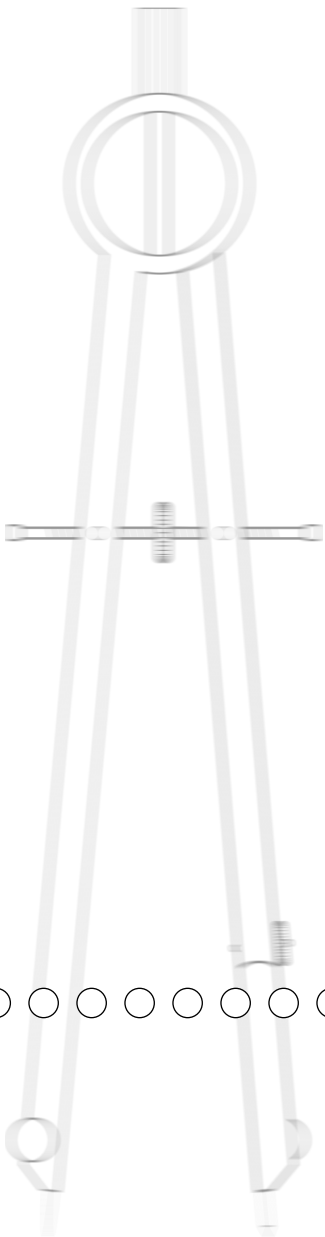
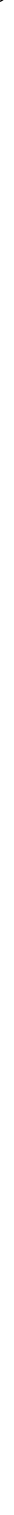
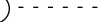




Translation and Cultural Adaptation of the TIMSS Instruments

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4.1 Overview

The TIMSS 1999 data-collection instruments (achievement tests and background questionnaires) were prepared in English and translated into 33 languages. Ten of the thirty-eight participating countries collected data in two languages. The most common languages of testing were English (nine countries) and Arabic (four countries). Even though the United States and the Benchmarking participants collected data in English, it was nonetheless necessary to make minor cultural adaptations to reflect U.S. language usage. This chapter describes the extensive procedures for translating and adapting the TIMSS instruments.

Countries that administered the instruments in English followed the same procedures for cultural adaptation and verification as countries that translated them into a different target language. For the TIMSS 1999 main survey, each country had to translate and adapt the following instruments:

- Eight booklets of mathematics and science achievement items (Test Booklets 1-8)
- One Student Questionnaire
- One Mathematics Teacher Questionnaire
- One Science Teacher Questionnaire
- One School Questionnaire

The translation and adaptation process was designed to ensure standard instruments across countries. national research coordinators (NRCs) received guidelines for translating the testing instruments into their national languages and cultural context (TIMSS, 1998a). Upon completion, the translated instruments were checked by an international translation company against the TIMSS 1999 international version to assess the faithfulness of

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1. This chapter was based on O'Connor & Malak (2000) from the international technical report for TIMSS 1999.

translation. The NRCs then received suggestions from the translation company and the International Study Center for additional revisions. After these had been made, the final version was checked by the International Study Center at Boston College.

4.2 Translation and Adaptation of Instruments

The TIMSS 1999 survey translation guidelines called for two independent translations of each test instrument from English into the target language. A translation review team then compared the two to arrive at a final version. Any deviation from the international version of the instrument and all cultural adaptations made were reported on a Translation Deviation Form (see O'Connor & Malak, 2000 for further details of the international translation process).

Each NRC identified the language or languages to be used in testing and the geographical or political areas involved. Most countries tested in just one language, but nine tested in two languages. The testing languages used in the participating countries are presented in Exhibit 4.1.

The United States administered the assessment in English. As mentioned previously, the U.S. (English) versions of the instruments were used in the Benchmarking study.

Exhibit 4.1 Language of Testing in Each Country

Country	Language(s) of Test	Country	Language(s) of Test
Australia	English	Latvia	Latvian
Belgium (Flemish)	Flemish	Lithuania	Lithuanian
Bulgaria	Bulgarian	Macedonia, Rep. of	Macedonian and Albanian
Canada	English and French	Malaysia	Malay
Chile	Spanish	Moldova	Moldavian and Russian
Chinese Taipei	Chinese	Morocco	Arabic
Cyprus	Greek	Netherlands	Dutch
Czech Republic	Czech	New Zealand	English
England	English	Philippines	English and Filipino
Finland	Finnish and Swedish	Romania	Romanian
Hong Kong, SAR	Chinese and English	Russian Federation	Russian
Hungary	Hungarian	Singapore	English
Indonesia	Indonesian	Slovak Republic	Slovak
Iran, Islamic Rep.	Farsi	Slovenia	Slovenian
Israel	Hebrew and Arabic	South Africa	English and Afrikaans
Italy	Italian and German*	Thailand	Thai
Japan	Japanese	Tunisia	Arabic and French**
Jordan	Arabic	Turkey	Turkish
Korea, Republic of	Korean	United States	English

* Italy did not have the German version of the items and the Student Questionnaire verified. Less than 1% of the population took the assessment and Student Questionnaire in German.

** Tunisia translated only the Teacher Questionnaires into French.

4.2.1 Guidelines for Translation and Cultural Adaptation of Instruments

Translators were given guidelines to follow in translating the instruments and adapting them to their national cultural context. The guidelines were designed to yield translations that were as close as possible to the international versions in style and meaning, while allowing for cultural adaptations where necessary. Even countries that tested in English, such as Australia, Canada, England, New Zealand, the Philippines, Singapore, South Africa, and the United States, found it necessary to adapt to national usage with regard to spelling and usage. Translators were cautioned not to change the meaning or the difficulty level of an item.

The translators' tasks included:

- Identifying and minimizing cultural differences
- Finding equivalent words and phrases
- Ensuring that the reading level was the same in the target language as in the international version (English)
- Ensuring that the essential meaning of the text did not change
- Ensuring that the difficulty level of achievement items did not change
- Ensuring that there was no other possible correct answer to an adapted item
- Being aware of possible changes in the instrument layout due to translation

Translators were permitted to adapt the text as necessary to make unfamiliar contextual terms culturally appropriate. Thus they could change the names of seasons, people, places, animals, plants, currencies, and the like. Exhibit 4.2 shows a list provided to translators detailing the types of adaptations that were acceptable.

Exhibit 4.2 Types of Acceptable Cultural Adaptations

Type of Change	Specific Change from	Specific Change to
Punctuation/Notation	decimal point	decimal comma
	place value comma	space
Units	centimeters	inches
	liters	quarts
	ml	mL
Proper nouns	Ottawa	Oslo
	Mary	Maria
Common nouns	robin	kiwi
	elevator	lift
Spelling	center	centre
Verbs (not related to content)	skiing	sailing
Usage	Bunsen burner	hot plate

4.2.2 Adaptation of the U.S Instruments

The review of the US instruments for cultural adaptation was led by Westat with the work conducted by Educational Testing Services (ETS) under subcontract. No translation was necessary as the international versions of the instruments were in American English, thus the purpose of the review was to identify changes necessary due to cultural context. Westat suggested a number of changes that were to be made in the U.S. versions.

These included adding commas in numbers to denote thousands, millions, etc.; spelling out units of measurement; and changing unit terms from the International System of Units (metric units) to U.S. inch-pound units when the measure was not integral to the task.

International procedures required that the International Study Center be notified, and a corresponding statement included in the NRC Survey Activities Report, of any items that proved to be problematic for translators. To identify problematic items, Westat contracted with Educational Testing Service to conduct a sensitivity and fairness review. Reviewers indicated that no items were found to be problematic and that the items were of excellent quality.

4.2.3 Recording Deviations from the International Version

After a single translation had been agreed upon, the Translation Deviation Form was used to record all changes in test and questionnaire items. Translators were asked to document all changes in vocabulary and content not authorized in the translation guidelines. The description of each deviation included the English term, the translated term, and an explanation of why that term was selected. Translators also noted any other changes in or problems with the translation. This record was used in translation verification and during the item analysis and review.

4.3 Verification of Instruments

Each country's translated documents went through a rigorous process that included verification of the item translations at the national centers, verification by an international translation company, a review by the International Study Center, and a check by quality control monitors.

4.3.1 Verification of Translations at National Centers

The results of item analyses from the field test were reviewed by each country. Since unusual results for an item could indicate errors in translation, NRCs were asked to check for items that might have been mistranslated. NRCs were also notified of any potentially problematic items and asked to verify that the translation was sound.

4.3.2 External Verification

Once the final translated version of each instrument was agreed upon, it was externally verified. NRCs were required to send (no later than six weeks before printing) the following material to the IEA Secretariat in preparation for external translation verification:

- A copy of the test item clusters (A through Z) and the accompanying instructions for students
- A set of test booklets (1 through 8)
- A copy of the School Questionnaire, Student Questionnaire, and Teacher Questionnaires

All 38 countries that participated in the TIMSS 1999 main survey submitted their national versions of instruments for external verification.

4.3.3 International Verification

The IEA Secretariat, which organized and managed the translation verification process, enlisted Berlitz, an international translating company with a reputation for excellence, to check the quality of the translations. Berlitz staff were to document all errors and omissions, and to make suggestions for improvements so that NRCs could review and revise their instruments.

Verifiers received general information about the study and instrument design. They also received materials describing the translation procedures used by the national centers along with detailed instructions for reviewing the instruments (TIMSS, 1998b). Each verifier received a package consisting of:

- The international version of each survey instrument
- A set of translated instruments to be verified
- A copy of the instructions given to the translators in their country
- Instructions for verifying the layout of the survey instruments
- Instructions for verifying the content of the survey instruments

- Instructions for verifying the instructions to students
- Translation Verification Control Forms to be completed for each instrument
- Translation Verification Report Forms

The main task of the translation verifier was to evaluate the accuracy of the translation and the comparability of layout of the survey instruments. The verification guidelines emphasized the importance of maintaining the meaning, difficulty level, and format of each item while allowing for cultural adaptations as necessary.

For the United States and other TIMSS 1999 countries that also participated in 1995, verifiers were responsible for ensuring that the translated version of the trend items was identical to that administered in 1995. Accordingly, verifiers reviewing instruments for trend countries also received the following:

- A set of trend item clusters A through H (1995 version used in that country)
- A Trend Item Verification Form

4.3.4 Translation Verification Reports

The translation verifier prepared two types of reports. The first was a Translation Verification Control Form for each instrument. Its cover sheet served as a summary and indicated whether or not deviations were found. If the translated version was judged to be equivalent to the international version, no further entry needed to be made in the form. Second, for each translated version of an item that differed in any way from the international version, an entry was made in the Translation Verification Report Form giving:

- The location of the deviation (item number)
- The severity of the deviation (using the severity code below)
- A description of the change
- A suggested alternative translation

These records were used to document the quality of the translations and the comparability of the testing materials across countries. The *severity codes* ranged from 1 (serious error) to 4 (acceptable adaptation)² as described below:

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2. When in doubt as to the severity of the deviation, verifiers used code 1.

Code 1 - Major Change or Error: Examples include incorrect ordering of choices in a multiple-choice item; omission of a graph; omission of an item; incorrect translation of text such that the answer is indicated by the question; incorrect translation that changes the meaning or difficulty of the question; incorrect ordering of the items or placement of the graphics.

Code 2 - Minor Change or Error: Examples include spelling errors that do not affect comprehension; misalignment of margins or tabs; incorrect font or font size; discrepancies in the headers or footers of the document.

Code 3 - Suggestions for Alternative: The translation may be adequate, but the verifier suggests a different wording.

Code 4 - Acceptable Changes: The verifier identifies changes that are acceptable and appropriate, for example, a reference to winter that is changed from January to July for the Southern Hemisphere.

The layout of the documents was also reviewed during verification for any changes or deviations. Exhibit 4.3 details the layout issues to be considered and checked for each survey instrument.

Exhibit 4.3 Layout Issues Considered in Verification

Layout Issues	Verification Details
Instructions	Test items should not have been visible when the test booklet was opened to the Instructions
Items	All items should have been included in the same order and location as in the international version
Response options	Response options should have appeared in the same order as in the international version
Graphics	All graphics should have been in the same order and modifications should have been limited to necessary translation of text or labels
Font	Font and font size should have been consistent with the international version
Word emphasis	Word emphasis should have remained the same as in the international version; if the form of emphasis was not appropriate for the given language, an acceptable alternate form should have been used (e.g., italics instead of capital letters)
Shading	Items with shading should have been clear and text legible
Page and item identification	Headers and footers that include booklet and page identification as well as item identification should have been present
Pagination	Page breaks should have corresponded with the international version of the instruments

For any deviation from the original international version, an entry was made in the Translation Verification Report Form indicating location and severity and describing the change. If necessary and appropriate, a suggestion for improving the layout was included. In the case of TIMSS 1995 participants, any differences between the 1995 and 1999 versions of test items were entered in the Trend Item Verification Form, and the nature of the change was described.

The completed Translation Verification Forms were sent to NRCs and to the International Study Center at Boston College. In the United States, Westat was responsible for reviewing the report forms and reevaluating the instruments based on the translation verifiers' suggestions. Necessary changes were sent by Westat to a subcontractor, National Computer Systems, who produced the assessment materials.

4.3.5 International Study Center Item Review

As a final review, when the suggestions of the verifiers had been acted upon, a print-ready copy of the achievement test booklets and questionnaires was submitted to the International Study Center at Boston College. This was reviewed by the International Study Center primarily to identify issues such as misplaced graphics, improper format, and inconsistent text.

For all countries, items were compared with the international version to identify any changes in text, graphics, and format. For languages in which the reviewers were not fluent, items were reviewed for format and similarity of words used in the stem and options.

For trend countries like the U.S., each item in Clusters A-H was compared with the 1995 translated version to note whether it had been changed. When the reviewer was not familiar with the language of these items, the NRC was asked about any apparent changes.

NRCs were given a list of any deviations identified by the International Study Center that went beyond those recorded in the Translation Deviation and Verification Forms. Deviations that were not corrected before the final printing of the test booklets were noted in the database and used when reviewing the item data after the data collection.

4.3.6 Quality Control Monitor Item Review

As part of an ambitious quality control program, Quality Control Monitors (QCMs) were hired to document the quality of the TIMSS 1999 assessment in each country (see chapter 9 for a description of their work). An important task for the QCMs was to review the translation of the test items. QCMs examined the Translation Verification Reports for each test language, verified whether the suggested changes were made in the final document, and noted these changes on a copy of the Translation Verification Report.

4.4 Summary

The rigorous procedures for translation, cultural adaptations, translation verification, and review of the instruments put in place for TIMSS 1999 resulted in comparable translations across participating countries. Verification by internal statistical review, external translation verification by bilingual judges, and review by the International Study Center and QCMs proved to be a comprehensive way to check and document deviations and review anomalies, ensuring accuracy in the analysis and reporting of the main survey data.

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