

# Chapter 4



## *Translation and National Adaptations of the TIMSS 2007 Assessment and Questionnaires*

Ieva Johansone and Barbara Malak

### **4.1 Overview**

The international version of the TIMSS 2007 assessment items and background questionnaires was developed and prepared in English by the TIMSS & PIRLS International Study Center, with contributions from the National Research Coordinators (NRCs) of participating countries. The test instruments were subsequently translated by these countries into their languages of instruction, 39 in total. The overarching goal was to create excellent quality translations that were appropriately adapted for the national context and at the same time are internationally comparable.

About one third of the participating countries administered the TIMSS 2007 assessment in more than one language. The most common languages of testing were English (16 countries) and Arabic (14 countries). Because so many countries administered the TIMSS assessment in Arabic, all the test instruments were translated into generic Arabic by CAPSTAN, a linguistic quality control company (Brussels, Belgium).

The TIMSS & PIRLS International Study Center prepared all the test instruments in English and in Arabic using the Adobe InDesign® layout program. The participating countries were provided with detailed instructions on translating and adapting the testing materials. Please refer to Chapter 6 and the *TIMSS 2007 Survey Operations Procedures Unit 3, Preparing Materials for the TIMSS 2007 Data Collection* (TIMSS & PIRLS International Study Center, 2006).

Since high-quality translations were essential to the success of the study, translated assessment items and background questionnaires were subjected to a stringent international translation verification process, organized by the

IEA Secretariat in Amsterdam. This process was intended to make certain that the translated materials were equivalent to the international version through direct comparisons of the two. Each participating country was asked to submit materials for verification prior to both the field test and the main data collection.

Generally, countries complied very well with the requirements for translation verification. Only one country (Saudi Arabia) did not submit their instruments for verification. A number of countries did not submit instruments in languages that were used for a smaller proportion of the sample. For example, Egypt did not submit its English version of the achievement test, and Romania did not submit its Hungarian version of the achievement test and *Student Questionnaire*. Finally, Japan, Mongolia, Morocco, and Latvia didn't submit instruments for translation verification on time and, therefore, verification was not completed until after their instruments were printed.

#### 4.2 TIMSS Instruments to Be Translated

For TIMSS 2007, the following materials required translation for each grade tested:

- 28 blocks of achievement items
- One set of the booklet covers, directions, and instructions
- Background questionnaires for students, teachers, and school principals
- School coordinator and test administrator manuals
- Scoring guides for constructed-response items.

The TIMSS & PIRLS International Study Center provided each country with electronic files containing all of the materials to be translated. Even if each item block appears in two different test booklets, the files were designed in a way that each item block had to be translated only once. The same was true for the cover pages, directions, and instructions that were included in each test booklet. These “component files of the test booklets” were later distributed throughout the achievement booklets.

The item blocks and the background questionnaires underwent the international translation verification process (see section 4.6), whereas the manuals and scoring guides did not.

Countries testing in English and Arabic did not have to translate the instruments but were required to adapt the international version (English) or the generic Arabic version to the vernacular and make adaptations necessary for national reasons. The Arabic-speaking countries had to adapt the generic translation to their national context, comparing introduced adaptations to the international (English) version for international comparability.

#### **4.2.1 Trend Item Blocks**

About half of the TIMSS 2007 item blocks were used in TIMSS 2003 and were the basis of the TIMSS trend measurement. Countries that participated in TIMSS 2003 were required to use the same translation for the trend item blocks as was used in 2003.

Some of the trend item blocks also were used in TIMSS 1999. The Czech Republic, Thailand, and Turkey did not participate in TIMSS 2003 but did participate in TIMSS 1999. Thus, these countries used their translations from 1999 for these item blocks.

In some cases, however, countries decided that improvements to some of the translations from 1999 or 2003 were absolutely necessary. These changes were carefully documented and were referenced during data analysis. If the changes seemed to have altered the performance of any item, then this item was not included in trend analyses for this participant.

Additionally, countries that had participated in TIMSS 2003 also administered the four bridging study booklets at each grade. These booklets, labeled B1, B2, B3, and B4, were in fact booklets 5, 6, 11, and 12, respectively, from the TIMSS 2003 assessment. The countries were required to use these booklets as they were administered in TIMSS 2003. Since the translations in these booklets were not to be altered, they were not subject to international translation verification. However, they did undergo layout verification by the TIMSS & PIRLS International Study Center (for more information on the TIMSS & PIRLS International Study Center review of the survey instruments, please refer to Chapter 6).

### 4.3 Identification of the Target Language

For most participating countries, identifying the target language, the language in which the test instruments would be administered, was straightforward, because they have one dominant language that is used in public and private arenas. Some countries, however, use more than one language of instruction in their education systems. The translation process for these countries was even more challenging, since they had to make sure that the translations were equivalent across languages. In other cases, while there may be one language of instruction, there are other languages that are prominent in other parts of society. For example, Romania administered the achievement test and *Student Questionnaire* in Romanian and Hungarian but the teacher and school questionnaires only in Romanian. Exhibits 4.1 and 4.2 show the languages used by each participant for the various instruments.

**Exhibit 4.1 Languages Used for the TIMSS 2007 Grade 4 Test Instruments**

Country	Language	Instruments			
		Student Test	Student Questionnaire	Teacher Questionnaire	School Questionnaire
Alberta, Canada	English	●	●	●	●
	French	●	●	●	●
Algeria	Arabic	●	●	●	●
Armenia	Armenian	●	●	●	●
Australia	English	●	●	●	●
Austria	German	●	●	●	●
British Columbia, Canada	English	●	●	●	●
	French	●	●	●	●
Chinese Taipei	Traditional Chinese	●	●	●	●
Colombia	Spanish	●	●	●	●
Czech Republic	Czech	●	●	●	●
Denmark	Danish	●	●	●	●
Dubai, UAE	Arabic	●	●	●	●
	English	●	●	●	●
El Salvador	Spanish	●	●	●	●
England	English	●	●	●	●
Georgia	Georgian	●	●	●	●
Germany	German	●	●	●	●
Hong Kong SAR	Modern Standard Chinese	●	●	●	●
	English	●	●	●	●
Hungary	Hungarian	●	●	●	●
Iran, Islamic Rep. of	Farsi	●	●	●	●
Italy	Italian	●	●	●	●
Japan	Japanese	●	●	●	●
Kazakhstan	Kazakh	●	●	●	●
	Russian	●	●	●	●
Kuwait	Arabic	●	●	●	●
Latvia	Latvian	●	●	●	●
Lithuania	Lithuanian	●	●	●	●
Massachusetts, US	English	●	●	●	●
Minnesota, US	English	●	●	●	●
Mongolia	Mongolian	●	●	●	●
	Kazakh	●	●	●	●
Morocco	Arabic	●	●	●	●
Netherlands	Dutch	●	●	●	●
New Zealand	English	●	●	●	●
Norway	Norwegian	●	●	●	●
Ontario, Canada	English	●	●	●	●
	French	●	●	●	●
Qatar	Arabic	●	●	●	●
	English	●	–	–	–
Quebec, Canada	English	●	●	●	●
	French	●	●	●	●
Russian Federation	Russian	●	●	●	●
Scotland	English	●	●	●	●
Singapore	English	●	●	●	●
Slovak Republic	Slovak	●	●	●	●
	Hungarian	●	●	–	–
Slovenia	Slovene	●	●	●	●
Sweden	Swedish	●	●	●	●
Tunisia	Arabic	●	●	●	●
Ukraine	Ukrainian	●	●	●	●
	Russian	●	●	–	–
United States	English	●	●	●	●
Yemen	Arabic	●	●	●	●

**Exhibit 4.2 Languages Used for the TIMSS 2007 Grade 8 Test Instruments**

Country	Language	Instruments				
		Student Test	Student Questionnaire	Mathematics Teacher Questionnaire	Science Teacher Questionnaire	School Questionnaire
Algeria	Arabic	●	●	●	●	●
Armenia	Armenian	●	●	●	●	●
Australia	English	●	●	●	●	●
Bahrain	Arabic	●	●	●	●	●
	English	●	●	●	●	●
Basque Country, Spain	Basque	●	●	●	●	●
	Spanish	●	●	●	●	●
Bosnia and Herzegovina	Bosnian	●	●	●	●	●
	Croatian	●	●	●	●	●
	Serbian	●	●	●	●	●
Botswana	English	●	●	●	●	●
British Columbia, Canada	English	●	●	●	●	●
	French	●	●	●	●	●
Bulgaria	Bulgarian	●	●	●	●	●
Chinese Taipei	Traditional Chinese	●	●	●	●	●
Colombia	Spanish	●	●	●	●	●
Cyprus	Greek	●	●	●	●	●
Czech Republic	Czech	●	●	●	●	●
Dubai, UAE	Arabic	●	●	●	●	●
	English	●	●	●	●	●
Egypt	Arabic	●	●	●	●	●
	English	●	–	–	–	–
El Salvador	Spanish	●	●	●	●	●
England	English	●	●	●	●	●
Georgia	Georgian	●	●	●	●	●
Ghana	English	●	●	●	●	●
Hong Kong SAR	Modern Standard Chinese	●	●	●	●	●
	English	●	●	●	●	●
Hungary	Hungarian	●	●	●	●	●
Indonesia	Bahasa Indonesian	●	●	●	●	●
Iran, Islamic Rep. of	Farsi	●	●	●	●	●
Israel	Hebrew	●	●	●	●	●
	Arabic	●	●	●	●	●
Italy	Italian	●	●	●	●	●
Japan	Japanese	●	●	●	●	●
Jordan	Arabic	●	●	●	●	●
Korea, Rep. of	Korean	●	●	●	●	●
Kuwait	Arabic	●	●	●	●	●
Lebanon	English	●	●	●	●	●
	French	●	●	●	●	●
Lithuania	Lithuanian	●	●	●	●	●
Malaysia	Malay	●	●	●	●	●
	English	●	–	●	●	●
Malta	English	●	●	●	●	●
Massachusetts, US	English	●	●	●	●	●
Minnesota, US	English	●	●	●	●	●
Mongolia	Mongolian	●	●	●	●	●
	Kazakh	●	●	●	●	●

**Exhibit 4.2 Languages Used for the TIMSS 2007 Grade 8 Test Instruments (Continued)**

Country	Language	Instruments				
		Student Test	Student Questionnaire	Mathematics Teacher Questionnaire	Science Teacher Questionnaire	School Questionnaire
Morocco	Arabic	●	●	●	●	●
Norway	Norwegian	●	●	●	●	●
Oman	Arabic	●	●	●	●	●
	English	●	●	●	●	●
Ontario, Canada	English	●	●	●	●	●
	French	●	●	●	●	●
Palestinian Nat'l Auth.	Arabic	●	●	●	●	●
Qatar	Arabic	●	●	●	●	●
	English	●	–	–	–	–
Quebec, Canada	English	●	●	●	●	●
	French	●	●	●	●	●
Romania	Romanian	●	●	●	●	●
	Hungarian	●	●	–	–	–
Russian Federation	Russian	●	●	●	●	●
Saudi Arabia	Arabic	●	●	●	●	●
Scotland	English	●	●	●	●	●
Serbia	Serbian	●	●	●	●	●
Singapore	English	●	●	●	●	●
Slovenia	Slovene	●	●	●	●	●
Sweden	Swedish	●	●	●	●	●
Syrian Arab Republic	Arabic	●	●	●	●	●
Thailand	Thai	●	●	●	●	●
Tunisia	Arabic	●	●	●	●	●
Turkey	Turkish	●	●	●	●	●
Ukraine	Ukrainian	●	●	●	●	●
	Russian	●	●	–	–	–
United States	English	●	●	●	●	●

#### 4.4 Translators and Reviewers

To translate the items and questionnaires, countries were strongly encouraged to hire highly qualified national translators and reviewers. Translators were expected to have an excellent knowledge of both English and the target language, experience in the country's cultural context, and, if possible, experience in the subject matter, preferably at the level of the target grade.

All translations had to be reviewed by a translation reviewer. Reviewers were expected to have experience with students in the target grade (preferably a fourth grade and/or eighth grade mathematics and/or science teacher), experience in a country's cultural context, and an excellent knowledge of both English and the target language.

Countries could employ more than one translator and/or reviewer (per target grade and language) and divide the work, if necessary. However, it was important to ensure the consistency of the translations within and across instruments.

#### 4.5 Translation and Adaptation of the Instruments

Each translator and reviewer was given the international version of the TIMSS 2007 test instruments to be translated. The role of the reviewer was to check that the translation was correct and appropriate for the target population. The reviewer's suggestions then were analyzed by the NRC and incorporated into the translations, if necessary.

The TIMSS & PIRLS International Study Center provided translators and reviewers with directions to follow in translating and adapting the test instruments. The directions were designed to yield translations that were as close as possible to the international (English) version of the survey instruments, while allowing for national adaptations where necessary. In translating and adapting the TIMSS 2007 instruments, translators and reviewers were asked to pay particular attention to the following issues:

- Finding words/terms and phrases in the target language that are equivalent to those in the international version
- Making sure that the essential meaning of the text and reading level do not change
- Making sure that the difficulty level of achievement items does not change
- Ensuring that the translated text has equivalent qualifiers and modifiers appropriate for the target language
- Ensuring that the translated questionnaires ask the same questions as the international version and that national adaptations are made appropriately.

It also was extremely important to keep in mind that these translations were intended for fourth grade and/or eighth grade students and should reflect the language level of this audience. Translators were not permitted to clarify, take out, or add explanations to the source text. At the same time, idiomatic expressions had to be translated appropriately but not necessarily word for word.

Additionally, because unusual results from the TIMSS 2007 field test could have been an indication of errors in translation, each country was asked to check and, if this was the case, to correct the translation for the final TIMSS 2007 test instruments.

#### 4.5.1 Adaptations in Achievement Items

Very few modifications were allowed to the items beyond those necessitated by the translation into the target language. Translators were encouraged to change phrasing and expressions that were not common to the country's national context and not related to the substance of the questions. For example, references to the work week as Monday through Friday could be altered. Also, whenever possible, punctuation or notation (e.g., decimal points), measurement units, expressions of date and time, names of people, places, animals, plants, etc. could be changed to make them equally familiar to all students. However, changes to names had to be similar in length and complexity to the originals.

There were some vocabulary issues that had to be kept in mind when translating the achievement items. Some words were pertinent to the item (e.g., a science item asking to explain "soil erosion"). Some words were not pertinent (e.g., in a mathematics item asking to compare data on "classmates' favorite juice", "mango juice" could be changed to "apple juice"). For multiple-choice items, translators had to pay particular attention to the correspondence between words in the item stems and options. Some items required an exact (verbatim) match between words in the stem and options of an item.

For some items, a nonexistent currency "zed" is used. Countries had to keep this currency or, replace it with another nonexistent currency, in case the word "zed" could not be used in their language.

#### 4.5.2 Adaptations in Background Questionnaires

Unlike the achievement items, there were a few places in the questionnaires where national adaptations were required. Questions or information in carets (< >) had to be replaced with the country-appropriate term. For example, <eighth-grade> in the international version was replaced with "Form III" in the Maltese version. Questions that asked students and teachers about levels of education utilized the ISCED-1997 system. The international versions of the questionnaires provided the generic ISCED levels in carets to be replaced with the educational terms appropriate for each country. For example, <ISCED 3> was replaced with "high school" in the United States version of the questionnaires. NRCs were provided with detailed directions and the Operational Manual for ISCED-1997 (UNESCO, 1999) to assist them in determining the equivalent educational levels in their countries.

In addition to these required adaptations, participants were allowed to add questions of national interest to the questionnaires. Countries were encouraged, however, to add items only at the end of the questionnaires to avoid influencing the responses to the international questions in any way. The country-specific questions were required to appear in the same form as the rest of the questionnaire and to be approved by the TIMSS & PIRLS International Study Center.

#### **4.5.3 Documenting National Adaptations**

NRCs were required to document all adaptations made to the international test instruments on the National Adaptations Forms. The forms had to be completed and reviewed at various stages of preparing the national test instruments. NRCs completed Version I of the forms during the internal translation and review process and sent it along with the rest of the materials for international translation verification. After translation verification, NRCs updated the forms (Version II) to reflect any changes resulting from the verification and sent them along with the national instruments for TIMSS & PIRLS International Study Center review. After finalizing the national instruments, NRCs updated the forms again (Version III) for data processing at the IEA Data Processing and Research Center (DPC) and as a final documentation of their national adaptations.

NRCs received detailed instructions on how to complete each version of the National Adaptations Forms. The forms were supplied as an electronic document and treated as a set. It was required that each version be submitted as a single document upon completion.

#### **4.6 International Verification of the Translations**

Each translation went through a rigorous verification process that included internal verification of the translations at the national centers, independent verification by an international translation company, and a check by International Quality Control Monitors to determine whether or not the verifier's suggestions had been adapted. As the last step, the TIMSS & PIRLS International Study Center reviewed the assembled test instruments from all participating countries. For more information on the checking process used by International Quality Control Monitors and the review process used by TIMSS & PIRLS International Study Center staff, please refer to Chapter 6.

Once the instruments had been translated and internally reviewed, the text of the booklet, cover pages, directions, instructions, item blocks, and background questionnaires were submitted for international translation verification. This process was managed by the IEA Secretariat in Amsterdam, who enlisted the assistance of two independent translation companies to verify translations for each country: Lionbridge (offices in Dublin, Ireland and Brussels, Belgium) and CAPSTAN.

The international translation verifiers for TIMSS were required to have the target language as their first language, formal credentials as translators working in English, be educated at the university level, and live and work in the target country. When the last condition could not be met, verifiers were expected to maintain close contact with the country and its culture.

#### 4.6.1 The Translation Verification Process

The international translation verifiers attended a training seminar where they received general information about the study and the design of the instruments, together with a description of the translation procedures used by the national centers. They also received detailed instructions for reviewing the instruments and registering deviations from their original version.

The primary task of the translation verifiers was to evaluate the accuracy of the translation and adequacy of the national adaptations (reported in the National Adaptation Forms). Their instructions emphasized the importance of maintaining the meaning and the difficulty level of the items, as well as questions included in each of the background questionnaires. Specifically, verifiers had to ensure the following:

- The translation has not affected the meaning or difficulty of the text.
- The items have not been made easier or more difficult when translated or adapted.
- No information has been omitted or added in the translated text.
- The questionnaires contain all the correct questions and answer options.
- The National Adaptations Forms reflect all adaptations planned to be implemented into the national test instruments.

Verifiers also were asked to suggest, if necessary, an alternative that would improve the comparability (i.e., the equivalence between the adapted

version and the international source version) and provide the overall evaluation of translation, its accuracy, and cultural relevance.

The verifiers documented any errors or suggested changes either directly in the submitted PDF documents (using the eXPert PDF 4 Professional application) or in a specially created report form (using Microsoft® Word).

To help NRCs understand the comparability of the translated text with the international version, verifiers were asked to assign a “severity code” to any deviations. The following severity codes ranged from 1 (*major change or error*) to 4 (*acceptable change*):

1. *Major change or error*: Examples include the incorrect order of choices in a multiple-choice item, omission of a graphic, omission of an item or question, incorrect translation resulting in the answer being indicated by the item, an incorrect translation that changes the meaning or difficulty of the item or question, and the incorrect order of the questions or items.
2. *Minor change or error*: Examples include spelling errors that do not affect comprehension, misalignment of margins or tabs, inappropriate changes in fonts or font sizes, and discrepancies in the headers and footers of the document.
3. *Suggestion for alternative*: The translation may be adequate, but the verifier suggests a different wording.
4. *Acceptable change*: The change was acceptable and appropriate but was not documented in the National Adaptations Forms.

Additionally, for the countries that also participated in prior cycles of the study, verifiers checked that the translated version of the trend item blocks was identical to the version administered in 1999 or 2003. Any discrepancies were documented in the trend item checklist.

The translation verification feedback (either corrections and comments in the PDF version of the instruments or registered in separate forms in a Word format) was sent to the national centers. NRCs were responsible for reviewing translation verifier’s suggestions and revising the test instruments. The NRCs also were asked to complete a Translation Verification Summary Form, providing comments on the verifier’s suggestions that they had decided not to implement.

## References

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TIMSS & PIRLS International Study Center. (2006). *TIMSS 2007 survey operations procedures unit 3: Preparing materials for the TIMSS 2007 data collection*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

UNESCO Institute for Statistics. (1999). *Operational manual for ISCED-1997 (international standard classification of education)*. Paris: Author.

