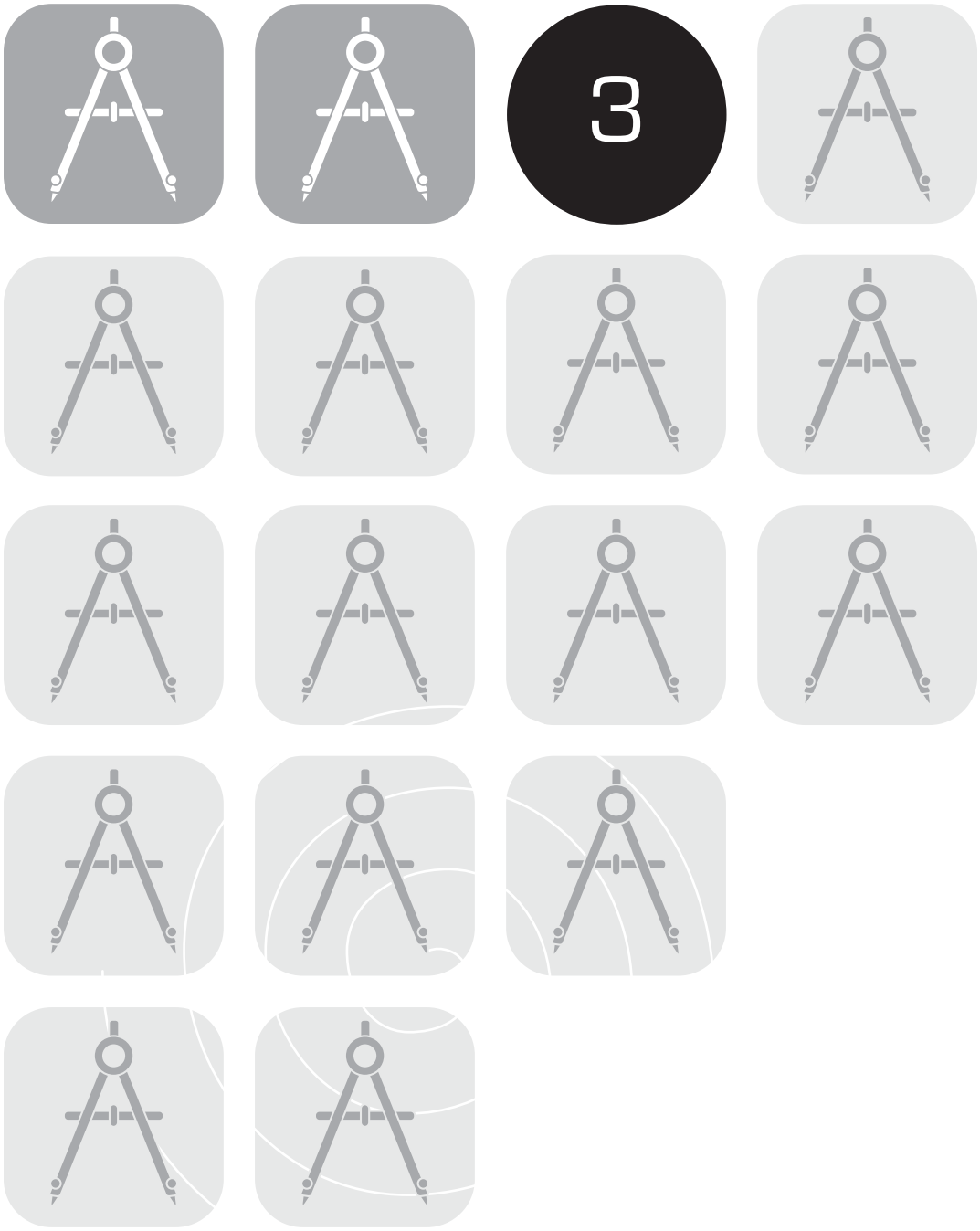

TIMSS Questionnaire Development

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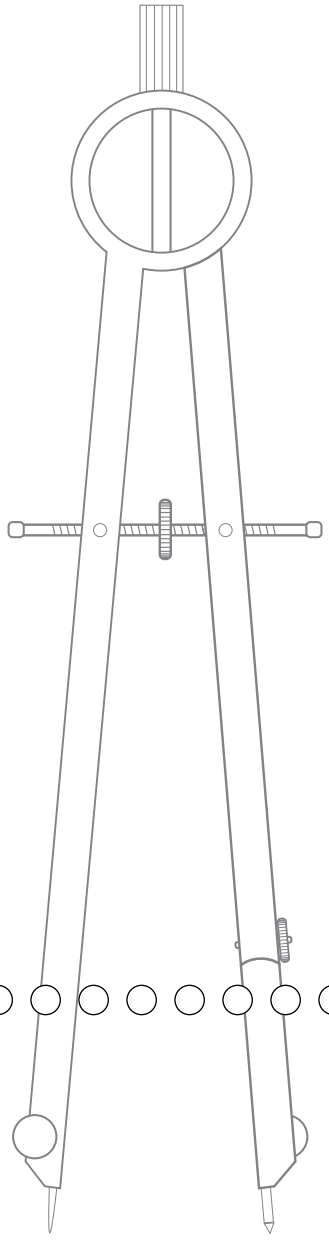

3 TIMSS Questionnaire Development[1]

Ina V.S. Mullis
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Steven E. Stemler

3.1 Overview

Just as the TIMSS Benchmarking study used the U.S. versions of the TIMSS 1999 mathematics and science tests to measure achievement, it also used the U.S. versions of the TIMSS questionnaires to gather information about the educational context in each participating jurisdiction. This chapter describes the design and development of the TIMSS questionnaires, and summarizes the content of each one.

TIMSS 1999 was designed to measure trends in student achievement over time by building on the data collected from the Third International Mathematics and Science Study of 1995. Consequently, it was important to have not only measures of student achievement that linked the two assessments, but also background questionnaires that had much in common. Four background questionnaires were used to gather information at various levels of the educational system: curriculum questionnaires addressed issues of curriculum design and emphasis in mathematics and science; a School Questionnaire asked school principals about school staffing and facilities, as well as curricular and instructional arrangements; Teacher Questionnaires asked mathematics and science teachers about their backgrounds, attitudes, and teaching activities and approaches; and a questionnaire for students sought information about their home backgrounds and attitudes, and their experiences in mathematics and science classes.

The approach to developing the international versions of the questionnaires adopted for TIMSS 1999 was to retain the parts of the 1995 questionnaires that were found to be most valuable in analysis and reporting and to concentrate development efforts on areas needing expansion or refinement. Each of the questionnaires went through an exhaustive review process prior to

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1. This chapter was based on Mullis, Martin, & Stemler (2000) from the international technical report for TIMSS 1999.

the field test, and was reviewed again in light of the field-test data. Items retained for the final versions of the questionnaires were those judged to yield the most information with the least burden to respondents.

Each country was permitted to include additional questions to the international version of the questionnaires. These additions were categorized as: international or national options. International options are questions provided by the International Study Center as having been found to be of interest in many countries but not required. National options, developed and included in the questionnaire at the individual country level, allowed participants the flexibility of collecting other useful data that pertained to their nation or education system.

Benchmarking participants used the same Student, Teacher, and School Questionnaires as those administered to the U.S. national sample. The Curriculum Questionnaire, however, was adapted to gather more specific information relevant to Benchmarking jurisdictions.

This chapter begins with an overview of the conceptual framework and research questions that guided the development of the questionnaires; it goes on to present the main issues addressed by each questionnaire as well as questions included as international options, U.S. national options, and international questions adapted for Benchmarking participants.

3.2 Conceptual Framework

The conceptual framework for TIMSS was greatly influenced by IEA's Second International Mathematics Study (SIMS), which focused on the curriculum as a major explanatory factor for international variation in student achievement. In the SIMS model, the curriculum was viewed as having three aspects: the *intended* curriculum, the *implemented* curriculum, and the *attained* curriculum.

- The **intended curriculum** refers to the curricular goals of the education system and the structures established to achieve them.
- The **implemented curriculum** refers to the practices, activities, and institutional arrangements within the school and classroom that are designed to implement the goals of the system.
- The **attained curriculum** refers to the products of schooling – what students actually gained from their education.

Building on this view of the educational process, TIMSS in 1995 sought to assess, through context questionnaires, the factors likely to influence students' learning of mathematics and the sciences at the national (or regional), school, classroom, and student level (Schmidt and Cogan, 1996).

3.3 Research Questions

Consistent with TIMSS 1995, TIMSS 1999 posed four general research questions to guide the development of the tests and questionnaires and to provide a focus for the analysis and reporting of results: What kinds of mathematics and science are students expected to learn? Who provides the instruction? How is instruction organized? What have students learned?

What students know and are expected to learn was addressed by questionnaires distributed to mathematics and science curriculum experts in participating countries. The characteristics and preparation of mathematics and science teachers were addressed by questionnaires distributed to school principals and teachers. The third question, on instructional approaches to the teaching of mathematics and science, was also addressed by questionnaires to principals and teachers, as well as to students. The fourth question, what students had learned, was examined by measuring performance on the TIMSS 1999 achievement tests.

The research questions cast a broad net for exploring factors potentially associated with achievement in mathematics and science. For example, in attempting to answer the question "Who provides the instruction?" the questionnaires tapped characteristics of the instructor, such as gender, age, years of experience, attitude toward the subject, and time spent preparing lessons. The national options also allowed the U.S. and Benchmarking jurisdictions to gain additional information on teachers' professional development activities. The background questionnaires enable researchers to investigate the most influential characteristics of the people, practices, and policies affecting student achievement.

3.4 Curriculum Questionnaires

The TIMSS 1999 study included Curriculum Questionnaires that were not available for the 1995 survey. These were designed to collect basic information about the organization of the mathematics and science curriculum in each country and Benchmarking jurisdiction, and about the topics intended to be covered up to the eighth grade. Coordinators in each country and jurisdiction were

asked to complete separate questionnaires about the mathematics and the science curriculum, drawing on the expertise of mathematics and science specialists in their country or jurisdiction as necessary.

The international Curriculum Questionnaires had two parts. The first part sought information about the organization and structure of the curriculum. The second part asked whether a wide range of detailed topics in mathematics and science were in the intended curriculum. In addition, the questionnaires asked what percentage of the eighth-grade student body was exposed to each of the topics in the intended curriculum.

A shortened version of these questionnaires was completed by Benchmarking coordinators in each jurisdiction, supplemented with follow-up surveys and interviews designed to put the international questions in the context of the states and districts. For example, while countries were asked to provide information on their national curriculum, states were asked to report on their content standards and curriculum frameworks, and districts and consortia were asked to report on the level at which curriculum is developed. These follow-up surveys and interviews focused on the issues that coordinators from the Benchmarking jurisdictions found to be interesting for international comparisons.

The interviews with national research coordinators (NRCs) and Benchmarking coordinators resolved ambiguities and assisted in developing a clear understanding of each entity's curriculum. Important research questions addressed by the questionnaires were:

- Is there a country-, state-, district-level curriculum or curriculum framework? If so, how is implementation monitored?
- What is the nature of system-wide assessments, if there are any?
- What content is emphasized in the curriculum or curriculum framework?

The contents of the national Mathematics and Science Curriculum Questionnaires are described further in Exhibits 3.1 and 3.2. Additional questions addressed in the Benchmarking curriculum surveys and interviews are described in Exhibit 3.3.

3.5 School Questionnaire

The School Questionnaire was completed by the school principal and was designed to elicit information concerning some of the major factors thought to influence student achievement. Several important research questions addressed by the School Questionnaire were:

- What staffing and resources are available at each school?
- What are the roles and responsibilities of the teachers and staff?
- How is the mathematics curriculum organized?
- How is the science curriculum organized?
- What is the school climate?

In addition to questions asked internationally, the U.S. and Benchmarking School Questionnaire gathered information on the percentage of students at each school eligible to receive free or reduced-price lunches, to be used as an indicator of socio-economic status.

3.5.1 Changes from the 1995 Questionnaire

For the most part, the TIMSS 1999 international School Questionnaire was very similar to the 1995 version. Four questions about scheduled time for teachers were removed, since they seemed more appropriate to the Teacher Questionnaires. Questions on computer availability were revised and extended to include access to the Internet for instructional or educational purposes. Finally, questions dealing with provisions for students of different abilities were extensively revised, since responses to the original questions were not as informative as expected.

The complete contents of the School Questionnaire are described further in Exhibit 3.4.

3.6 Teacher Questionnaires

Typically, a single mathematics class in each participating school was sampled for the TIMSS 1999 testing. The mathematics teacher of that class was asked to complete a questionnaire that sought information on the teacher's background, beliefs, attitudes, educational preparation, and teaching load, as well as details of the instructional approach used in teaching mathematics to the class. The science teacher (or teachers) of the students in that class was asked to complete another questionnaire, which in many respects paralleled that for the mathematics teachers. Although the general background questions were the same for the two versions, questions pertaining to instructional

practices, content coverage, classroom organization, teachers' perceptions about teaching, and their views of subject matter were geared toward mathematics or science. Many questions, such as those related to classroom characteristics, activities and homework practices were answered with respect to the specific mathematics and science classes of the sampled TIMSS students.

Like the School Questionnaire, the Teacher Questionnaires were carefully constructed to elicit information on variables thought to be associated with student achievement. Some of the important research questions addressed by the Teacher Questionnaires were:

- What are the characteristics of mathematics and science teachers?
- What are teachers' perceptions about mathematics and science?
- How do teachers spend their school-related time?
- How are mathematics and science classes organized?
- What activities do students do in their mathematics and science lessons?
- How are calculators and computers used?
- How much homework are students assigned?
- What assessment and evaluation procedures do teachers use?

The U.S. version of the questionnaire included a national-option section that elicited information on teachers' participation in specific professional development activities.

Changes from the 1995 Questionnaire

Several changes were made in the Mathematics and Science Teacher Questionnaires for the 1999 assessment. The originals were judged by most NRCs to be too lengthy, and some of the questions needed revision. The first section of the Teacher Questionnaires dealt with teacher background, experience, attitudes, and teaching load. The 1999 version omitted questions about grades taught, and added several questions on teacher education and preparation for teaching. The review of the descriptive statistics and the error diagnostics produced from the field test also revealed some problems associated with filter questions, which were resolved before the questionnaires for the main survey were administered.

The second section of the Teacher Questionnaires dealt with teaching mathematics or science to the class sampled for TIMSS 1999 testing. This section was shortened, mainly by omitting a set of questions on teaching activities in a recent lesson. A lengthy set of questions on the coverage of mathematics and science topics in class was also simplified and shortened considerably. Additions to the Teacher Questionnaires for 1999 included questions on subject matter emphasis in class, use of computers and the Internet in class, and teacher activities in class. Two further sections of the original questionnaires, dealing with opportunity to learn and pedagogical approach, were judged by NRCs to be too lengthy; these were omitted from the field-test versions, and consequently also from the TIMSS 1999 final questionnaires.

The complete contents of the Mathematics and Science Teacher Questionnaires are described further in Exhibit 3.5.

3.7 Student Questionnaire

Each student in the sampled class was asked to complete a Student Questionnaire, which sought information about the student's home background, attitudes and beliefs about mathematics and science, and experiences in mathematics and science class. As in TIMSS 1995, two versions of the questionnaire were used internationally:

- The **General Science Version** was intended for systems where science is taught as a single integrated subject
- The **Separate Science Subject Version** was intended for systems where science is taught as separate subjects (i.e., biology, chemistry, earth science, and physics)

Countries administered the version that was consistent with the way in which science instruction was organized at the target grade. U.S. and Benchmarking entities administered the general science version. Although the two versions differed with respect to the science questions, the general background and mathematics-related questions were identical across the two. In the general science version, science-related questions pertaining to students' attitudes and classroom activities were based on single questions asking about "science," to which students were to respond in terms of the "general or integrated science" course they were taking. In the separate science subject version, several

questions were asked about each science subject area, and students were to respond with respect to each science course they were taking. This structure accommodated the diverse systems that participated in TIMSS.

Consistent with the other questionnaires, the Student Questionnaires were designed to elicit information on some of the major factors thought to influence student achievement. Several important research questions were:

- What educational resources do students have in their homes?
- What are the academic expectations of students, their families, and their friends?
- How do students spend their out-of-school time during the school week?
- How do students perceive success in mathematics and science?
- What are students' attitudes toward mathematics and science?

Changes from the 1995 Questionnaire

Five questions from the TIMSS 1995 Student Questionnaire that were considered to be of lesser importance were moved from the body of the questionnaire to the "international option" section at the end. Questions added to the TIMSS 1999 Student Questionnaire dealt with the following topics:

- Student self-concept in mathematics and science
- Internet access and use for mathematics and science activities
- Instructional activities in mathematics and science class

Experience with the TIMSS 1995 video study helped frame the questions on activities in mathematics and science class. The complete contents of the Student Questionnaires are described further in Exhibit 3.6.

3.8 Summary

The U.S. versions of the background questionnaires were very similar to the international versions; however, the U.S. chose to develop and include an additional section in the Teacher Questionnaire related to professional development activities. In addition, the mathematics and science international Curriculum Questionnaires were adapted to apply in the context of states and districts.

The School, Teacher, and Student Questionnaires used in the TIMSS 1999 field test were modified versions of the 1995 questionnaires. The Curriculum Questionnaire, however, was a new addition to the study. Since TIMSS 1999 was intended to build on TIMSS 1995 in order to track trends in student achievement in mathematics and science, it was important to retain in the questionnaires the elements essential to reporting trends. Consequently, questions that were reported in the international reports were used in their original form, without modification. Not all items in the TIMSS 1995 questionnaires were used in the international reports, largely because of problems with the wording of the questions. Questions with identifiable difficulties were either revised to resolve the problem or eliminated. Occasionally new questions were introduced, either as replacements for eliminated items or to provide extra information in areas considered important to the study. In many cases, questions that were originally dichotomous were expanded to permit a range of responses. In general, every effort was made to shorten and streamline the questionnaires in order to reduce the burden on respondents.

Exhibit 3.1 Contents of the Mathematics Curriculum Questionnaire

Question Number	Item Content	Description
	PART I: Structure of the Curriculum	
1	National / Regional Curriculum	Identifies countries with a national vs. regional curriculum in mathematics, year the curriculum was introduced, and whether revisions are under way.
2	Standards	Provides information on whether achievement standards are incorporated into the curriculum.
3	Supporting and Monitoring Curriculum Implementation	Identifies steps taken to support and monitor implementation of the national curriculum (e.g., teacher training, school inspections).
4	Examinations and Assessments	Provides information on which countries have public examinations and/or assessments in mathematics, whether they are sample-based, and the grades at which they are administered.
5	Specialist Teachers	Identifies the grade level at which mathematics is first taught by specialist mathematics teachers.
6	Instructional Time	Describes the amount of instructional time expected to be devoted to mathematics instruction at grades 4, 6, and 8 as dictated by the curriculum.
7	Organization of the Curriculum	Identifies the underlying organizational structure of the curriculum (e.g., by subject area).
8	Differentiation of Curriculum	Provides information on whether the curriculum is designed to deal with students of different ability levels (e.g., different curricula for different groups, same curriculum for all groups).
9	Curricular Emphasis	Identifies the extent to which the curriculum emphasizes each of several approaches / processes (e.g., mastering basic skills, solving non-routine problems).
10	Calculator Use	Identifies the policy on calculator use in grade 8 mathematics.
11	Computer Use	Identifies the policy on computer use in grade 8 mathematics.
	PART II: Emphasis on Mathematics Topics	
12a	Fractions and Number Sense (15 subtopics)	Identifies the percentage of students expected to have been taught specific Fractions and Number Sense topics (e.g., understanding and representing decimal fractions) up to and including grade 8.
12b	Measurement (9 subtopics)	Identifies the percentage of students expected to have been taught specific Measurement topics (e.g., converting units of measurement).
12c	Geometry (13 subtopics)	Identifies the percentage of students expected to have been taught specific Geometry topics (e.g., angles, Pythagorean theorem).
12d	Proportionality (3 subtopics)	Identifies the percentage of students expected to have been taught specific Proportionality topics (e.g., rate problems, ratios).
12e	Algebra (11 subtopics)	Identifies the percentage of students expected to have been taught specific Algebra topics (e.g., simple algebraic expressions, solving simultaneous equations with two variables).
12f	Data Representation, Analysis, and Probability (5 subtopics)	Identifies the percentage of students expected to have been taught specific Data Representation, Analysis, and Probability topics (e.g., graphing data, simple probabilities)

Exhibit 3.2 Contents of the Science Curriculum Questionnaire

Question Number	Item Content	Description
	PART I: Structure of the Curriculum	
1	National / Regional Curriculum	Identifies countries with a national vs. regional curriculum in science, year the curriculum was introduced, and whether revisions are under way.
2	Science Subjects Offered	Provides information on the science courses offered up to an including grade 8 (e.g., biology, chemistry, physics).
3	Standards	Provides information on whether achievement standards are incorporated into the curriculum.
4	Supporting and Monitoring Curriculum Implementation	Identifies the steps taken to support and monitor implementation of the national curriculum (e.g., teacher training, school inspections).
5	Examinations and Assessments	Provides information on which countries have public examinations and/or assessments in science, whether they are sample-based, and the grades at which they are administered.
6	Specialist Teachers	Identifies the grade level at which science is first taught by specialist science teachers.
7	Instructional Time	Describes the amount of instructional time expected to be devoted to science instruction at grades 4, 6, and 8 as dictated by the curriculum.
8	Organization of the Curriculum	Identifies the underlying organizational structure of the curriculum (e.g., by subject area).
9	Differentiation of Curriculum	Provides information on whether the curriculum is designed to deal with students of different ability levels (e.g., different curricula for different groups, same curriculum for all groups).
10	Curricular Emphasis	Identifies the extent to which the curriculum emphasizes each of several approaches / processes (e.g., knowing basic science facts, performing science experiments).
11	Computer Use	Identifies the policy on computer use in grade 8 science.
	PART II: Emphasis on Science Topics and Skills	
12a	Earth Science (4 subtopics)	Identifies the percentage of students expected to have been taught specific Earth Science topics (e.g., Earth's atmosphere, Earth in the solar system).
12b	Biology (7 subtopics)	Identifies the percentage of students expected to have been taught specific Biology topics (e.g., human bodily processes, biology of plant and animal life).
12c	Chemistry (12 subtopics)	Identifies the percentage of students expected to have been taught specific Chemistry topics (e.g., classification of matter, chemical reactivity and transformations).
12d	Physics (10 subtopics)	Identifies the percentage of students expected to have been taught specific Physics topics (e.g., physical properties and physical changes of matter, forces and motion).
12e	Environmental and Resource Issues (3 subtopics)	Identifies the percentage of students expected to have been taught specific Environmental and Resources Issues topics (e.g., pollution, conservation of natural resources).
12f	Nature of Science and Scientific Inquiry Skills (6 subtopics)	Identifies the percentage of students expected to have been taught specific Nature of Science and Scientific Inquiry Skills topics (e.g., scientific method, experimental design).

Exhibit 3.3 Contents of the Benchmarking Curriculum Survey and Interview

State-level Question	District-level Question	Item Content	Description
NA	1	Level of Curriculum Development	Indicates the administrative level at which the curriculum is developed - state, district, or school and whether it is based on state standards.
1	NA	Curriculum Frameworks/ Content Standards	Indicates the title, date and organization of the state curium framework or content standards
2	2	Status of Assessments	Indicates current status of development of new assessments.
3	2	Assessments	Indicates assessments administered including criterion-referenced assessments and norm-referenced assessments.
3	NA	Consequences of Assessments	Indicates whether the state requires students to pass an exam for graduation, as well as other consequences for the student, school, or district based on results (includes sanctions and rewards).
4	3	Textbook Selection	Indicates the policy for textbook selection.
5	4	Pedagogical Guide	Provides information on state (or local) pedagogical guides.
6	5	Accreditation	Indicates use of accreditation to support curriculum implementation.
7	6	Differentiation of Curriculum	Provides information on whether the curriculum is designed to deal with students of different ability levels (e.g., different curricula for different groups, same curriculum for all groups).
8	7	Science Subjects Offered	Provides information on the science courses offered up to an including grade 8 (e.g., biology, chemistry, physics).
9	8	Policy on Calculator Use	Identifies the policy on calculator usage as well and any policy changes that on calculator use that occur as the students progress through school
CQ	CQ	Curricular Emphasis	Identifies the extent to which the curriculum emphasizes each of several approaches / processes (e.g., knowing basic science facts, performing science experiments).

Exhibit 3.4 Contents of the School Questionnaire

International Question Number	U.S. Question Number	Item Content	Description
1	1	Community	Situates the school within a community of a specific type.
2-4	2-4	Staff	Describes the school's professional full and part-time staff and the percentage of teachers at the school for 5 or more years.
5	5	Years Students Stay with Teacher	Indicates the number of years students typically stay with the same teacher.
6	6	Collaboration Policy	Identifies the existence of a school policy promoting teacher cooperation and collaboration.
7	7	Principal's Time	Indicates the amount of time the school's lead administrator typically spends on particular roles and functions.
8	8	School Decisions	Identifies who has the responsibility for various decisions for the school.
9	9	Curriculum Decisions	Identifies the amount of influence various individuals and educational and community groups have on curriculum decisions.
10	10	Formal Goals Statement	Indicates the existence of school-level curriculum goals for mathematics and science.
11-12	11-12	Instructional Resources	Describes the material factors limiting the school's instructional activities.
13	13	Students in the school	Provides total school enrollment and attendance data.
	13 (e.)	Students in the school	Provides percentage of students receiving free or reduced-price lunches.
14	14	Students in the target grade	Provides target grade enrollment and attendance data, student's enrollment in mathematics and science courses, and typical class sizes.
15	15	Number of Computers	Provides the number of computers for use by students in the target grade, by teachers, and in total.
16	16	Internet Access	Identifies whether the school has Internet access as well as identifying whether the school actively posts any school information on the world wide web.
17	17	Student Behaviors	Describes the frequency with which schools encounter various unacceptable student behaviors.
18	18	Instructional Time	Indicates the amount of instructional time scheduled for the target grade, according to the school's academic calendar.
19	19	Instructional Periods	Indicates the existence and length of weekly instructional periods for the target grade.
20	20	Organization of Mathematics Instruction	Describes the school's provision for students with different ability levels in mathematics (e.g., setting/streaming, tracking, and remedial/enrichment programs).
21	21	Program Decision Factors in Mathematics	Indicates how important various factors are in assigning students to different educational programs or tracks in mathematics.
22	22	Organization of Science Instruction	Describes the school's provision for students with different ability levels in science (e.g., setting/streaming, tracking, and remedial/enrichment programs).
23	23	Program Decision Factors in Science	Indicates how important various factors are in assigning students to different educational programs or tracks in science.
24	24	Admissions	Describes the basis on which students are admitted to the school.
25	25	Parental Involvement	Describes the kinds of activities in which parents are expected to participate (e.g., serve as teacher's aides, fundraising).

Exhibit 3.5 Contents of the Teacher Questionnaires

Question Number	U.S. Number	Item Content	Description
Section A			
1-2	1-2	Age and Sex	Identifies teacher's sex and age range.
	2b	Race / Ethnicity	Identifies teacher's race/ethnicity
3	3	Teaching Experience	Describes the teacher's number of years of teaching experience.
4-5	4-5	Instructional Time	Identifies the number of hours per week the teacher devotes to teaching mathematics, science, and other subjects.
6	6	Administrative Tasks	Identifies the number of hours per week spent on administrative tasks such as student supervision and counseling.
7	7	Other Teaching-Related Activities	Describes the amount of time teachers are involved in various professional responsibilities *outside* the formally-scheduled school day.
8	8	Teaching Activities	Describes the total number of hours per week spent on teaching activities.
9	9	Meet with Other Teachers	Describes the frequency with which teachers collaborate and consult with their colleagues.
10	10	Teacher's Influence	Describes the amount of influence that teachers perceive they have on various instructional decisions.
11	11	Being Good at Mathematics / Science	Describes teacher's beliefs about what skills are necessary for students to be good at mathematics / science.
12	12	Ideas about Mathematics / Science	Describes teacher's beliefs about the nature of mathematics / science and how the subject should be taught.
13	13	Document Familiarity	Describes teacher's knowledge of curriculum guides, teaching guides, and examination prescriptions (country-specific options).
14	14	Mathematics / Science Topics Prepared to Teach	Provides an indication of teacher's perceptions of their own preparedness to teach the TIMSS 1999 in-depth topic areas in mathematics or science.
15-18	15-18	Formal Education and Teacher Training	Describes the highest level of formal education completed by the teacher, the number of years of teacher training completed, and the teacher's major area of study.
International Options			
19-20	NA	Career Choices	Identifies whether teaching was a first choice and if the teacher would change careers if given the opportunity.
21	NA	Social Appreciation	Describes whether teachers believe society appreciates their work.
22	NA	Student Appreciation	Describes whether teachers believe students appreciate their work.
23	NA	Books in Home	Provides an indicator of teacher's cultural capital.

Exhibit 3.5 Contents of the Teacher Questionnaires (continued)

Question Number	U.S. Number	Item Content	Description
Section B			
1	1	Target Class	Identifies the number of students in the TIMSS 1999 tested class, by gender.
2	2	Instructional Emphasis	Identifies the subject matter emphasized most in the target mathematics / science class.
3	3	Instructional Time	Identifies the number of minutes per week the class is taught.
4	4	Textbook Use	Identifies whether textbook is used in mathematics / science class as well as the approximate percentage of weekly instructional time that is based on the textbook.
5-7	5-7	Calculators	Describes the availability of calculators and how they are used in the target class.
8	8	Computers	Describes the availability of computers and whether they are used to access the internet.
9	9	Planning Lessons	Identifies the extent to which a teacher relies on various sources for planning lessons (e.g., curriculum guides, textbooks, exam specifications).
10	10	Tasks Students are Asked to Do	Describes the frequency with which teachers ask students various types of questions and ask students to perform various mathematics / science activities during lessons.
11	11	Student's Work Arrangements	Describes how often students work in various group arrangements.
12	12	Time Allocation	Describes the percentage of time spent on each of several activities associated with teaching (e.g., homework review, tests).
13	13	Mathematics / Science Topic Coverage	Indicates the extent of teacher's coverage in target class of mathematics / science topics included in the assessment.
14	14	Classroom Factors	Identifies the extent to which teachers perceive that various factors limit classroom instructional activities.
15-16	15-16	Amount of Homework Assigned	Describes the frequency and amount of homework assigned to the target class.
17-18	17-18	Type and Use of Homework	Describes the homework assignments and how the homework is used by the teacher.
19-20	19-20	Assessment	Describes the kind and use of various forms of student assessment in the target class.
Question Number	**U.S. Number**	**Item Content**	**Description**
U.S. National Option: Professional Development Activities			
NA	1-2	Classroom Observations	Indicates the number of class periods spent observing other teachers and being observed by other teachers.
NA	3	Participation in Professional Development Activities	Indicates hours spent on various types of professional development activities.
NA	4	Participation in Individual Activities	Indicates hours spent on various types of individual professional development activities.
NA	5	Focus of Activities	Indicates the extent to which professional development activities focused on certain topics (i.e. pedagogy, curriculum, assessment, leadership, etc.)
NA	6	Focus on Content Areas	Indicates whether the teacher participated in professional development activities related to specific mathematics topics or science content areas covered in the assessment.
NA	7-8 math only	Effect on Student Learning	Identifies the extent to which the teacher believes that student learning was improved as a result of his or her professional development.

Exhibit 3.6 Contents of the Student Questionnaires

Question Number		Item Content	Description
General Version (U.S.)	Separate Science Version		
1-4	1-4	Student Demographics	Provides basic demographic information such as age, sex, language of the home, whether born in country and if not how long he/she has lived in country. (U.S. version includes a question on race/ethnicity.)
5	5	Academic Activities Outside of School	Provides information on students' activities that can affect their academic achievement (e.g., extra lessons, science club).
6	6	Time Spent Outside of School	Provides information about the amount of time student spends on homework and leisure activities on a normal school day.
7	7	Parents' Education	Provides information about the educational level of the student's mother and father. Used as an indicator of the home environment and socioeconomic status.
8	8	Student's Future Educational Plans	Identifies the student's plans for further education.
9	9	Parents' Country of Birth	Provides information regarding immigrant status.
10	10	Books in the home	Provides information about the number of books in the home. Used as an indicator of the home environment and socioeconomic status.
11	11	Possessions in the home	Provides information about possessions found in the home (e.g., calculator, computer, dictionary, study desk, and country-specific items). Used as an indicator of academic support in the home environment as well as an indicator of socioeconomic status.
12	12	Mother's Values	Provides information about the student's perception of the degree of importance his/her mother places on academics and other activities. Used as an indicator of the home environment and general academic press.
13	13	Student's Behavior in Mathematics Class	Describes typical student behavior during mathematics lessons.
14	14	Peers' Values	Provides information about the student's perception of the degree of importance peers place on academics and other activities. Used as an indicator of peers' values and student's social environment.
15	15	Student's Values	Provides information about the degree of importance the student places on academics and other activities. Used as an indicator of student's values.
16	16	Competence in Mathematics / Science	Provides an indication of student's self-description of academic competence in mathematics and science (specialized version asks about biology, earth science, chemistry, and physics separately).
17	17	Difficulty of Mathematics	Describes student's perception of the difficulty level of mathematics.
18	18	Doing Well in Mathematics	Identifies student's attributions for doing well in mathematics.
19	19-22	Difficulty of Science	Provides a description of student's perception of the difficulty level of science (specialized version asks about biology, earth science, chemistry, and physics separately)
20	23	Doing Well in Science	Identifies student's attributions for doing well in science.

Exhibit 3.6 Contents of the Student Questionnaire (continued)

Question Number		Item Content	Description
General Version	Separate Science Version		
21	24	Liking Mathematics / Science	Identifies how much students like mathematics and science; a key component of student motivation (specialized version asks about biology, earth science, chemistry, and physics separately).
22	25	Liking Computers for Mathematics / Science	Identifies how much students like using computers to learn mathematics and science.
23	26	Internet Access	Identifies whether students are accessing the Internet and for what purposes they are using it.
24	27	Interest, Importance, & Value of Mathematics	Describes student's interest, importance rating, and value attributed to mathematics.
25	28	Reasons to Do Well in Mathematics	Provides the extent to which students endorse certain reasons they need to do well in mathematics.
26	29	Classroom Practices in Mathematics	Describes student's perceptions of classroom practices in mathematics instruction.
27	30	Beginning a New Mathematics Topic	Describes the frequency with which specific strategies are used in the classroom to introduce a new mathematics topic.
28	31	Taking Science Class(es)	Identifies whether or not the student is enrolled in science classes this year (specialized version asks about biology, earth science, chemistry, and physics separately)
29	32, 36, 40, 44	Interest, Importance, & Value of Science	Describes student's interest, importance rating, and value attributed to science (specialized version asks about biology, earth science, chemistry, and physics separately).
30	33, 37, 41, 45	Reasons to Do Well in Science	Provides the extent to which students endorse certain reasons they need to do well in science (specialized version asks about biology, earth science, chemistry, and physics separately).
31	34, 38, 42, 46	Classroom Practices in Science	Describes student's perceptions of classroom practices in science instruction (specialized version asks about biology, earth science, chemistry, and physics separately).
32	35, 39, 43, 47	Beginning a New Science Topic	Describes the frequency with which specific strategies are used in the classroom to introduce a new science topic (specialized version asks about biology, earth science, chemistry, and physics separately).
International Options			
33-34	48-49	People Living in the Home	Provides information about the home environment as an indicator of academic support and economic capital.
35-36	50-51	Cultural Activities	Describes student's involvement in cultural events or programming such as plays or concerts.
37	52	Report on Student Behaviors	Indicates the student's perspective of the existence of specific problematic student behaviors at school.
38	53	Environmental Issues	Indicates the student's beliefs about how much the application of science can help in addressing environmental issues.
39	54	Science Use in a Career	Identifies preference for sciences in careers.

References

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