

CHAPTER 5

Instrument Translation and Layout Verification for TIMSS 2019

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Overview

The TIMSS & PIRLS International Study Center developed the international versions of the TIMSS 2019 assessment instruments, context questionnaires, and procedural manuals in English. Then, using the international source versions, the participating countries translated the materials into their languages of instruction and adapted them to their cultural contexts as necessary. For many countries, identifying the language of instruction, referred to as the “target” language, was relatively straightforward because there is a primary language used in the education system. However, some countries use more than one language of instruction in their education systems, and in these cases, they translated the TIMSS 2019 instruments into multiple languages. These multilingual countries also translated the context questionnaires and test administration scripts for each language assessed. In addition, some countries also translated the home questionnaire into additional languages in order to make the questionnaire more accessible to parents from different backgrounds. The complete scope of the verification process for TIMSS 2019 is fully documented in a subsequent section of this chapter.

As an additional complication for TIMSS 2019, it was the first cycle of TIMSS’ two-cycle transition to digital assessment. About half the countries administered TIMSS as a digitally-based assessment (eTIMSS) and the rest as a paper-based assessment (paperTIMSS). To maintain international comparability, the TIMSS items were designed to be as identical as possible between eTIMSS and paperTIMSS. For the eTIMSS achievement materials, the procedures for translation and verification took place in the eTIMSS Online Translation system, part of IEA Hamburg’s eAssessment system (see [Chapter 4](#)). The translation system was designed to mimic the same overarching procedures of paperTIMSS but also contained additional features for accommodating eTIMSS. These features included a “player preview” mode that

displayed how each item would appear in the player software, an SVG editor to edit images and/or labels on images, a button to duplicate translations that appear in more than one item, and a feature to add comments or document national adaptations.

In addition, countries who participated in eTIMSS administered paper booklets of their trend items from TIMSS 2015 to a subsample of schools, to provide a “bridge” between the two administration modes. Substantial effort was required to maintain consistent procedures for verifying the three types of TIMSS 2019 instruments—eTIMSS, paperTIMSS, and bridge booklets.

To ensure a fair basis for comparing mathematics and science achievement across countries, languages, and contexts; the participating countries followed standardized internationally agreed-upon procedures to translate and prepare their national instruments for data collection (see [Chapter 6: Survey Operations Procedures](#)). This process included two stages: translation verification and layout verification. As part of the translation verification process, each country’s national instruments underwent formal external review by linguistic and assessment experts. During translation verification, verifiers compared the national text to the international text and provided detailed feedback to improve the accuracy and comparability of the national translations. Once the verification was completed, the National Research Coordinators (NRCs) reviewed the feedback, revised their national materials as needed, and documented their changes. Following translation verification, countries submitted their national instruments to the TIMSS & PIRLS International Study Center for layout verification. During layout verification, verifiers checked to ensure that all national instruments conformed to the international format and that any national adaptations made to the TIMSS 2019 instruments did not unduly influence their international comparability.

The process of translation verification and layout verification was carried out once for the field test materials and a second time prior to data collection. Before data collection, the process involved verifying any changes made to field test materials and checking the trend materials to make document any changes. In the interest of measuring trends in student achievement over time, the overall process of instrument translation and verification remains consistent from one TIMSS cycle to the next.

The following TIMSS 2019 instruments underwent verification:

- Student achievement items and directions
- Context questionnaires, covers, and directions for the student, home, teacher, and school questionnaires
- Online questionnaire items, covers, and directions (for countries administering questionnaires to parents, teachers, and/or schools online)
- Paper bridge booklets (for eTIMSS countries).

Providing the Instruments to the Countries for Translation and Adaptation

The TIMSS & PIRLS International Study Center provided NRCs with the TIMSS 2019 assessment materials based on each country's mode of administration. For countries that administered paperTIMSS, NRCs received electronic files consisting of the paperTIMSS achievement materials, guidelines for adaptation, and National Adaptation Forms for documenting each step of the adaptation, translation, and verification processes. For countries that administered eTIMSS, the NRCs received digital versions of all achievement items via the eTIMSS Online Translation System, as well as PDF versions of the eTIMSS achievement blocks, guidelines for adaptation, and instructions and tutorial videos on using the eTIMSS Online Translation System. Additionally, trend countries participating in eTIMSS also received electronic files consisting of the TIMSS 2019 “bridge booklet” production files and instructions on applying their trend translations to their national bridge booklets.

As part of the [TIMSS assessment design](#), each “block” of assessment items appeared in two achievement booklets or two eTIMSS “item block combinations” at each grade level. Therefore, the component parts of the booklets/item block combinations (item blocks and directions) were prepared as separate files for translation and translation verification. This approach allowed countries to translate each component only once. Following translation verification, countries were required to assemble their national paperTIMSS or “bridge” blocks, covers, and directions into booklets to be reviewed during layout verification. To assist in this process, the TIMSS & PIRLS International Study Center provided NRCs with detailed manuals and instructional videos, support materials for right-to-left languages, and instructions for booklet assembly. For eTIMSS, digital item block combinations were assembled through IEA's eAssessment System.

In addition to the achievement materials, all countries also received electronic files consisting of the international versions of the context questionnaires, guidelines for context questionnaire adaptation, and National Adaptation Forms for documenting the translation, adaptation, and verification processes for the questionnaires. For countries that chose to administer the home, teacher, or school questionnaires online, IEA Hamburg provided access and instructions for using the Online SurveySystem (OSS) to create, administer, and monitor online versions of the questionnaires.

Guidelines for Translation and Adaptation

The TIMSS & PIRLS International Study Center provided guidelines for translating and adapting the TIMSS 2019 instruments. The purpose of the guidelines was to ensure that, when countries translated and adapted the international versions, the meaning and difficulty level of the instruments remained the same. All participating countries were expected to follow these guidelines, including countries that administered the TIMSS 2019 instruments in English or used the Arabic source versions.

In accordance with the guidelines, translators and reviewers ensured that:

- The translated texts had the same register (language level and degree of formality) as the source texts
- The translated texts had correct grammar and usage (e.g. subject/verb agreement, prepositions, verb tenses, etc.)
- The translated texts did not remove text from the source text and did not clarify or add more information
- The translated texts had equivalent qualifiers and modifiers appropriate for the target language
- Idiomatic expressions were translated appropriately, not necessarily word for word
- Spelling, punctuation, and capitalization in the target texts were appropriate for the target language and the country's national context.

After the field test, the TIMSS & PIRLS International Study Center provided NRCs with a list of changes made to the international versions that they could refer to while preparing their assessment instruments for the main data collection. This information helped minimize the translation burden by highlighting the necessary changes to the translations before data collection.

TIMSS 2019 Arabic International Reference Version

As has been the practice since 2007, Arabic reference versions of the TIMSS 2019 instruments were made available to participating Arabic-speaking countries to serve as a starting point for preparing their national instruments. The Arabic reference versions were first created for the field test, and then updated by the same team of experts for the main data collection. This was done both for paper and digital versions of the assessment.

In TIMSS 2019, Arabic reference versions were offered for the following materials:

- Grade 4 achievement instruments
- Grade 4 less difficult mathematics achievement booklets
- Grade 8 achievement instruments
- Grade 4 context questionnaires for students, parents, teachers, and schools
- Grade 8 context questionnaires for students, teachers, and schools

The initial translation of the TIMSS 2019 instruments into Arabic was conducted in accordance with the general guidelines for translation and adaptation. The translation was produced by a team of linguists (two expert translators, one reconciler, and one proofreader) from BranTra, an independent translation agency based in Brussels, Belgium. The translators produced two separate translations that were reviewed

and compared against one another. In the case of differences between the two translations, the reconciler selected the most appropriate translation for use in the field test instruments. The resulting draft versions then underwent a second review by experienced NRCs to assess the content and terminology used in specific school subjects at the target grades in a variety of Arabic-speaking countries. Upon completion of the content review, the recommendations were taken into consideration and the translations were revised accordingly. The final translations were then sent to the TIMSS & PIRLS International Study Center to produce the right-to-left Arabic reference materials.

The TIMSS & PIRLS International Study Center used the Middle Eastern Version of Adobe® InDesign® software to create the paper Arabic-reference production files with CopyFlow Gold® to import the translation from rich-text format (RTF) into InDesign. After importing the translations, the TIMSS & PIRLS International Study Center applied fonts, styles, and graphics to the instruments and reviewed the materials to ensure that the translations and layout resembled the international version aside from the right-to-left format. Before the release of the TIMSS 2019 Arabic paper reference versions, an additional optical check was performed to verify the layout of the Arabic version and eradicate any remaining errors or issues that occurred during the import process. The multiple stages of translation and review of the Arabic reference instruments ensured that they were an adequate starting point for Arabic-speaking countries to use in preparing their national versions.

For eTIMSS, the Arabic reference translations were imported into the eTIMSS Online Translation System for Arabic-speaking countries that requested to start with this source version. All graphics were automatically flipped and countries were given instructions on how to revert this if they required certain graphics to be viewed left-to-right in their national education context. Further assistance was provided to the eTIMSS Arabic-speaking countries during layout verification for any right-to-left issues that NRCs were not able to adjust themselves.

Blocks of Achievement Items Designated to Measure Trends

According to the TIMSS design, about two-thirds of the items are carried over from one cycle to the next for the purpose of measuring changes in student achievement over time. Therefore, TIMSS 2019 included some items previously used in TIMSS 2015 and 2011. To ensure the quality of measuring TIMSS trends, the trend items must be identical from cycle to cycle. For countries that previously participated in TIMSS 2011 or TIMSS 2015, the TIMSS 2019 trend blocks (including paper bridge booklets) were reviewed during translation and layout verification in comparison with those from the last cycle in which the country participated. If a country determined that changes to an item in a trend block were absolutely necessary (e.g., in order to correct a mistranslation discovered in a previous version), they were instructed to document the change for further review during the verification process. Trend items that underwent changes were not included in the scaling process or the estimation of the achievement scores for that country.

National Adaptations Forms

Each country prepared one National Adaptations Form (NAF) for each set of paper TIMSS achievement instruments and/or set of questionnaires in each language in which they were administered. NAFs are Excel documents formatted to contain the translations, adaptations, and verification history of each set of national instruments administered on paper. When countries translated and adapted their national paper instruments, the NAFs were filled out by the translators, reviewers, and NRCs. Documenting an adaptation in the NAF requires entering the identifying information (location and/or question number), an English back translation of the adaptation, and recoding instructions (if applicable). During verification, the verifiers reviewed the documentation in the NAFs and recorded any feedback. NRCs were responsible for updating the documentation within the NAFs after each round of international verification. To ease the process of documentation and review, the NAFs include designated areas for each stage of instrument preparation and verification.

For eTIMSS, NAFs were not external worksheets but instead built into the eTIMSS Online Translation System. All national adaptations and documentation for the eTIMSS instruments, as well as feedback from the verifiers was recorded directly into the eTIMSS Online Translation System. For archiving purposes, the translation system had a function to export all documentation including translations, adaptations, and comments from the translators, verifiers, and NRCs.

Countries administering eTIMSS were also provided with Bridge Verification Forms for the paper bridge booklets. Because the bridge booklets were comprised of each country's trend blocks and did not contain any new translations or adaptations, the Bridge Verification Forms were a simplified version of the NAF. These forms did not need to be filled out by NRCs but, rather, were used by the verifiers to document any deviations from trend and any layout issues noted during verification.

Scope of Translation and Layout Verification in TIMSS 2019

For many countries, identifying the language of assessment, referred to as the “target” language, was relatively straightforward because there is a primary language used in the education system. However, some countries use more than one language of instruction in their education systems, and in these cases, they translated the TIMSS 2019 instruments into multiple languages. These multilingual countries also translated the context questionnaires and test administration scripts for each language assessed. In addition, some countries also translated the home questionnaire into additional languages in order to make the questionnaire more accessible to parents from different backgrounds.

For TIMSS 2019, 64 countries and 8 benchmarking participants prepared a total of 144 sets of achievement instruments and 145 sets of background questionnaires in 50 languages.¹ The instruments

¹ Counts may be inconsistent with Exhibits 5.1, 5.2, and 5.3 due to omission of benchmarking entities that share instruments with the national country participant and did not require additional translation and layout verification.

were translated into 50 different languages across 58 participating countries and 6 benchmarking entities at the fourth grade, and across 39 countries and 7 benchmarking entities at the eighth grade. Of these participants, 31 countries and 4 benchmarking entities administered the TIMSS 2019 instruments in more than one language. The most common languages used were English (24 countries) and Arabic (10 countries).

Exhibits 5.1, 5.2, and 5.3 lists the target languages used for the TIMSS 2019 fourth grade assessment, the fourth grade less difficult mathematics assessment, and the eighth grade assessment, respectively.

Exhibit 5.1: Languages Used for the TIMSS 2019 Grade 4 Assessment Instruments

| Country | Language | Instruments | | | | |
|-------------------|---------------------|------------------|-----------------------|-----------------------|----------------------|--------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaire | School Questionnaire | Home Questionnaire |
| Armenia | Armenian | ● | ● | ● | ● | ● |
| Australia | English | ● | ● | ● | ● | |
| Austria | German | ● | ● | ● | ● | ● |
| Azerbaijan | Azeri | ● | ● | ● | ● | ● |
| | Russian | ● | ● | ● | ● | ● |
| Bahrain | English | ● | ● | ● | ● | ● |
| | Arabic | ● | ● | ● | ● | ● |
| Belgium (Flemish) | Dutch | ● | ● | ● | ● | ● |
| Bulgaria | Bulgarian | ● | ● | ● | ● | ● |
| Canada | English | ● | ● | ● | ● | ● |
| | French | ● | ● | ● | ● | ● |
| Chile | Spanish | ● | ● | ● | ● | ● |
| Chinese Taipei | Traditional Chinese | ● | ● | ● | ● | ● |
| | Croatian | ● | ● | ● | ● | ● |
| Croatia | Italian | | ● | | | ● |
| | Serbian | | ● | | | ● |

Exhibit 5.1: Languages Used for the TIMSS 2019 Grade 4 Assessment Instruments (continued)

| Country | Language | Instruments | | | | |
|-----------------------|---------------------|------------------|-----------------------|-----------------------|----------------------|--------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaire | School Questionnaire | Home Questionnaire |
| Cyprus | Greek | • | • | • | • | • |
| | English | • | • | • | • | • |
| Czech Republic | Czech | • | • | • | • | • |
| Denmark | Danish | • | • | • | • | • |
| England | English | • | • | • | • | |
| Finland | Finnish | • | • | • | • | • |
| | Swedish | • | • | • | • | • |
| France | French | • | • | • | • | • |
| Georgia | Georgian | • | • | • | • | • |
| Germany | German | • | • | • | • | • |
| Hong Kong SAR | English | • | • | • | • | • |
| | Traditional Chinese | • | • | • | • | • |
| Hungary | Hungarian | • | • | • | • | • |
| Iran, Islamic Rep. of | Farsi | • | • | • | • | • |
| Ireland | English | • | • | • | • | • |
| | Irish | • | • | • | • | • |
| Italy | Italian | • | • | • | • | • |
| Japan | Japanese | • | • | • | • | • |
| Kazakhstan | Kazakh | • | • | • | • | • |
| | Russian | • | • | • | • | • |
| Korea, Rep. of | Korean | • | • | • | • | • |

Exhibit 5.1: Languages Used for the TIMSS 2019 Grade 4 Assessment Instruments (continued)

| Country | Language | Instruments | | | | |
|--------------------|------------|------------------|-----------------------|-----------------------|----------------------|--------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaire | School Questionnaire | Home Questionnaire |
| Latvia | Latvian | ● | ● | ● | ● | ● |
| | Russian | ● | ● | | | ● |
| Lithuania | Lithuanian | ● | ● | ● | ● | ● |
| | Polish | ● | ● | | | |
| | Russian | ● | ● | | | |
| Malta | Maltese | | | | | ● |
| | English | ● | ● | ● | ● | ● |
| Netherlands | Dutch | ● | ● | ● | ● | |
| New Zealand | English | ● | ● | ● | ● | ● |
| Northern Ireland | English | ● | ● | ● | ● | ● |
| Norway (5) | Bokmål | ● | ● | ● | ● | ● |
| | Nynorsk | ● | ● | | | |
| Oman | Arabic | ● | ● | ● | ● | ● |
| | English | ● | ● | ● | ● | ● |
| Poland | Polish | ● | ● | ● | ● | ● |
| Portugal | Portuguese | ● | ● | ● | ● | ● |
| Qatar | Arabic | ● | ● | ● | ● | ● |
| | English | ● | ● | ● | ● | ● |
| Russian Federation | Russian | ● | ● | ● | ● | ● |
| Serbia | Serbian | ● | ● | ● | ● | ● |

Exhibit 5.1: Languages Used for the TIMSS 2019 Grade 4 Assessment Instruments (continued)

| Country | Language | Instruments | | | | |
|----------------------|---------------------|------------------|-----------------------|-----------------------|----------------------|--------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaire | School Questionnaire | Home Questionnaire |
| Singapore | English | ● | ● | ● | ● | ● |
| | Traditional Chinese | | | | | ● |
| | Tamil | | | | | ● |
| | Malay | | | | | ● |
| Slovak Republic | Slovak | ● | ● | ● | ● | ● |
| | Hungarian | ● | ● | | | ● |
| Spain | Spanish | ● | ● | ● | ● | ● |
| | Catalan | ● | ● | ● | ● | ● |
| | Valencian | ● | ● | ● | ● | ● |
| | Galician | | ● | ● | ● | ● |
| | Basque | ● | ● | ● | ● | ● |
| Sweden | Swedish | ● | ● | ● | ● | ● |
| Turkey (5) | Turkish | ● | ● | ● | ● | ● |
| United Arab Emirates | Arabic | ● | ● | ● | ● | ● |
| | English | ● | ● | ● | ● | ● |
| United States | English | ● | ● | ● | ● | |

Exhibit 5.2: Languages Used for the TIMSS 2019 Grade 4 Less Difficult Mathematics Assessment Instruments

| Country | Language | Instruments | | | | |
|------------------------|------------------------|------------------|-----------------------|-----------------------|----------------------|--------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaire | School Questionnaire | Home Questionnaire |
| Albania | Albanian | ● | ● | ● | ● | ● |
| Bosnia and Herzegovina | Bosnian | ● | ● | ● | ● | ● |
| | Croatian | ● | ● | ● | ● | ● |
| | Serbian | ● | ● | ● | ● | ● |
| Kosovo | Albanian | ● | ● | ● | ● | ● |
| Kuwait | Arabic | ● | ● | ● | ● | ● |
| | English | ● | ● | ● | ● | ● |
| Montenegro | Montenegrin (Cyrillic) | ● | ● | ● | ● | ● |
| Morocco | Arabic | ● | ● | ● | ● | ● |
| North Macedonia | Macedonian | ● | ● | ● | ● | ● |
| | Albanian | ● | ● | ● | ● | ● |
| Pakistan | Urdu | ● | ● | ● | ● | ● |
| | English | ● | ● | ● | ● | ● |
| | Sindhi | ● | ● | ● | ● | ● |
| Philippines | English | ● | ● | ● | ● | ● |
| Saudi Arabia | Arabic | ● | ● | ● | ● | ● |
| | English | ● | ● | ● | ● | ● |
| South Africa (5) | Afrikaans | ● | ● | ● | ● | ● |
| | English | ● | ● | ● | ● | ● |

Exhibit 5.3: Languages Used for the TIMSS 2019 Grade 8 Assessment Instruments

| Country | Language | Instruments | | | |
|-----------------------|---------------------|------------------|-----------------------|------------------------|----------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaires | School Questionnaire |
| Australia | English | ● | ● | ● | ● |
| Bahrain | English | ● | ● | ● | ● |
| | Arabic | ● | ● | ● | ● |
| Canada ¹ | English | ● | ● | ● | ● |
| | French | ● | ● | ● | ● |
| Chile | Spanish | ● | ● | ● | ● |
| Chinese Taipei | Traditional Chinese | ● | ● | ● | ● |
| Cyprus | Greek | ● | ● | ● | ● |
| | English | ● | ● | ● | ● |
| Egypt | Arabic | ● | ● | ● | ● |
| | English | ● | | | |
| England | English | ● | ● | ● | ● |
| Finland | Finnish | ● | ● | ● | ● |
| | Swedish | ● | ● | ● | ● |
| France | French | ● | ● | ● | ● |
| Georgia | Georgian | ● | ● | ● | ● |
| | English | ● | ● | ● | ● |
| Hong Kong SAR | Traditional Chinese | ● | ● | ● | ● |
| Hungary | Hungarian | ● | ● | ● | ● |
| Iran, Islamic Rep. of | Farsi | ● | ● | ● | ● |
| Ireland | English | ● | ● | ● | ● |
| | Irish | ● | ● | ● | ● |

¹ Canada only participated at Grade 8 in the benchmarking regions of Ontario and Quebec.

Exhibit 5.3: Languages Used for the TIMSS 2019 Grade 8 Assessment Instruments (continued)

| Country | Language | Instruments | | | |
|---------------------|----------------------|------------------|-----------------------|------------------------|----------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaires | School Questionnaire |
| Israel | Hebrew | ● | ● | ● | ● |
| | Arabic | ● | ● | ● | ● |
| Italy | Italian | ● | ● | ● | ● |
| Japan | Japanese | ● | ● | ● | ● |
| Jordan ² | Arabic | ● | ● | ● | ● |
| | English ² | ● | | | |
| Kazakhstan | Kazakh | ● | ● | ● | ● |
| | Russian | ● | ● | ● | ● |
| Korea, Rep. of | Korean | ● | ● | ● | ● |
| Kuwait | Arabic | ● | ● | ● | ● |
| | English | ● | ● | ● | ● |
| Lebanon | English | ● | ● | ● | ● |
| | French | ● | ● | ● | ● |
| Lithuania | Lithuanian | ● | ● | ● | ● |
| | Polish | ● | ● | | |
| | Russian | ● | ● | | |
| Malaysia | Malay | ● | ● | ● | ● |
| | English | ● | | | |
| Morocco | Arabic | ● | ● | ● | ● |
| | French | ● | | | |
| New Zealand | English | ● | ● | ● | ● |

2 For Jordan, the Grade 8 Achievement Test in English did not undergo international adaptation/translation verification.

Exhibit 5.3: Languages Used for the TIMSS 2019 Grade 8 Assessment Instruments (continued)

| Country | Language | Instruments | | | |
|----------------------|------------|------------------|-----------------------|------------------------|----------------------|
| | | Achievement Test | Student Questionnaire | Teacher Questionnaires | School Questionnaire |
| Norway (9) | Bokmål | ● | ● | ● | ● |
| | Nynorsk | ● | ● | | |
| Oman | Arabic | ● | ● | ● | ● |
| | English | ● | ● | ● | ● |
| Portugal | Portuguese | ● | ● | ● | ● |
| Qatar | Arabic | ● | ● | ● | ● |
| | English | ● | ● | ● | ● |
| Romania | Romanian | ● | ● | ● | ● |
| Russian Federation | Russian | ● | ● | ● | ● |
| Saudi Arabia | Arabic | ● | ● | ● | ● |
| | English | ● | ● | ● | ● |
| Singapore | English | ● | ● | ● | ● |
| South Africa (9) | English | ● | ● | ● | ● |
| | Afrikaans | ● | ● | ● | ● |
| Sweden | Swedish | ● | ● | ● | ● |
| Turkey | Turkish | ● | ● | ● | ● |
| United Arab Emirates | Arabic | ● | ● | ● | ● |
| | English | ● | ● | ● | ● |
| United States | English | ● | ● | ● | ● |

Translation and Translation Verification

Translators and Reviewers

All countries and benchmarking participants were advised to hire highly qualified translators and reviewers well suited to the task of working with the TIMSS materials.

Essential qualifications for translators and reviewers included:

- Excellent knowledge of English
- Excellent knowledge of the target language
- Experience in the country's cultural context
- Experience translating texts in the subject areas related to the TIMSS assessment (mathematics and science).

The primary responsibility of the reviewer was assessing the readability and accuracy of the translation for the target population. In addition to excellent language skills and knowledge of the country's cultural context, reviewers were expected to have experience with students in the target grade (preferably as a school teacher).

In cases where several translators and reviewers were needed to distribute the work, NRCs were responsible for maintaining the consistency of the translations within and across instruments. Countries that administered the assessment in more than one language were advised to employ translators and reviewers that were highly proficient in the various languages to ensure the consistency of the translations and adaptations across different language versions.

Translation and Adaptation of the Achievement Instruments

One of the main challenges in translating TIMSS achievement blocks is finding appropriate terms and expressions in the target language(s) that convey the same meaning and style of text as the international version. When adapting and translating expressions with more contextually appropriate terms, translators ensured that the meaning and difficulty of the item remained the same as the international version. In particular, it was important that adaptation/translation did not simplify or clarify the text in such a way as to provide a hint or definition of the meaning of a question. Translators also ensured the consistency of adaptations and translations from item to item. For multiple-choice items, translators were instructed to pay particular attention to the literal and synonymous matches of text in both the question stem and answer options. Any matches in the international version were required to be maintained in the translated national version.

Although NRCs were strongly advised to keep adaptations to a minimum, some adaptations were necessary in order to prevent students from facing unfamiliar contexts or vocabulary that could hinder their ability to read and understand the item. For example, a reference to the working week as Monday to Friday might be adapted according to national customs. Similarly, a word such as “flashlight” in American English would be adapted to “torch” in British English. In TIMSS 2019, most of the adaptations were in respect to national conventions of measurement (e.g. metric vs imperial units), mathematical notation (e.g. decimal separator, multiplication sign), punctuation, and expressions of date and time. In addition, fictional names of characters and places were modified to similar names in the target language. When adapting the names of fictional cities or towns, translators were instructed not to use real names of places to prevent student responses’ from being influenced by their perceptions and knowledge of the real locations.

Within the TIMSS items, some terms were not to be changed or adapted beyond translation. Examples included proper names of actual people and places, as well as the fictional currency “zed” which is used in TIMSS items to denote currency. To aid in the standardization of common adaptations across countries, the TIMSS & PIRLS International Study Center provided a list of specific examples of acceptable and unacceptable adaptations, including a list of measurement conversions.

Translation and Adaptation of the Context Questionnaires

Translation procedures for the questionnaires differed from the achievement blocks in that participating countries were required to adapt some terms to ensure that questions were appropriate for the national context and education system. The terms requiring adaptation were listed in angle brackets in the international version with a description of what country-specific information was needed. For example, <language of test> and <fourth grade> would be adapted to the actual language and grade in which the assessment is administered—in the Netherlands, these terms would be replaced by equivalents “Nederlands” (Dutch) and “groep 6” (grade 4).

The guidelines for translation and adaptation contained detailed descriptions of the required questionnaire adaptations, including the intent of each adaptation to help translators select the appropriate national term or expression to convey the intended meaning. For TIMSS 2019, the main difficulties encountered in adapting the questionnaires involved terminology, specific educational contexts, and, for a few countries, consistency across multiple languages of administration.

Countries were permitted to add a limited number of questions to the questionnaires that were of national interest. To avoid influencing responses to the international questions, NRCs were advised to place these national questions at the end of the corresponding module or questionnaire and to ensure these questions adopted the same format as the rest of the questionnaire. All national questions required approval by the TIMSS & PIRLS International Study Center before inclusion in the final questionnaires.

International Translation Verification

After the instruments were translated and adapted, they were submitted to IEA Amsterdam for translation verification. For TIMSS 2019, the international translation verifiers were responsible for reviewing and documenting the quality of the national instruments and their comparability to the international instruments.

The required qualifications for international translation verifiers were:

- Fluency in English
- Mother tongue proficiency in the target language
- Formal credentials as translators working in English
- University-level education and (if possible) familiarity with the subject area
- Residency in the target country, or close contact with the country and its culture.

IEA Amsterdam in collaboration with cApStAn Linguistic Quality Control trained the international translation verifiers and provided them with a comprehensive set of instructional materials to support their work. For TIMSS 2019, web-based seminars were used to train and provide verifiers with information about TIMSS and the assessment instruments. Each verifier received a document containing the description of the adaptation and translation guidelines, the relevant manuals and instruments, and a document with the directions and instructions for reviewing the national instruments and documenting deviations from the international version.

The Translation Verification Process

The instruction and training given to the verifiers emphasized the importance of maintaining the same meaning and difficulty level of the translations as in the international versions and ensuring that translations and adaptations were adequate and consistent within and across national instruments. The translation verification process involved:

- Checking the accuracy, linguistic correctness, and comparability of the translation and adaptations of the achievement items and questionnaires
- Documenting any deviations between the national and international versions, including additions, deletions, and mistranslations
- Suggesting an alternative translation/adaptation to improve the accuracy and comparability of the national instruments.

Verifiers provided feedback on the quality of the translated and adapted texts directly in the instruments, in the accompanying NAFs, and/or in the eTIMSS Online Translation System. Verifiers were asked to correct the text of the assessment items and questionnaires and/or to add notes specifying

errors using either “Sticky Notes” in Adobe PDFs, “Track Changes” and “New Comment” functions in Microsoft Word or the “Add comment” button in the eTIMSS Translation System.

For paper-based instruments, all comments viewed by the verifiers as major issues or deviations in the adaptation/translation were entered in the NAF. For eTIMSS achievement materials all verifier comments were recorded in the eTIMSS Online Translation System. All verifier comments were accompanied by a code to help NRCs understand the severity and type of deviation of the translated text from the international version (see Exhibit 5.4). Translation verifiers were also instructed to review all adaptations and check whether or not the adaptations were correctly documented and implemented for review by the NRC and the TIMSS & PIRLS International Study Center.

Exhibit 5.4: Translation Verification Feedback Codes for TIMSS 2019

The criteria for coding are as follows:

CODE 1 indicates a major change or error. Examples include the omission or addition of a question or answer option; incorrect translation that changes the meaning or difficulty of the item or question; and incorrect order of questions or answer options in a multiple-choice question.

If in any doubt, verifiers are instructed to use **CODE 1?** so that the error can be referred to the TIMSS & PIRLS International Study Center for further consultation

CODE 2 indicates a minor change or error, such as a spelling or grammar error that does not affect comprehension.

CODE 3 indicates that while the translation is adequate, the verifier has a suggestion for an alternative wording.

CODE 4 indicates that an adaptation is acceptable and appropriate.

Translation Verification of the Trend Assessment Blocks

For countries assessing changes of student achievement over time, the international verification procedures included a so-called trend check of the achievement instruments to ensure that the trend items had not changed. For countries administering eTIMSS, this included a check of the bridge booklets against the national trend versions.

As part of the trend check process, translation verifiers checked that each of the trend items used in the current TIMSS cycle remained identical to the trend items as they were administered in the previous cycle and documented any differences in content or wording.

The verifiers were instructed to record any discrepancies found in the trend items in the NAF, eTIMSS Online Translation System, or Bridge Verification Form. NRCs were required to carefully review all discrepancies and discuss any proposed changes with the TIMSS & PIRLS International Study Center.

Review of International Translation Verification Feedback

Upon completion of international translation verification, the NRCs were responsible for responding to the translation verifiers’ feedback by either accepting, modifying or rejected suggested changes to the adapted and/or translated text. Some of the typical errors identified by the verifiers during translation

verification included mistranslations, omissions/additions of text, inconsistent translations, gender agreement, and grammar. Some of the domain-specific concepts in mathematics and science were a particular challenge to translate for some languages. The constructive feedback from the verifiers aided NRCs in revising the materials and in improving the quality of their national versions in line with the translation guidelines for TIMSS 2019.

Layout Verification

Following translation verification, all national instruments were required to undergo layout verification by the TIMSS & PIRLS International Study Center. Layout verification is the final external review and ratification of each participating country's assessment instruments, questionnaires, and corresponding documentation. During layout verification, staff at the TIMSS & PIRLS International Study Center reviewed all national instruments to ensure international comparability of layout structure and proper documentation of any national adaptations.

In particular, layout verification focused on the following:

- Reviewing the national achievement materials and context questionnaires against the international versions for acceptable layout structure
- Reviewing national adaptations to the achievement materials and context questionnaires with respect to how they may influence the international comparability of the data
- Reviewing the online questionnaires against their corresponding paper versions (where applicable)
- Reviewing trend materials and bridge booklets against the previous national versions for consistency across cycles.

Layout Verification of Achievement Materials

The primary goal of layout verification of achievement materials is to ensure that students in different countries experience the assessment instruments in the same way. Thus, the national versions of the paperTIMSS 2019 achievement booklets or eTIMSS item blocks were checked against the appropriate international versions to identify any deviations from the international format. For paperTIMSS instruments, layout verification was conducted on printed versions of each set of national booklets compared to printed versions of the international booklets. For eTIMSS materials, layout verification was conducted directly in the eTIMSS Online Translation System using the player preview mode. To accommodate on-screen verification, the translation system included a feature to view both the national preview and the international preview so that verifiers could compare each national item to the international version.

Due to differences in languages, the TIMSS national assessment instruments varied slightly in length and format across countries. The international versions, however, were designed with this in mind. For paperTIMSS materials, extra space was provided in the margins of the pages to facilitate the use of longer text and different paper sizes (letter versus A4) without necessitating extensive changes to the layout of each page. For eTIMSS, the layout of the items was designed to run vertically to minimize scrolling in longer languages. In addition, specific layout adjustments were made to national eTIMSS items, as needed, to accommodate things such as special characters, longer languages, and country-specific right to left requirements.

During layout verification of paperTIMSS instruments, verifiers reviewed the national booklets against the international versions with respect to pagination, page breaks, headers, footers, stop signs, item sequence, scoring boxes, response options, text formats, and graphics. For countries administering paperTIMSS in right-to-left languages this included ensuring that no elements were incorrectly altered in adjusting the alignment and conventions for graphics were implemented consistently throughout all booklets. Any layout deviations or errors, as well as any concerns of international incomparability of assessment items, were documented by the verifiers in the NAFs. Following layout verification, the NAFs containing the verifiers' comments were sent back to the National Research Coordinators for consideration. The NRC's were asked to confirm that each suggested change was implemented or provide an explanation for not implementing the suggested change.

During layout verification of eTIMSS materials, the verifiers reviewed the layout of all items, directions, system login pages, on-screen alerts, and eTIMSS system components including navigation tools, number pad, ruler, and calculator (8th grade only). The verifiers checked the eTIMSS materials for comparability to the international versions as well as on-screen readability, minimal scrolling, item sequence, response format, text format and graphics. For countries with right-to-left languages the verifiers checked that no elements were incorrectly altered in adjusting the alignment and conventions for graphics were implemented consistently throughout all of the items. As an additional step for eTIMSS layout verification, the verifiers also checked the basic functionality of the items and eTIMSS system components. Any technical issues were reported to the IEA Hamburg software unit to be fixed prior to development of the national Player software.

For eTIMSS, the verifiers entered their comments regarding layout deviations or errors, as well as any concerns of international incomparability directly in the eTIMSS Online Translation System. Comments from the verifiers included a reference to the text element, whether the comment was related to an adaptation or layout issue, and a button to "accept" or "reject" the comment. Following the completion of layout verification, the NRC's were asked to review the verifier's feedback and accept or reject each comment. If the NRC rejected a comment they were required to provide an explanation for not implementing the suggested change.

Layout Verification of Context Questionnaires

As with the achievement booklets, the context questionnaires were checked against the international versions to identify any potential layout issues as well as to ensure the international comparability of the questionnaire data. During layout verification of questionnaires, the verifiers took into consideration any national adaptations documented by the NRCs. Instances of internationally incomparable adaptations or errors were recorded by the verifiers in the NAFs along with recommendations for recoding or rewording.

In an effort to make the questionnaires general enough for international analyses but appropriate for each intended audience, participating countries were required to adapt certain phrases and designations in the text of the questionnaires. For example, items asking about levels of education were expressed in terms of the current version of the *International Standard Classification of Education ISCED 2011* (UNESCO Institute for Statistics, 2012), and required adaptation to the nationally equivalent educational terms by each participating country. These items were reviewed during layout verification in comparison to the ISCED level classifications, and if deemed internationally comparable, suggestions were made by the verifier to revise or recode their education categories.

The verifiers ensured that all items requiring adaptations were accompanied by proper English back translations. The documentation for these universally adapted questionnaire items was intended for later use in the National Adaptations Database. The database is a compilation of each country's questionnaire adaptations, to be used during data processing by IEA Hamburg (see [Chapter 8](#)). The information included in the database is reported as a supplement to the [TIMSS 2019 User Guide for the International Database](#).

For countries that chose to administer the home, teacher, or school questionnaires online using the IEA Online SurveySystem (OSS), layout verification of the online questionnaires was conducted in the OSS environment. All countries that administered online questionnaires were also required to create paper directions containing information on accessing the online questionnaire and the purpose and use of the information being collected. The paper directions were reviewed by the layout verifiers in conjunction with the online questionnaires. For countries that administered any of the questionnaires in both paper and online, the layout verifiers compared the paper version to the corresponding online version to ensure consistency across the two forms. Feedback for both online and paper questionnaires were entered into the questionnaire NAFs and sent back to the NRCs for consideration. The NRCs were asked to confirm that each suggested change was implemented or provide an explanation for not implementing the suggested change.

Layout Verification of Trend Materials and Bridge Booklets

For countries that previously participated in TIMSS 2015 or TIMSS 2011, the national TIMSS 2019 trend blocks were also reviewed against the versions from the last cycle in which the country participated. During layout verification of trend materials, the verifiers ensured that the layout structure and adaptations in the national TIMSS 2019 instruments were consistent with countries' trend versions. In the event a country needed to make a change to their trend materials due to an error in previous cycles or a change in curriculum, the TIMSS & PIRLS International Study Center documented approval of the change or requested more information in the "trend check" section of the NAF.

For eTIMSS achievement materials, the change in mode of administration from paper to digital necessitated slight changes to the layout of some trend items. During layout verification the verifiers ensured that all conventions and adaptations in the eTIMSS 2019 materials were consistent with the trend versions and any changes beyond adjustments for digital administration were properly documented.

In addition to the eTIMSS 2019 achievement items, countries participating in eTIMSS also produced paper bridge booklets for use in the TIMSS 2019 bridge study. The bridge booklets were reviewed during layout verification alongside the corresponding national trend blocks from previous cycles. The verifiers also ensured that the pagination, page breaks, block sequence, headers, footers, graphics, covers, and directions of each bridge booklet matched the international versions of the TIMSS 2019 bridge booklets.

Review of Final Instruments

Upon completion of layout verification, the NRCs were responsible for finalizing their national TIMSS 2019 instruments. This included making any necessary adjustments to the materials and responding to all the feedback from the layout verifiers. Once the materials were reviewed and finalized, NRCs were required to submit their materials to the TIMSS & PIRLS International Study Center for a final review. In the final review of paper-based instruments (paperTIMSS, context questionnaires, and bridge booklets), the layout verifiers checked to see that all issues had been addressed, comments in the NAFs had been answered, and all of the compiled booklets and questionnaires had been submitted. Once, the TIMSS & PIRLS International Study Center confirmed the materials were finalized, the country was permitted to begin printing the paper-based instruments. In the final review of eTIMSS achievement materials, the layout verifiers checked that all issues had been addressed in the eTIMSS Online Translation System, comments from verification had been answered, and all materials had been set to the status "Instrument Finalized." This status indicated that no further changes would be made to the materials and the country was now ready to receive their national Player software.

Outcomes and Summary for TIMSS 2019

TIMSS 2019 followed stringent procedures for translation, adaptation, and verification. The ultimate goal of the translation and verification process was to create national versions of the TIMSS 2019 instruments that accommodated national languages and context while maintaining international comparability. The TIMSS & PIRLS International Study Center provided countries and benchmarking entities with comprehensive guidelines and procedural manuals outlining the various steps of instrument preparation and verification.

The feedback from translation verification helped NRCs to improve the quality and comparability of their national instruments. Similarly, the feedback from the layout verification provided NRCs with explanations for the adjustments requested and helped ensure the international comparability of instruments across countries. Ultimately, the stringent procedures applied in TIMSS 2019 resulted in high quality instruments that allowed for comparisons in student achievement across all participating countries and benchmarking entities.

Reference

UNESCO. (2012). *International Standard Classification of Education ISCED 2011*. Montreal: UNESCO Institute of Statistics. Retrieved from <http://www.uis.unesco.org/Education/Documents/isced-2011-en.pdf>