

Chapter 3

Translation and National Adaptations of the TIMSS Advanced 2008 Instruments

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3.1 Introduction

The international versions of the TIMSS Advanced 2008 assessment items, background questionnaires, and procedural manuals were developed in English, the working language of the International Association for the Evaluation of Education Achievement (IEA). Using the international versions prepared by the TIMSS & PIRLS International Study Center, participants translated the materials into their target language(s) and adapted them as required for their national context.

Throughout this translation and adaptation process, the primary purpose was to ensure that the set of instruments in each country was internationally comparable, while still allowing each country to adapt the materials to their national needs. Guidelines for translating the materials were described in the *Survey Operations Procedures Unit 3: Preparing Materials for the TIMSS Advanced 2008 Data Collection and Administering the Assessment* (TIMSS & PIRLS International Study



Center, 2007), and were discussed at meetings of National Research Coordinators (NRCs). The translated texts were subjected to a stringent international translation verification process that was managed by the IEA secretariat in Amsterdam. The IEA secretariat scheduled activities and trained personnel at Lionbridge, an independent translation company (based in Brussels, Belgium).

Each participating country was asked to submit materials for verification prior to both the field test and the main data collection. National Research Coordinators received a Translation Verification Report in which all verifier comments were recorded either directly into the submitted documents or in separate tables. NRCs made changes to their instruments as appropriate, and submitted the final version to the TIMSS & PIRLS International Study Center for verification of the layout of the assembled instruments.

Finally, international Quality Control Monitors (QCMs) reviewed the final printed instruments against the Translation Verification Report and recorded instances where the verifier's suggestions were not implemented. These reports were forwarded to the TIMSS & PIRLS International Study Center and were supplemented with Translation Verification Summary reports, in which NRCs explained the justification for not implementing verifier suggestions concerning any serious error. NRCs were not obliged to implement suggestions from the verifier; however, they did take responsibility for any errors or mistranslations in the instruments

3.2 TIMSS Advanced materials to be translated

For TIMSS Advanced 2008, the following instruments and related materials required translation:

- ◆ Seven blocks of advanced mathematics achievement items and 7 blocks of physics achievement items;

- ◆ Two sets of booklet covers and introductory information (including directions)—one each for advanced mathematics and physics;
- ◆ Background questionnaires for students, teachers, and schools;
- ◆ School coordinator, test administrator, and national quality control monitor manuals;
- ◆ Scoring guides for constructed-response items, where necessary.

The TIMSS & PIRLS International Study Center provided each country with the electronic files necessary to facilitate the translation of the blocks and the subsequent creation of the booklets. There were 8 test booklets for the TIMSS Advanced 2008 data collection: 4 for the advanced mathematics assessment, and 4 for the physics assessment. The booklets comprised blocks of items that were assigned in a systematic fashion. To create the booklets, each item block and an introduction for each subject were translated and then these “components” of the booklets were later distributed throughout the booklets.

Three types of background questionnaires were prepared and administered as part of the TIMSS Advanced 2008 data collection: a school questionnaire, two teacher questionnaires (one for advanced mathematics, and one for physics), and two student questionnaires (one for students assessed in advanced mathematics, and one for students assessed in physics). Each student questionnaire contained a general block and one of the subject-specific blocks (advanced mathematics or physics). For the student questionnaire, the general block was translated once and later included in both student questionnaires.

3.3 Number of Languages Used for Translation

In total, the TIMSS Advanced 2008 data collection instruments were translated into 11 languages. Two countries (Lebanon and Norway) prepared the test materials in two languages, and two countries collected data in English. Participants who tested in English were also expected to go through the verification of their national adaptations and the layout of the instruments. Exhibit 3.1 shows the languages used by each participant for the various instruments.

Exhibit 3.1 Participants and Languages in TIMSS Advanced 2008

Country	Language
Armenia	Armenian
Iran, Islamic Rep. of	Farsi
Italy	Italian
Lebanon	English French
Netherlands	Dutch
Norway	Bokmål Nynorsk
Philippines	English
Russian Federation	Russian
Slovenia	Slovenian
Sweden	Swedish

3.4 Translators and Reviewers

Participating countries were strongly advised to hire an experienced translator who was qualified to translate the TIMSS Advanced 2008 items and questionnaires, and a reviewer to review the translations. It was important for the translator to have had experience translating texts in mathematics and physics, preferably at the level of the target grade; and it was desirable for the translator to be familiar with test development.

Guidelines suggested that both the translator and the reviewer of the TIMSS Advanced instruments should have:

- ◆ an excellent knowledge of English;
- ◆ an excellent knowledge of the target language;
- ◆ experience in the national cultural context; and
- ◆ experience with students in the target grade.

The ideal translation reviewer would be a teacher teaching students in final year of secondary school in the country with the qualities listed above, and an understanding of the subject matter.

Countries could employ more than one translator and/or reviewer (per subject). In some cases it was not possible to engage translators and reviewers with the required language skills and subject matter knowledge in both advanced mathematics and physics. Another reason for dividing the work of translators was that subject matter experts were not needed for the questionnaire materials. In such cases, National Research Coordinators were reminded to ensure the consistency of the translations within and across instruments. Countries preparing translations in more than one language were encouraged to involve professionals familiar with the various languages in order to make sure that the translations were equivalent across languages.

3.5 Translation and Adaptation Guidelines

To ensure that appropriate translations and adaptations were made when the TIMSS Advanced instruments were produced, the TIMSS & PIRLS International Study Center provided basic guidelines for the translating and adapting process. These guidelines are summarized in the list below.

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

3.5.1 Adaptations to Test Items

In order to ensure international equivalence of the achievement items across countries, NRCs were instructed to minimize adaptations to them. Unfamiliar vocabulary and expressions could and should be adapted to ensure that the terminology was equally familiar to students in all countries, so long as this did not change the meaning or the difficulty level of the item. The major concern was to convey the same meaning and style as the text of the international version. Guidelines for specific terms, including units of measurement, were listed in the *Survey Operations Procedures Unit 3*.

3.5.2 Adaptations to Questionnaires

Guidelines for adapting terminology in the questionnaires were similar to that for the achievement items; however, unlike the achievement items, there were places in the questionnaires where adaptations were required. These places were marked with carets (< >), indicating information that must be replaced with the country-appropriate term. For example, <country> would be replaced with the country name and <language of test> would be replaced with the language of the test in that country. The NRC received adaptation notes for the questionnaires.

3.6 Documenting National Adaptations

All deviations from the international versions of the advanced mathematics and physics assessment booklets or questionnaires were documented on National Adaptations Forms (NAFs). The National Adaptations Forms consisted of a set of 8 forms: the first 6 were for the background questionnaires, the seventh was for the achievement items, and the last one consisted of general adaptations that applied to all instruments. The forms were supplied as one electronic document to be treated as a set, and each version was submitted as a single document upon completion. The forms listed any changes made and, in the rare cases of not-administered questions, the rationale behind these decisions. These forms were updated after each stage of the verification process. 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 translation verification. After translation verification, NRCs updated the forms (Version II) to reflect any changes resulting from the verification process and sent them along with the national instruments for TIMSS & PIRLS International Study Center review. After finalizing the national instruments, NRCs uploaded the forms

again (Version III) for data-collection processing at the IEA Data Processing and Research Center (DPC) and as a final documentation of their national adaptations. The NAFs were completed in English only, so that the staff reviewing them at different stages could review the changes and ensure that they were acceptable and did not affect the international comparability of the instruments.

3.7 International Translation Verification

Each translation went through a rigorous verification process that included internal verification of the translations at the national centers, independent verification of the translations at the national centers, independent verification by an international translation company, and a check by international QCMs 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 QCMs and the review process used by TIMSS & PIRLS International Study Center staff, please refer to Chapter 5.

Once the instruments had been translated and internally reviewed, the text of the booklet cover pages, introductions, assessment blocks (including trend items from 1995 where relevant), and questionnaires were submitted for international translation verification. This process was managed by the IEA Secretariat in Amsterdam, that enlisted Lionbridge, an independent translation company (based in Brussels, Belgium), to verify translations for each of the countries. Of the 10 participants in TIMSS Advanced 2008, all except Lebanon and Philippines (and Norway for Nynorsk language) participated in and submitted materials for verification for the field test. All participants submitted instruments for verification before the main data collection;

however, in the Philippines the results of the verification were not used to make final changes to the assessment materials;¹ and, in Lebanon the verification was done only for the French version, and without National Adaptations Forms.

3.7.1 Verification of Translations at National Centers after the Field Test

International translation verification procedures for the field test were equally as rigorous as for the main data collection. The results of item analyses from the TIMSS Advanced 2008 field test, conducted during February and March of 2007, were reviewed by each country. Since unusual item statistics could be an indication of errors in translation, each NRC was asked to check the results to identify items that might have been mis-translated. If needed, they corrected the translation for the final TIMSS Advanced 2008 test instruments.

3.7.2 International Translation Verifiers

The international translation verifiers for TIMSS Advanced 2008 were required to be educated at university level: preferably to have postgraduate qualifications in mathematics or science; to have the target language as their first language; to have formal credentials as translators working in English; and, if possible, to live and work in the country for which the verification was being carried out (or in close contact with this country). Experience translating technical texts was preferred.

Verifiers 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 the international version. Wherever possible, verifiers were asked to make their comments and changes directly on the PDF documents.

¹ The Philippines NRC and the international translation verifier for the Philippines reported that there were no changes made to the international achievement items in the national version of the instruments

3.7.3 Process of Translation Verification

National Research Coordinators were instructed to send PDF files of the following documents to the IEA Secretariat for translation verification:

- ◆ 7 blocks of advanced mathematics achievement items;
- ◆ 7 blocks of physics achievement items;
- ◆ 1 set of advanced mathematics booklet covers;
- ◆ 1 set of physics booklet covers;
- ◆ the calculator use survey;
- ◆ the advanced mathematics booklet introduction;
- ◆ the physics booklet introduction;
- ◆ the school questionnaire;
- ◆ the advanced mathematics teacher questionnaire;
- ◆ the physics teacher questionnaire;
- ◆ the general, advanced mathematics, and physics item blocks of the student questionnaires;
- ◆ covers for the student questionnaires; and
a Microsoft®-Word document of:
- ◆ the completed National Adaptations Forms.

Verifiers received these materials together with the international English versions of instruments and the *Guidelines for Translation Verification of the TIMSS Advanced 2008 Instruments*. For the 5 countries (Italy, Norway, Russia, Slovenia, and Sweden) that also participated in the TIMSS 1995 study at this level, verifiers were responsible for ensuring that the 2008 national versions of the trend items were identical to those administered in 1995. Accordingly,

verifiers reviewing instruments for the trend countries also received the translated trend items used in that country in 1995. Verifiers of trend items were instructed to check that the 1995 and 2008 items matched exactly, and to detail the nature of any change identified.

Verifiers were given the option of registering their comments directly on the submitted PDF documents of the translation (using the eXPert PDF 4 Professional application), or in a specially created report (using Microsoft® Word) especially for languages written right-to-left. The instruments were returned to the NRC of each country with the verifier's suggestions (Translation Verification Report). The NRCs were responsible for reviewing the translation verifier's suggestions and revising the instruments. NRCs also had the opportunity to comment on any aspect of translation verification, on the Translation Verification Summary report.

Verifiers were instructed to compare the translated version of each document with the international version—sentence by sentence, rather than word by word—ensuring that all the information in the international version was also in the translated version, and that the latter was fluent. If the translated text differed in any way from the international version, verifiers documented the deviations. Where, in the judgment of the verifier, the translated version of an achievement or questionnaire item deviated from the international version, the translation verifier indicated the severity of the deviation (using a severity code as defined below), a description of the change, and a suggested alternative translation.

Instructions to verifiers included a list of “severity codes,” which were used to help identify the nature and severity of any deviation. The severity codes ranged from 1 (serious error) to 4 (acceptable adaptation). The severity codes were defined as follows:

1. **Major Change or Error:** Examples include incorrect order of response options in a multiple-choice item; omission of an item or a graphic; incorrect order of item or question; incorrect translation resulting in the answer being suggested by the item; and an incorrect translation which changes the meaning or difficulty of the item or question.
2. **Minor Change or Error:** Examples include spelling errors that do not affect comprehension or purely linguistic errors that do not affect content or equivalence.
3. **Suggestion for Alternative:** The translation may be adequate, but the verifier has suggested a different wording.
4. **Acceptable Change:** (also known as “appropriate but undocumented adaptation”) the change was acceptable and appropriate.

3.7.4 Translation Verification Summary

Following translation verification, National Research Coordinators were asked to document all the verifier comments marked with a code 1 (or 1?)² and indicate

- ◆ whether they adopted the suggestion or not during the revision process; and
- ◆ why they disagreed with the verifier (in cases where suggestions were not adopted in full).

This summary report served two purposes: first, it alerted NRCs to pay special attention to any verifier comments or interventions marked with “code 1,” thus providing an extra check of the more significant suggestions; second, it provided a structured format for NRCs to deliver feedback to verifiers. This feedback was particularly useful

2 When in doubt, verifiers were asked to use code 1 with a question mark (1?)

following the field trial, and feedback was delivered to the verifier who was working on the instruments for the main data collection.

The Translation Verification Summary forms were forwarded to the TIMSS & PIRLS International Study Center, where they were reviewed for any misunderstandings or mistranslations. Furthermore, the forms could be reviewed following data collection and analysis, if any item characteristics suggested an error. NRCs were not obliged to implement suggestions from the verifier; however, they did take responsibility for any errors or mistranslations in the instruments. For the field trial, all participants returned completed Translation Verification Summary forms (or indicated that there were no code 1 errors, or that they had accepted all code 1 interventions). For the data collection consisting of the field tested and trend items, only 5 of 10 participants returned the completed forms.

3.8 Summary

The rigorous procedures for translation, national adaptations, translation verification, and review of the instruments implemented for TIMSS Advanced 2008 provided for comparable translations of the instruments across participating countries. The verification process—consisting of internal review, external translation verification by bilingual judges, review by the TIMSS & PIRLS International Study Center, careful item analysis of the data from the field test and the assessment, and checking by the international QCMs—proved to be a comprehensive program for translation verification, helping to ensure the validity of the data analyzed and reported for TIMSS Advanced 2008.

References

IEA Secretariat. (2007). *Guidelines for Translation Verification of the TIMSS Advanced 2008 Instruments*. Amsterdam: IEA

TIMSS & PIRLS International Study Center. (2007). *TIMSS Advanced 2008 survey operations procedure unit 3: Preparing materials for the TIMSS Advanced 2008 data collection and administering the assessment*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.



