight in mathematics and eight in science), twelve new assessment blocks were developed for TIMSS 2019 at each grade level (six mathematics and six science). The new assessment blocks replaced those released after the previous assessment cycle. Also, all four PSIs (two mathematics and two science) for each grade level were newly developed for eTIMSS 2019. Countries administering paperTIMSS 2019 at the fourth grade had the option of administering a less difficult mathematics assessment. The less difficult assessment consisted of nine item blocks previously administered in 2015 in TIMSS or TIMSS Numeracy and five blocks newly developed for TIMSS 2019.

All participating countries and benchmarking entities translated and/or adapted the item blocks into their language(s) of instruction. Countries that participated in the 2015 or 2011 assessment cycles were required to use the same translations that they used in those cycles for the trend assessment blocks.

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT   6.9

Similarly, all context questionnaires (school, teacher, student, and, for fourth grade, home questionnaires) were translated/adapted and field tested by all participating countries and evaluated following the field test to gauge the validity and reliability of the various questionnaire scales.

In preparation for translation for both the field test and main data collection, the participating countries received the international version (English) of the achievement booklets/item block combinations and context questionnaires with all the necessary instrument production files, including fonts and graphics files. For the eTIMSS assessment, this was done via the eTIMSS Online Translation System. Instructions on how to use the materials to produce high-quality, standardized instruments were included in the corresponding Survey Operations Procedures units and manuals. IEA Amsterdam and the TIMSS & PIRLS International Study Center also provided a generic Arabic source version of the TIMSS 2019 assessment booklets/item block combinations and context questionnaires. Individual countries adapted the generic source version to local usage.

Once translated and/or adapted, first for the field test and then again for the main data collection, the achievement items and context questionnaires were submitted to IEA Amsterdam for translation verification (see Chapter 5). IEA Amsterdam worked with independent translators to evaluate each country's translations and, when deemed necessary, suggested changes to the text.

After the translations had been verified by IEA Amsterdam, National Research Coordinators assembled the paper-based achievement booklets and context questionnaires using InDesign software, and print-ready copies of the instruments were sent to the TIMSS & PIRLS International Study Center for layout verification and a review of national adaptations. For eTIMSS this also was achieved via the eTIMSS Online Translation System. This review checked that the instruments conformed to the international format and that any adaptations made to the instruments did not unduly influence their international comparability.

Documenting National Adaptations

While preparing national achievement items and context questionnaires, countries sometimes by necessity made adaptations to the international versions. paperTIMSS countries documented all their national adaptations using the National Adaptations Forms (NAFs). eTIMSS countries documented their national adaptations to the achievement test via the eTIMSS Online Translation System and adaptations to the context questionnaires using the National Adaptations Forms.

Separate NAFs were provided for the paper achievement booklets and for the context questionnaires (per grade/assessment). During the translation verification and layout review, the verifiers checked whether the national adaptations were likely to influence the ability to produce internationally comparable data for the items involved. Any questions raised were directed to the NRC for consideration via the NAFs. Bridge booklets had their own Bridge Verification Forms, which were used to track any changes

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to the national version of the 2015 cycle and to document any layout issues noted during the layout verification.

The documentation was completed and reviewed at various stages of preparing national assessment instruments. Version I of the forms and online documentation was completed during the internal translation and review process and sent along with the rest of the materials for international translation verification. After translation verification, the documentation (Version II) was updated in response to the translation verifier's comments, reflecting any changes resulting from the verification, and sent along with the national assessment instruments for layout and adaptations verification. Following layout verification, the national instruments and documentation were finalized (Version III) and submitted to IEA and the TIMSS & PIRLS International Study Center.

Managing the Administration of the TIMSS 2019 Assessments

Preparing and distributing assessment materials to the participating schools required careful organization and planning on the part of the National Research Coordinators. The assessment materials were packaged and sent to the School Coordinators prior to testing, giving ample time for the School Coordinators to confirm the receipt and correctness of the materials. The school and teacher questionnaires were then distributed, and the other instruments were kept in a secure room until the testing date.

Each sampled class was assigned a Test Administrator who followed procedures described in the Test Administrator Manual to administer the assessments and student questionnaire. Test Administrators were in most cases chosen and trained by School Coordinators, and in some cases, the School Coordinator doubled as the Test Administrator.

Test Administrators were responsible for distributing materials to the appropriate students, reading the instructions provided in the Test Administrator Manual to the students, and timing the sessions. WinW3S systematically assigned achievement booklets/eTIMSS item block combinations and produced labels to facilitate the distribution of the assessment, and Test Administrators used the Student Tracking Form and these labels to distribute the assessment instruments (devices for eTIMSS) to the correct students) and to document student participation. When a class had a participation rate below 90 percent, it was the School Coordinator's responsibility to hold a makeup session for the absent students before returning all of the testing materials to the national center. Using the Test Administration Form, the Test Administrators documented the timing of the testing sessions and information about anything out of the ordinary that took place during assessment administration.

The achievement booklets consisted of two sections and the time allotted for each section of the assessment was standardized and strictly enforced by the Test Administrator. The TIMSS assessment consisted of two parts with each containing two item blocks. To complete each part of the TIMSS achievement test, fourth grade students were allowed 36 minutes and eighth grade students were allowed 45 minutes. For eTIMSS countries, the eTIMSS Player automatically logged students out of the system

once the time allowed had expired. There was a required break between the two parts of assessment administration. The break was not to exceed 30 minutes. Students who completed part 1 or part 2 of the assessment before the allotted time were not allowed to leave the testing room and were asked to review their answers or read quietly. Some Test Administrators provided activity sheets for these students.

Following the administration of the TIMSS assessment, students were provided 30 minutes to complete the student questionnaire with extra time provided to students who needed it. Following the administration of the eTIMSS assessment, students also took a short computer-based questionnaire about their experiences and attitudes toward using a computer. During administration of the fourth grade student questionnaire, Test Administrators were permitted to read the questionnaire items aloud together with the students.

eTIMSS was mostly administered via individual USB sticks on individual eTIMSS compatible computers or via Android tablets. Sometimes, the server method was used via a Local Area Network (LAN), which entailed a single eTIMSS compatible computer being used as a local server and students using individual devices connected to the server computer. For eTIMSS, the Test Administrators and School Coordinators submitted/uploaded the eTIMSS data after each testing session. Due to computer shortages, sometimes multiple eTIMSS testing sessions were needed for each class.

Linking Students to their Teachers and Classes

Exhibit 6.2 illustrates the hierarchical identification system codes that were used to link the data among schools, classes, students, and teachers. The school, class, and student IDs were strictly hierarchical, with classes nested within schools and students nested within classes.

Exhibit 6.2: Hierarchical Identification System Codes Used to Link Schools, Classes, Students, and Teachers

Participant	ID Components	ID Structure	Numeric Example
School	School	CCCC	0001
Class	School + Class within the school	CCCCKK	000101 000102
Student	School + Class within the school + Student within the class	CCCCKKSS	00010101 00010201
Teacher	School + Teacher within the school + Linkage number to the sampled class	CCCCTTLL	00010101 00010201

Each teacher was assigned a teacher identification number consisting of the four-digit school number followed by a two-digit teacher number. Since the same teacher could be teaching more than one class within a school, it was necessary to have a unique identification number for each teacher linked to a class. This is achieved by adding a two-digit link number to the six digits of the teacher identification number to create a unique eight-digit identification number.

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.12

Online Administration of the School, Teacher, and Home Questionnaires

Countries could choose to administer the school, teacher, and home questionnaires online. The benefits of administering the questionnaires online included saving money and time in printing, and improving the efficiency of questionnaire distribution, data entry, and data cleaning.

For the online administration of the questionnaires, IEA Hamburg provided its IEA Online SurveySystem (OSS) Software that incorporates design, presentation, and monitoring components.

The design component, known as the Designer, supports the preparation of the online surveys, data management, and data output to IEA Hamburg. Through the OSS Designer, national centers could tailor the online questionnaires to their national language. To facilitate translation and adaptation, the Designer concurrently stored the original English question text and the translations and/or national adaptations. It also stored the variable names and data validation rules. If a national center decided not to administer a particular international question or option, it could be disabled in the Designer and not administered during the online questionnaire administration. The Designer also included an integrated preview function to allow for a visual side-by-side comparison of the paper/PDF and online versions of the questionnaires, facilitating the layout verification process.

For the online data collection, the OSS Web Component presented the questionnaires to the respondents. The navigation capabilities of the Web Component allowed respondents to pick and choose their order of response. Buttons marked "next" and "previous" facilitated navigation between adjacent pages, so users could browse through the questionnaire in the same way that they flip through the pages of the paper questionnaire. A hyperlinked interactive "table of contents" allowed the respondents to fluidly navigate to specific questions. Overall, these two functions permitted respondents to answer questions in the order of their choosing. Also, the online questionnaires could be accessed through any standard internet browser on all standard operating systems without any additional software.

Finally, the OSS Monitor component allowed NRCs to monitor the survey responses in real time. Many national centers made extensive use of the Monitor to follow-up with non-respondents.

IEA Hamburg followed a stringent set of procedures to safeguard the confidentiality of the respondents and maintain the integrity of the data. Each respondent received a statement of confidentiality, and information on how to access the online questionnaire. For most countries, the online questionnaire administration was hosted on the IEA Hamburg customized high performance server. This server allowed for the 24-hour availability of the questionnaires during the data collection period, and it also ensured backup and recovery provisions for the data.

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.13

Scoring the Constructed Response Items

Constructed response items represent a substantial portion of the TIMSS assessments, and because reliable and valid scoring of these items is critical to the assessment results, the TIMSS & PIRLS International Study Center provided explicit scoring guides for each individual item and extensive training in their use. Also, the Survey Operations Procedures units specified a procedure for efficiently organizing and implementing the scoring activity. Scoring the eTIMSS constructed response items was done online via IEA's CodingExpert Software, which incorporated the IEA standards and reliability procedures.

International scoring training sessions (one for the field test and two for the main data collection—one for Southern Hemisphere countries and another for Northern Hemisphere countries) were conducted where all National Research Coordinators (or country representatives appointed by the National Research Coordinators) were trained to score each of the constructed response items. At these training sessions, the scoring guide for each item was reviewed and applied to a set of example student responses that had already been scored. These example papers were chosen to represent a range of response types and to demonstrate the guides as clearly as possible. Following the example papers, the training participants applied the scoring guides to a different set of student responses that had not yet been scored. The scores to these practice papers were then shared with the group and any discrepancies were discussed.

Following international scoring training, national centers trained their scoring staff on how to apply the scoring guides for the constructed response items. National Research Coordinators were encouraged to create additional example papers and practice papers from student responses collected in their country.

Documenting Scoring Reliability

Because reliable scoring of the constructed response items is essential for high quality data, it is important to document the reliability of the scoring process. A high degree of scorer agreement is evidence that scorers have applied the scoring guides in the same way. The procedure for scoring the TIMSS constructed response items provided for documenting scoring reliability within each country (within-country reliability scoring), over time (trend reliability scoring), and across countries (cross-country reliability scoring) (see results in Chapter 10).

The method for establishing the reliability of the scoring within each country was for two independent scorers to score a random sample of 200 responses for each constructed response item. The degree of agreement between the scores assigned by the two scorers is a measure of the reliability of the scoring process. In collecting the within-country reliability data, it was vital that the scorers independently scored the items assigned to them, and each scorer did not have prior knowledge of the scores assigned by the other scorer. The within-country reliability scoring was integrated within the main scoring procedure and ongoing throughout the scoring process.

The purpose of the trend reliability scoring was to measure the reliability of the scoring from one assessment cycle to the next (i.e., from TIMSS 2015 to TIMSS 2019). The trend reliability scoring

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required scorers of TIMSS 2019 to score student responses collected in 2015. The scores from 2019 were then compared with the scores awarded in 2015. Trend reliability scoring was conducted using IEA's CodingExpert Software provided by IEA Hamburg.

Student responses included in the trend reliability scoring (200 responses per item) were actual student responses to 22 fourth grade items (13 items for the less difficult mathematics assessment) and/or 27 eighth grade items (4 item blocks) from the TIMSS trend assessment blocks collected during the TIMSS 2015 assessment administration in each country and benchmarking entity. These responses were scanned and provided to each participating country and benchmarking entity, and were scored with IEA's CodingExpert Software. All scorers who scored the trend assessment blocks in 2019 were required to participate in the trend reliability scoring. If all scorers were trained to score all trend items, the software divided the student responses equally among the scorers. If scorers were trained to score specific assessment blocks, National Research Coordinators were able to specify within the software which scorers would score particular blocks, and the software allocated the student responses accordingly. Similar to the within-country reliability scoring, the trend reliability scoring had to be integrated within the main scoring procedure.

Finally, cross-country reliability scoring gave an indication about how consistently the scoring guides were applied from one country to the next. The cross-country reliability scoring also was conducted using IEA's CodingExpert Software. Student responses included in the cross-country reliability scoring (200 responses per item) were student responses to 22 fourth grade items (17 items for the less difficult mathematics assessment) and/or 27 eighth grade items. The same items were used for the trend scoring reliability study. Student responses were collected from the English-speaking countries during the TIMSS 2015 assessment administration. All scorers who could score student responses written in English were required to participate in the cross-country reliability scoring, and the student responses were equally divided among the participating scorers in each country. In most countries, the scoring exercise was completed immediately after all other scoring activities.

Creating the TIMSS 2019 Databases

The data entry process took place from March to May 2018 for the field test, from December 2018 to March 2019 following data collection in the Southern Hemisphere, and June to September 2019 following data collection in the Northern Hemisphere. The procedure for creating the TIMSS 2019 databases included entering sampling and assessment administration information into WinW3S and adding responses from the context questionnaires and achievement booklets using IEA's Data Management Expert (DME) software. IEA Hamburg provided the DME software to accommodate keyboard data entry from the paper instruments. The DME software also offers data and file management capabilities, a convenient checking and editing mechanism, interactive error detection, and quality control procedures.

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT   6.15

The eTIMSS achievement test data were captured automatically by submitting them to the IEA Hamburg eTIMSS server immediately after the assessment administration. Countries were provided with the eTIMSS Online Data Monitor to monitor the data submission. The eTIMSS constructed response scoring took place directly in the online database and thus did not require any manual data entry. For the TIMSS 2019 teacher, school, and home questionnaires administered online through the Online SurveySystem (OSS) via the IEA Hamburg server, the data were directly accessible by IEA Hamburg and no further data entry was required.

For manual data entry using the DME software, IEA Hamburg provided international codebooks describing all variables and their properties to ensure that data files produced with this system met the internationally defined rules and standards for data entry. Before being used, however, the international codebooks had to be updated to accommodate any national adaptations to the data collection instruments. These adapted national codebooks then were used to create the TIMSS 2019 data files in each country, with the responses to the context questionnaires, achievement booklets, and Reliability Scoring Sheets keyed into the DME database.

Quality control throughout the data entry process was essential to maintain accurate data. Therefore, National Research Coordinators were responsible for performing periodic reliability checks during data entry and for applying a series of data verification checks provided by both WinW3S and DME systems prior to submitting the databases to IEA Hamburg. To ensure the reliability of the data entry process, data entry staff was required to independently reenter at least 5 percent of the records from each instrument type. An error rate of 1 percent or less was acceptable for the questionnaire files. An error rate of 0.1 percent or less was required for the student achievement files and the reliability scoring files. If the required agreement was not reached, retraining of the key punchers was required.

Both WinW3S and DME systems offered a data verification module that checked for a range of problems, such as inconsistent identification codes, inconsistencies between participation status information and achievement and/or questionnaire data availability, and out-of-range or otherwise invalid codes. The data verification module also verified the integrity of the linkage between the students, teachers, and schools entered into the DME database and tracking of information for those specified in WinW3S. For data captured online (i.e., eTIMSS achievement data and context questionnaires administered online), it was possible to export data availability information and apply data verification to check for inconsistencies via the WinW3S and DME data verification modules.

When all data files had passed the quality control checks, they were submitted to IEA Hamburg, along with data documentation, for further checking and processing. For information on data processing at IEA Hamburg, please refer to Chapter 8 of this publication.

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.16

TIMSS 2019 Survey Activities Questionnaire

The Survey Activities Questionnaire was designed to elicit information about National Research Coordinators' experiences in preparing for and conducting the TIMSS 2019 data collection. The questionnaire was composed of six sections and focused on the following:

- Sampling schools and classes
- Translating, adapting, and producing the assessment instruments
- Administering the assessments
- Implementing the National Quality Control Program
- Preparing for and scoring the constructed response items
- Creating and submitting the databases and documentation

All items in the Survey Activities Questionnaire included accompanying comment fields, in which NRC respondents were encouraged to explain their responses, provide additional information, and suggest improvements for the process.

The TIMSS 2019 Survey Activities Questionnaire was administered online via the OSS system and was completed by a total of 65 NRCs, 31 for paperTIMSS and 34 for eTIMSS. The following sections summarize information gathered from the Survey Activities Questionnaire.

Sampling Schools and Classes

The first section of the Survey Activities Questionnaire asked National Research Coordinators about the Survey Operations Procedures units for sampling both schools and classes within the sampled schools. As shown in Exhibit 6.3, 59 National Research Coordinators considered Survey Operations Procedures Unit 1 to be clear and sufficient, and 63 considered Unit 3 to be clear and sufficient. Eight countries reported deviating from the basic TIMSS sampling design. Their reasons for these modifications to the sampling procedures included a change in the way a country identified schools, adjustments for classes based on gender, special needs, or mixed grade levels, identification of schools for the field test and the main data collection at separate times, and the need to oversample for enhanced reporting. Statistics Canada, in cooperation with IEA Hamburg, selected the school samples for all countries and benchmarking participants.

Question	Yes	No	Not Answered
Was the information provided in the "TIMSS 2019 Survey Operations Procedures Unit 1: Sampling Schools and Obtaining their Cooperation" clear and sufficient?	59	5	1
Were there any conditions or organizational constraints that necessitated deviations from the basic TIMSS sampling design described in the "Survey Operations Procedures Unit 1"?	8	56	1
Did you use the Within-School Sampling Software (WinW3S) to sample classes?	63	0	2
If you answered "yes", did you experience any problems when using the WinW3S software?	17	45	3
Was the information provided in the "TIMSS 2019 Survey Operations Procedures Unit 3: Contacting Schools and Sampling Classes" clear and sufficient?	63	1	1
Did you follow the procedures outlined in "TIMSS 2019 Survey Operations Procedures Unit 3: Contacting Schools and Sampling Classes" for working with the schools to sample classes (e.g., using the appropriate tracking forms in the proposed order to obtain information from School Coordinators)?	53	10	2

Almost all of the National Research Coordinators reported using the Windows® Within-School Sampling Software (WinW3S) provided by IEA Hamburg to select classes within the sampled schools. National Research Coordinators reported experiencing problems using the WinW3S software. Among the issues reported were the slow processing speed, difficulty in accepting 2019 dates, and difficulties created by the status of excluded students.

Ten National Research Coordinators applied some modifications to the procedures outlined in the Survey Operations Procedures Unit 3. For example, some National Research Coordinators used an online survey or online form to gather information from School Coordinators. Some National Research Coordinators did not use the Class Listing Forms because a class-level database was available from the ministry or national center, and one country did not use the Teacher Tracking Forms because there was only one teacher per class in every school. All modifications were reviewed and approved by the TIMSS & PIRLS International Study Center.

Translating, Adapting, and Producing Assessment Instruments

The second section of the Survey Activities Questionnaire asked National Research Coordinators about translating, adapting, assembling, and printing the test materials, as well as issues related to checking the materials and securely storing them. Some eTIMSS-specific questions were asked in this section related

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.18

to using the eTIMSS Online Translation System, receiving the eTIMSS Player, and preparing USBs in order to deliver eTIMSS to schools and students.

As reported in Exhibit 6.4, almost all National Research Coordinators found the instructions on preparing achievement booklets, context questionnaires, and eTIMSS item block combinations to be clear and sufficient. However, ten countries reported experiencing some problems using the paper-based survey instrument production materials. These problems mostly included issues with fonts and special characters (e.g., for Cyrillic alphabet) and difficulties due to changes in staff between the field test and main data collection. The 13 National Research Coordinators who reported issues with the eTIMSS Online Translation System noted the difficulty in editing the format of some text and images, in adjusting for font-related issues, particularly regarding character-based languages, and in using some shared text across grades. All of the identified problems were resolved either by specialists at the national center or with assistance from IEA Hamburg and the TIMSS & PIRLS International Study Center.

All but three National Research Coordinators reported applying corrections to their survey instruments as suggested by the external translation verifier or the layout verifier. When suggestions were rejected it was because the language suggested was not the most appropriate for the age group or was not consistent with styles used in trend items, because of the National Research Coordinator's strong preference, or due to time constraints.

Exhibit 6.4: Survey Activities Questionnaire, Section Two—Translating, Adapting, and Producing Assessment Instruments (Numbers of NRC Responses)

Question	Yes	No	Not Answered
Was the information provided in the "TIMSS 2019 Survey Operations Procedures Unit 4: Preparing the Assessment Instruments" clear and sufficient?	61	2	2
Did you encounter any major problems using the assessment instrument InDesign/RTF production/translation materials (used for preparing the paper context questionnaires and achievement booklets)?	10	53	2
Did you encounter any major problems using the eTIMSS Translation System for preparing the eTIMSS achievement test?	13	20	1
After the translation verification (IEA Amsterdam), did you correct your translations/adaptations as suggested by the verifier in the majority of cases?			
paperTIMSS achievement booklets	29	0	2 *(Not Answered)* 34 *(Not Applicable)*
eTIMSS bridge booklets	31	0	3 *(Not Answered)* 31 *(Not Applicable)*

TIMSS & PIRLS
International Study Center
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BOSTON COLLEGE

CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT   6.19

Exhibit 6.4: Survey Activities Questionnaire, Section Two—Translating, Adapting, and Producing Assessment Instruments (Numbers of NRC Responses) (continued)

Question	Yes	No	Not Answered
Context questionnaires	61	0	1 *(Not Answered)* 3 *(Not Applicable)*
eTIMSS achievement test	30	2	2 *(Not Answered)* 31 *(Not Applicable)*
After the layout verification (TIMSS & PIRLS International Study Center), did you correct your assessment instruments as noted by the verifier in the majority of cases?			
paperTIMSS achievement booklets	29	0	2 *(Not Answered)* 34 *(Not Applicable)*
eTIMSS bridge booklets	30	1	3 *(Not Answered)* 31 *(Not Applicable)*
Context questionnaires	60	0	1 *(Not Answered)* 3 *(Not Applicable)*
eTIMSS achievement test	31	1	2 *(Not Answered)* 31 *(Not Applicable)*
Did you apply any quality control measures to check paper assessment instruments during the printing process (e.g., checking for missing pages, upside down pages, text too bright or too dark)?	58	4	3
Did you experience any problems receiving the eTIMSS Player(s) from IEA Hamburg and preparing the eTIMSS USB sticks and/or tablets?	2	31	1
Did you apply quality control measures to check random eTIMSS USBs (e.g., number of files, size of the files, initiating the eTIMSS Player) before they were provided to schools?	26	1	7
Did you take measures to protect the security of the assessment instruments during the preparing and duplicating process?	61	3	1
Did you detect any potential breaches in security of the assessment instruments?	0	64	1
Did you encounter any problems preparing the Online SurveySystem files for administering the school, teacher, and/or home (Early Learning Survey) questionnaires online?	6	23	1 *(Not Answered)* 35 *(Not Applicable)*

Nearly all of the countries conducted the recommended quality control checks during the process of printing the testing materials for paperTIMSS and preparing devices for eTIMSS. Samples of the printed material were checked for any missing pages, pages in the wrong order, upside down pages, and text being too dark or too light. For eTIMSS, countries randomly sampled USB sticks/tablets to ensure the size of the files and/or that they were operating properly.

TIMSS & PIRLS
International Study Center
Lynch School of Education
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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.20

Six countries reported that they experienced problems with the IEA's Online SurveySystem (OSS). They reported issues with adding national questions and adding skip-logic to some questions. These problems were solved with assistance and support from IEA Hamburg.

Assessment Administration

The third section of the Survey Activities Questionnaire addressed the extent to which National Research Coordinators were notified about errors in the testing materials sent to schools. As shown in Exhibit 6.5, a small number of errors were found in the materials. Almost half of such errors were corrected before distributing the materials to the respondents. Errors found after distribution were mostly minor, and were either fixed by School Coordinators or replacement materials were provided. The cases where the errors could not be remedied were reported to the TIMSS & PIRLS International Study Center, where decisions were made about setting the problematic data to "not administered."

Exhibit 6.5: Survey Activities Questionnaire, Section Three—Assessment Administration (Numbers of NRC Responses)

Question	Yes	No	Not Answered
Was the information provided in the "TIMSS 2019 Survey Operations Procedures Unit 5: Conducting the Data Collection" clear and sufficient?	62	2	1
Were any errors detected in any of the following assessment materials after they were sent to schools?			
paperTIMSS achievement booklets	9	21	1 *(Not Answered)* 34 *(Not Applicable)*
paperTIMSS achievement booklet ID labels	4	26	1 *(Not Answered)* 34 *(Not Applicable)*
eTIMSS bridge booklets	5	26	3 *(Not Answered)* 31 *(Not Applicable)*
eTIMSS bridge booklet ID labels	2	29	3 *(Not Answered)* 31 *(Not Applicable)*
eTIMSS files on USB sticks/tablets	3	28	3 *(Not Answered)* 31 *(Not Applicable)*
Student Questionnaire	5	58	1 *(Not Answered)* 1 *(Not Applicable)*
Student Questionnaire ID labels	2	61	1 *(Not Answered)* 1 *(Not Applicable)*
Learning to Read Survey	2	47	1 *(Not Answered)* 15 *(Not Applicable)*

Question	Yes	No	Not Answered
Learning to Read Survey ID labels	1	48	1 *(Not Answered)* 15 *(Not Applicable)*
Student Tracking Forms	3	59	1 *(Not Answered)* 2 *(Not Applicable)*
Teacher Questionnaires	3	59	1 *(Not Answered)* 2 *(Not Applicable)*
Teacher Tracking Forms	0	59	1 *(Not Answered)* 5 *(Not Applicable)*
School Questionnaire	0	63	1 *(Not Answered)* 1 *(Not Applicable)*
School Coordinator Manual(s)	3	57	1 *(Not Answered)* 4 *(Not Applicable)*
Test Administrator Manual(s)	0	61	2 *(Not Answered)* 2 *(Not Applicable)*
If any errors were detected, did you correct the error(s) before the testing began?	19	22	4 *(Not Answered)* 20 *(Not Applicable)*
Did you provide access to the Data Protection Declaration (provided by IEA and/or prepared by your country) to respondents in your country?	30	34	1
Does your country have a confidentiality policy that restricts putting respondents' names on tracking forms and assessment instrument covers?	16	48	1
Did you encounter any problems translating and/or adapting the School Coordinator Manual(s)?	6	58	1
Did you encounter any problems translating and/or adapting the Test Administrator Manual(s)?	6	57	1
Were most/all School Coordinators appointed from within the participating schools?	56	8	1
Did you hold formal training session(s) for School Coordinators?	37	27	1
Were most/all Test Administrators trained by School Coordinators within the participating schools?	37	27	1
Did the Test Administrators document any problems or special circumstances that occurred frequently during the assessment administration (please refer to the completed Test Administration Forms)?	33	31	1

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Exhibit 6.5 header graphic

Exhibit 6.5: Survey Activities Questionnaire, Section Three—Assessment Administration (Numbers of NRC Responses) (continued)

Question	Yes	No	Not Answered
If you administered school, teacher, and/or home (Early Learning Survey) questionnaires online, did any of the respondents in your country encounter any problems responding to the online questionnaires?	12	17	36
Who did the devices used for eTIMSS testing belong to?			
Participating schools	10	–	–
Outsourced company	3	–	–
National center	6	–	–
A combination of above	15	–	–
If you used personal computers, did you use the individual USB sticks or the local server method to administer eTIMSS in your country?			
Individual computers/USB sticks	16	–	–
Local server method	3	–	–
Both methods were used	10	–	–
Not applicable, only tablets were used	5	–	–
Did you require/suggest/provide an additional person to help the Test Administrators during the eTIMSS testing sessions?	26	7	1
Did you experience any software-specific problems with the eTIMSS Player(s)?	16	17	1
Did you have a sufficient number of computers/tablets available for all/most schools to test all of the selected students (the whole class) at the same time?	22	11	1

In May 2018, a new General Data Protection Regulation (GDPR) was implemented in the European Union law on data protection and privacy for all individuals within the European Union and the European Economic Area. In order for the TIMSS study to comply with the requirements of the law, IEA provided countries with templates of the Data Protection Declaration for each of the TIMSS 2019 context questionnaires, specifically reflecting the content of each questionnaire. The provided templates were fully compliant with the GDPR of Europe. All European countries prepared a Data Protection Declaration, complying with the GDPR and country-specific amendments to the law, and provided it along with each of the TIMSS 2019 national context questionnaires. Some non-European participating countries also adapted and adopted the declaration as required by law in those countries. Altogether 30 National Research Coordinators responded that they prepared and provided Data Protection Declaration along with national context questionnaires.

Six National Research Coordinators reported difficulties translating the School Coordinator Manual and/or the Test Administrator Manual. Primarily, problems arose when the manual(s) had to be reorganized or adapted and the standardized procedures were modified (e.g., no Class Listing Forms or Teacher Tracking Forms were used). Countries administering both eTIMSS and bridge booklets also had two sets of manuals to prepare.

In 56 countries, School Coordinators were appointed from within the participating schools. In the remaining countries, School Coordinators were from the national center or were contracted externally. In most countries, the National Research Coordinators organized centralized training sessions for School Coordinators. In others, training was conducted through webinars, regional meetings, and online and written materials. In 37 countries, Test Administrators were trained by the School Coordinators within the participating schools. In the remaining countries, Test Administrators were trained by members of the national center staff.

Although the TIMSS administration mostly went well, Test Administrators occasionally reported difficulties. Among the problems documented by Test Administrators were the following: loud noises outside the classroom, some disruptive students, some students being unfamiliar with some of the subject material, some students having difficulty with the language of the test, some technical problems with eTIMSS administration, the length of the student questionnaire in some countries, and some commenting that the test was too long or that there was not enough time to complete it.

Less than half the countries that administered the school, teacher, and/or home questionnaires online reported issues. The great majority of these issues related to typos or user error when typing in the URL or login information. For some countries, the problem was easily solved by providing direct links to the correct web address.

In most countries administering eTIMSS, an additional person helped the Test Administrators during the eTIMSS testing sessions. This was usually the classroom teacher, School Coordinator, or an information technology consultant/expert. Several countries added two people per classroom to help with computer set up as well as any technical issues that arose during the testing session.

In about half the eTIMSS countries, some software-specific problems occurred. In the early sessions, there were some issues with initiating the software that were promptly addressed by IEA Hamburg. Other problems included the system sometimes crashing during testing, timer disabling for special needs students not working properly, inability to close the program, difficulty in using the ruler, unintentionally moving out of the test on tablet touchscreens, and some issues with submitting the data. In all but a few cases, eTIMSS was successfully administered despite the need to resolve the above reported issues.

Twenty-two of the 34 countries administering eTIMSS had enough computers or tablets to test all the selected classes at the same time. The rest of the schools held multiple sessions, from two to nine sessions per school. Two countries reported providing extra computers to schools specifically for the testing sessions.

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.24

National Quality Control Program

The fourth section of the Survey Activities Questionnaire addressed the National Quality Control Program that each country implemented during data collection (see Chapter 7). As part of national quality assurance activities, National Research Coordinators were instructed to send National Quality Control Observers to ten percent of the participating schools to observe both TIMSS and eTIMSS test administration and to document compliance with the prescribed procedures. The national program was in addition to the program of International Quality Control visits conducted by IEA. Some countries did not use national monitors due to the additional cost or planning time needed for the program. Others made additional efforts when training Test Administrators or used phone calls, surveys and National Resource Center staff to gather information.

As shown in Exhibit 6.6, when applicable, almost all of the national centers conducted their quality assurance program using the National Quality Control Monitor Manual provided by the TIMSS & PIRLS International Study Center. Among the documented problems detected by the national monitors were eTIMSS technical issues where students needed to change computers during the test, schools saying the fourth grade assessment was too long for students, a high absentee rate due to flu season, and in one country, issues with poor testing facilities.

Exhibit 6.6: Survey Activities Questionnaire, Section Four—National Quality Control Program (Numbers of NRC Responses)

Question	Yes	No	Not Answered
Did you conduct a national quality control program that observed the data collection in the participating schools?	56	8	1
Did you use the National Quality Control Monitor (NQCM) Manual and the Classroom Observation Record provided by the TIMSS & PIRLS International Study Center to conduct your national quality control program?	51	6	8 *(Not Applicable)*
Did your national quality control monitors (NQCMs) document any major problems or special circumstances that occurred frequently during the assessment administration?	9	48	8

Preparing for and Scoring the Constructed Response Items

Exhibit 6.7 provides data on responses to items asking National Research Coordinators about their experiences preparing for and scoring the constructed response items. Almost all National Research Coordinators found the scoring procedures as explained in the Survey Operations Procedures Unit 6: Scoring the Constructed Response Items to be clear and sufficient. Countries reporting problems with the scoring training materials asked for more "borderline" examples, including more detailed explanations

within the scoring guides. Almost half of National Research Coordinators reported creating their own national examples and practice papers for training their scorers, as suggested by the TIMSS & PIRLS International Study Center.

Question	Yes	No	Not Answered
Was the information provided in the "TIMSS 2019 Survey Operations Procedures Unit 6: Scoring the Constructed Response Items" clear and sufficient?	60	3	2
Did you encounter any major problems using the scoring training materials, provided by the TIMSS & PIRLS International Study Center?	8	55	2
Did you create national scoring training materials in addition to the international scoring training materials?	31	32	2
Did you scan any paper achievement booklets for electronic image scoring?	3	27	1 *(Not Answered)* 34 *(Not Applicable)*
Did you encounter any major procedural problems during the TIMSS 2019 constructed response item scoring in your country?	2	61	1 *(Not Answered)* 1 *(Not Applicable)*
Did you encounter any major problems with the Online Scoring System (IEA's CodingExpert Software)?	12	51	2 *(Not Answered)* 0 *(Not Applicable)*
Did all your scorers participate in scoring student responses of the trend items, including the Trend Reliability Scoring?	36	18	1 *(Not Answered)* 10 *(Not Applicable)*
Did all your scorers participate in the Cross-country Reliability Scoring?	26	34	5 *(Not Answered)* 0 *(Not Applicable)*

Three countries scanned their TIMSS achievement booklets and scored student responses electronically. A small number of countries reported some minor problems using the Online Scoring System (IEA's CodingExpert Software), which was used for all eTIMSS scoring and also for the trend and cross-country reliability scoring for both paper and eTIMSS countries. The reported problems included software-related issues that were addressed early in the process by IEA Hamburg, difficulty assigning items to scorers, and problems with scanned images.

Because English was used for the cross-country reliability scoring task, not all scorers were able to participate. Only one country reported no participation, while the majority reported at least two or more scorers participating. For the countries that did not participate in the previous cycle of TIMSS, the question on the trend reliability scoring procedures did not apply.

TIMSS & PIRLS
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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.26

Creating and Submitting the Databases and Documentation

The last section of the Survey Activities Questionnaire addressed data entry of the paper assessment instruments, administration data entry, and data quality control activities. As shown in Exhibit 6.8, almost all of the National Research Coordinators found the instructions in Survey Operations Procedures Unit 7: Creating and Submitting the TIMSS 2019 Databases to be clear and sufficient. Some National Research Coordinators reported issues when using WinW3S, mainly related to import and export functions. For example, the participation status of excluded students created an issue when importing data, and time/date data needed to be entered manually by some countries. IEA Hamburg was able to provide support to countries as needed.

Exhibit 6.8: Survey Activities Questionnaire, Section Six—Creating and Submitting the Databases and Documentation (Numbers of NRC Responses)

Question	Yes	No	Not Answered
Was the information provided in the "TIMSS 2019 Survey Operations Procedures Unit 7: Creating and Submitting the TIMSS 2019 Databases" clear and sufficient?	59	4	2
Did you encounter any problems entering test administration information and exporting your WinW3S database(s)?	21	42	2
Who primarily entered the test administration information and paper instrument data for your country?			
National center staff	26	–	–
Temporarily hired data entry staff	9	–	–
An external data entry firm	4	–	–
Combination of the above	22	–	–
Other	3	–	–
Did you use manual (key) data entry to enter paper instrument data for your country?			
paper achievement booklets	26	2 (optical scanning)	3 (Not Answered) 34 (Not Applicable)
eTIMSS bridge booklets	21	9 (optical scanning)	4 (Not Answered) 31 (Not Applicable)
Context questionnaires	52	10 (optical scanning)	1 (Not Answered) 2 (Not Applicable)
Did you encounter any major problems using the IEA's Data Management Expert (DME) software?	2	61	1 (Not Answered) 2 (Not Applicable)

Exhibit 6.8: Survey Activities Questionnaire, Section Six—Creating and Submitting the Databases and Documentation (Numbers of NRC Responses) (continued)

Question	Yes	No	Not Answered
If you entered paper data manually, did you enter 5% of each assessment instrument twice as a quality control measure?	21	5	3 *(Not Answered)* 34 *(Not Applicable)*
Did you apply all the data quality checks described in the "TIMSS 2019 Survey Operations Procedures Unit 7: Creating and Submitting the TIMSS 2019 Databases" before submitting your data and documentation to IEA Hamburg?	63	1	2
Have you stored all the assessment instruments in a secure storage area until the original documents can be destroyed?	62	0	3

In 26 countries, the national center staff entered data from the paper instruments and 22 countries used a combination of national center staff, temporarily hired staff, and an external data entry firm. Some countries used optical scanning instead of manual data entry. All countries but one reported applying all required data quality checks. All countries reported having securely stored their original assessment instruments until all data are processed and reported, and these materials can be destroyed. The non-responses here correspond to the benchmarking participants for whom data entry and instrument storage was done centrally for the whole country.

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CHAPTER 6: SURVEY OPERATIONS PROCEDURES
METHODS AND PROCEDURES: TIMSS 2019 TECHNICAL REPORT 6.28