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5. Development of the TIMSS Context Questionnaires

William H. Schmidt
Leland S. Cogan

5.1 OVERVIEW

The Third International Mathematics and Science Study was designed to investigate students' learning of mathematics and the sciences internationally. The IEA's Second International Mathematics Study (SIMS), recognizing the importance of curriculum in any study of student achievement, developed a tripartite model that placed the curriculum at the center of the education process. The factors that influence the education process at three different levels–system, classroom, and student–are represented in this model by three aspects of curriculum: the intended, implemented, and attained curriculum. The intended curriculum refers to the educational system's goals and the structures established to reach them. The implemented curriculum refers to the range of practices, activities, and institutional arrangements within the school and classroom that are designed to implement the visions and goals of the intended curriculum. The attained curriculum refers to the products of schooling, what students have actually gained from their educational experiences. Building on this conceptualization of the education process, TIMSS sought to assess, through context questionnaires, the factors at the system, school, teacher, and student level that are likely to influence students' learning of mathematics and the sciences.

The Survey of Mathematics and Science Opportunities (SMSO) was funded by the National Science Foundation and the U.S. National Center for Educational Statistics as a small-scale international research project. Its task was, first, to construct a model of the

educational experiences of students; and, second, to develop a comprehensive battery of survey instruments for TIMSS that could be used to study the student, teacher, and school characteristics that explain cross-national differences in student achievement in mathematics and the sciences. A team of educational researchers from six countries collaborated in the development, piloting, and revision of all aspects of the instrumentation.

The principal contributors to this effort were Richard Wolfe (Canada), Emilie Barrier (France), Toshio Sawada and Katsuhiko Shimizu (Japan), Doris Jorde and Svein Lie (Norway), Ignacio Gonzalo (Spain), Urs Moser (Switzerland), and Edward Britton, Leigh Burstein, Leland Cogan, Curtis McKnight, Senta Raizen, Gilbert Valverde, David Wiley, and William Schmidt (United States). Others made significant contributions by conducting teacher interviews and classroom observations and by participating in analytical discussions. Among these people are Daniel Robin and Josette Le Coq from France, Masao Miyake and Eizo Nagasaki from Japan, José Antonio López Varona, Reyes Hernández, Blanca Valtierra, and Icíar Eraña from Spain, Erich Ramseier from Switzerland, and Carol Crumbaugh, Pam Jakworth, Mary Kino, and Margaret Savage from the United States.

5.2 INITIAL CONCEPTUAL MODELS AND PROCESSES

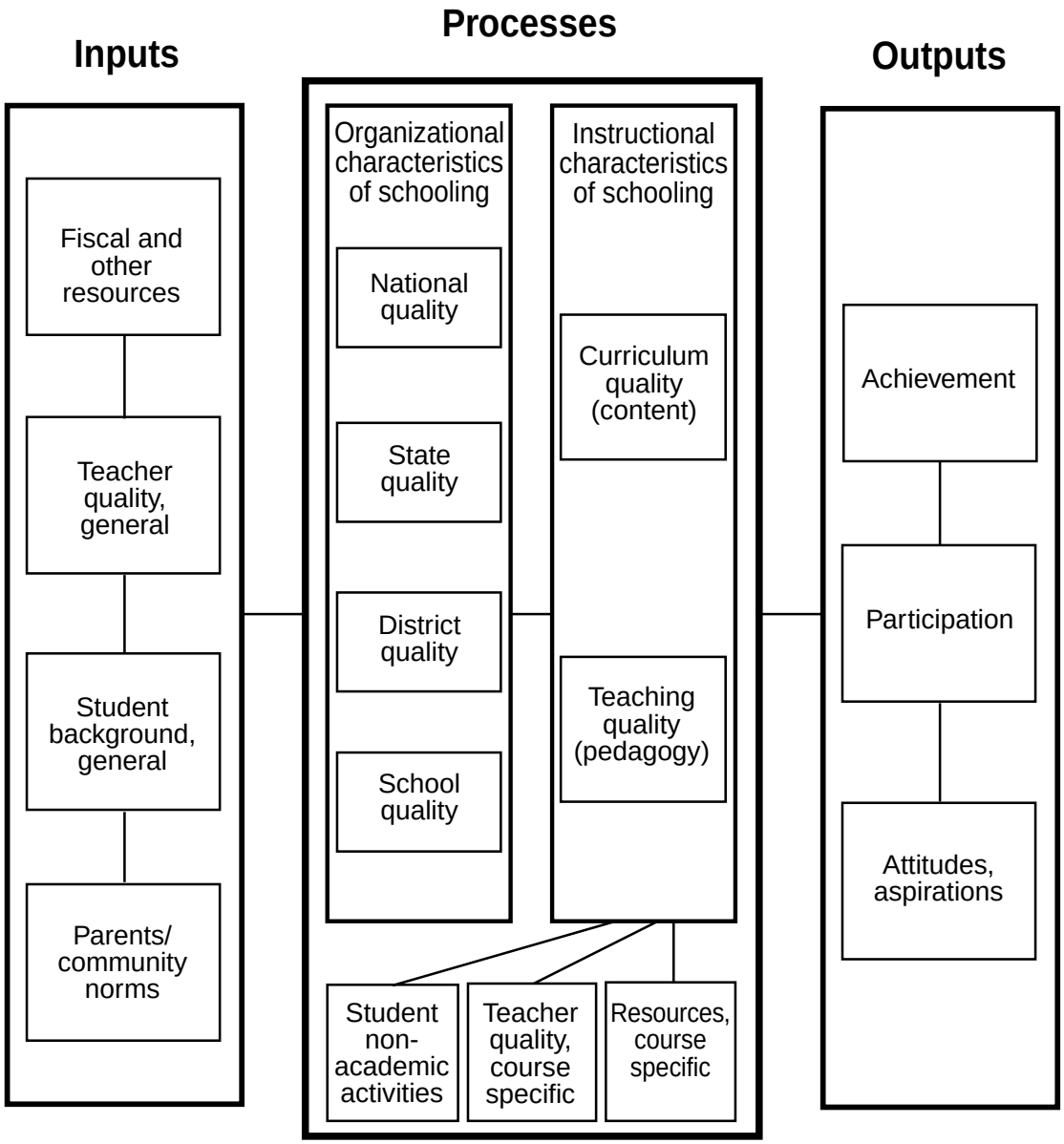
The U.S. National Center for Education Statistics (NCES) provided funding for a series of focus groups to begin to identify issues for specific data-gathering instruments. Each focus group concentrated on one of four levels of the educational system–the system; the school; the classroom and the teacher; and the student–and developed the corresponding questionnaires. The group concentrating on system-level characteristics developed the TIMSS participation questionnaire, which was used to gather some of the earliest TIMSS data. This group was chaired by David Wiley (United States) and included Manfred Lehrke (Germany), David Stevenson (United States), Ian Westbury (United States), and Timothy Wyatt (Australia). The school questionnaire focus group was chaired by Andrew Porter (United States) and consisted of Ray Adams (Australia), David Baker (United States), Ingrid Munck (Sweden), and Timothy Wyatt (Australia). The focus group for the teacher questionnaire was co-chaired by Leigh Burstein and Richard Prawat (United States) and included Ginette DeLandshere (Belgium), Jong-Ha Han (Korea), Mary Kennedy (United States), Frederick K. S. Leung (Hong Kong), Eizo Nagasaki (Japan), and Teresa Tatto (Mexico). The student questionnaire focus group was chaired by Judith Torney-Purta (United States) and included Chan Siew Eng (Singapore), Lois Peak (United States), Jack Schwille (United States), and Peter Vari (Hungary).

The development of each questionnaire began with a conceptual framework or model of the explanatory factors related to the object of the questionnaire. These models were based on the research literature and on previous IEA studies. For example, the initial identification of school-related concepts to be included in TIMSS was based on an indicator model of school processes developed by Porter (1991), shown in Figure 5.1.

The educational research literature has identified a profusion of important teacher characteristics that are related to student performance in mathematics and science. These

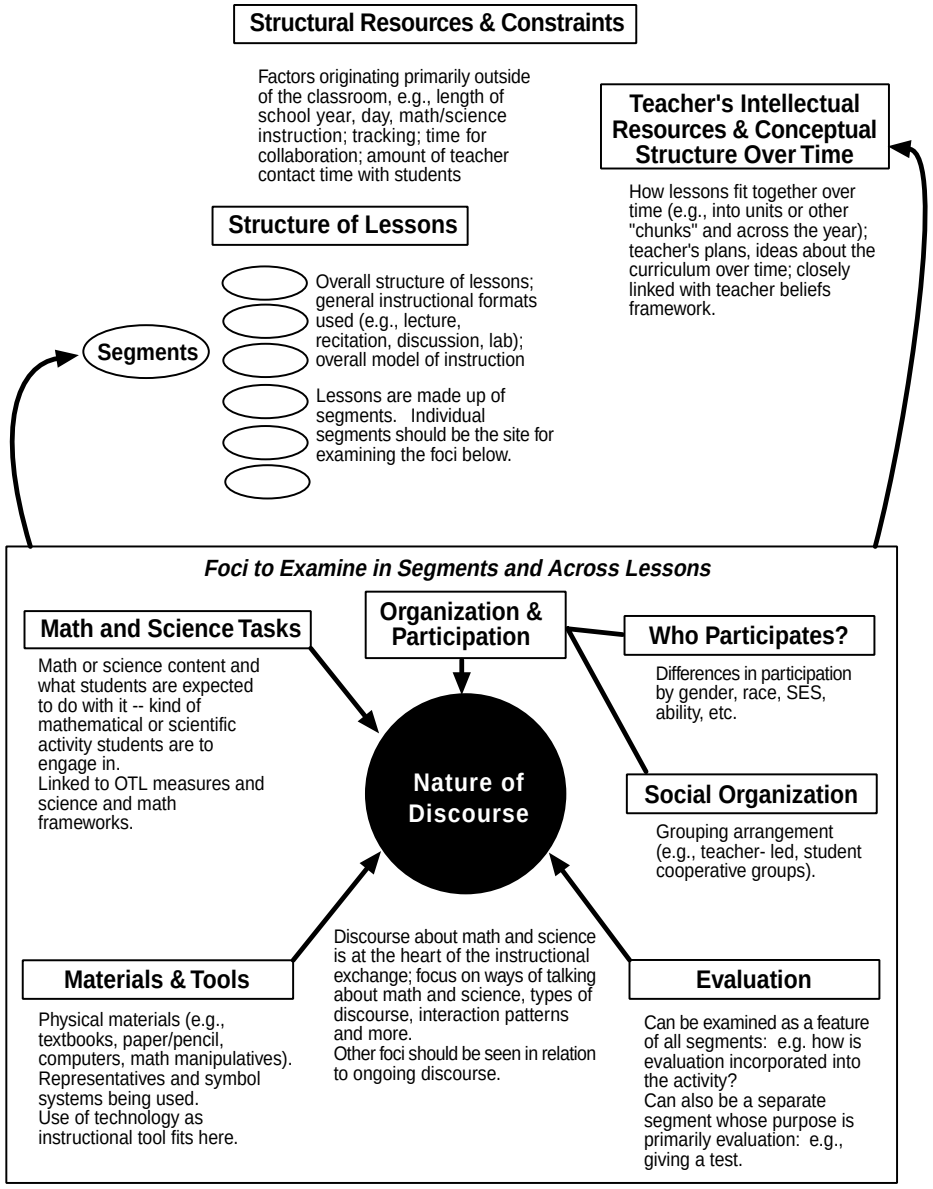
include the amount of conceptual coherence or focus that teachers build into their lessons (which reflects their own conceptual understanding), how teachers represent the subject matter, the organization and nature of instructional tasks, the patterns of classroom discourse, and the types of evaluation. In addition, the availability of technological and other material resources has proved to be significant for student learning.

Figure 5.1 An Indicator Model of School Processes



The conceptual model for instructional practices, shown in Figure 5.2, which was based upon reviews of the research literature (Prawat, 1989a, Prawat 1989b), integrated these factors for the first phase of instrument development.

Figure 5.2 Factors That Influence Instructional Practices

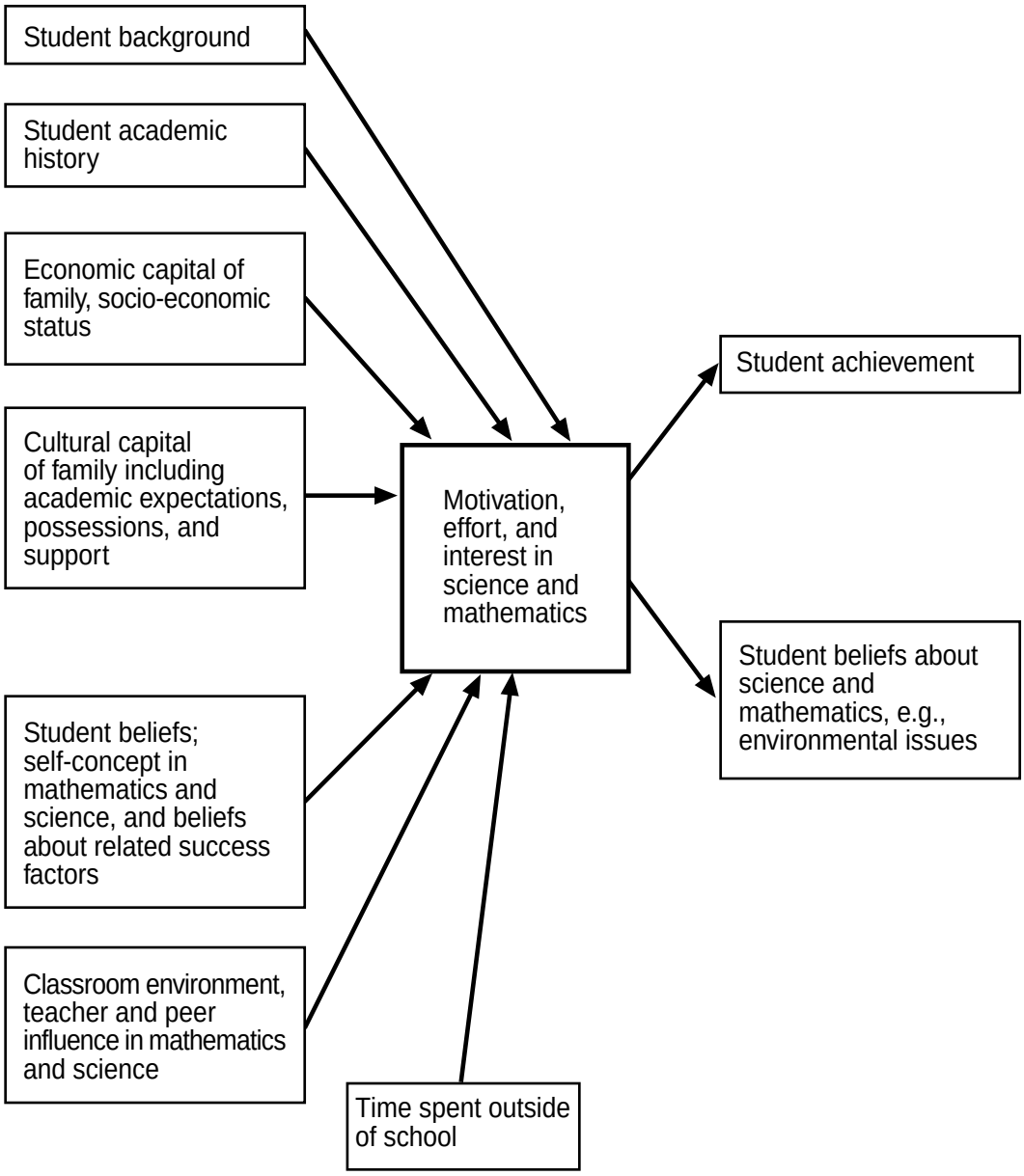


The initial list of student characteristics to be examined in TIMSS was drawn from the literature. Conceptual models of student achievement abound in the literature and most have a common set of constructs. Given the limits of a large-scale survey and the amount of student response time available, the TIMSS student focus group identified the following student constructs for consideration: demographic characteristics; home and family environment; attitudes and expectations; activities; perceptions of school context; and perceptions of classroom context.

Next, a draft student questionnaire was developed and piloted in a few countries. In addition, most countries reviewed the questionnaire, with some disappointing results. A group of Scandinavian researchers (Kjell Gisselberg, Marit Kjaernsli, Svein Lie, Borge Prien, Ingemar Wedman, Peter Weng, and Anita Wester) advanced work in this area by developing a conceptual framework that stressed the central role of motivation and effort in student achievement. That model was then integrated with the original framework. It is designed to address two questions: (1) what have students learned about science and mathematics (including ideas and beliefs about these subjects)? and (2) what student characteristics are related to student learning? The revised model is presented in Figure 5.3.

The model in Figure 5.3 suggests some of the factors that influence the motivation and interest a student has in studying science and mathematics. This motivation in turn influences student achievement, and also student beliefs about science and mathematics. Interest, motivation, and effort have been fused into one conceptual unit because of the difficulty of distinguishing among them on the basis of limited questionnaire data.

Figure 5.3 Revised Model of Student Characteristics



5.3 EDUCATIONAL OPPORTUNITY AS AN UNDERLYING THEME

The models described in the previous sections assume particular points of view, each aimed at a specific aspect of school learning. The model of Figure 5.2 represents a psycho-social view of classroom instruction consistent with the cognitive-psychology literature. The model of Figure 5.3 portrays a view of student learning influenced by theories of individual differences and motivation and sociological concepts such as family background. The school framework is based on an indicator model of school processes (Porter, 1991).

In a study of cross-national differences a more comprehensive perspective is essential–one in which instructional practices, individual student learning, and the organization of the school are all part of a larger system in which educational experiences are realized. Such a view recognizes that educational systems, schools, teachers, and the students themselves all influence the learning opportunities and experiences of individual students. From this perspective, educational opportunity can be regarded as a unifying theme of the TIMSS explanatory framework. Curriculum, instruction, and teacher characteristics are factors that both provide and delimit the educational opportunities of students to learn mathematics and sciences.

The curriculum, by specifying the learning goals at the national or regional level, emphasizes certain opportunities to learn and constrains others. For example, in a country with a mandatory national curriculum, the inclusion of a learning goal in that curriculum greatly increases the probability that classrooms will offer an opportunity to learn that topic. By the same token, the absence of a learning goal decreases the probability that educational opportunities related to that goal will be provided.

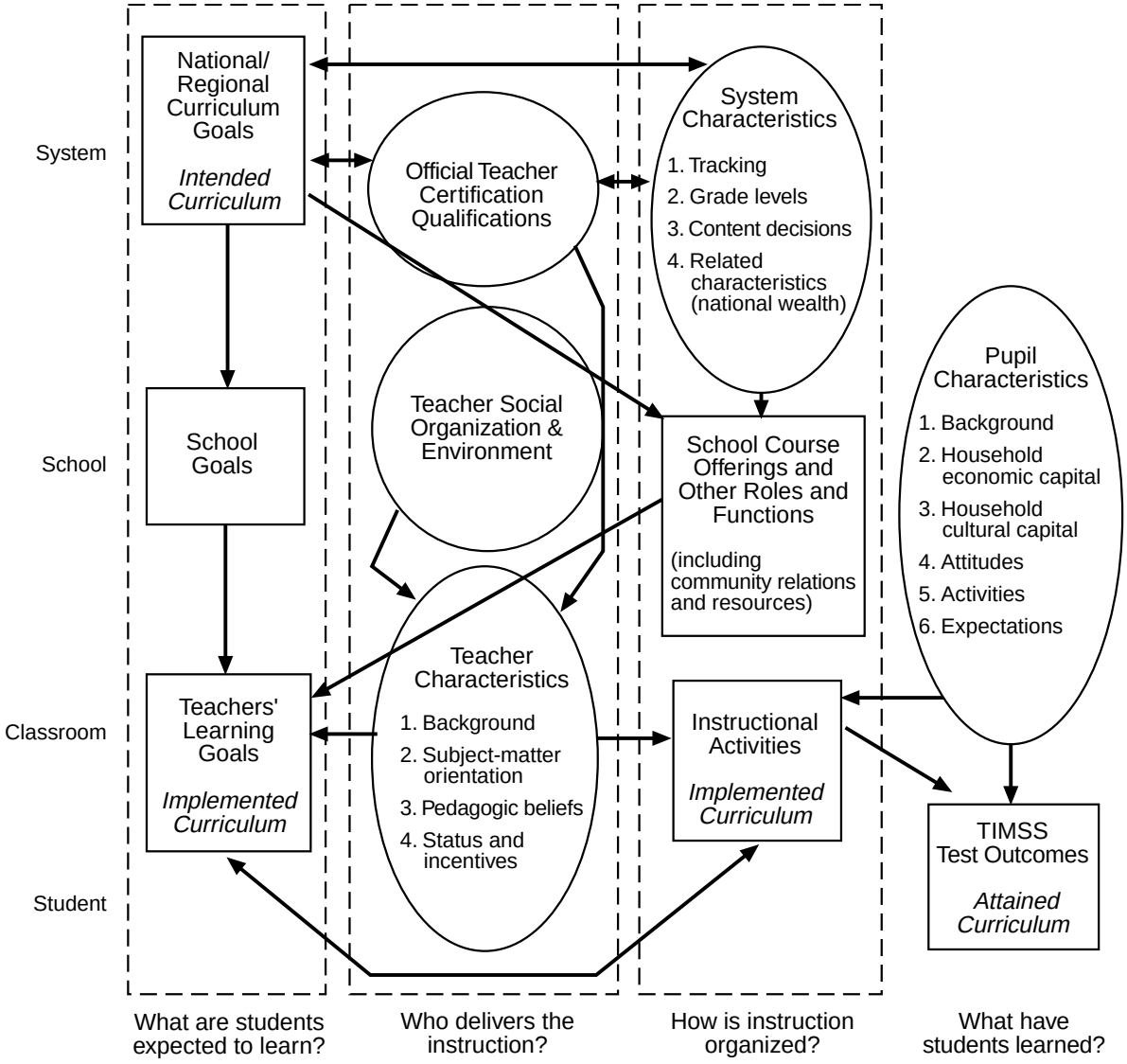
Differences across countries in the specification of learning goals, and the policies related to the learning goals, are critically important to understanding the nature of educational opportunity in those countries. The system-level specification of learning goals sets parameters by which educational opportunities are constrained in the first instance.

Schools and teachers, by their characteristics and activities, further frame educational opportunities. Both the curricular organization of the school and the qualifications and subject-matter knowledge of the teachers affect the provision and quality of educational opportunities. Teachers' instructional practices and the schools' course offerings further shape those opportunities.

To undergird the development of the data collection instruments, provision of educational opportunity was considered at the levels of the educational system, the school, and the classroom in terms of the four general research questions of TIMSS: (1) What are students expected to learn? (2) Who delivers the instruction? (3) How is instruction organized? and (4) What have students learned? This conceptual framework is presented schematically in Figure 5.4.

What are students expected to learn? There are three main levels of the educational system at which learning goals are commonly set: the national or regional level, the school level, and the classroom level. This first research question addresses not only the specification of learning goals for a system or country as a whole, but also the differentiation of such goals for divisions within the larger educational system, such as regions, tracks, school types, and grade levels. Learning goals specified at the national or regional level are, in the terminology developed within IEA for SIMS, the *intended* curriculum, whereas those specified at the school or classroom level are part of the *implemented* curriculum.

Figure 5.4 TIMSS Conceptual Framework: The Educational Experience Opportunity



Who delivers the instruction? Students' learning in school is shaped to a great extent by their teachers. The teaching force in a country may be characterized on a number of levels. At the system level are official teacher certification qualifications–including grade and subject restrictions, required education for licensing, and perhaps specific required coursework or experience. At the school level, the social organization and environment in which teachers work may influence their instructional practices. An important area here is the allocation of teacher time–the proportion of professional time spent during a school day in planning and teaching mathematics or science, and the amount of cross-grade-level teaching (Doyle, 1986; Lockhead, 1987). Collaboration among teachers in planning

instructional sequences and strategies may also greatly influence what occurs within the classroom.

At the classroom level the characteristics of the individual teacher may affect the quality of instruction and hence the quality of students' educational experiences. Such characteristics include teachers' background and beliefs (see Porter, 1991). Teacher background variables include age, gender, education, subject taught, and teaching experience. Teacher beliefs include subject-matter orientation–the views teachers have about the disciplines of mathematics and the sciences, which have been shown to affect instructional practices and student achievement (Thompson, 1992; Putnam, 1992; Peterson, 1990). Teacher beliefs also include pedagogical beliefs–their views about what is a good way to teach a particular topic.

How is the instruction organized? The organization of instruction influences the implemented curriculum and the learning experiences of students. Decision making concerning instruction is distributed across all levels of the education system. This diffusion affects many organizational aspects–the age-grade structure of education systems, the nature of the schools serving different arrays of grades, and the various curricular tracks into which students are placed. Economic resources also influence how instruction is organized, as do the qualifications of the teaching force, the instructional resources available to the teachers, and the time and material resources available to the students.

Instructional organization also subsumes course offerings and support systems for mathematics and science instruction, and the implementation of curriculum in classrooms, including textbook use, structure of lessons, instructional materials, classroom management, student evaluation, student participation, homework, and in-class grouping of students.

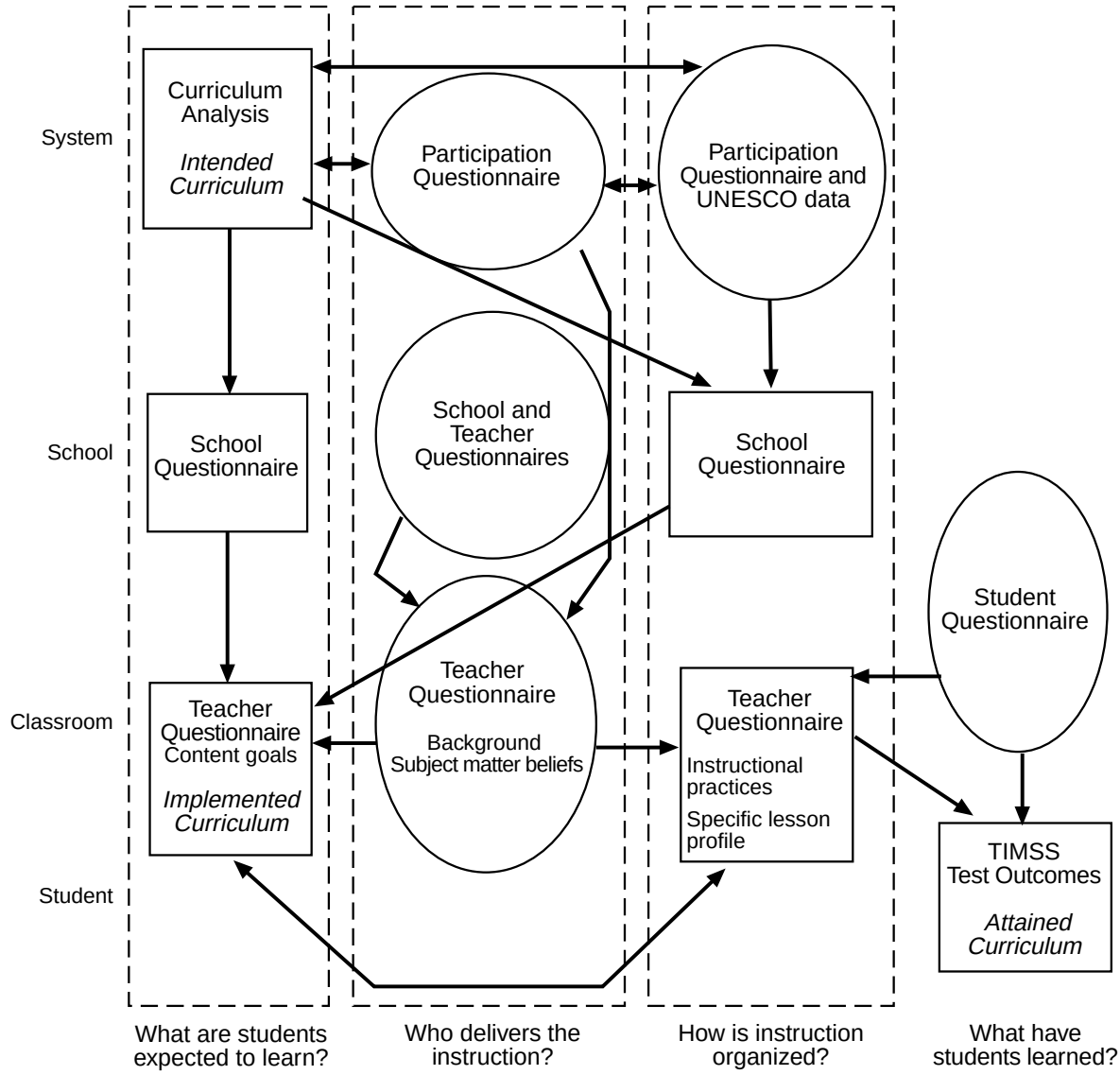
What have students learned? Comparing what students have learned in terms of their performance on the TIMSS achievement tests is a major focus of the study. However, beyond such comparisons TIMSS wanted to investigate the factors associated with student learning. Aside from curriculum goals, teachers, and instructional organization, characteristics of the students themselves influence what and how they learn. These characteristics include students' academic history, the economic and cultural capital of the family, students' self-concept, how students spend time outside school, and students' beliefs, motivation, effort, and interest in education and school subjects.

It is not possible to identify and measure every possible factor that affects student learning. However, the educational-opportunity model recognizes the connections among major components of the educational system in a very general way. This generic model can be used to describe many specific educational systems. It does not advocate a particular system but rather is intended as a template against which to study systemic variations; in this sense, it is particularly appropriate for cross-national comparisons.

The data collection instruments developed by SMSO, specifically the participation, school, teacher, and student questionnaires and the curriculum analysis, were all developed

concomitantly with the educational opportunity model to examine specific model components. These are presented schematically in Figure 5.5.

Figure 5.5 TIMSS Instruments Assessing Educational Opportunity



5.4 INSTRUMENTATION REVIEW AND REVISION

In addition to the NCES focus groups that identified the initial issues and questions for the various instruments, many others were involved in the review and revision process. National Research Coordinators (NRCs) from the countries participating in TIMSS had opportunities to review the school, teacher, and student questionnaires at various stages.

Comments from NRCs were always carefully considered in producing subsequent versions for further rounds of piloting, review, and revision.

Upon several occasions, special groups of researchers were assembled to review, revise, and reorganize the questionnaires. The SMSO, the International Coordinating Center (ICC), and the International Study Center brought together groups to work in this area. As part of the development of the questionnaires, TIMSS conducted small informal pilot studies with teachers, students, and school administrators, as well as large-scale formal pilot studies. The student questionnaire was piloted during the item pilot conducted by the ICC in most of the TIMSS countries in April and May 1993, and the teacher and school questionnaires during September and October 1993; key portions of the latter two questionnaires were also included in the field trial in April and May 1994.

For the 1993 pilot study of the teacher and school questionnaires, each participating country translated the questionnaires into the local language, obtained responses from teachers and principals, and recorded those responses in computer files. Twenty-two countries participated in this pilot in some fashion. Twenty countries–Canada (Alberta), Argentina, Australia, Czech Republic, Denmark, France, Greece, Indonesia, Iran, Ireland, Korea, Mexico, New Zealand, Portugal, Romania, Singapore, Spain, Sweden, Switzerland, and the United States–submitted data files. Table 5.1 shows the number of responses submitted and analyzed.

Table 5.1 Responses in Pilot Study of School and Teacher Questionnaires

Questionnaire		Number of Responses
Teacher Questionnaire	Population 1	488
	Population 2	296
	Population 3	290
School Questionnaire	Population 1	133
	Population 2	174
	Population 3	58

In addition to the data files, 15 countries–Canada (Alberta), Australia, Czech Republic, France, Greece, Ireland, Korea, Netherlands, New Zealand, Portugal, Singapore, Sweden, Switzerland, Tunisia, and the United States–submitted written reports on the pilot studies in their countries.

Three types of data from the pilot study were used to revise the teacher and school questionnaires. First, all comments concerning the questionnaires made in NRCs' reports or by other sources were placed into an electronic database. This was organized by item within each questionnaire. Table 5.2 shows examples of comments on two items, one from the school questionnaire and one from the teacher questionnaire.

Table 5.2 Examples of Comments on Questionnaire Items Entered into Database

Question	Country	Comment
SC1-12	CSK	Principals teach regularly, they must prepare for their lessons, some of them even work as homeroom teachers. These activities are missing in the list.
TQ1 General	NLD	Each questionnaire needs a general instruction in front of the questionnaire indicating the purpose of it (gathering information about the implemented curriculum, which is related to information about the attained and intended curriculum as well) and saying that most questions can be answered by checking one or more boxes. Note: same comments for TQ2M-Gen. and TQ2S-Gen.

The second type of data from which revisions were made came from the written responses to the "other" options that were part of many items in the piloted questionnaires. These responses were translated into English, placed into a database, and sorted by questionnaire type and item. The third type of data came from multiple-choice questionnaire items that were stored in the data files.

The written responses to the "other" options were used to expand the options for some items and to revise others. Instructions and options were rewritten to clarify the intent of some questions and to facilitate the generation of an appropriate response. The multiple-choice item data were analyzed to eliminate options for some items, rewrite some options, and confirm that some options should be retained rather than eliminated.

The pilot study gave rise to the following conclusions about the draft questionnaires.

- The questionnaires were too long and took too much time to complete
- Some of the language was too technical
- Considerable cross-country variation in item responses was evident. This variation, which makes international comparisons interesting, also makes it difficult to develop items that are meaningful and relevant within all countries
- There was a good distribution of responses across the item options. Respondents seemed to have no difficulty responding to options with three, four, or five categories
- Much of the formatting needed to be simplified. Some countries were unable to reproduce shaded areas and many respondents found the skip patterns difficult to follow

The results of the pilot study led to extensive revision of the questionnaires. In June 1994, a meeting was held in Hamburg, Germany, for the purpose of reviewing and revising the Populations 1 and 2 school and teacher questionnaires. Hosted by Neville Postlethwaite and chaired by William Schmidt, the working group included Michael Martin (International Study Center) and the following NRCs: Wendy Keys (England), Christiane Brusselmans-Dehairs (Belgium, Flemish), and Wilmad Kuiper (Netherlands). The International Study Center then made the recommended changes and disseminated the revised versions of the questionnaires to all NRCs and TIMSS committees. Simultaneously,

the student questionnaires for Populations 1 and 2 were reformatted, revised, and distributed for review. The Populations 1 and 2 context questionnaires were endorsed by the TIMSS NRCs in August 1994 and both paper and electronic versions were provided to the participating countries for translation, duplication, and administration.

In October 1994, the Population 3 school and student questionnaires were revised. In early November 1994, a group of NRCs reviewed the questionnaires and made suggestions for restructuring them. The International Study Center made the changes and distributed the revised versions to a small group of NRCs nominated by their colleagues for review before dissemination. In December 1994, the final versions of the Population 3 student and school questionnaires were disseminated to all participating countries for translation, duplication, and administration.

The model of educational opportunity guided questionnaire development, item evaluation, and revision throughout. The identification of key research questions led to the creation of a conceptual framework matrix in which various issues were assigned to specific instruments. This model links the three main areas of investigation in TIMSS: the curriculum analysis, the context questionnaires, and the student test.

5.5 THE FINAL INSTRUMENTS

The participation questionnaires gathered general information about a country's education system and its organization and structure. This information was used in the early stages of TIMSS to make decisions about sampling and about which curriculum guides and textbooks would be appropriate for the curriculum analysis. It was also used to identify issues that would need further clarification from the other instruments.

The school questionnaires at each population level sought information about the school's community, staff, students, curriculum and programs of study, and instructional resources and time. The number of years students are taught by the same teacher is addressed in the Population 1 and 2 versions but is not relevant at the Population 3 level. The school's requirements for graduation or successful completion of schooling are addressed in the Population 3 version but not in the others. Questions that address programs of study are expanded in the Population 3 version since this issue is considerably more complex at this level. The content and purpose of each item and the correspondences and differences among the three versions are detailed in Table 5.3.

The teacher questionnaires for Population 2 address four major areas: teacher's background, instructional practices, students' opportunity to learn, and teacher's pedagogic beliefs. There are separate questionnaires for teachers of mathematics and of science. Since most Population 1 teachers teach all subjects, a single teacher questionnaire at this level addresses both mathematics and science. This has constrained coverage such that only items addressing teacher's background and instructional practices are included. In general, the focus for most questions is mathematics. However, the item assessing teacher's content goals is asked about both mathematics and science, since this is the main link in the teacher

questionnaire to the TIMSS curriculum analysis. The content and purpose of each item and the similarities and differences among the three versions are detailed in Table 5.4.

In general, the structure and content of the student questionnaires are consistent across populations. A few items were not included in the Population 1 version, such as students' reports of parents' education, since responses were not considered reliable. Also, most response categories were reduced in the Population 1 version from four to three. Two versions of student questionnaires for Population 2 were developed: one for use in systems teaching general science and another for use in systems where students take courses in specific sciences such as biology, chemistry, earth science, or physics. Some items are unique to the Population 3 student questionnaire. These were developed to gather information regarding students' academic history and their plans for further education. The content and purpose of each item is detailed in Table 5.5.

Table 5.3 Contents of the School Questionnaires for Populations 1, 2, and 3

Question Number				
POPULATION			Item Content	Description
1	2	3		
1	1	1	Community	Situates the school within a community of a specific type.
2	2	2	Grade Levels	Identifies the grade levels present in the school.
3, 4, & 5	3, 4, & 5	3, 4, & 5	Staff	Describes the school's professional full- and part-time staff and the percentage of teachers at the school for 5 or more years.
6	6	6 - 9	Teaching Load	Describes percentage of time teachers teach mathematics, the sciences, and/or other subjects.
7	7	–	Students with Teacher	Indicates the number of years students typically stay with the same teacher.
8	8 & 9	–	Teacher Time	Indicates the amount of time a teacher usually has for teaching mathematics/science classes and doing related tasks.
9	10	–	Collaboration Policy	Identifies the existence of a school policy promoting teacher cooperation and collaboration.
–	–	10 & 11	University Certification	Indicates the percentage of mathematics and science teachers who have university certification in their subject matter.
10	11	13	Principal's Time	Indicates the amount of time a school's lead administrator typically spends on particular roles and functions.
11	12	14	School Decisions	Identifies for the school who has responsibility for various decisions.
12	13	15	Curriculum Decisions	Identifies the amount of influence various individuals and educational and community groups have on curriculum decisions.
13	14	16	Formal Goals Statement	Indicates the existence of school-level curriculum goals for mathematics and science.
14	15	–	Availability of Computers	Indicates the number of computers available to staff and students for specific types of use.
15	16	12	Instructional Resources	Provides a description of the material factors limiting a school's instructional activities.
16	17	19	Students	Provides enrollment and attendance data, students' enrollment in mathematics and science courses, and typical class sizes.
17	18	17	Student Behaviors	Provides a description of the frequency with which schools encounter various unacceptable student behaviors.
18	19		Instructional Time	Indicates the amount of instructional time scheduled, according to the school's academic calendar.
19	20		Instructional Periods	Indicates the existence and length of weekly instructional periods.
20 - 23	21 - 24		Remedial and Enrichment	Describes the school's provision for remedial and enrichment programs in mathematics and science.

Table 5.3 Contents of the School Questionnaires for Populations 1, 2, and 3 (continued)

Question Number				
POPULATION			Item Content	Description
1	2	3		
24 & 26	25 & 27	20-22	Programs of Study	Describes the existence of different educational tracks or programs for studying mathematics and the sciences, and the instructional time for each program.
25 & 27	26 & 28	18	Program Decision Factors	Indicates how important various factors are in assigning students to different educational programs or tracks.
-	-	21	Graduates	Describes the academic standards required of students who successfully graduate or leave the school.
INTERNATIONAL OPTIONS				
28	29		Student Demographics	Indicates the percentage of students with various backgrounds.
29	30		Admissions	Describes the basis on which students are admitted to the school.

Table 5.4 Contents of the Teacher Questionnaires for Populations 1 and 2

Question Number				
POPULATION			Item Content	Description
1	2M	2S		
SECTION A:				
1 - 2	1 - 2	1 - 2	Age and Sex	Identifies teachers' sex and age-range category.
3	3	3	Education	Describes teachers' preparation for teaching according to 8 internationally defined categories of education and teacher training. Labels for categories are country-specific with only relevant categories being used.
4 - 5	4 - 5	4 - 5	Teaching This Year	Describes at which grade levels teacher is teaching math and/or science.
6 - 8	6 - 8	6 - 8	Teaching Experience	Identifies teachers as either full- or part-time, the number of years of teaching experience, and an indication of experience in last 5 years with teaching at various grade levels.
–	9 - 11	9 - 11	Formal Teaching Responsibilities	Describes the scope and depth of the formally scheduled teaching responsibilities of teachers of mathematics and the sciences.
9	12	12	Other Teaching-Related Activities	Describes the amount of time teachers are involved in various professional responsibilities *outside* the formally scheduled school day.
10	13	13	Meet With Other Teachers	Describes the frequency that teachers' collaborate and consult with their colleagues.
–	14	14	Teachers' Influence	Describes the amount of influence that teachers' perceive they have on various instructional decisions.
11	15	15	Being Good at Maths/Science	Describes teachers' beliefs about what skills are necessary for students to be good at mathematics/science.
12	16	16	Ideas about Maths/Science	Indicates teachers' beliefs about the nature of mathematics/science and how the subject should be taught.
13	17	17	Document Familiarity	Describes teachers' knowledge of curriculum guides, teaching guides, and examination prescriptions. (country-specific options)
–	–	18	Topics Prepared to Teach	Provides an indication of teachers' perceptions of their own preparedness to teach the TIMSS in-depth topic areas.
INTERNATIONAL OPTIONS				
–	18-23	19-24	Teacher Status	Describes teacher's occupational satisfaction, perceived social status of teaching, and the number of books in the home.
SECTION B: INSTRUCTIONAL PRACTICES (Pertains to Target Class)				
14	B-1	B-1	Target Class	Identifies the number of students in the TIMSS tested class.
15	B-2	B-2	Student Achievement	Describes teacher's perception of the achievement levels of students in the TIMSS tested class compared to other students nationally.
16	B-3	B-3	Instructional Time	Identifies the number of minutes per week the class is taught.

Table 5.4 Contents of the Teacher Questionnaires for Populations 1 and 2 (continued)

Question Number				
POPULATION			Item Content	Description
1	2M	2S		
17	B-4	B-4	Textbook Used	Identifies the textbook used in the TIMSS target class.
18	B-5	B-5	Percent Textbook Used	Identifies the approximate percentage of teacher's weekly teaching that is based on the textbook.
–	B-6	B-6	Textbook Alternatives	Identifies resources that a teacher uses in addition to or in the place of a textbook.
19	–	–	Teaching Groups	Identifies the frequency with which the teacher divides the class into groups for teaching.
20	B-7	B-7	Classroom Factors	Identifies the extent to which teachers perceive that various factors limit classroom instructional activities.
1 22	B-8 B-9	B-8 B-9	Calculators	Describes the availability of calculators and how they are used in the target class.
23 24	B-10 B-11	B-10 B-11	Planning Lessons	Identifies the extent to which a teacher relies on various sources for planning lessons.
25-M 37-S	B-12	B-12	Topic Coverage	Indicates the extent of teachers' content coverage with the TARGET CLASS according to categories from the TIMSS Curriculum Frameworks.
26	B-13	B-13	Recent Class Hour	Describes the length, topic (according to the TIMSS frameworks), type (introduction, continuation, or end), and homework assigned for a recent lesson.
27	B-14	B-14	Lesson Order	Characterizes a recent lesson; the sequence of instructional activities and the amount of time devoted to each activity.
28	B-15	B-15	Asking Students Questions	Describes the type, manner, and purpose for which teachers ask students various types of questions and ask students to perform various activities during lessons.
29	B-16	B-16	Incorrect Response	Identifies the frequency with which a teacher responds to a student's incorrect response in several different ways.
30-M 36-S	B-17	B-17	Students' Work Arrangements	Describes how often students working in various group arrangements.
31 32	B-18 B-19	B-18 B-19	Amount of Homework Assigned	Describes the frequency and amount of homework assigned to target class students.
33 34	B-20 B-21	B-20 B-21	Type and Use of Homework	Describes the nature of homework assignments and how homework is used by the teacher.
35	–	–	Science	Indicates the weekly amount of science instruction and whether science is taught as a separate subject.
–	B-22 B-23	B-22 B-23	Assessment	Describes the nature and use of various forms of student assessment in the target class.
SECTION C: OPPORTUNITY TO LEARN				
–	I to XIV	I to XIII	Opportunity to Learn	Describes students opportunity to learn items from the in-depth topic areas. Items used in this section come from the TIMSS student test.
SECTION D: PEDAGOGICAL APPROACH				
	1 - 2	1 - 3	Pedagogical Beliefs	Provides an indication of teachers' instructional beliefs systems about teaching specific subject matter (i.e. mathematics or science).

Table 5.5 Contents of the Student Questionnaires for Populations 1, 2, and 3

Question Number					
POPULATION				Item Content	Description
1	2	2 (s)	3		
1 - 4	1 - 4	1 - 4	1 - 5	Student's Demographics	Provides basic demographic information to contextualize students' responses: age; sex; language of the home; if born in the country and if not how long he/she has lived in country.
5	5	5	15	Academic Activities Outside of School	Provides information on student activities that can impact their academic achievement.
6	6	6	16	Time Outside of School	Provides information on students' recreational and study habits outside of school.
7 - 8	7 - 8	7 - 8	6 - 7	People Living in the Home	Provides information about the home environment as an indicator of cultural and economic capital.
–	9	9	11	Parental Education	Provides an indicator of the home environment and data to create an indicator of socio-economic status.
9	10	10	4	Parent's Country of Birth	Provides information regarding immigrant status.
10	11	11	8	Books in Home	Provides an indicator of the cultural capital of the home environment.
11	12	12	9	Possessions in the Home List	Provides information to create an indicator of socio-economic status.
–	–	–	10	Residence While Attending School	Identifies the type of living situation students have while attending school.
–	–	–	12	Others' Ideas for Student's Future	Describes students' perceptions of what parents, teachers, and peers think student should do upon completion of school.
12	13	13	13	Mother's Values	Provides an indicator of the home environment and general academic press.
–	14	14	–	Students' Behavior in Math Class	Provides a description of typical student behavior during math lessons.
13	15	15	13	Peers' Values	Provides a description of peers' values and student's social environment.
14	16	16	13	Student's Values	Provides a description of student's values.
–	–	–	14	Student's Future Education Plans	Identifies what plans student has for further education.

Table 5.5 Contents of the Student Questionnaires for Populations 1, 2, and 3 (continued)

Question Number					
POPULATION				Item Content	Item Purpose
1	2	2 (s)	3		
15	17	17	22	Competence in Math/ Sciences	Provides an indication of students' self-description of their academic competence in mathematics and the sciences.
16	18	18	17	Report on Student Behaviors	Provides an indication of the existence of specific problematic student behaviors at school from the student's perspective.
17	19	19	20	Doing Well in Math	Identifies students' attributions for doing well in mathematics.
18	20	20	21	Doing Well in Science	Identifies students' attributions for doing well in the sciences
19	21	21	19	Liking Math/ Sciences	Identifies how much students like specific subjects; a key component of student motivation.
20	22	22	–	Liking of Computers	Identifies how well students like working with computers, a key indicator of technology familiarity.
21	23	23	18	Interest, Importance, & Value of Mathematics	Provides a description of students' interest, importance rating, and value afforded mathematics.
–	24	24	–	Reasons to Do Well in Math	Provides the extent to which students endorse certain reasons they need to do well in mathematics.
–	–	–	23	Technology Use	Identifies the type and frequency of student's technology use.
–	–	–	24	Student's Academic Program/ Track	Identifies the educational program or track in which student is enrolled .
–	–	–	25	Most Advanced Math	Identifies the most advanced math course student has taken.
–	–	–	26	Most Advanced Physics	Identifies the most advanced physics course student has taken.
–	–	–	27	Most Advanced Chemistry	Identifies the most advanced chemistry course student has taken.
–	–	–	28	Most Advanced Biology	Identifies the most advanced biology course student has taken.
–	–	–	29	Most Advanced Earth Science	Identifies the most advanced earth science course student has taken.
–	–	–	30	Math Enrollment	Identifies which math course(s) student currently take.
22	25	25	31	Classroom Practices: Math	Provides a description of students' perceptions of classroom practices in mathematics instruction.
–	26	26	–	Beginning a New Math Topic	Describes the frequency with which specific strategies are used in the classroom to introduce a new mathematics topic.

Table 5.5 Contents of the Student Questionnaires for Populations 1, 2, and 3 (continued)

Question Number					
POPULATION				Item Content	Item Purpose
1	2	2 (s)	3		
–	27	27	–	Environmental Issues	Provides an indication of students' concern and involvement in environmental issues.
–	–	28	34, 35	Sciences Enrollment	Identifies which science course(s) students are currently taking.
21	28	29, 33, 37, 41	–	Interest, Importance, & Value of the Sciences	Provides a description of students' interest, importance rating, and value afforded mathematics.
–	29	30, 34, 38, 42	–	Reasons to Do Well in the Sciences	Provides the extent to which students endorse certain reasons they need to do well in the sciences.
–	30	–	–	Science Use in a Career	Identifies preferences for sciences in careers.
23	31	31, 35, 39, 43	–	Classroom Practices: Sciences	Provides a description of students' perceptions of classroom practices in science instruction.
–	32	32, 36, 40, 44	–	Beginning a New Topic	Describes the frequency with which specific strategies are used in the classroom to introduce a new topic in the sciences.
–	–	–	32	Math Textbook	Identifies the textbook used by students in their math course.
–	–	–	33	Math Homework	Identifies the frequency with which homework is assigned in students' math course.
–	–	–	36	Classroom Practices: Physics or Other Science	Provides a description of students' perceptions of classroom instructional practices.
–	–	–	37	Physics/ Other Science Textbook	Identifies the textbook used by students in their physics or other science course.
–	–	–	38	Physics/ Other Science Homework	Identifies the frequency with which homework is assigned in students' physics or other science course.
OPTIONAL ITEMS					
24, 25	33, 34	45, 46	–	Cultural Activities	Provides a description of student's involvement in cultural events or programming such as plays and concerts.
–	–	–	39, 40	Academic Program Profile	Indicates whether students are repeating the current grade or if they have already completed any other educational program at school.

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