DOCUMENT RESUME

ED 286 707 SE 047 846

AUTHOR Wolfe, Richard G.
TITLE Second International Mathematics Study. Training Manual for Use of the Databank of the Longitudinal, Classroom Process Surveys for Population A in the IEA Second International Mathematics Study. Contractor's Report.
INSTITUTION International Association for the Evaluation of Educational Achievement, New York, NY.; Ontario Inst. for Studies in Education, Toronto.
SPONS AGENCY Center for Education Statistics (OERI/ED), Washington, DC.
REPORT NO CS-87-332
PUB DATE Mar 87
CONTRACT 300-83-0212
NOTE 109p.; For a description and availability of the databank, see SE 048 649.
PUB TYPE Tests/Evaluation Instruments (160) -- Statistical Data (110) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Classroom Research; *Databases; *Educational Assessment; Educational Research; *Guides; *International Studies; *Mathematics Education; Mathematics Instruction; Mathematics Tests; *Research Tools; Surveys
IDENTIFIERS Mathematics Education Research; *Second International Mathematics Study

ABSTRACT

This manual is designed for those researchers using the databank on classroom process surveys for the population of 13-year-olds in the Second International Mathematics Study. The manual opens with overviews of the study and the databank and states the purpose of the training. In the second section on "Interpretation," the codes, layout, and other documentation points are explained. The third section on "Application" shows the general flow of processing to use the documentation and data files. Finally, a "Practice" section is provided, with exercises related to the data. Appendices pertain to: (1) Analysis of the Cognitive Item Table; (2) International Item Response File; (3) U.S.A. Classroom Aggregate File; (4) Extracts from the Databank; and (5) Weighting and Sampling Errors. (MNS)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

Second International Mathematics Study

**Training Manual for Use of the Databank of the Longitudinal, Classroom Process Surveys for Population A in the IEA Second International Mathematics Study**

Richard G. Wolfe
The Ontario Institute for Studies in Education

International Association for the Evaluation of Educational Achievement (IEA)

Larry E. Suter, Project Officer
Center for Education Statistics

Prepared in part for the Center for Education Statistics under contract OE 300-83-0212. Opinions, conclusions or recommendations contained herein are those of the author, and not necessarily those of the U.S. Department of Education.

March 1987

CS 87-332

CONTENTS


| Section | | Page |
|---|---|---|
| A | ORIENTATION | 1 |
| A1 | Overview of the Study | 1 |
| A2 | Overview of the Databank | 3 |
| A3 | Purpose of the Training | 5 |
| B | INTERPRETATION | 5 |
| B1 | Data Identification Codes | 5 |
| B2 | The Special Case of Belgium Flémish | 6 |
| B3 | Instrument Identification Codes | 7 |
| B4 | Deciphering the Documentation Files (Documentation File A.0) | 7 |
| B5 | Instrument Utilization (Documentation File A.1) | 8 |
| B6 | Response Data Layout (Documentation File A.2) | 8 |
| B7 | Cognitive Testing Arrangement (Documentation File A.3) | 10 |
| B8 | Evaluations of Data Quality (Documentation File TABLE.COG) | 12 |
| B9 | Questionnaire Data Interpretation (Documentation File A.4) | 12 |
| B10 | National Sampling Information (Documentation File A.5) | 14 |
| B11 | Questionnaire Texts and Variations (Documentation File A.6) | 14 |
| C | APPLICATION | 15 |
| C1 | Cross-National Descriptive Tabulation of the Questionnaires | 15 |
| C2 | Analysis of the Cognitive Achievement Instruments | 15 |
| C3 | Relational Analysis of Achievement and Classroom Factors | 18 |
| D | PRACTICE | 18 |
| D1 | Cognitive Item Classification | 18 |
| D2 | International Item Response Analysis | 20 |
| D3 | U.S.A. Classroom Relational Analysis | 20 |
| | APPENDIXES | |
| I | Analysis of the Cognitive Item Table | 21 |
| II | International Item Response File | 31 |
| III | U.S.A. Classroom Aggregate File | 43 |
| IV | Extracts from the Databank | 52 |
| V | Weighting and Sampling Errors | 98 |

# FIGURES


| *Figure* | | *Page* |
|---|---|---|
| 1 | Instrumentation for students, teachers-classrooms, and schools for the longitudinal, classroom process surveys at Population A | 2 |
| 2 | General organization of the databank directories and files | 4 |
| 3 | Illustration of response data layout for student files | 9 |
| 4 | Interpretation of the cognitive item table | 11 |
| 5 | Interpretation of the questionnaire item table | 13 |
| 6 | Processing flow for cross-national descriptive tabulation of the questionnaires | 16 |
| 7 | Processing flow for analysis of the cognitive achievement instruments | 17 |
| 8 | Processing flow for relational analysis of achievement and classroom factors | 19 |

# TRAINING MANUAL FOR USE OF THE DATABANK OF THE LONGITUDINAL, CLASSROOM PROCESS SURVEYS FOR POPULATION A IN THE IEA SECOND INTERNATIONAL MATHEMATICS STUDY

Richard G. Wolfe
The Ontario Institute for Studies in Education

## A. ORIENTATION

### A1. Overview of the Study

The IEA Second International Mathematics Study (SIMS) was conducted in 20 countries on two sampled populations: Population A of 13 year olds and Population B of students studying mathematics in their final year of secondary school. Mathematics achievement was measured with a large number of test items (180 or 176 for the 13 year olds, 136 for the older students) distributed across the curricular content of mathematics found at these grade levels. In addition, a substantial amount of background information was collected from pupils, teachers, and schools, including detailed questions on the students' opportunity to learn the specific mathematics of the tests.

For the 13 year old population, eight of the countries (Belgium Flemish, Canada British Columbia, Canada Ontario, France, Japan, New Zealand, Thailand, and the United States) augmented the standard IEA-type survey design with two crucial innovations: (1) a pretest (beginning of school year) measure based on the same mathematics item pool and (2) rich documentation of classroom teaching practices. The survey instrumentation is shown in Figure 1.

The subject of this training manual is the databank from the resulting longitudinal, classroom process surveys of Population A students, teachers, and schools. The datasets and the potential analyses are unique: for the first time one has international datasets, gathered under common and rigorous survey conditions, with a pretest methodology that allows precise assessment of the specific mathematical content that is learned in a school year and with detailed information on the content and methodology of instruction.

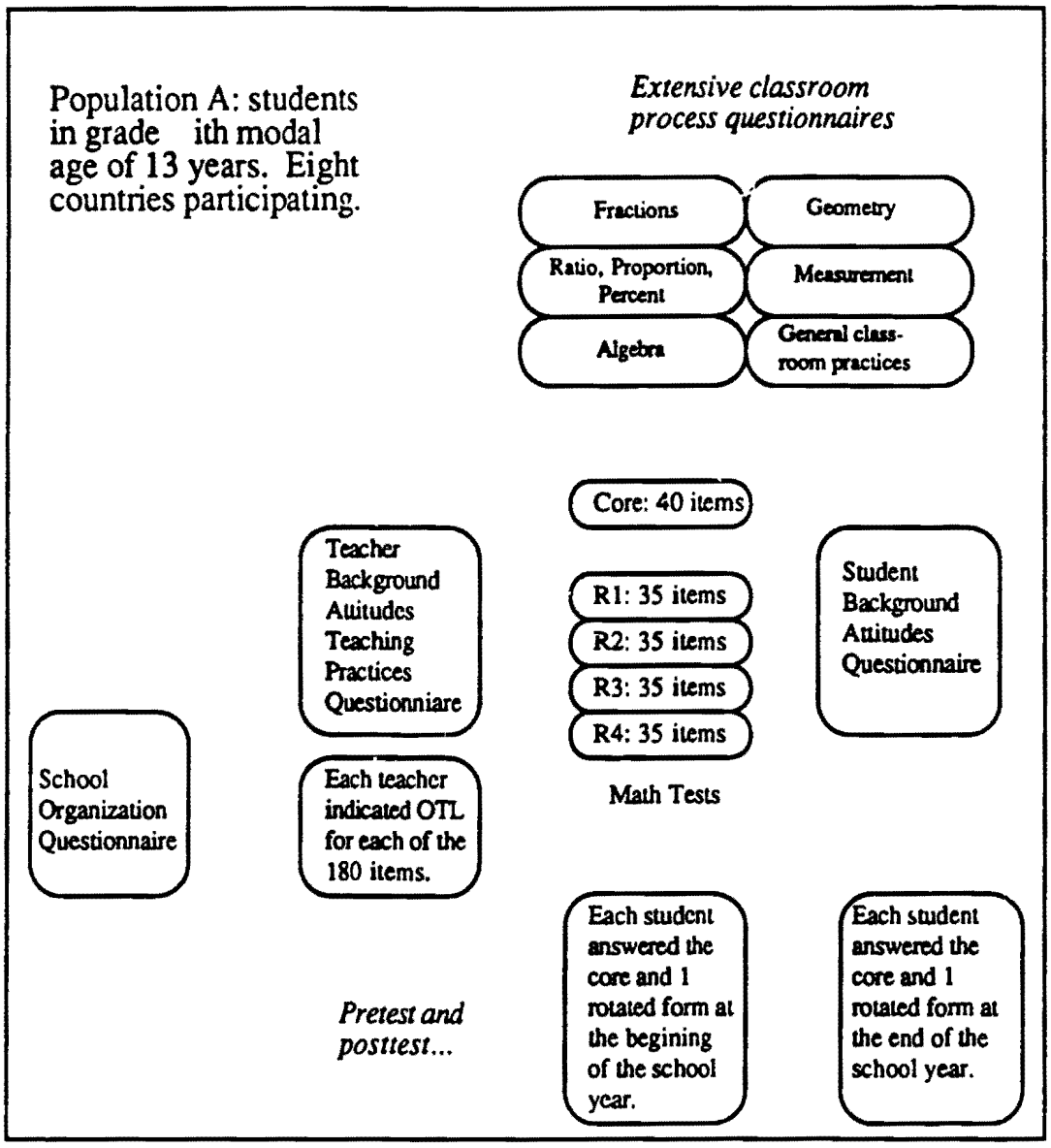



FIGURE 1. Instrumentation for students, teachers-classrooms, and schools for the longitudinal, classroom process surveys at Population A

## A2. Overview of the Databank

The databank comprises all the response data from the surveys in the eight participating countries together with a computerized version of all the corresponding data documentation.

The databank is distributed on industry-standard magnetic computer tape as 39 files. The files are all in standard ASCII (or EBCDIC) printable codes with record sizes of 80 characters or less.

The entire databank can also be stored in on-line disk, as it is on one of the VAX/VMS computers at the Ontario Institute for Studies in Education. The data and data documentation files are organized in a set of directories as shown in Figure 2. The total disk storage in kilobytes is indicated.

In the main DATABANK directory can be found the DATALINK procedure, which makes the databank files easily accessible for inspection and analysis. For example, after invoking DATALINK, the student response data for New Zealand could be called into a statistical program simply as STUDENT:ALL.NZ. While this procedure is specific to VAX/VMS computers, a similar arrangement can be made for other systems. Also in the main DATABANK directory are stored 4 demonstration programs and working files: LONGTAB.FOR, LONGTAB.OUT, COMBO.SPS, and COMBO.USA. These are described in section D of this manual and in Appendixes II and III. Finally, there is a file AAAREAD.ME, which contains last-minute update information about the databank.

For each country, there are three response data files, corresponding to the data levels: SCHOOL, TEACHER or classroom, and STUDENT. These are given the name ALL plus a country code: ALL.BFL, ALL.BC, ALL.ONT, ALL.FRA, ALL.JPN, ALL.NZ, ALL.THA, ALL.USA.

Each response file contains a fixed number of records per unit (e.g., per student). The first record contains the identification codes as well as keys that indicate the presence and completeness of the data (e.g., whether a student completed both pre and posttest questionnaires). The following records contain the original response data, laid out according to a simplified version of the international codebooks. The data for all questionnaires and tests, pre and post, are merged together.

The computerized documentation files provide unified information about the data storage and coding, including the international standard systems as well as particular notes about the national variations, sampling designs, etc.

There is one introductory file (A.0) and six main documentation files: (A.1) basic parameters and sizes, (A.2) definition of the response data layout, (A.3) cognitive item coding, (A.4) questionnaire item coding, (A.5) sampling notes and stratum definitions, and (A.6) detailed coding and textual explanations.

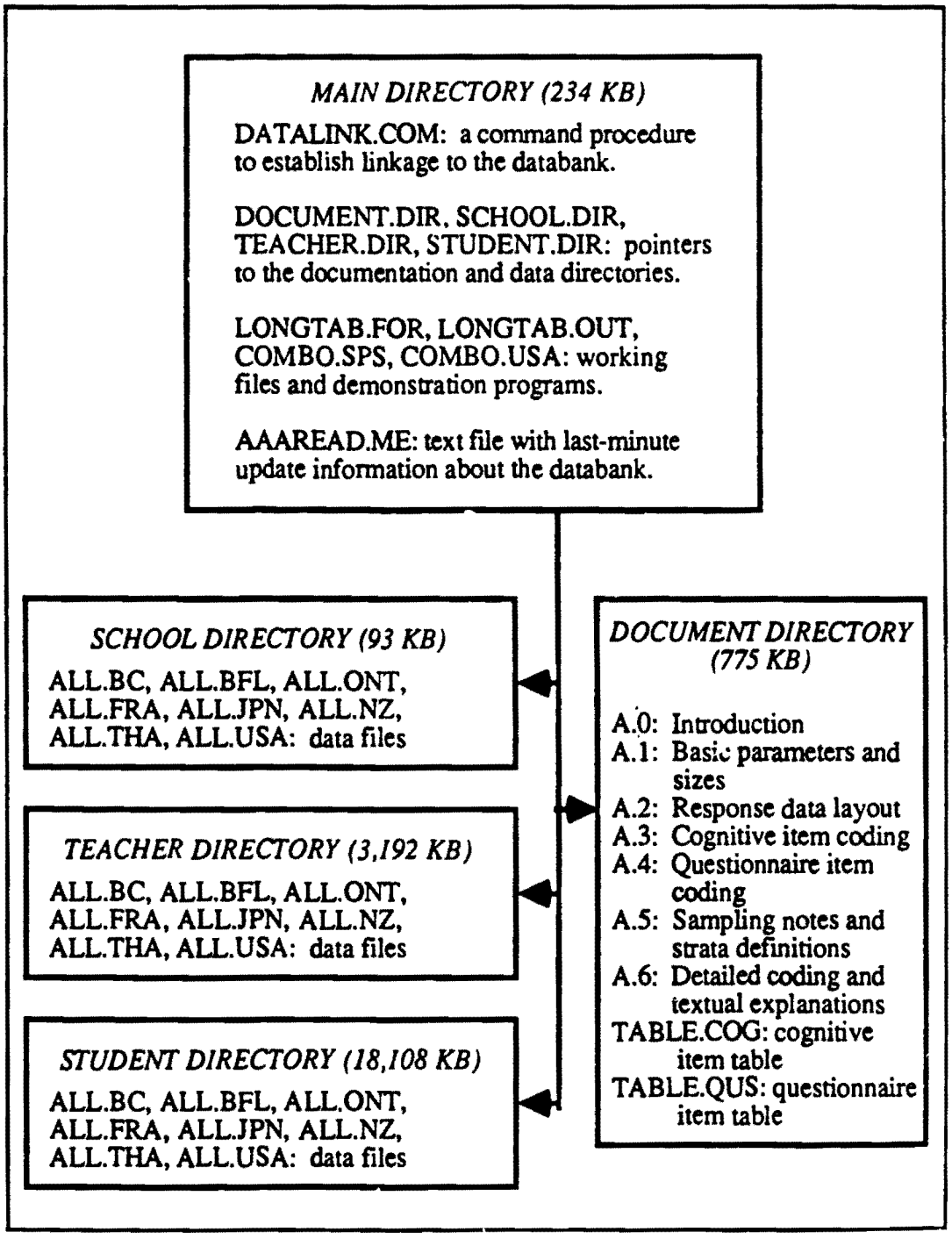



FIGURE 2. General organization of the databank directories and files

The documentation files can be printed but they are also intended to be read by programs that will print codebooks and provide entry into statistical analysis systems. In particular, the TABLE.COG and TABLE.QUS files are extracted from A.3 and A.4 for direct use by analysis programs.

## A3. Purpose of the Training

In a project of this size and importance (and infrequency), the databank will be of interest to secondary analysts for years. It is likely that the most important analyses will be secondary ones, perhaps for purposes we have not imagined and using analytic tools not yet invented. However, the size and complexity of the databank means that secondary analysts will need special training to gain access to the databank and to make efficient and accurate use of the data and their documentation. This manual outlines the nature of that training and is intended for use in a training course or for individual study.

The first goal of the training is to understand how to *interpret* the data and documentation in the Databank. The response data are spread out over 24 files, the documentation includes 9 files, and the control, working, and demonstration files account for 6 more. It is necessary to understand the structure of the data files, the content and coding of the documentation files, and the linkages across data files and between data and documentation. The second goal is to know how to *apply* the databank for some major types of analyses, including cross-national descriptive tabulation of the questionnaires, analysis of the cognitive achievement instruments, and in-depth analysis relating student achievement with classroom factors. The final goal of the training is to *practice* analysis, using the demonstration programs and working files.

# B. INTERPRETATION

## B1. Data Identification Codes

The eight countries whose data are stored in the databank are uniformly identified as follows:

| | | | |
|---|---|---|---|
| 15 | Belgium Flemish | 54 | Japan |
| 22 | British Columbia | 63 | New Zealand |
| 25 | Ontario | 79 | Thailand |
| 40 | France | 81 | U.S.A. |

Within countries, the identification for data is further broken down according to:

| | |
|---|---|
| Stratum | from the national sampling design, 2 digits |
| School | numbered within or across strata, 3 digits |
| Classroom | numbered within school, 2 digits |
| Teacher | numbered within or across schools, 3 digits |
| Student | numbered within classroom, 3 digits |

The nesting of identification codes–e.g., schools numbered within strata or numbered across strata–is not the same for all countries, but information will be unambiguously identified if all identification codes are used. That is:

| | |
|---|---|
| School | use statum and school codes |
| Teacher | use stratum, school, and teacher codes |
| Classroom | use stratum, school, and classroom codes |
| Student | use stratum, school, classroom, and student codes |

Generally, *classroom* and *teacher* refer to the same unit and the same data records. Only in the case where the same teacher is the teacher for two classrooms is a distinction made. Then the teacher code should be the same, but the classroom code will be different.

## B2. The Special Case of Belgium Flemish

Due to an error that occurred early in the processing of the Belgium Flemish data, the correspondences of student-level data from the pretest to the posttest and from the questionnaire to the cognitive test data were lost, except to the level of classroom.

For the purpose of assembling the databank, an arbitrary match-up of data was made, so that the format of the Belgium Flemish student data file *looks* like the format of the other countries. However, there is no promise whatsoever that the pretest, posttest, and quesionnaire data coded under one student identification code come from the same student.

Obviously, student level analysis that requires linking the information across tests and questionnaires is *impossible*. Analysis on classroom aggregations should be correct.

## B3. Instrument Identification Codes

In the original codebooks and in the databank, the different survey instruments and tests for student level information are identified with these codes:

500 Student pretest questionnaire
510 Student cognitive pretest - core
511 Student cognitive pretest - form A
512 Student cognitive pretest - form B
513 Student cognitive pretest - form C
514 Student cognitive pretest - form D
520 Student posttest questionnaire
530 Student cognitive posttest - core
531 Student cognitive posttest - form A
532 Student cognitive posttest - form B
533 Student cognitive posttest - form C
534 Student cognitive posttest - form D

For instruments at the teacher/classroom level, the following codes are used:

600 Teacher background questionnaire
610 Topic specific questionnaire - fractions
611 Topic specific questionnaire - ratio, proportion, percent
612 Topic specific questionnaire - measurement
613 Topic specific questionnaire - algebra
614 Topic specific questionnaire - geometry
615 General classroom process questionnaire
620 Opportunity to learn - core
621 Opportunity to learn - form A
622 Opportunity to learn - form B
623 Opportunity to learn - form C
624 Opportunity to learn - form D

Finally, for school-level data, there is one instrument:

800 School questionnaire.

## B4. Deciphering the Documentation Files *(Documentation File A.0)*

The databank documentation files *A.0* to *A.6* contain their own definitions and explanations. As explained in *A.0*, each file begins with a line filled with asterisks. This is followed by an introductory text explaining the purpose of the file and the layout of the main content. Then there is a line of minus signs and specially formatted table or coded listing that is intended for visual inspection or programmed interpretation. The final line of a file is filled with slashes.

*The analyst is advised to make a complete printout of the documentation files and also a printout of a page or two of each data file.* See also Appendix IV.

## B5. Instrument Utilization *(Documentation File A.1)*

Not all instruments were used in all countries. In the documentation file *A.1, Basic Parameters and Sizes,* is given definitive information on which instruments were used in each country. Also indicated is whether the original application of the instrument was in the cross-sectional or longitudinal format (this mainly concerns item order, and in the construction of this databank, the differences have been annotated or reconciled). For the cognitive tests, there is indication of which questions (response, calculator, OTL) were asked of students, since this varied from country to country and across forms.

## B6. Response Data Layout *(Documentation File A.2)*

There are 24 response data files, corresponding to the 3 levels of data (student, teacher-classroom, and school) for each of the 8 countries. The files are recorded in plain, printable text (ASCII or EBCDIC) with records that are no longer than 80 characters. On some systems, they will be of variable length, with blanks to the right stripped off, and on other systems they will be filled with blanks to exactly 80 characters.

The layout of the response data files is explained in detail in the documentation file *A.2*. The main features of the layout are as follows:

1. There is a fixed number of records per case, i.e., per school, teacher, or student. The number of records varies from country to country, depending on which instruments were employed (see documentation file *A.1*).

2. A block of records – corresponding to a school, a teacher, or a student – begins with a special identification record, which gives the ID codes for the position of the case in the data hierarchy and also gives special data availability codes for each of the possible data collection instruments that could apply to the case. The layout and coding of the identification record is explained in document file *A.2*.

3. The response data records follow the identification record in fixed order and with the instrument and record within instrument indicated. The division of the information into records follows the original international codebooks.

The precise card and column location of variables can be determined from the cognitive and questionnaire item tables (documentation files *A.3* and *A.4* ). Because of the rearrangment of columns in the databank, *cognitive items columns are test positions +7 and questionnaire columns are original positions -13*.

This layout is illustrated in Figure 3, which contains an extract from the USA student data file, STUDENT:ALL.USA.

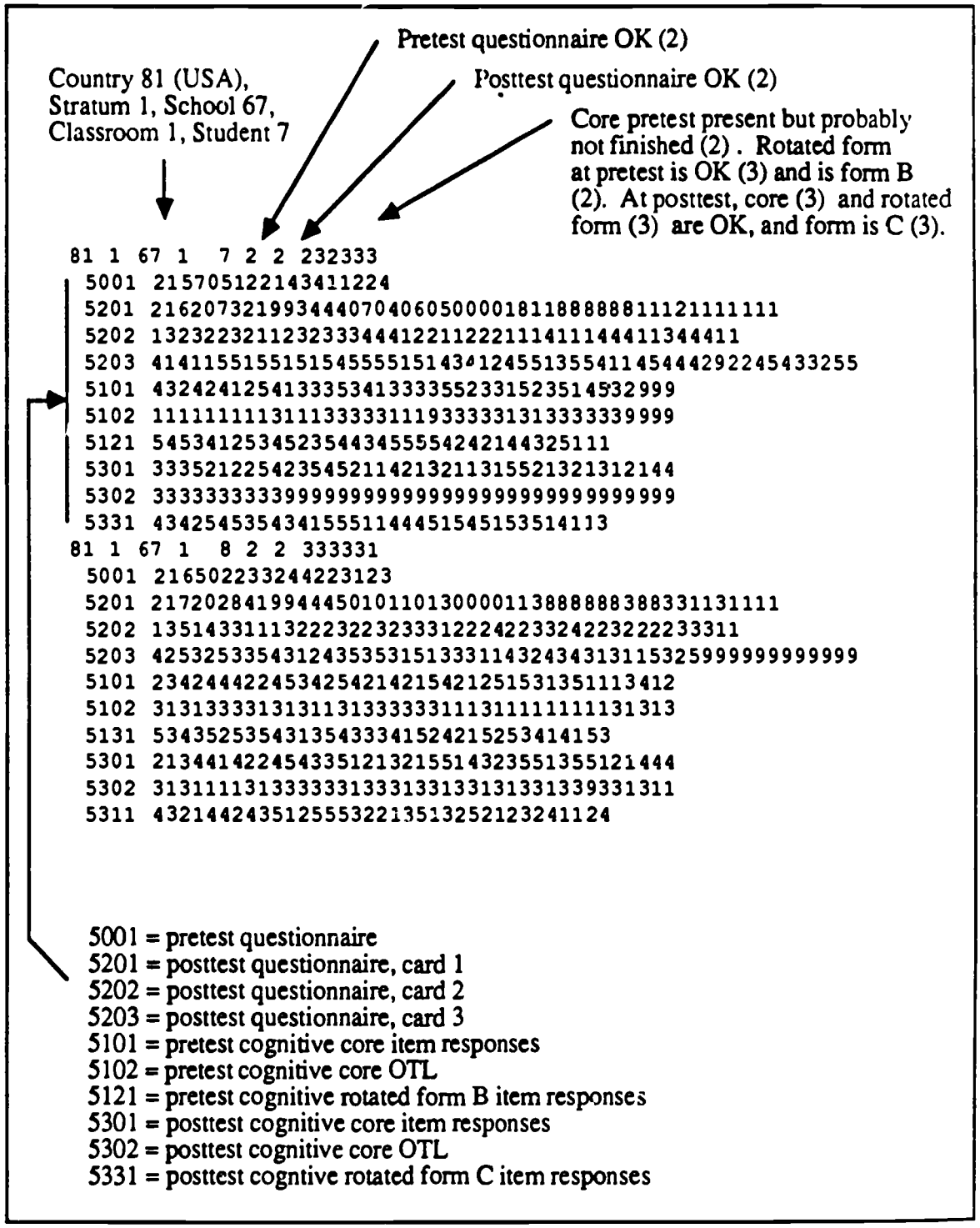



Figure 3. Illustration of response data layout for student files

## B7. Cognitive Testing Arrangement *(Documentation File A.3)*

The mathematics tests were based in Japan on a cross-sectional set of 176 items, divided into a core test of 40 items and 4 rotated forms of 34 items each, and elsewhere on a longitudinal set of 180 items, divided into a suggested core test of 40 items and 4 suggested rotated forms of 35 items each. There are 157 items in the overlap. Details are given in documentation files *A.2* and, especially, *A.3, Cognitive Item Coding*, the main content of which is also available in the *TABLE.COG* file, ready for automatic processing.

Generally, a form of matrix sampling was used, with each student taking a *core test* and also one of four *rotated forms*. The overall testing arrangements are summarized below, and in Figure 4 is shown how to interpret the cognitive item table.

| | |
|---|---|
| Belgium Flemish | Longitudinal forms adjusted to Belgium Flemish curriculum. Core and rotated form at pretest, core and rotated form at posttest, complete rotation between pre and posttest. NB: Some linkage has been lost. |
| British Columbia | Standard longitudinal forms, with one minor adjustment. Core only at pretest. Core and rotated forms at posttest. |
| Ontario | Standard longitudinal forms. Core and rotated form at pretest, core and rotated form at posttest, complete rotation between pre and posttest. |
| France | Longitudinal forms adjusted to French curriculum. Core and rotated form at pretest, core and same rotated form at posttest. |
| Japan | Special 60-item pretest selected from cross-sectional items. Cross-sectional core and rotated form at posttest. |
| New Zealand | Standard longitudinal forms. Core and rotated form at pretest, core and rotated form at posttest, complete rotation between pre and posttest. |
| Thailand | Standard longitudinal forms. Core and rotated form at pretest, core and rotated form at posttest, with rotation at posttest excluding repetition of the same form. |
| U.S.A. | Standard longitudinal forms. Core and rotated form at pretest, core and rotated form at posttest, complete rotation between pre and posttest. Extra sample of classrooms with posttest only. |

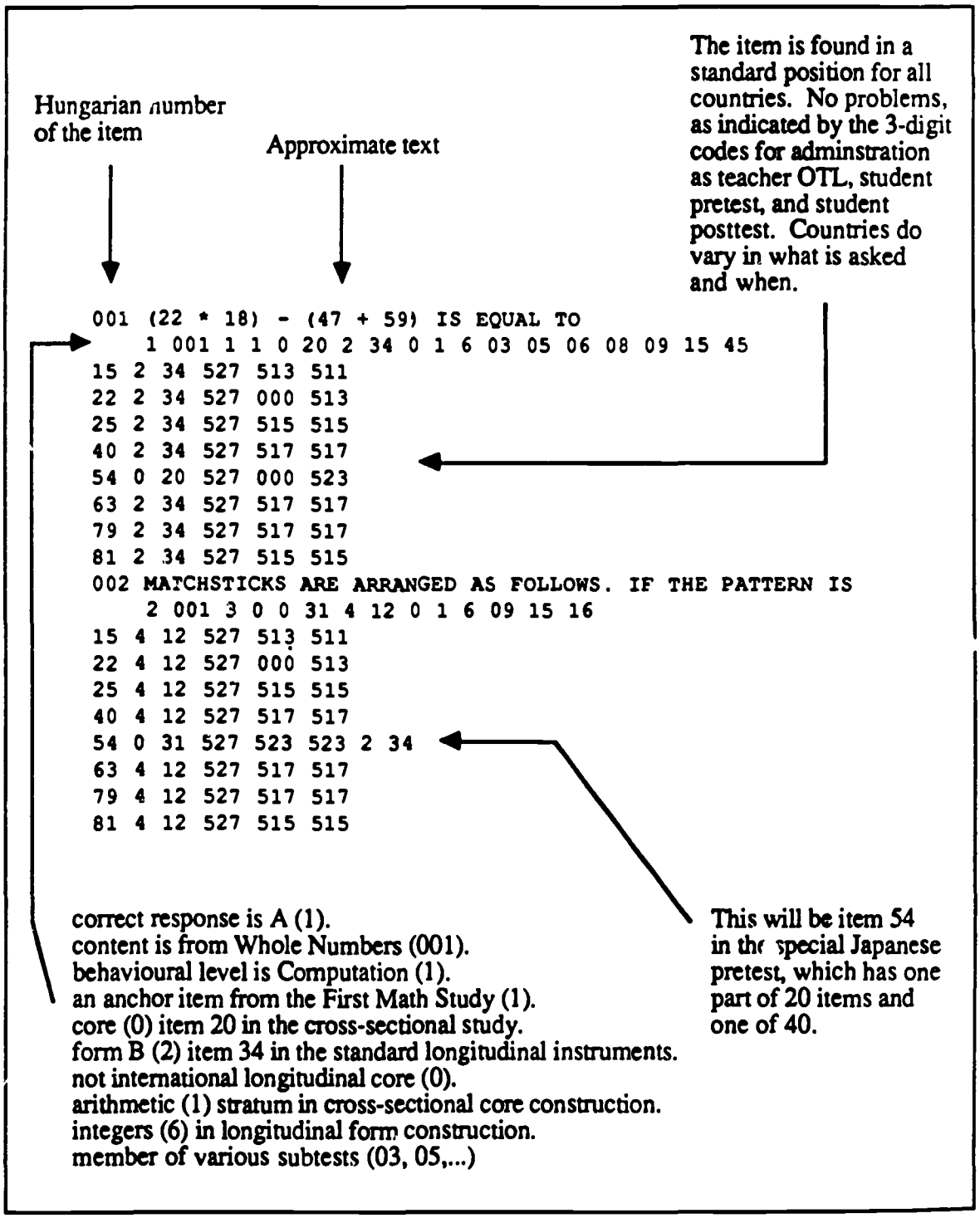



Figure 4. Interpretation of the cognitive item table

## B8. Evaluations of Data Quality *(Documentation File TABLE.COG)*

A major purpose of the elaborate documentation is to record the national variations and irregularities that inevitably occur in an international study of this magnitude. In the cognitive item table, each item is coded for each country according to whether it was:

| | |
|---|---|
| 0 | not used |
| 1 | used but spoiled, e.g., by a misprinting |
| 2 | used with non-standard alternatives and text |
| 3 | used with non-standard alternatives but standard text |
| 4 | used with standard alternatives but non-standard text |
| 5 | used in standard form |

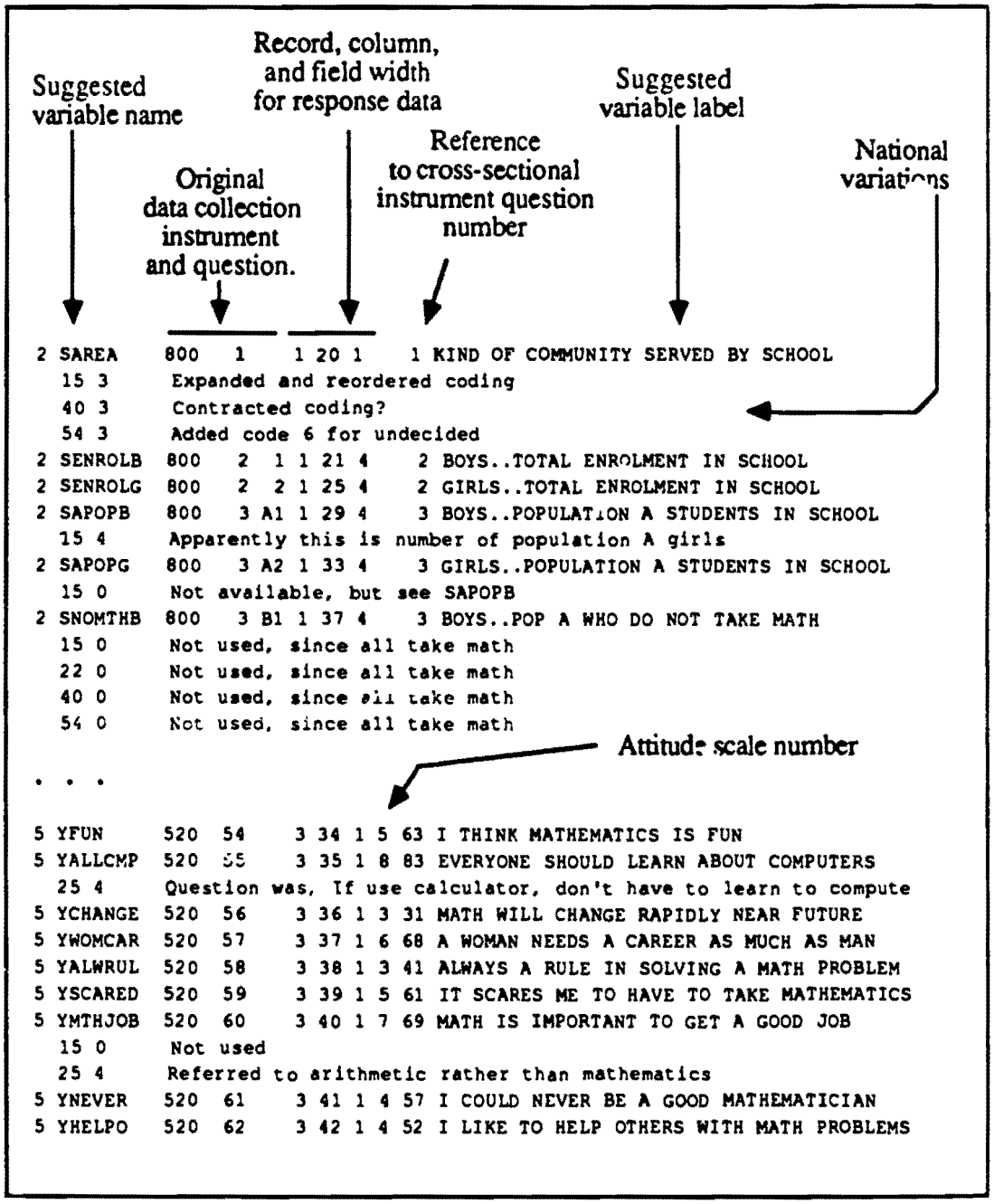
In fact, this coding is given for each potential application of an item: in the pretest, in the posttest, and for teachers' evaluations of opportunity to learn. Most items are now coded as "5", but can be anticipated that as secondary analysts make more careful examination of the items, additional problems will be discovered, and it can be hoped that this tabulated data can be updated and made available to the analyst community.

## B9. Questionnaire Data Interpretation *(Documentation File A.4)*

Extracts from documentation file *A.4* are given in Figure 5. One of the purposes of this section of the documentation is to provide a uniform system of naming the variables in the study. The first letters of the suggested names are determined by the data source:

| | |
|---|---|
| S | School questionnaire |
| T | Teacher background questionnaire |
| F | Fractions topic specific questionnaire |
| R | Ratio proportion percent topic specific questionnaire |
| M | Measurement topic specific questionnaire |
| G | Geometry topic specific questionnaire |
| A | Algebra topic specific questionnaire |
| C | Classroom process general questionnaire |
| X | Beginning of year student background/attitude questionnaire |
| Y | End of year student background/attitude questionnaire |

The file also contains linkage to the original question numbers in the questionnaires and to the card and column numbers from the original international codebooks. An abbreviated variable label is provided and should be acceptable to most statistical packages. Finally, for any items known to deviate in a country from the international standard, there is a coding similar to that used for cognitive items and a short explanation.




```
2 SAREA    800   1    1 20 1    1 KIND OF COMMUNITY SERVED BY SCHOOL
  15 3     Expanded and reordered coding
  40 3     Contracted coding?
  54 3     Added code 6 for undecided
2 SENROLB  800   2  1 1 21 4    2 BOYS..TOTAL ENROLMENT IN SCHOOL
2 SENROLG  800   2  2 1 25 4    2 GIRLS..TOTAL ENROLMENT IN SCHOOL
2 SAPOPB   800   3 A1 1 29 4    3 BOYS..POPULATION A STUDENTS IN SCHOOL
  15 4     Apparently this is number of population A girls
2 SAPOPG   800   3 A2 1 33 4    3 GIRLS..POPULATION A STUDENTS IN SCHOOL
  15 0     Not available, but see SAPOPB
2 SNOMTHB  800   3 B1 1 37 4    3 BOYS..POP A WHO DO NOT TAKE MATH
  15 0     Not used, since all take math
  22 0     Not used, since all take math
  40 0     Not used, since all take math
  54 0     Not used, since all take math

. . .

5 YFUN     520  54    3 34 1 5 63 I THINK MATHEMATICS IS FUN
5 YALLCMP  520  55    3 35 1 8 83 EVERYONE SHOULD LEARN ABOUT COMPUTERS
  25 4     Question was, If use calculator, don't have to learn to compute
5 YCHANGE  520  56    3 36 1 3 31 MATH WILL CHANGE RAPIDLY NEAR FUTURE
5 YWOMCAR  520  57    3 37 1 6 68 A WOMAN NEEDS A CAREER AS MUCH AS MAN
5 YALWRUL  520  58    3 38 1 3 41 ALWAYS A RULE IN SOLVING A MATH PROBLEM
5 YSCARED  520  59    3 39 1 5 61 IT SCARES ME TO HAVE TO TAKE MATHEMATICS
5 YMTHJOB  520  60    3 40 1 7 69 MATH IS IMPORTANT TO GET A GOOD JOB
  15 0     Not used
  25 4     Referred to arithmetic rather than mathematics
5 YNEVER   520  61    3 41 1 4 57 I COULD NEVER BE A GOOD MATHEMATICIAN
5 YHELPO   520  62    3 42 1 4 52 I LIKE TO HELP OTHERS WITH MATH PROBLEMS
```

Figure 5. Interpretation of the questionnaire item table

## B10. National Sampling Information *(Documentation File A.5)*

Each participating country drew a national sample according to an sampling plan that had to have been approved by the international sampling referee. The samples are generally stratified and multistaged. Documentation file *A.5* contains textual explanations of the sampling plans, including definitions of the sampling strata, clusters, and subsamplings; formulas for the derivation of national statistics; and all necessary population sizes and weights for producing standard statistical estimates.

## B11. Questionnaire Texts and Variations *(Documentation File A.6)*

Documentation file *A.6* consists of a coded text that includes:

- the full English text of the questions from the original international instruments, including the question stems and the response alternatives
- linkage to the questionnaire item table via the variable names
- the numerical value coded for each of the response alternatives
- suggested value labels for the response alternatives
- indications of national variations: extra or missing response alternatives, variations in question wording or intent, substitute questions, etc.

This information is complexly formatted, but it can be read and interpreted to guide the selection and use of items between the national datasets. It should also be possible to program automatic input of the file into special procedures for constructing national codebooks or statistical program setups.

The details of this part of the documentation system are beyond the scope of this training manual, but they are described fully in the introductory section of the file and in a published report (Wolfe, R. G., "Integrating data and documentation in a multi-national research project: the IEA second international mathematics study. *Proceedings of the Second International Workshop on Statistical Database Management*, Los Altos, California, 1983. Lawrence Berkeley Laboratory, University of California, and U.S. Department of Energy.)

# C. APPLICATION

## C1. Cross-National Descriptive Tabulation of the Questionnaires

In Figure 6 is shown the general flow of processing to use the documentation and data files to tabulate responses to the questionnaires over instruments and over countries.

The actual processing steps are shown in square-edged boxes on the left. How exactly these are implemented will depend, of course, on the statistical programming system being used. In theory, all steps can be driven automatically from the machine-readable documentation files. Often in practice, careful, manual reading of the documentation file will assist the analyst in defining and setting up the statistical program.

The round-edged boxes on the right of Figure 6 show the references to the different documentation files.

## C2. Analysis of Cognitive Achievement Instruments

In Figure 7 is shown the general flow of processing to use the documentation and data files to analyze the mathematics test information.

The complex matrix sampling that was used to administer the mathematics tests implies that decisions need always to be made about how to construct and adjust or scale the subtest scores (total scores do not make sense in SIMS). Reference to the documentation file *A.1, Basic Parameters and Sizes,* and tabulation of the TABLE.COG documentation file will be useful in arriving at a stragegy; an example is given in section D1 and Appendix I of this manual.

In addition to the technical information about test formatting and item quality, the TABLE.COG table contains the content coding of the mathematics items and so it can be used to select items for subtests.

The availability and completeness codes found in each block of student response data need to be considered, together with sampling information from the documentation file *A.5*. In particular, a decision needs to be made of what to do with students who participated only in the pretest or only in the posttest.

Also, something has to be done with students who did not complete a test (the indication recorded in the file is based on the statistical likelihood of the pattern of omits as they appear at the end of the test relative to the total number of omits.)

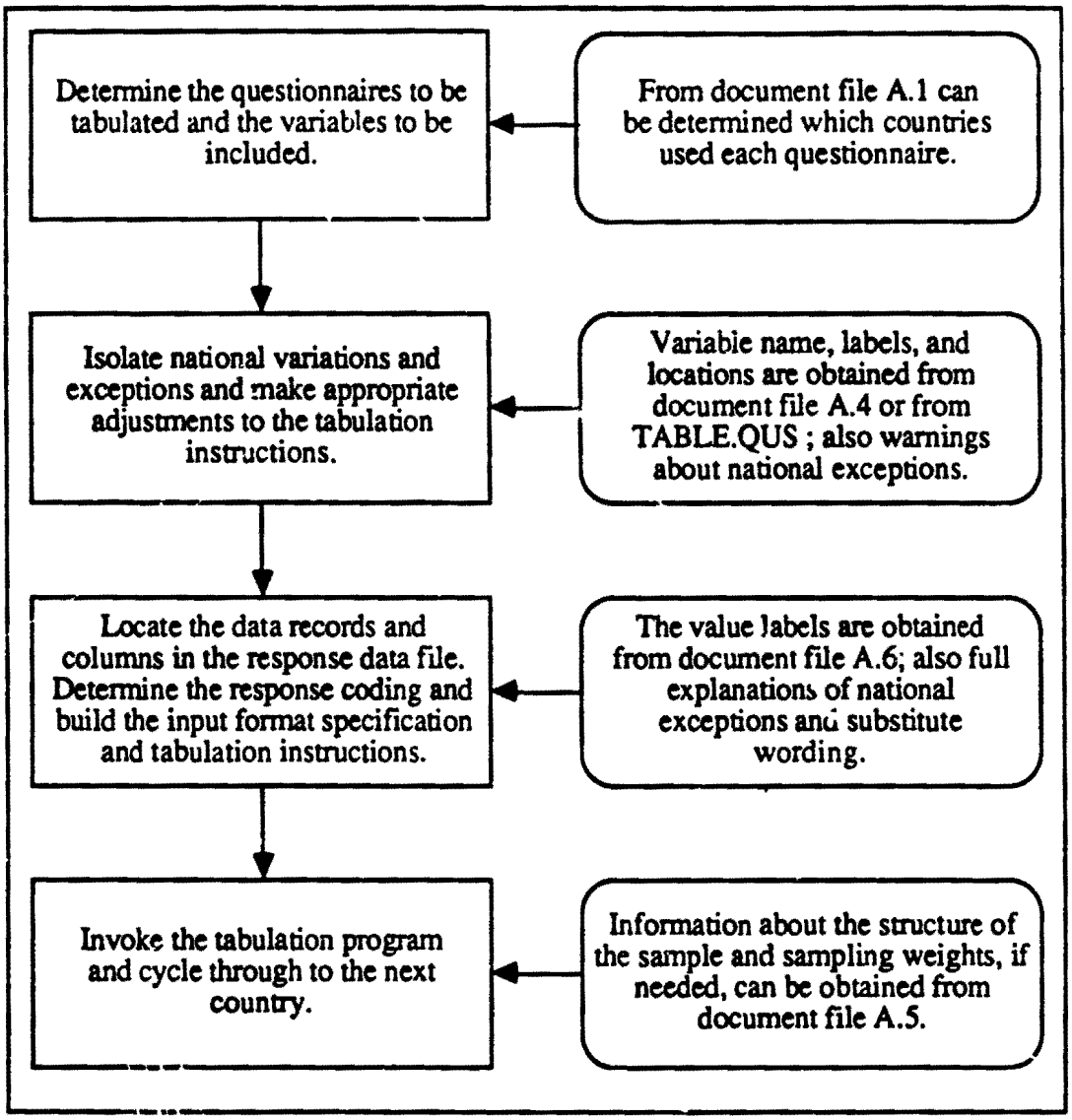



Figure 6. Processing flow for cross-national descriptive tabulation of the questionnaires

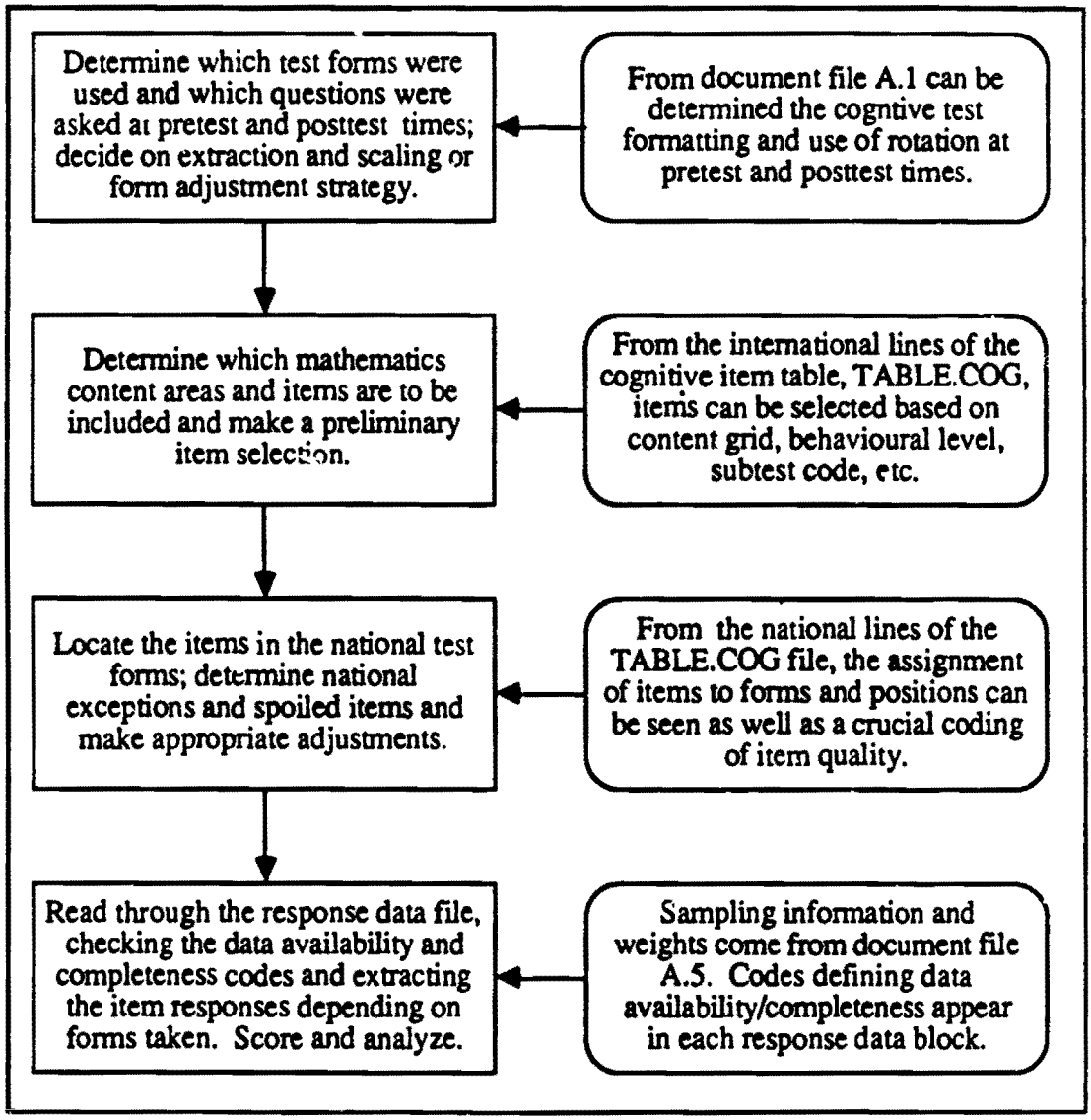



Figure 7. Processing flow for analysis of the cognitive achievement instuments

## C3. Relational Analysis of Achievement and Classroom Factors

In Figure 8 is shown the general flow of processing for an integrated analysis of student-level and classroom-level variables.

As in the previous cases, the documentation files are used to drive the steps of selecting and computing questionnaire items and mathematics subtest scores. In this case, the steps are carried out in parallel for student and classroom information. For example, when a subtest is defined for student mathematics achievement, it is likely that there should be a parallel opportunity to learn (OTL) score calculated from the teacher response data, although the method of calculation may be quite different (teachers responded to all items, while matrix sampling was used for student responses.)

When the matching of student and classroom level data is made, the combined identification code for Stratum, School, and Classroom is key. However, the careful analyst will consider what to do with cases where the same teacher appears in both classrooms of a school.

For both the student data and the classroom-teacher data, the availability and completeness codes found in each block of response data need to be examined, and decisions need to be made of what to do with students who participated only in the pretest or only in the posttest, with classrooms with no teacher data, of teacher data with no student data, etc. The goal of the databank construction has been to include all available data and to leave the selection problem for each analyst to solve.

# D. PRACTICE

## D1. Cognitive Item Classification

The first practice analysis suggested for an analyst new to SIMS and its databank involves treating the TABLE.COG file as data for analysis and tabulation.

In Appendix I are given the input to and the results from a MINITAB analysis of the file. The purpose was to recover the content dimensions of the special Japanese pretest and the Japanese cross-sectional posttest core and rotated forms.

*Suggested exercises:* (1) Do the same analysis for one of the other countries, which will have used the longitudinal item set. (3) Create an output file with the necessary item positions and keys to drive a subsequent analysis program that will create subtests scores or analyses.

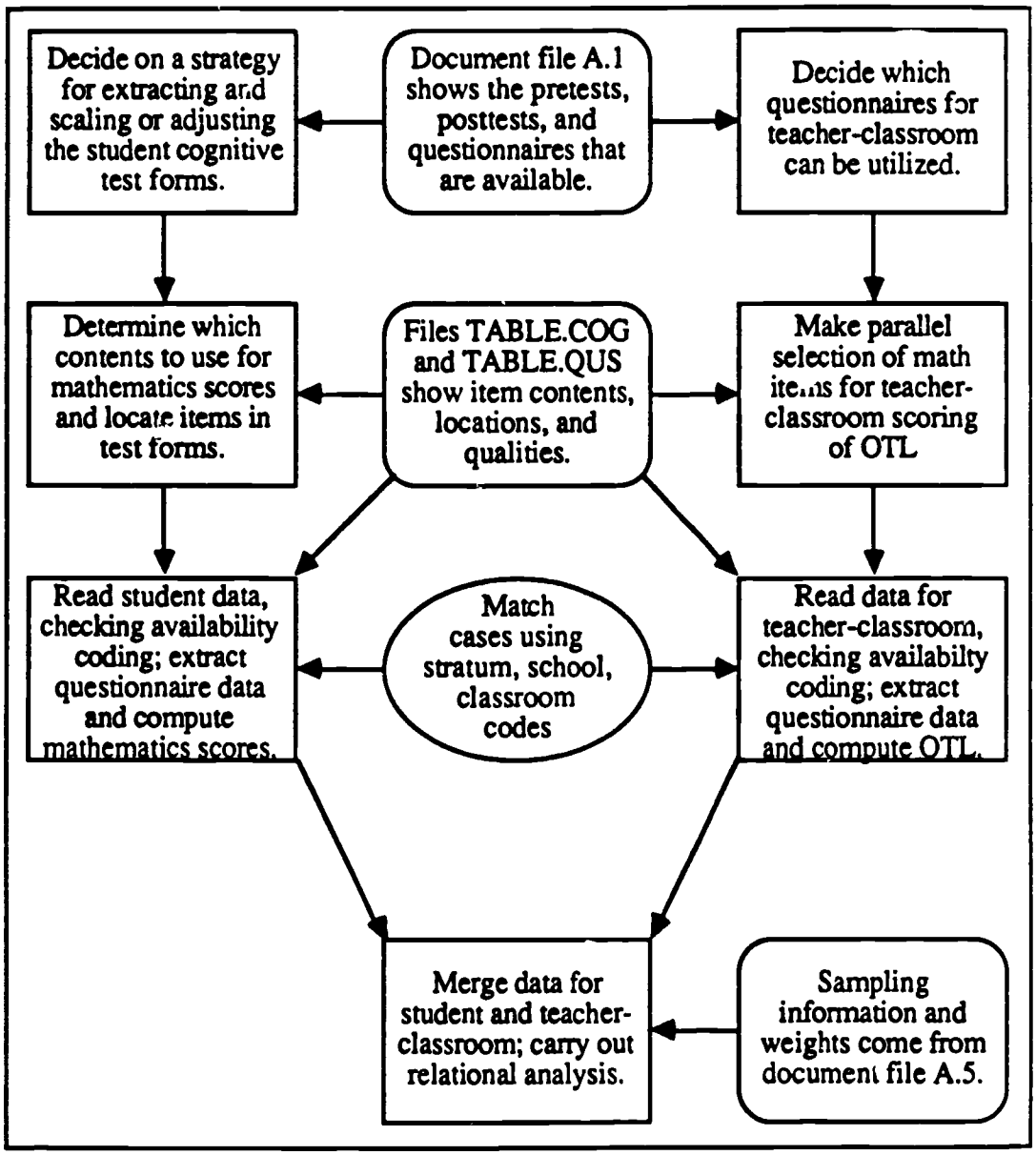



Figure 8. Processing flow for relational analysis of achievment and classroom factors

## D2. International Item Response Analysis

Included with the distribution of the databank is a demonstration program called LONGTAB.FOR and the "unofficial" working file LONGTAB.OUT which the program generated. The data file format, a partial listing of data, and a listing of the program are presented in Appendix II.

The units of analysis are the 199 items, and the variables recorded include the basic classification information from the cognitive item table and an approximate response distribution – right, wrong, omit by pretest, posttest – over countries. The response distribution is based on simple tabulation of the student data, so the estimates are not properly weighted. They should be sufficiently accurate for the purpose of practice.

*Suggested exercises:* (1) Compare gain from pretest to posttest with initial pretest level by subtest–as defined by the grid–and country. (2) Check omit rates over countries and determine the effect of "correction" for "guessing".

## D3. U.S.A. Classroom Relational Analysis

The process of putting together a full aggregate file from the databank, if done with proper attention to all the coding variations, formatting differences, etc., is rather long. Included with the databank is another "unofficial" working file, COMBO.USA, of classroom-level variables and aggregates for the U.S.A. Again no guarantees are made of the accuracy or appropriateness of the data. It is intended for practice.

The file includes basic information from the teacher background questionnaire, the complete set of responses to the general classroom process questionnaire, adjusted subscores for student pretest and posttest mathematics achievement in 6 content areas, and teacher estimates of prior and current opportunity to learn for the same content areas. Also included is a special U.S.A. national coding of mathematics class type, which is considered to be a crucial variable there.

The layout of the file and a listing of an SPSS-X program setup for its use are presented in Appendix III. The setup program, COMBO.SPS, is also included in the databank distribution.

*Suggested exercises:* (1) Determine the regression of posttest on pretest and compare that over subtests. (2) Include some of the teacher characteristics in a multiple regression.

## Appendix I. Analysis of the Cognitive Item Table


Page 1 MINITAB program listing

Page 2-9 Results

```
note reads the cognitive item table international item
note number and major grid position and then the form assignments
note for Japan.

fread 'document:table.cog' into c1-c2 c11-c12 c21-c22
(f3.0/6x,f1.0/////3x,f1.0,f3.0,12x,f2.0,f3.0///)

name c1 'Hungnum'
name c2 'Grid'
name c11 'Postform'
name c12 'Postitem'
name c21 'Preform'
name c22 'Freitem'

note omit the items that are longitudinal only.

omit 0 in c12 carrying c1 c2 c11 c21 c22 putting into  c12 c1 c2 c11 c21 c22

note check distribution by grid level

histo c2
table c2 c11

note construct a single code combining posttest form and item

multipy c11 by 100 put into c13
add c12 to c13 put into c13

note sort and print an item table for posttest

sort c13 carrying c1 c2 c11 c12 c21 c22 putting into c13 c1 c2 c11 c12 c21 c22
print c1 c2 c11 c12 c21 c22

note omit items not on the pretest

omit 0 c22 carrying c1 c2 c11 c12 c21 putting into c22 c1 c2 c11 c12 c21

note construct a single code combining pretest form and item

multiple c21 by 100 put into c23
add c22 to c23 put into c23

note sort and print an item table for posttest

sort c23 carrying c1 c2 c11 c12 c21 c22 putting into c23 c1 c2 c11 c12 c21 c22
print c1 c2 c11 c12 c21 c22

note check grid distribution on pretest

histo c2

stop
```

```
MTB > histo c2

  Grid

   MIDDLE OF    NUMBER OF
   INTERVAL     OBSERVATIONS
         0       46     **********************************************
         1       40     ****************************************
         2       48     ************************************************
         3       18     ******************
         4       24     ************************
```

```
MTB > table c2 c11
```

ROWS: Grid  COLUMNS: Postform

| | 0 | 1 | 2 | 3 | 4 | ALL |
|---|---|---|---|---|---|---|
| 0 | 11 | 8 | 9 | 8 | 10 | 46 |
| 1 | 9 | 8 | 7 | 9 | 7 | 40 |
| 2 | 11 | 10 | 10 | 9 | 8 | 48 |
| 3 | 4 | 3 | 3 | 4 | 4 | 18 |
| 4 | 5 | 5 | 5 | 4 | 5 | 24 |
| ALL | 40 | 34 | 34 | 34 | 34 | 176 |

```
MTB > print c1 c2 c11 c12 c21 c22
```

| ROW | Hungnum | Grid | Postform | Postitem | Preform | Preitem |
|---|---|---|---|---|---|---|
| 1 | 14 | 1 | 0 | 1 | 2 | 12 |
| 2 | 27 | 2 | 0 | 2 | 0 | 0 |
| 3 | 6 | 0 | 0 | 3 | 2 | 4 |
| 4 | 12 | 1 | 0 | 4 | 0 | 0 |
| 5 | 30 | 2 | 0 | 5 | 0 | 0 |
| 6 | 25 | 2 | 0 | 6 | 0 | 0 |
| 7 | 32 | 3 | 0 | 7 | 0 | 0 |
| 8 | 40 | 4 | 0 | 8 | 1 | 18 |
| 9 | 22 | 2 | 0 | 9 | 1 | 13 |
| 10 | 15 | 1 | 0 | 10 | 1 | 11 |
| 11 | 39 | 4 | 0 | 11 | 0 | 0 |
| 12 | 17 | 1 | 0 | 12 | 2 | 10 |
| 13 | 31 | 2 | 0 | 13 | 2 | 25 |
| 14 | 4 | 0 | 0 | 14 | 0 | 0 |
| 15 | 34 | 3 | 0 | 15 | 0 | 0 |
| 16 | 20 | 1 | 0 | 16 | 0 | 0 |
| 17 | 3 | 0 | 0 | 17 | 1 | 1 |
| 18 | 5 | 0 | 0 | 18 | 0 | 0 |
| 19 | 26 | 2 | 0 | 19 | 1 | 15 |
| 20 | 1 | 0 | 0 | 20 | 0 | 0 |
| 21 | 33 | 3 | 0 | 21 | 0 | 0 |
| 22 | 18 | 1 | 0 | 22 | 2 | 18 |
| 23 | 10 | 0 | 0 | 23 | 2 | 32 |
| 24 | 37 | 4 | 0 | 24 | 0 | 0 |
| 25 | 16 | 1 | 0 | 25 | 2 | 15 |
| 26 | 8 | 0 | 0 | 26 | 1 | 6 |
| 27 | 35 | 3 | 0 | 27 | 0 | 0 |
| 28 | 21 | 2 | 0 | 28 | 0 | 0 |
| 29 | 29 | 2 | 0 | 29 | 2 | 24 |
| 30 | 36 | 4 | 0 | 30 | 0 | 0 |
| 31 | 2 | 0 | 0 | 31 | 2 | 34 |
| 32 | 23 | 2 | 0 | 32 | 1 | 1[illegible] |
| 33 | 9 | 0 | 0 | 33 | 2 | 5 |
| 34 | 11 | 0 | 0 | 34 | 0 | 0 |
| 35 | 7 | 0 | 0 | 35 | 1 | 2 |
| 36 | 24 | 2 | 0 | 36 | 0 | 0 |
| 37 | 38 | 4 | 0 | 37 | 2 | 29 |
| 38 | 28 | 2 | 0 | 38 | 2 | 19 |
| 39 | 19 | 1 | 0 | 39 | 1 | 12 |
| 40 | 13 | 1 | 0 | 40 | 2 | 14 |

| ROW | Hungnum | Grid | Postform | Postitem | Preform | Preitem |
|---|---|---|---|---|---|---|
| 41 | 52 | 1 | 1 | 1 | 0 | 0 |
| 42 | 55 | 1 | 1 | 2 | 2 | 16 |
| 43 | 50 | 1 | 1 | 3 | 0 | 0 |
| 44 | 62 | 2 | 1 | 4 | 0 | 0 |
| 45 | 72 | 4 | 1 | 5 | 1 | 20 |
| 46 | 173 | 2 | 1 | 6 | 0 | 0 |
| 47 | 67 | 3 | 1 | 7 | 0 | 0 |
| 48 | 169 | 2 | 1 | 8 | 0 | 0 |
| 49 | 57 | 2 | 1 | 9 | 0 | 0 |
| 50 | 44 | 0 | 1 | 10 | 2 | 3 |
| 51 | 43 | 0 | 1 | 11 | 0 | 0 |
| 52 | 69 | 4 | 1 | 12 | 2 | 28 |
| 53 | 58 | 2 | 1 | 13 | 0 | 0 |
| 54 | 64 | 2 | 1 | 14 | 0 | 0 |
| 55 | 51 | 1 | 1 | 15 | 0 | 0 |
| 56 | 46 | 0 | 1 | 16 | 1 | 5 |
| 57 | 48 | 0 | 1 | 17 | 0 | 0 |
| 58 | 63 | 2 | 1 | 18 | 0 | 0 |
| 59 | 65 | 3 | 1 | 19 | 0 | 0 |
| 60 | 47 | 0 | 1 | 20 | 2 | 6 |
| 61 | 45 | 0 | 1 | 21 | 0 | 0 |
| 62 | 49 | 1 | 1 | 22 | 0 | 0 |
| 63 | 71 | 4 | 1 | 23 | 1 | 17 |
| 64 | 66 | 3 | 1 | 24 | 0 | 0 |
| 65 | 70 | 4 | 1 | 25 | 2 | 27 |
| 66 | 60 | 2 | 1 | 26 | 0 | 0 |
| 67 | 41 | 0 | 1 | 27 | 0 | 0 |
| 68 | 56 | 1 | 1 | 28 | 0 | 0 |
| 69 | 53 | 1 | 1 | 29 | 2 | 9 |
| 70 | 61 | 2 | 1 | 30 | 1 | 14 |
| 71 | 68 | 4 | 1 | 31 | 0 | 0 |
| 72 | 54 | 1 | 1 | 32 | 0 | 0 |
| 73 | 42 | 0 | 1 | 33 | 0 | 0 |
| 74 | 59 | 2 | 1 | 34 | 2 | 26 |

| ROW | Hungnum | Grid | Postform | Postitem | Preform | Preitem |
|---|---|---|---|---|---|---|
| 75 | 86 | 1 | 2 | 1 | 2 | 11 |
| 76 | 100 | 4 | 2 | 2 | 0 | 0 |
| 77 | 93 | 2 | 2 | 3 | 0 | 0 |
| 78 | 85 | 1 | 2 | 4 | 0 | 0 |
| 79 | 88 | 1 | 2 | 5 | 0 | 0 |
| 80 | 95 | 2 | 2 | 6 | 0 | 0 |
| 81 | 104 | 4 | 2 | 7 | 0 | 0 |
| 82 | 74 | 0 | 2 | 8 | 2 | 35 |
| 83 | 73 | 0 | 2 | 9 | 0 | 0 |
| 84 | 176 | 2 | 2 | 10 | 0 | 0 |
| 85 | 80 | 0 | 2 | 11 | 2 | 31 |
| 86 | 78 | 0 | 2 | 12 | 1 | 4 |
| 87 | 83 | 1 | 2 | 13 | 0 | 0 |
| 88 | 96 | 2 | 2 | 14 | 0 | 0 |
| 89 | 90 | 2 | 2 | 15 | 0 | 0 |
| 90 | 89 | 2 | 2 | 16 | 0 | 0 |
| 91 | 101 | 4 | 2 | 17 | 0 | 0 |
| 92 | 97 | 3 | 2 | 18 | 0 | 0 |
| 93 | 99 | 3 | 2 | 19 | 2 | 40 |
| 94 | 171 | 2 | 2 | 20 | 0 | 0 |
| 95 | 103 | 4 | 2 | 21 | 0 | 0 |
| 96 | 81 | 0 | 2 | 22 | 0 | 0 |
| 97 | 77 | 0 | 2 | 23 | 0 | 0 |
| 98 | 79 | 0 | 2 | 24 | 1 | 8 |
| 99 | 91 | 2 | 2 | 25 | 0 | 0 |
| 100 | 75 | 0 | 2 | 26 | 1 | 3 |
| 101 | 76 | 0 | 2 | 27 | 0 | 0 |
| 102 | 87 | 1 | 2 | 28 | 0 | 0 |
| 103 | 84 | 1 | 2 | 29 | 0 | 0 |
| 104 | 102 | 4 | 2 | 30 | 0 | 0 |
| 105 | 98 | 3 | 2 | 31 | 0 | 0 |
| 106 | 92 | 2 | 2 | 32 | 0 | 0 |
| 107 | 94 | 2 | 2 | 33 | 0 | 0 |
| 108 | 82 | 1 | 2 | 34 | 1 | 10 |

| ROW | Hung..um | Grid | Postform | Postitem | Preform | Preitem |
|---|---|---|---|---|---|---|
| 109 | 114 | 1 | 3 | 1 | 0 | 0 |
| 110 | 130 | 3 | 3 | 2 | 0 | 0 |
| 111 | 175 | 2 | 3 | 3 | 0 | 0 |
| 112 | 108 | 0 | 3 | 4 | 2 | 1 |
| 113 | 133 | 4 | 3 | 5 | 0 | 0 |
| 114 | 136 | 4 | 3 | 6 | 0 | 0 |
| 115 | 125 | 2 | 3 | 7 | 0 | 0 |
| 116 | 132 | 3 | 3 | 8 | 0 | 0 |
| 117 | 105 | 0 | 3 | 9 | 0 | 0 |
| 118 | 129 | 3 | 3 | 10 | 2 | 39 |
| 119 | 135 | 4 | 3 | 11 | 0 | 0 |
| 120 | 109 | 0 | 3 | 12 | 0 | 0 |
| 121 | 126 | 2 | 3 | 13 | 0 | 0 |
| 122 | 131 | 3 | 3 | 14 | 0 | 0 |
| 123 | 116 | 1 | 3 | 15 | 0 | 0 |
| 124 | 107 | 0 | 3 | 16 | 0 | 0 |
| 125 | 119 | 1 | 3 | 17 | 0 | 0 |
| 126 | 121 | 2 | 3 | 18 | 0 | 0 |
| 127 | 128 | 2 | 3 | 19 | 0 | 0 |
| 128 | 110 | 0 | 3 | 20 | 2 | 8 |
| 129 | 120 | 1 | 3 | 21 | 2 | 13 |
| 130 | 112 | 0 | 3 | 22 | 0 | 0 |
| 131 | 113 | 1 | 3 | 23 | 1 | 9 |
| 132 | 172 | 1 | 3 | 24 | 0 | 0 |
| 133 | 127 | 2 | 3 | 25 | 0 | 0 |
| 134 | 124 | 2 | 3 | 26 | 2 | 20 |
| 135 | 123 | 2 | 3 | 27 | 0 | 0 |
| 136 | 117 | 1 | 3 | 28 | 0 | 0 |
| 137 | 134 | 4 | 3 | 29 | 0 | 0 |
| 138 | 122 | 2 | 3 | 30 | 0 | 0 |
| 139 | 106 | 0 | 3 | 31 | 0 | 0 |
| 140 | 115 | 1 | 3 | 32 | 0 | 0 |
| 141 | 111 | 0 | 3 | 33 | 0 | 0 |
| 142 | 118 | 1 | 3 | 34 | 0 | 0 |

| ROW | Hungnum | Grid | Postform | Postitem | Preform | Preitem |
|---|---|---|---|---|---|---|
| 143 | 159 | 2 | 4 | 1 | 2 | 21 |
| 144 | 155 | 2 | 4 | 2 | 2 | 23 |
| 145 | 141 | 0 | 4 | 3 | 0 | 0 |
| 146 | 154 | 2 | 4 | 4 | 0 | 0 |
| 147 | 146 | 0 | 4 | 5 | 0 | 0 |
| 148 | 140 | 0 | 4 | 6 | 0 | 0 |
| 149 | 143 | 0 | 4 | 7 | 2 | 7 |
| 150 | 164 | 4 | 4 | 8 | 0 | 0 |
| 151 | 153 | 1 | 4 | 9 | 2 | 17 |
| 152 | 150 | 1 | 4 | 10 | 0 | 0 |
| 153 | 163 | 3 | 4 | 11 | 0 | 0 |
| 154 | 147 | 1 | 4 | 12 | 0 | 0 |
| 155 | 145 | 0 | 4 | 13 | 0 | 0 |
| 156 | 138 | 0 | 4 | 14 | 0 | 0 |
| 157 | 139 | 0 | 4 | 15 | 2 | 2 |
| 158 | 144 | 0 | 4 | 16 | 0 | 0 |
| 159 | 168 | 4 | 4 | 17 | 2 | 30 |
| 160 | 166 | 4 | 4 | 18 | 0 | 0 |
| 161 | 148 | 1 | 4 | 19 | 0 | 0 |
| 162 | 167 | 4 | 4 | 20 | 1 | 19 |
| 163 | 152 | 1 | 4 | 21 | 0 | 0 |
| 164 | 137 | 0 | 4 | 22 | 2 | 33 |
| 165 | 162 | 3 | 4 | 23 | 2 | 38 |
| 166 | 174 | 2 | 4 | 24 | 2 | 22 |
| 167 | 157 | 2 | 4 | 25 | 0 | 0 |
| 168 | 142 | 0 | 4 | 26 | 1 | 7 |
| 169 | 170 | 2 | 4 | 27 | 0 | 0 |
| 170 | 165 | 4 | 4 | 28 | 0 | 0 |
| 171 | 156 | 2 | 4 | 29 | 0 | 0 |
| 172 | 151 | 1 | 4 | 30 | 0 | 0 |
| 173 | 149 | 1 | 4 | 31 | 0 | 0 |
| 174 | 158 | 2 | 4 | 32 | 0 | 0 |
| 175 | 160 | 3 | 4 | 33 | 2 | 36 |
| 176 | 161 | 3 | 4 | 34 | 2 | 37 |

```
MTB > print c1 c2 c11 c12 c21 c22
```

| ROW | Hungnum | Grid | Postform | Postitem | Preform | Preitem |
|---|---|---|---|---|---|---|
| 1 | 3 | 0 | 0 | 17 | 1 | 1 |
| 2 | 7 | 0 | 0 | 35 | 1 | 2 |
| 3 | 75 | 0 | 2 | 26 | 1 | 3 |
| 4 | 78 | 0 | 2 | 12 | 1 | 4 |
| 5 | 46 | 0 | 1 | 16 | 1 | 5 |
| 6 | 8 | 0 | 0 | 26 | 1 | 6 |
| 7 | 142 | 0 | 4 | 26 | 1 | 7 |
| 8 | 79 | 0 | 2 | 24 | 1 | 8 |
| 9 | 113 | 1 | 3 | 23 | 1 | 9 |
| 10 | 82 | 1 | 2 | 34 | 1 | 10 |
| 11 | 15 | 1 | 0 | 10 | 1 | 11 |
| 12 | 19 | 1 | 0 | 39 | 1 | 12 |
| 13 | 22 | 2 | 0 | 9 | 1 | 13 |
| 14 | 61 | 2 | 1 | 30 | 1 | 14 |
| 15 | 26 | 2 | 0 | 19 | 1 | 15 |
| 16 | 23 | 2 | 0 | 32 | 1 | 16 |
| 17 | 71 | 4 | 1 | 23 | 1 | 17 |
| 18 | 40 | 4 | 0 | 8 | 1 | 18 |
| 19 | 167 | 4 | 4 | 20 | 1 | 19 |
| 20 | 72 | 4 | 1 | 5 | 1 | 20 |
| 21 | 108 | 0 | 3 | 4 | 2 | 1 |
| 22 | 139 | 0 | 4 | 15 | 2 | 2 |
| 23 | 44 | 0 | 1 | 10 | 2 | 3 |
| 24 | 6 | 0 | 0 | 3 | 2 | 4 |
| 25 | 9 | 0 | 0 | 33 | 2 | 5 |
| 26 | 47 | 0 | 1 | 20 | 2 | 6 |
| 27 | 143 | 0 | 4 | 7 | 2 | 7 |
| 28 | 110 | 0 | 3 | 20 | 2 | 8 |
| 29 | 53 | 1 | 1 | 29 | 2 | 9 |
| 30 | 17 | 1 | 0 | 12 | 2 | 10 |

| ROW | Hungnum | Grid | Postform | Postitem | Preform | Preitem |
|---|---|---|---|---|---|---|
| 31 | 86 | 1 | 2 | 1 | 2 | 11 |
| 32 | 14 | 1 | 0 | 1 | 2 | 12 |
| 33 | 120 | 1 | 3 | 21 | 2 | 13 |
| 34 | 13 | 1 | 0 | 40 | 2 | 14 |
| 35 | 16 | 1 | 0 | 25 | 2 | 15 |
| 36 | 55 | 1 | 1 | 2 | 2 | 16 |
| 37 | 153 | 1 | 4 | 9 | 2 | 17 |
| 38 | 18 | 1 | 0 | 22 | 2 | 18 |
| 39 | 28 | 2 | 0 | 38 | 2 | 19 |
| 40 | 124 | 2 | 3 | 26 | 2 | 20 |
| 41 | 159 | 2 | 4 | 1 | 2 | 21 |
| 42 | 174 | 2 | 4 | 24 | 2 | 22 |
| 43 | 155 | 2 | 4 | 2 | 2 | 23 |
| 44 | 29 | 2 | 0 | 29 | 2 | 24 |
| 45 | 31 | 2 | 0 | 13 | 2 | 25 |
| 46 | 59 | 2 | 1 | 34 | 2 | 26 |
| 47 | 70 | 4 | 1 | 25 | 2 | 27 |
| 48 | 69 | 4 | 1 | 12 | 2 | 28 |
| 49 | 38 | 4 | 0 | 37 | 2 | 29 |
| 50 | 168 | 4 | 4 | 17 | 2 | 30 |
| 51 | 80 | 0 | 2 | 11 | 2 | 31 |
| 52 | 10 | 0 | 0 | 23 | 2 | 32 |
| 53 | 137 | 0 | 4 | 22 | 2 | 33 |
| 54 | 2 | 0 | 0 | 31 | 2 | 34 |
| 55 | 74 | 0 | 2 | 8 | 2 | 35 |
| 56 | 160 | 3 | 4 | 33 | 2 | 36 |
| 57 | 161 | 3 | 4 | 34 | 2 | 37 |
| 58 | 162 | 3 | 4 | 23 | 2 | 38 |
| 59 | 129 | 3 | 3 | 10 | 2 | 39 |
| 60 | 99 | 3 | 2 | 19 | 2 | 40 |

```
MTB > histo c2

  Grid

   MIDDLE OF    NUMBER OF
   INTERVAL     OBSERVATIONS
         0       21    **********************
         1       14    **************
         2       12    ************
         3        5    *****
         4        8    ********
```

## Appendix II. International Item Response File


| | |
|---|---|
| Pages 1-3 | File layout |
| Page 4 | Partial listing of file (LONGTAB.OUT) |
| Pages 5-9 | Listing of Fortran program (LONGTAB.FOR) |

INTERNATIONAL ITEM RESPONSE FILE LAYOUT
==========

INTERNATIONAL LINE ONE

1-3 ITEM REFERENCE NUMBER FROM ITEM BANK

5-80 ABBREVIATED TEXT OF THE INTERNATIONAL FORM OF THE ITEM

INTERNATIONAL LINE TWO

5 CORRECT RESPONSE ALTERNATIVE
1 A 2 B 3 C 4 D 5 E

7-9 POSITION IN INTERNATIONAL CONTENT GRID

000 ARITHMETIC
001 WHOLE NUMBERS
002 COMMON FRACTIONS
003 DECIMAL FRACTIONS
004 RATIO, PROPORTION, PERCENT
005 NUMBER THEORY
006 POWERS
100 ALGEBRA
101 INTEGERS
102 RATIONALS
103 INTEGER EXPONENTS
104 FORMULAS
105 POLYNOMIALS EXPRESSIONS
106 EQUATIONS AND INEQUATIONS
107 RELATIONS
200 GEOMETRY
201 CLASSIFICATION
202 PROPERTIES
203 CONGRUENCE
204 SIMILARITY
205 GEOMETRIC CONSTRUCTIONS
206 PYTHAGOREAN
207 COORDINATES
208 DEDUCTIONS
209 TRANSFORMATION (INFORMAL)
212 SPATIAL VISUALIZATION
215 TRANSFORMATIONAL GEOMETRY
300 PROBABILITY AND STATISTICS
302 ORGANIZATION
303 REPRESENTATION
304 MEAN, MEDIAN, MODE
306 PROBABILITY
400 MEASUREMENT
401 UNITS
402 ESTIMATION
403 APPROXIMATION
404 DETERMINING MEASURES

11 BEHAVIOURAL LEVEL
1 COMPUTATION
2 COMPREHENSION
3 APPLICATION
4 ANALYSIS

13 ANCHOR ITEM STATUS
0 NOT AN ANCHOR
1 ANCHOR ITEM
2 MODIFIED ANCHOR ITEM

15 FORM PLACEMENT FOR THE CROSSSECTIONAL STUDY
17-18 POSITION WITHIN FORM FOR THE CROSSSECTONAL STUDY

20 FORM PLACEMENT FOR THE LONGITUDINAL STUDY
22-23 POSITION WITHIN FORM FOR THE LONGITUDINAL STUDY

NOTE... THE PLACEMENT AND POSITION NUMBERS ARE ZERO FOR ITEMS NOT INCLUDED IN A GIVEN STUDY. THE PLACEMENT AND POSITION NUMBERS FOR THE LONGITUDINAL STUDY ARE THOSE OF THE SUGGESTED STANDARD.

25 LONGITUDINAL CORE TYPE
- 0 NOT LONGITUDINAL INTERNATONAL.CORE
- 1 LONGITUDINAL INTERNATIONAL CORE

27 STRATUM FOR CROSSSECTIONAL FORM CONSTRUCTION
- 1 ARITHMETIC
- 2 ALGEBRA
- 3 GEOMETRY
- 4 PROBABILITY AND STATISTICS
- 5 MEASUREMENT

29 STRATUM FOR LONGITUDINAL FORM CONSTRUCTION
- 1 FRACTIONS
- 2 RATIO PROPORTION PERCENT
- 3 ALGEBRA
- 4 GEOMETRY
- 5 MEASUREMENT
- 6 INTEGERS (NOT IN INTERNATIONAL CORE)
- 7 PROBABILITY AND STATISTICS (NOT IN INTERNATIONAL CORE)

31-32 SUBTEST CODE 1
34-35 SUBTEST CODE 2
...
79-80 SUBTEST CODE 17

THESE ARE THE SUBTESTS DEFINED IN MEMORANDUM A/369, WITH CORRECTIONS. THE NUMBER OF SUBTEST CODES PER ITEM VARIES. THE FOLLOWING SUBTEST CODES ARE USED.

01 ESTIMATION AND APPROXIMATION
02 NEW MATHS IN 1ST STUDY
03 BASIC SKILLS
04 ALGEBRA (COMPUTATION)
05 CALCULATOR USE
06 ARITHMETIC (COMPUTATION)
07 PROPORTIONATE THINKING
08 ANCHOR ITEMS
09 WHOLE NUMBERS
10 COMMON FRACTIONS
26 PLANE FIGURES
27 COORDINATES
28 INFORMAL TRANSFORMATIONS IN GEOMETRY
29 GEOMETRY
30 GEOMETRY (COMPUTATION)
31 GEOMETRY (OTHER THAN COMPUTATION)
32 REPRESENTATION OF DATA
33 (NOT USED)
34 PROBABILITY AND STATISTICS

11 COMMON FRACTIONS
(COMPUTATION)

35 PROBABILITY AND STATISTICS
(OTHER THAN COMPUTATION)

12 DECIMAL FRACTIONS
13 RATIO AND PROPORTION
14 PERCENT
15 ARITHMETIC
16 ARITHMETIC (OTHER THAN COMPUTATION)
17 INTEGERS
18 FORMULAS AND ALGEBRAIC EXPRESSIONS
19 EQUATIONS AND INEQUATIONS
20 ALGEBRA
21 ALGEBRA (OTHER THAN COMPUTATION)
22 CLASSIFICATION OF PLANE FIGURES
23 PROPERTIES OF PLANE FIGURES
24 CONGRUENCE OF PLANE FIGURES
25 SIMILARITY OF PLANE FIGURES
36 STANDARD UNITS OF MEASURE
37 DETERMINATION OF MEASURES
38 MEASUREMENT
39 MEASUREMENT (COMPUTATION)
40 MEASUREMENT (OTHER THAN COMPUTATION)
41 PROBABILITY AND STATISTICS (COMPUTATION)
42 MODIFIED ANCHOR ITEMS
43 NON-VERBAL
44 VERBAL
45 ANCHOR (NON-VERBAL)
46 ANCHOR (VERBAL)
47 DIAGRAMMATIC ITEMS (PAIRED WITH NON-DIAGRAMMATIC)
48 NON-DIAGRAMMATIC ITEMS (PAIRED WITH DIAGRAMMATIC)

NATIONAL LINES (1 PER EACH OF EIGHT COUNTRIES, IN ORDER
15/BFL, 22/BC, 25/ONT, 40/FRA,
54/JPN, 63/NZ, 79/THA, 81/USA)

3-8 PERCENT RIGHT PRETEST
9-14 PERCENT WRONG PRETEST
15-20 PERCENT OMIT PRETEST
23-28 PERCENT RIGHT POSTTEST
29-34 PERCENT WRONG POSTTEST
35-40 PERCENT OMIT POSTTEST

NOTE THAT "-1" IS CODED WHEN ITEM RESPONSE INFORMATION IS NOT AVAILABLE.

PARTIAL LISTING OF THE INTERNATIONAL ITEM RESPONSE FILE

001 (22 * 18) - (47 + 59) IS EQUAL TO
1 001 1 1 0 20 2 34 0 1 6 03 05 06 08 09 15 45
73.0 24.5 2.5 71.2 27.1 1.7
-1.0 -1.0 -1.0 74.3 22.2 3.5
78.4 20.8 0.8 73.2 26.2 0.6
72.5 19.4 8.0 79.6 17.1 3.4
-1.0 -1.0 -1.0 83.3 15.8 0.9
65.2 33.5 1.2 63.2 35.6 1.2
59.7 38.4 2.0 63.4 36.3 0.2
69.3 29.1 1.6 69.7 29.6 0.6

002 MATCHSTICKS ARE ARRANGED AS FOLLOWS. IF THE PATTERN IS
2 001 3 0 0 31 4 12 0 1 6 09 15 16
53.7 43.0 3.3 55.5 41.9 2.6
-1.0 -1.0 -1.0 51.8 45.8 2.4
42.7 53.5 3.8 46.8 51.3 1.9
57.7 34.9 7.4 60.8 34.6 4.6
58.1 40.5 1.4 62.4 37.0 0.6
48.8 49.5 1.7 50.4 48.2 1.4
33.1 63. 3.1 36.7 61.5 1.8
37.6 59.7 2.7 43.3 55.5 1.2

003 2/5 + 3/8 IS EQUAL TO
5 002 1 1 0 17 0 31 1 1 1 03 06 08 10 11 15 43 45
51.2 46.8 2.1 78.3 20.2 1.5
66.9 31.6 1.5 72.1 26.4 1.5
58.2 40.7 1.1 63.6 35.6 0.7
4.5 77.9 17.6 73.4 24.6 2.0
84.2 15.2 0.6 89.2 10.4 0.3
29.0 70.3 0.7 39.0 60.2 0.8
28.4 70.6 0.9 48.0 51.8 0.2
44.8 54.5 0.8 61.5 37.9 0.6

004 WHICH OF THE FOLLOWING IS A PAIR OF EQUIVALENT FRACTIONS?
4 002 2 0 0 14 3 3 0 1 1 10 15 16
86.7 11.9 1.5 90.3 9.0 0.7
-1.0 -1.0 -1.0 89.7 9.0 1.3
81.6 17.3 1.1 85.1 14.1 0.9
43.5 22.7 33.8 82.6 11.1 6.3
-1.0 -1.0 -1.0 82.6 16.5 1.0
58.6 39.4 1.9 65.4 33.9 0.7
62.7 35.9 1.4 74.2 25.4 0.4
72.4 26.5 1.1 80.4 19.3 0.3

005 0.40 * 6.38 IS EQUAL TO
3 003 1 1 0 18 0 26 0 1 1 03 05 06 08 12 15 43 45
64.8 32.1 3.1 59.5 37.4 3.1
54.8 40.2 5.0 61.5 34.7 3.8
60.1 37.0 2.9 64.6 34.2 1.2
70.3 24.9 4.7 73.5 24.5 2.0
-1.0 -1.0 -1.0 62.8 36.4 0.8
35.7 62.4 1.9 40.3 58.2 1.5
39.6 59.2 1.3 49.6 49.8 0.6

52.1 45.4 2.5 63.3 35.7 1.0

. . .

LISTING OF FORTRAN PROGRAM USED TO OBTAIN THE
INTERNATIONAL ITEM RESPONSE FILE

```
c this program reads the cognitive item table and each of
c the student response file  and produces an integrated table of
c item statistics, right-wrong-omit by pretest-posttest by country,
c with some item codes.  The results will be accumulated in rwo,
c with sample sizes in sam.
c
c
      integer p,q,r,c,u,v
      character*17 id
      character*1 xxx
      dimension rwo(199,3,2,8)
      character*3 place(8)
      data place / 'bfl','bc','ont','fra','jpn','nz','tha','usa'/
c
c the following table shows the ndes(form,time,country),
c the number of items per form by time and country
c
      dimension ndes(2,2,8)
      data ndes
     1      /40,35,40,35,
     1       40, 0,40,35,
     1       40,35,40,35,
     1       40,35,40,35,
     1       60, 0,40,34,
     1       40,35,40,35,
     1       40,35,40,35,
     1       40,35,40,35/
c
c the following arrays will hold a response data set for one
c student, including the availability and form keys
c
      dimension kab(3,2),inp(60,2,2)
c
c The following arrays store what is read from the cognitive
c item table.
c imap(p,q,j,c) will indicate where to put tabulations for item p
c in form q at time j for country c.
c
c
      dimension key(199)
      character*3 hun(199)
      character*76 itlab(199)
      character*74 itcode(199)
      dimension imap(60,5,2,8)
```

```
c
c clear out the maps
c
          do c=1,8
           do p=1,60
           do q=1,5
           do j=1,2
             imap(p,q,j,c)=0
             enddo
             enddo
             enddo
          enddo
c
c read and store cit data input
c
        open(unit=22,file='document:table.cog',status='old',
     1    readonly)
        do i=1,199
c
c read the international information
c
           read(22,20)hun(i),itlab(i),key(i),itcode(i)
20         format(a3,1x,a/4x,i1,1x,a)
c
c read the national information, making a special case of Japan,
c which has a non-standard pretest
c
           do c=1,8
              if( c.ne.5 ) read(22,30)ifrm,ipos,ia1,ia2
              if( c.eq.5 ) read(22,30)ifrm,ipos,ia1,ia2,jfrm,jpos
30            format(2x,i2,i3,5x,i1,3x,i1,2x,i2,i3 )
c
c che       application codes and count anything other than
c 4 or .    unusable.  For the pretest, making Japar
c a special case...
c
                if( ia1.ge.4 ) then
                   if( c.eq.5 ) then
                       p=(jfrm-1)*20+jpos
                       imap(p,1,1,c)=i
                   else
                       imap(ipos,ifrm+1,1,c)=i
                       endif
                   endif
c
c for the posttest...
c
                if( ia2.ge.4 ) then
                   imap(ipos,ifrm+1,2,c)=i
                   endif
             enddo
           enddo
```

```
c
c loop through the data files, opening the input and clearing the
c accumulators
c
        do c=1,8
          type *, c
          open(unit=20,file='student:all.'//place(c),
     1                 status='old',readonly)
          do i=1,199
                do j=1,2
                   do k=1,3
                      rwo(i,k,j,c)=0
                      enddo
                      enddo
                      enddo
c
c now read the data and score and aggregate, making a special
c skip for the USA student OTL data
c
110       read(20,120,end=200)id,kab
120       format(a17,6i1////)
          do j=1,2
                  do k=1,2
                        if( ndes(k,j,c).ne.0 ) read(20,130)
     1                     (inp(p,k,j),p=1,ndes(k,j,c))
130                     format(6x,60i1)
                        if( c.eq.8 .and. k.eq.1 ) read(20,140)xxx
140                     format(a1)
                        enddo
                        enddo
```

```
c
c insist on a complete pretest and posttest (in BC, there is no
c pretest rotated form)
c in this loop, j is time pre or post, k is form core or rotated
c in the US, throw out the supplementary samples and Hartford
c
           if( kab(1,1).eq.3 .and. kab(1,2).eq.3 .and. kab(2,2).eq.3
     1          .and. (kab(2,1).eq.3 .or. c.eq.2 )
     1          .and. (c.ne.8 .or. id(5:5).ne.'3' .and.
     1                 (id(9:9).eq.'1' .or. id(9:9).eq.'2') ) ) then
                do j=1,2
                do k=1,2
                   nn=ndes(k,j,c)
                   if( nn.ne.0 ) then
                      kk=1
                      if(k.eq.2)kk=kab(3,j)+1
                      do p=1,nn
                        ii=imap(p,kk,j,c)
                        if( inp(p,k,j).eq.key(ii) ) then
                                v=1
                        elseif( inp(p,k,j).gt.5 ) then
                                v=3
                        else
                                v=2
                                endif
                        rwo(ii,v,j,c)=rwo(ii,v,j,c)+1
                        enddo
                      endif
                    enddo
                    enddo
                endif
              goto 110
c
c close the file and loop
c
200         close(unit=20)
            enddo
```

```
c
c now write out the results
c
      open(unit=1,file='longtab.out',status='new',
     1          carriagecontrol='list')
      do i=1,199
            write(1,210)hun(i),itlab(i),key(i),itcode(i)
210         format(a3,1x,a/i5,1x,a)
            do c=1,8
                do j=1,2
                    sam=rwo(i,1,j,c)+rwo(i,2,j,c)+rwo(i,3,j,c)
                    if( sam.eq.0 ) then
                            do v=1,3
                                    rwo(i,v,j,c)=-1
                                    enddo
                        else
                            do v=1,3
                                    rwo(i,v,j,c)=100*rwo(i,v,j,c)/
     1                                      sam
                                    enddo
                            endif
                    enddo
                write(1,220)((rwo(i,v,j,c),v=1,3),j=1,2)
220             format(2x,3f6.1,2x,3f6.1)
                enddo
            enddo
      end
```

## Appendix III. U.S.A. Classroom Aggregate File


| | |
|---|---|
| Page 1 | File layout |
| Page 2 | Partial listing of file (COMBO.USA) |
| Pages 3-8 | Listing of SPSS-X setup (COMBO.SPS) |

LAYOUT OF COMBO.USA FILE
==========

A. There are seven lines per classroom.

B. The first line is labeled "ID" and contains

3-4 sampling stratum
5-7 school number
8-9 classroom number within school
10-14 number of students with complete pretest and posttest

C. The second line is labeled "TEA" and contains, in format (6x,4f6.0),

- Gender of the teacher
- Age of the teacher
- Response by teacher to question of differentiating assignments (from the teacher background questionnaire)
- Special coding of USA class types (see USA national report)

Missing data are coded -1.

D. The third line contains two sets of OTL summaries, the first set having to do with OTL before the target year, the second with OTL in the target year. In each set the content scales are:

ARITH all arithmetic except ratio-proportion-percent
RPP ratio-proportion-percent
ALG algebra
GEOM geometry
PANDS probability and statistics
MEAS measurement

The format is (6x,12f6.1) and missing data are coded -1.

E. The fourth line contains two sets of achievement results, pretest and then posttest for the same six content areas. These are means in the metric of percent of response, but regression calibrations have been made for differences between rotated forms, and the pretest means include a weighting of the total score. The centres are arbitrary. For relational analysis, it should be appropriate to regress each posttest mean on the corresponding pretest mean and on teacher and classroom variables. See Burstein and Wolfe (Epilogue paper) for details.

Since only students with complete pre and posttest data were used, there are no missing data.

F. The fifth through seventh lines are labeled "CPG" and contain the general classroom process questionnaire, in the layout of the databank.

Missing data are blank, indicating there was no general questionniare, or are coded "9", as in the international codebooks.

PARTIAL LISTING OF COMBO.USA FILE

```
ID 1 11 1  20
 TEA       2    33     2     2
 OTL    16.0   0.0   0.0   5.0  61.0  15.0  71.0  82.0  72.0  33.0  17.0  54.0
 ACH    46.5  53.3  42.4  43.9  43.4  46.3  62.0  63.8  44.3  54.4  75.4  66.0
 CPG  232122111202210000000000000002222110110010030232221312207000 0
 CPG  030000222312122323333339121012007002000232323243242333444432 3
 CPG  3224323134433223343           2122
ID 1 11 2  19
 TEA       1    31     2     2
 OTL     0.0   0.0   3.0   0.0  22.0   4.0  82.0  94.0  81.0  33.0  28.0  65.0
 ACH    38.2  41.9  34.3  35.0  34.4  37.8  65.1  49.5  55.9  39.4  68.8  57.3
 CPG  231111122222121001100210012002222112211112232233322222060020
 CPG  020000112122121323233333221019002000000333444334333443322343 4
 CPG  4433324333434233334           2222
ID 1 36 1  28
 TEA       1    47     3     3
 OTL     0.0   0.0   0.0   0.0   0.0  15.0  98.0 100.0  94.0  76.0 100.0  85.0
 ACH    34.0  38.1  30.4  31.2  31.2  33.2  47.5  47.9  40.0  39.4  62.2  49.9
 CPG  122221121999999999999999999999999999999911410430222322100000
 CPG  000000222112222313133339011031000000000149444223442433421441 2
 CPG  4232324213444142424           2112
ID 1 36 2  20
 TEA       1    47     2     1
 OTL     0.0   0.0   6.0   0.0   0.0  27.0  89.0  94.0  53.0  14.0  78.0  46.0
 ACH    19.9  23.4  18.6  19.3  19.8  21.3  23.4  16.9  27.7  21.8  39.2  27.8
 CPG  111122231911929999999999999999922299999999014004204222020800 0
 CPG  020000222122213122333391210240060000001224449244434344424141 4
 CPG  4232313122444132444           2112
ID 1 40 1  24
 TEA       2    32     2    -1
 OTL    53.0  71.0   3.0  48.0  33.0  77.0  31.0  29.0  94.0  10.0  28.0   0.0
 ACH    53.0  59.0  46.3  47.2  46.8  49.0  73.8  62.5  79.7  60.2  72.1  70.0
 CPG  111112131222111110000000011222222111111110030123232432207001 5
 CPG  015000222112221222233329122023001000000242444344233443444442 3
 CPG  3433314443433243413           2112
ID 1 40 2  26
 TEA       1    34     3     4
 OTL    22.0  12.0   3.0   0.0  56.0  46.0  56.0  88.0  69.0   5.0   6.0   0.0
 ACH    41.4  45.8  36.1  36.9  36.9  39.6  59.8  46.9  56.5  48.4  63.8  52.4
 CPG  132111121222210000000000011222222111100001341244240213008500 0
 CPG  015000222112229999999999111028001001000222444343443444433444 3
 CPG  4433433434444233344           1211
ID 1 67 1  14
 TEA       2    51     3     3
 OTL     0.0   0.0   0.0   0.0   0.0   0.0  91.0  88.0  50.0  52.0 100.0  88.0
 ACH    30.0  36.0  28.2  29.1  29.8  30.7  39.2  28.1  29.0  32.7  58.7  51.4
 CPG  232122132122221100000000001010000000000000000310224344110500 0
 CPG  050000222112222323113339111017005000000112323232442424322344 3
 CPG  2432114412244134214           2112
```

LISTING OF SPSS CONTROL FILE
==========

```
title 'Input and distributions of U.S.A. COMBO file'
file handle combo / name='databank:combo.usa'
data list file=combo records=7
     /1
     QSTRAT QSCHOOL QCLASS QTEACHER NPREPOST
     (2x,f2.0,f3.0,f2.0,f3.0,f5.0)
     /2
     TSEX   TAGE    TDIFASG  CLASTYPE
     (6x,4f6.0)
     /3
     OLDARITH OLDRPP OLDALG OLDGEOM OLDPANDS OLDMEAS
     NEWARITH NEWRPP NEWALG NEWGEOM NEWPANDS NEWMEAS
     (6x,12f6.1)
     /4
     XARITH XRPP XALG XGEOM XPANDS XMEAS
     YARITH YRPP YALG YGEOM YPANDS YMEAS
     (6x,12f6.1)
     /5
     COBJLOG  COBJPRF  COBJINT  COBJKNW  COBJINQ  COBJLIF
     COBJCOM  COBJSCI COBJSYS  CSITXTG  CSITXTP  CSITXTD  CSITXTA
     CSISYLG  CSISYLP  CSISYLD  CSISYLA  CSIMING  CSIMINP
     CSIMIND  CSIMINA  CSIEXTG  CSIEXTP  CSIEXTD  CSIEXTA CSIJRNG
     CSIJRNP  CSIJRND  CSIJRNA  CSISLFG  CSISLFP  CSISLFD
     CSISLFA  CSIOTHG  CSIOTHP  CSIOTHD  CSIOTHA  CSIPROG
     CSIPROP  CSIPROD  CSIPROA  CDWVPUB CDWVSLF  CDWPSLF  CDWTPUB
     CDWADVA  CDWTSLF  CDWTEXT  CDWWBK  CDWEXP  CDWSYL CDWMEMM
     CDWMEME  CDWADVT  CDWEXAM  CGRPWHL  CGRPSMA  CGRPIND
     CGRPOTH  CSGMAB CSGLAB  CSGMANY  CPACING  CDASSGN  CHDMORE
     CHDHARD  CHDTOP  CPGABIL  CPGMISB CPGINDF  CPGFEAR  CPGABS
     CPGTIME  CPGPROF  CPGLIM  CPGMANY  CPGOTH  CFEAR CTCLASS
     CTMATH  CTCATT  CTCNATT  CTCBEHV  CTCOTH  CETALK  CECOMPT
     CESIMP CEPRSE  CETRAN  CERMRK  CECHNG  CEHPROB  CECORRF
     CESUM  CESTRC  CEACT  CERULE CEVARY  CEFEED  CEPREV  CEWARM
     CELONG  CEDSCV  CERDY  CEOUTLN  CELVLY  CEANTCQ  CECRIT
     CECALL  CESPWK  CECMMNT  CEGIRLS  CEFOOL  CESAYGD  CEVRTY
     CETRDIF CERVTST  CEFORST  CEKNDO  CESTPRF  CESTOP  CETAIL
     CEIDENT  CEGAPT  CESTEP
     (6x,55f1.0,2f3.0 / 6x,2f3.0,21f1.0,4f3.0,22f1.0 / 6x,19f1.0)

missing values COBJLOG to CDWEXAM, CSGMAB to CTMATH, CETALK to CESTEP (9)
               CGRPWHL to CGRPOTH, CTCATT to CTCOTH (999)
        TSEX, TAGE, TDIFASG, CLASTYPE (-1)
        OLDARITH to NEWMEAS (-.1)
```

```
variable labels
 NPREPOST 'NUMBER OF STUDENTS WITH PRE AND POSTTEST'
 TSEX     'GENDER OF THE TEACHER'
 TAGE     'AGE OF THE TEACHER'
 TDIFASG  'DIFFERENTIATED EXERCISES ASSIGNMENTS'
 CLASTYPE 'U.S.A. TYPE OF CLASSROOM'
 OLDARITH 'PRIOR OTL IN ARITHEMETIC'
 OLDRPP   'PRIOR OTL IN RATIO PROP. PERCENT'
 OLDALG   'PRIOR OTL IN ALGEBRA'
 OLDGEOM  'PRIOR OTL IN GEOMETRY'
 OLDPANDS 'PRIOR OTL IN PROB. AND STATS.'
 OLDMEAS  'PRIOR OTL IN MEASUREMENT'
 NEWARITH 'THIS YEAR OTL IN ARITHEMETIC'
 NEWRPP   'THIS YEAR OTL IN RATIO PROP. PERCENT'
 NEWALG   'THIS YEAR OTL IN ALGEBRA'
 NEWGEOM  'THIS YEAR OTL IN GEOMETRY'
 NEWPANDS 'THIS YEAR OTL IN PROB. AND STATS.'
 NEWMEAS  'THIS YEAR OTL IN MEASUREMENT'
 XARITH   'PRETEST IN ARITHEMETIC'
 XRPP     'PRETEST IN RATIO PROP. PERCENT'
 XALG     'PRETEST IN ALGEBRA'
 XGEOM    'PRETEST IN GEOMETRY'
 XPANDS   'PRETEST IN PROB. AND STATS.'
 XMEAS    'PRETEST IN MEASUREMENT'
 YARITH   'POSTTEST IN ARITHEMETIC'
 YRPP     'POSTTEST IN RATIO PROP. PERCENT'
 YALG     'POSTTEST IN ALGEBRA'
 YGEOM    'POSTTEST IN GEOMETRY'
 YPANDS   'POSTTEST IN PROB. AND STATS.'
 YMEAS    'POSTTEST IN MEASUREMENT'
 COBJLOG  'Q.1.A OBJTV..LOGICAL STRUCTURE OF MATH'
 COBJPRF  'Q.1.B OBJTV..THE NATURE OF PROOF'
 COBJINT  'Q.1.C OBJTV..INTEREST IN MATHEMATICS'
 COBJKNW  'Q.1.D OBJTV..KNOW MATH FACTS, ETC.'
 COBJINQ  'Q.1.E OBJTV..ATTITUDE OF INQUIRY'
 COBJLIF  'Q.1.F OBJTV..AWARENESS OF MATH IN LIFE'
 COBJCOM  'Q.1.G OBJTV..COMPUTATION SPEED ACCURACY'
 COBJSCI  'Q.1.H OBJTV..AWARENESS OF MATH IN SCIENCE'
 COBJSYS  'Q.1.I OBJTV..SYSTEMATIC APPROACH PROBLEMS'
 CSITXTG  'Q.2.A1 GOALS SOURCE..TEXTBOOK'
 CSITXTP  'Q.2.A2 PRESENT. SOURCE..TEXTBOOK'
 CSITXTD  'Q.2.A3 DRILL SOURCE..TEXTBOOK'
 CSITXTA  'Q.2.A4 APPLCT. SOURCE..TEXTBOOK'
 CSISYLG  'Q.2.B1 GOALS SOURCE..SYLLABUS'
 CSISYLP  'Q.2.B2 PRESENT. SOURCE..SYLLABUS'
 CSISYLD  'Q.2.B3 DRILL SOURCE..SYLLABUS'
 CSISYLA  'Q.2.B4 APPLCT. SOURCE..SYLLABUS'
 CSIMING  'Q.2.C1 GOALS SOURCE..MIN COMPETENCIES'
 CSIMINP  'Q.2.C2 PRESENT. SOURCE..MIN COMPETENCIES'
 CSIMIND  'Q.2.C3 DRILL SOURCE..MIN COMPETENCIES'
 CSIMINA  'Q.2.C4 APPLCT. SOURCE..MIN COMPETENCIES'
```

```
CSIEXTG  'Q.2.D1 GOALS SOURCE..EXTERNAL EXAMS'
CSIEXTP  'Q.2.D2 PRESENT. SOURCE..EXTERNAL EXAMS'
CSIEXTD  'Q.2.D3 DRILL SOURCE..EXTERNAL EXAMS'
CSIEXTA  'Q.2.D4 APPLCT. SOURCE..EXTERNAL EXAMS'
CSIJRNG  'Q.2.E1 GOALS SOURCE..JOURNALS, BOOKS'
CSIJRNP  'Q.2.E2 PRESENT. SOURCE..JOURNALS, BOOKS'
CSIJRND  'Q.2.E3 DRILL SOURCE..JOURNALS, BOOKS'
CSIJRNA  'Q.2.E4 APPLCT. SOURCE..JOURNALS, BOOKS'
CSISLFG  'Q.2.F1 GOALS SOURCE..BY YOURSELF'
CSISLFP  'Q.2.F2 PRESENT. SOURCE..BY YOURSELF'
CSISLFD  'Q.2.F3 DRILL SOURCE..BY YOURSELF'
CSISLFA  'Q.2.F4 APPLCT. SOURCE..BY YOURSELF'
CSIOTHG  'Q.2.G1 GOALS SOURCE..OTHER TEACHERS'
CSIOTHP  'Q.2.G2 PRESENT. SOURCE..OTHER TEACHERS'
CSIOTHD  'Q.2.G3 DRILL SOURCE..OTHER TEACHERS'
CSIOTHA  'Q.2.G4 APPLCT. SOURCE..OTHER TEACHERS'
CSIPROG  'Q.2.H1 GOALS SOURCE..PROF MEETINGS'
CSIPROP  'Q.2.H2 PRESENT. SOURCE..PROF MEETINGS'
CSIPROD  'Q.2.H3 DRILL SOURCE..PROF MEETINGS'
CSIPROA  'Q.2.H4 APPLCT. SOURCE..PROF MEETINGS'
CDWVPUB  'Q.3.A DIFFICULTY WO..PUBLISHED VISUALS'
CDWVSLF  'Q.3.B DIFFICULTY WO..VISUALS BY YOURSELF'
CDWPSLF  'Q.3.C DIFFICULTY WO..PROBLEMS BY YOURSELF'
CDWTPUB  'Q.3.D DIFFICULTY WO..PUBLISHED TESTS'
CDWADVA  'Q.3.E DIFFICULTY WO..ADVICE FROM ADMIN'
CDWTSLF  'Q.3.F DIFFICULTY WO..TESTS BY YOURSELF'
CDWTEXT  'Q.3.G DIFFICULTY WO..PUBLISHED TEXTBOOKS'
CDWWBK   'Q.3.H DIFFICULTY WO..PUBLISHED WORKBOOKS'
CDWEXP   'Q.3.I DIFFICULTY WO..EXAMPLES MADE UP'
CDWSYL   'Q.3.J DIFFICULTY WO..OFFICIAL SYLLABUS'
CDWMEMM  'Q.3.K DIFFICULTY WO..REMEMBER FROM MATH'
CDWMEME  'Q.3.L DIFFICULTY WO..REMEMBER FROM EDUC'
CDWADVT  'Q.3.M DIFFICULTY WO..ADVICE FROM TEACHERS'
CDWEXAM  'Q.3.N DIFFICULTY WO..KNOWLEDGE OF EXAMS'
CGRPWHL  'Q.4.A WHOLE CLASS WORKING AS A SINGLE GROUP'
CGRPSMA  'Q.4.B SMALL GROUP INSTRUCTION'
CGRPIND  'Q.4.C ALL STUDENTS WORKING INDIVIDUALLY'
CGRPOTH  'Q.4.D OTHER GROUPING ARRANGMENT'
CSGMAB   'Q.5.A MOST ABLE STUDENTS WORK SEPARATELY'
CSGLAB   'Q.5.B LEAST ABLE STUDENTS WORK SEPARATELY'
CSGMANY  'Q.5.C CLASS IS SPLIT INTO 3 OR MORE GROUPS'
CPACING  'Q.6  SAME OR VARIED CONTENT OR PACING'
CDASSGN  'Q.7  SAME OR VARIED EXERCISES AND PROBLEMS'
CHDMORE  'Q.8.A SOME STDS..MORE EXERCISES'
CHDHARD  'Q.8.B SOME STDS..MORE DIFFICULT EXERCISES'
CHDTOP   'Q.8.C SOME STDS..OTHER TOPICS'
CPGABIL  'Q.9.A PROGRESS..STUDENT LACK OF ABILITY'
CPGMISB  'Q.9.B PROGRESS..STUDENT MISBEHAVIOUR'
CPGINDF  'Q.9.C PROGRESS..STUDENT INDIFFERENCE'
CPGFEAR  'Q.9.D PROGRESS..FEAR OF MATHEMATICS'
```

```
CPGABS    'Q.9.E PROGRESS..STUDENT ABSENTEEISM'
CPGTIME   'Q.9.F PROGRESS..INSUFFICIENT SCHOOL TIME'
CPGPROF   'Q.9.G PROGRESS..PROFICIENCY ON YOUR PART'
CPGLIM    'Q.9.H PROGRESS..LIMITED RESOURCES'
CPGMANY   'Q.9.I PROGRESS..TOO MANY STUDENTS'
CPGOTH    'Q.9.J PROGRESS..OTHER REASONS'
CFEAR     'Q10. STUDENTS ESPECIALLY FEARFUL ANXIOUS'
CTCLASS   'Q11. TARGET CLASS EASY OR DIFF. TO TEACH'
CTMATH    'Q12. DO YOU FIND MATH EASY DIFF. TO TEACH'
CTCATT    'Q13.A TARGET CLASS..ATTENTIVE'
CTCNATT   'Q13.B TARGET CLASS..NOT ATTENTIVE'
CTCBEHV   'Q13.C TARGET CLASS..BEHAVIOUR PROBLEMS'
CTCOTH    'Q13.D TARGET CLASS..OTHER KINDS'
CETALK    'Q14.1 TALK TO INDIVIDUAL STUDENTS'
CECOMPT   'Q14.2 STIMULATE COMPETITION'
CESIMP    'Q14.3 GIVE LESS ABLE SIMPLE ASSGNMNTS'
CEPRSE    'Q14.4 PRAISE STUDENTS WHO ARE CORRECT'
CETRAN    'Q14.5 PLAN TRANSITIONS'
CERMRK    'Q14.6 MAKE ENCOURAGING REMARKS'
CECHNG    'Q14.7 CHANGE ACTIVITY IF NO ATTENTION'
CEHPROB   'Q14.8 MORE ABLE GET HARDER PROBLEMS'
CECORRF   'Q14.9 IMMDTLY CORRECT FALSE STATMNTS'
CESUM     'Q14.10 SUMMARIZE AT END OF PERIOD'
CESTRC    'Q14.11 PRESENT HIGHLY STRUCTURED'
CEACT     'Q14.12 ACTION TO DEAL WITH DISCOMFORT'
CERULE    'Q14.13 CLEAR.CUT RULES FOR BEHAVIOUR'
CEVARY    'Q14.14 VARY THE DIFFICULTY OF QUESTIONS'
CEFEED    'Q14.15 FREQUENT INDIVIDUAL FEEDBACK'
CEPREV    'Q14.16 CLEAR UP PREVIOUS PROBLEMS'
CEWARM    'Q14.17 WARM, PERSONAL RELATIONSHIPS'
CELONG    'Q14.18 ALLOW DISCUSSIONS TO GO LONGER'
CEDSCV    'Q14.19 OPPORTUNITY FOR DISCOVERY'
CERDY     'Q14.20 GET READY BEFORE CLASS'
CEOUTLN   'Q14.21 AT BEGINNING OUTLINE CONTENT'
CELVLY    'Q14.22 MAKE PRESENTATIONS LIVELY'
CEANTCQ   'Q14.23 TRY TO ANTICIPATE QUESTIONS'
CECRIT    'Q14.24 AVOID CRITICAL ABOUT ANSWERS'
CECALL    'Q14.25 CALL ON WHO DO NOT VOLUNTEER'
CESPWK    'Q14.26 DETERMINE SPECIFIC WEAKNESSES'
CECMMNT   'Q14.27 WRITE MEANINGFUL COMMENTS'
CEGIRLS   'Q14.28 SPECIAL ENCOURAGMENT TO GIRLS'
CEFOOL    'Q14.29 INTERVENE WHEN FOOLING AROUND'
CESAYGD   'Q14.30 SAY SOMETHING GOOD ABOUT ANSWERS'
CEVRTY    'Q14.31 CHANGE FOR SAKE OF VARIETY'
CETRDIF   'Q14.32 SOME TRUELY DIFFICULT PROBLEMS'
CERVTST   'Q14.33 REVIEW TESTS AFTER GRADING'
```

```
CEFORST  'Q14.34 FORSTALL STUDENT DISTURBANCES'
CEKNDO   'Q14.35 STUDENTS KNOW WHAT SHOULD DO'
CESTPRF  'Q14.36 STUDENT PREFERENCES INTO ACCOUNT'
CESTOP   'Q14.37 STOP MATTERS NOT CLOSELY RELATED'
CETAIL   'Q14.38 GIVE TAILORED ASSIGNMENTS'
CEIDENT  'Q14.39 IDENTIFY STUDENTS IN DIFFICULTY'
CEGAPT   'Q14.40 MATH APPROPRIATE FOR GIRLS'
CESTEP   'Q14.41 STEP BY STEP INSTRUCTIONS'

value labels TSEX
   1 'FEMALE'
   2 'MALE'
            /TDIFASG
   1 'FREQUENTLY'
   2 'OCCASIONNALLY'
   3 'RARELY OR NEVER'
            /CLASTYPE
   1 'REMEDIAL'
   2 'REGULAR'
   3 'ENRICHED'
   4 'ALGEBRA'
            /COBJLOG to COBJSYS
   1 'RELATIVELY MORE'
   2 'ABOUT EQUAL'
   3  RELATIVELY LESS'
            /CSIPXTG to CSIPROA
   0 'NEVER USED'
   1 'OCCSNLLY USED'
   2 'FREQUENTLY USED'
            /CDWVPUB to CDWEXAM
   1 'VERY EASY'
   2 'FAIRLY EASY'
   3 'FAIRLY DIFFICULT'
   4 'VERY DIFFICULT'
   0 'NOW DO WITHOUT'
            /CSGMAB to CSGMANY
   1 'YES'
   2 'NO'
   3 'NONE REGULARLY'
            /CPACING
   1 'SAME CNTNT PACE'
   2 'VARY PACE'
   3 'VARY CONTENT'
            /CDASSGN
   1 'SAME'
   2 'VARY DATE CMPLTN'
   3 'VARY EXERCISES'
            /CHDMORE to CHDTOP
   1 'YES'
   2 'NO'
```

```
          /CPGABIL to CPGOTH
   1 'VERY IMPORTANT'
   2 'SOMEWHAT IMPRTNT'
   3 'NOT IMPORTANT'
             /CFEAR
   0 'NONE'
   1 'ONE to THREE'
   2 'FOUR to SIX'
   3 'SEVEN to NINE'
   4 'TEN OR MORE'
             /CTCLASS
   1 'VERY EASY'
   2 'FAIRLY EASY'
   3 'NEUTRAL'
   4 'FAIRLY DIFFICULT'
   5 'VERY DIFFICULT'
             /CTMATH
   1 'VERY EASY'
   2 'FAIRLY EASY'
   3 'NEUTRAL'
   4 'FAIRLY DIFFICULT'·
   5 'VERY DIFFICULT'
             /CETALK to CESTEP
   1 'LIL OR NO IMPORT'
   2 'SOME IMPORT'
   3 'MAJOR IMPORT'
   4 'HIGHEST IMPORT'

condescriptive OLDARITH to YMEAS
          CGRPWHL to CGRPOTH, CTCATT to CTCOTH
frequencies variables =  TSEX, TAGE. TDIFASG, CLASTYPE
     COBJLOG to CDWEXAM, CSGMAB to CTMATH, CETALK to CESTEP
```

## Appendix IV. Extracts from the Databank


| | |
|---|---|
| Pages 1-2 | Directories |
| Pages 3-6 | Student, teacher, and school data files |
| Page 7 | TABLE.COG, Cognitive item table |
| Page 8 | TABLE.QUS, Questionnaire item table |
| Page 9 | A.0, Documentation introduction |
| Pages 10-13 | A.1, Basic parameters and sizes |
| Pages 14-17 | A.2, Response data layout |
| Pages 18-25 | A.3, Cognitive item coding |
| Pages 26-31 | A.4, Questionnaire item coding |
| Pages 32-36 | A.5, Sampling notes and strata definitions |
| Pages 37-40 | A.6, Detailed coding and textual explanations. |

```
$ datalink
==========


The Population A Longitudinal archive areas are:
  'databank'  = top directory
    'school'  = school data files
   'student'  = student data files
   'teacher'  = teacher/classroor data files
  'document'  = data documentation files
To see what is in an area, enter 'dir x' where x is the name of the area.
To refer to a archive file from your account, for typing, analysis, etc.,
prefix the file name with the area name and a colon, e.g., 'student:all.usa'.


$ dir student
=============

Directory CSG:[AMATHRGW.DATABANK.STUDENT]

ALL.BC;1                1698
ALL.BFL;1               2556
ALL.FRA;1               6860
ALL.JPN;1               6630
ALL.NZ;1                4521
ALL.ONT;1               4589
ALL.THA;1               3152
ALL.USA;2               7552

Total of 8 files, 37558 blocks.


$ dir school
============


Directory CSG:[AMATHRGW.DATABANK.SCHOOL]

ALL.BC;1                  15
ALL.BFL;1                 27
ALL.FRA;1                 30
ALL.JPN;1                 34
ALL.NZ;1                  17
ALL.ONT;1                 21
ALL.THA;1                 16
ALL.USA;1                 26

Total of 8 files, 186 blocks.
```

```
$ dir teacher
=============

Directory CSG:[AMATHRGW.DATABANK.TEACHER]

ALL.BC;3                460
ALL.BFL;4               548
ALL.FRA;2              1871
ALL.JPN;2               773
ALL.NZ;3                961
ALL.ONT;2               905
ALL.THA;1               520
ALL.USA;1              1331

Total of 8 files, 7369 blocks.


$ dir document
==============

Directory CSG:[AMATHRGW.DATABANK.DOCUMENT]

A.0;1                     7
A.1;1                    37
A.2;1                    39
A.3;1                   135
A.4;3                   241
A.5;1                   210
A.6;1                   339
TABLE.COG;1             112
TABLE.QUS;1             230

Total of 9 files, 1370 blocks.


$dir databank
=============

Directory CSG:[AMATHRGW.DATABANK]

AAAREAD.ME                2
COMBO.SPS;5              22
COMBO.USA;1             232
DATALINK.COM;10           2
DOCUMENT.DIR;1            1
LONGTAB.FOR;1            13
LONGTAB.OUT;1           195
SCHOOL.DIR;1              1
STUDENT.DIR;1             1
TEACHER.DIR;1             1

Total of 10 files, 470 blocks.
```

```
$ type student:all.usa
======================

81 1 11 1  1 2 2 334334
 5001 115802435223422224
 5201 116502999993344999999999999288988188888322121312
 5202 234124322344322422322234323243432124433323212
 5203 31432443321224343421534234332244434432522522314341213 3
 5101 24454442545332311142443145535312543135 13
 5102 113111111313111111311111113111111111119111
 5141 551124343335131532413441154541415 52
 5301 24344442545432311342453153535353513451 43
 5302 113111311931111113311111111111111311111111
 5341 552114343232132532413445134111431 52
81 1 11 1  2 2 2 331331
 5001 21570533322433312 4
 5201 216405999993444999999999999928888899999933113 1111
 5202 223223222234244234222223223243222223223222515
 5203 21432123454321234543212345443213213333433333333233333
 5101 113444325431335533222551513352525434311 5
 5102 113111311133131111311111111131111111111 3111
 5111 414511115352235424555132234543343 23
 5301 12345432121234543212345422345234543212 44
 5302 111113111113131113111113111111111111111 3
 5311 433544123351432123454321234543212 34
81 1 11 1  3 2 1 333000
 5001 115300114111212112
 5201
 5202
 5203
 5101 2435544252443255213215334513523213124414
 5102 111111111111111111111111111111111111111111
 5131 42432353143143432344525243254242431
 5301 99999999999999999999999999999999999999999
 5302
 5391 99999999999999999999999999999999999
81 1 11 1  4 2 2 332333
 5001 11680524513522412 4
 5201 11750599999444499999999999918898399999933412114 1
 5202 12312432442422242442444423421233343344434321 2
 5203 432214234422242434423422344224423422422234222444422334
 5101 532155222433455234125412433154131531 3421
 5102 99999999999999999999999999999999999999999
 5121 31153125311152155231151335143121312
 5301 24214212222352523242543321225353253534 45
 5302 111113311113131131313111331131311313111
 5331 434221321254355114341544435534121 45
...
```

```
$ type teacher:all.usa
======================

81 1 11 1  1 2  0  0  0  0  1 2 2 2 2 2 2
 6001 23310 913 6 32520222229159 09 01021 5 4513531 602 9 9 3 0
 6002 150240280300120120120120150150 30 30 60 60 75 75120120 30 30
 6003 42 3 3555999972511011011102 52402451 01 02312113315
 6004 1122131112222424344324422 45
 6101 32133323322232333222999999993299292299219999999911999911 99
 6102 11991911991199191199219999999932999992993299222292329999 92923
 6103 33322223133121219999999911991111913299299292329929929 2
 6104 219999999932992992923130450180101030202030602002030102020306 1
 6105 44551222244222112
 6111 21133322222222223111123229992992119919191111991911 11
 6112 22999999993131212211231211121312233211323132313230450260101 02
 6113 040102010202020523143422422 2
 6121 123333255555153231111111111111133323333333333219999999 9
 6122 11199911913229999923299999992219999999932992999923229299292
 6123 11191111991219111199329929999221999999993229999992322999999 2
 6124 32299999923229999992133333333040045010004040001010301010202 02
 6125 0202020203999908999999022224225 42
 6131 12333325511115125255553333232233333313333133331333333
 6132 32929999922299999999229999999921999999993229299299322929929 9
 6133 32992929223299292992329999229221999999991119119111329999929 9
 6134 32999922993299299999329929999933333333333333133333333333333333
 6135 33040030020000050203020101030003000000040344242422441232442
 6141 12233311111222551219999999922999999993299292992329299299 2
 6142 11911919112199999991111911919921999999992199999999329929999 2
 6143 11991199113299299223292999222333121199119111219999999 9
 6144 32292992923229299292322929929213332233211233111232204002003 02
 6145 02020203020302003000202040232224442244224242232 3
 6151 232122111202210000000000000002222110110010030232221312207000 0
 6152 03000022231212232333333912101200700200023232324324233344443 23
 6153 32243231344333223343          2122
 6201 34345344432455155415244445253154344444442
 6202 12212211111222122212122222121122122221221
 6203 49939931143999299939299999294299299991992
 6211 42542231425551412224544434244444234
 6212 11221111212121111112212212122222122
 6213 13992243929193322139919939299999299
 6221 45421241551421443335534442444424444
 6222 22111121221211221212212221122212222
 6223 99213294993913991919929992199939991
 6231 42525224144234544424233444354541423
 6232 21212112112122222212111222122221211
 6233 94939349319299999949211999199993922
 6241 44414534353354443134414255941444444
 6242 12212211221122222122111122921122111
 6243 19929921991299999399134299993199111
```

```
81 1 11 2  2 2  0  0  0  0  0 2 2 2 2 2 2
 6001 131101017 3 22520222229159 09 01021 5 4513531 60211 8 2 0
 6002 18027030039012512512011515015045 40 55 60 50 60120120 35 30
 6003 42 2 355191917101101 51101151201301121 09332233315
 6004 113122121133122455222442524
 6101 121322233222232222121999119932922999991111999119111199119
 6102 1111991191219999999921999999992299999999329922229932999992922
 6103 33223331132221219999999911119911992299999999911119911199
 6104 219999999922999999991130454500200020202000200900101010101032
 6105 24452223243211223
 6111 11232222222222222211111219999999922999999992299999999
 6112 22999999991122212322321122122313123321223122312230450120101102
 6113 01010101010101012424222243324
 6121 11222324225325322222112115111123332332332332122999999999
 6122 11119911913222999999229999999922999999993292299992329229999 2
 6123 11111911111219199119229999999922999999999229999999993292299992
 6124 29999999992999999999123222233045020010001010000000301020101 01
 6125 01010101019999019999990222432142 2
 6131 12232225513325535135512313132233223313233233333133333
 6132 22999999993292999999222999999999219999999932299999999322999999 9
 6133 32299999993299999999222999999999219999999911199999993292999999 9
 6134 32929999923292999992329299999223233331223323132333313333313233
 6135 33045022020000030101020101010102010000040224322423422424 42
 6141 11232211111111151111119911911119991992299999999229999999 9
 6142 11191991191119199119111919991992999999999319922992211111991 99
 6143 11111991993999999999299999999932212111119911921999999 99
 6144 22999999993222999999922999999991323122322313211122320450090101
 6145 01010101010201303010202030222122231132342242333 2
 6151 23111112222212100110021001200222211221111223223332222220600 20
 6152 02000011212212132323333322101900200000033344433433344332234 34
 6153 443332433343423333 4 2222
 6201 3542442442334345531414433512315544442422
 6202 12212212212222222212122222111122222222 11
 6203 499499399399999999393999993413999999992 2
 6211 32434121314351322334443434343422414
 6212 21222111212121121212212212221211212
 6213 939992439394933939499199499929249 39
 6221 44312232451321442325133344244433453
 6222 22111121221211221112122222122222222
 6223 99433292993923992249499999499999999
 6231 51425133123334333423533353352441331
 6232 21212112112222222212212222221221221
 6233 94939349449999999939949999994993994
 6241 43225331253154333113221152131352332
 6242 22222221222122221112111122121222211
 6243 99999993999399991349144499293999911
...
```

```
$ type school:all.usa
=====================


8102001 2
 8001 2 128 105  67  58   0   0 30  4 15  0  0  4  1176 8 452321111
8102002 2
 8001 2 123 145  67  58   0   0 26  1  2  1  2  1  2187 8 435524121
8105003 2
 8001 5  68  51  32  20   0   0 28  5 12  0  0  5 12175 7 455116631
8103004 2
 8001 2 226 226 107  88   0   0 26  4  1  1  1  2  0180 7 455323311
8105005 2
 8001 3 220 221 115 108   0   0 44  6 10  2  0  2  0175 7 475521111
...
```

```
$ type document:table.cog
=========================


001 (22 * 18) - (47 + 59) IS EQUAL TO
    1 001 1 1 0 20 2 34 0 1 6 03 05 06 08 09 15 45
15 2 34 527 513 511
22 2 34 527 000 513
25 2 34 527 515 515
40 2 34 527 517 517
54 0 20 527 000 523
63 2 34 527 517 517
79 2 34 527 517 517
81 2 34 527 515 515
002 MATCHSTICKS ARE ARRANGED AS FOLLOWS. IF THE PATTERN IS
    2 001 3 0 0 31 4 12 0 1 6 09 15 16
15 4 12 527 513 511
22 4 12 527 000 513
25 4 12 527 515 515
40 4 12 527 517 517
54 0 31 527 523 523 2 34
63 4 12 527 517 517
79 4 12 527 517 517
81 4 12 527 515 515
003 2/5 + 3/8 IS EQUAL TO
    5 002 1 1 0 17 0 31 1 1 1 03 06 08 10 11 15 43 45
15 0 31 527 523 521
22 0 31 527 523 523
25 0 31 527 523 523
40 0 31 527 527 527
54 0 17 527 523 523 1 01
63 0 31 527 527 527
79 0 31 527 527 527
81 0 31 527 523 523
004 WHICH OF THE FOLLOWING IS A PAIR OF EQUIVALENT FRACTIONS?
    4 002 2 0 0 14 3  3 0 1 1 10 15 16
15 0 04 527 523 521          3-3
22 3 03 527 000 413       /e "1/2 and 14/24" -> "1/2 and 14/15"
25 3 03 527 515 515
40 3 03 527 517 517
54 0 14 527 000 523
63 3 03 527 517 517
79 3 03 527 517 517
81 3 03 527 515 515
005 0.40 * 6.38 IS EQUAL TO
    3 003 1 1 0 18 0 26 0 1 1 03 05 06 08 12 15 43 45
15 2 10 527 513 511          0-26
22 0 26 527 523 523
25 0 26 527 523 523
40 0 26 527 527 527
54 0 18 527 000 523
63 0 26 527 527 527
79 0 26 527 527 527
```

81 0 26 527 523 523

```
$ type document:table.qus
=========================


0 PCOUNT              0  0 2      NAME OF THE COUNTRY
1 QSTRAT              0  0 2      PRINCIPAL STRATIFICATION CODE
2 SAREA    800   1    1 20 1    1 KIND OF COMMUNITY SERVED BY SCHOOL
  15 3     Expanded and reordered coding
  40 3     Contracted coding?
  54 3     Added code 6 for undecided
2 SENROLB  800   2  1 1 21 4    2 BOYS..TOTAL ENROLMENT IN SCHOOL
2 SENROLG  800   2  2 1 25 4    2 GIRLS..TOTAL ENROLMENT IN SCHOOL
2 SAPOPB   800   3 A1 1 29 4    3 BOYS..POPULATION A STUDENTS IN SCHOOL
2 SAPOPG   800   3 A2 1 33 4    3 GIRLS..POPULATION A STUDENTS IN SCHOOL
2 SNOMTHB  800   3 B1 1 37 4    3 BOYS..POP A WHO DO NOT TAKE MATH
  15 0     Not used, since all take math
  22 0     Not used, since all take math
  40 0     Not used, since all take math
  54 0     Not used, since all take math
2 SNOMTHG  800   3 B2 1 41 4    3 GIRLS..POP A WHO DO NOT TAKE MATH
  15 0     Not used, since all take math
  22 0     Not used, since all take math
  40 0     Not used, since all take math
  54 0     Not used, since all take math
2 STCHS    800   4    1 45 3    4 NUMBER OF FULL-TIME TEACHING STAFF
2 SSOMMM   800   5  1 1 48 3    5 MALES..TEACHING ONE OR MORE MATHS
2 SSOMMF   800   5  2 1 51 3    5 FEMALES..TEACHING ONE OR MORE MATHS
2 SALLMM   800   6  1 1 54 3    6 MALES..TEACHING MATH EXCLUSIVELY
2 SALLMF   800   6  2 1 57 3    6 FEMALES..TEACHING MATH EXCLUSIVELY
2 SSPECM   800   7  1 1 60 3    7 MALES..QUALIFIED MATH SPECIALISTS
  22 4     Defined specialist as math majors or math ed concentration
  63 4     Defined specialist form 3 level teachers of math
2 SSPECF   800   7  2 1 63 3    7 FEMALES..QUALIFIED MATH SPECIALISTS
  22 4     Defined specialist
```

```
$ type document:a.0
===================

*****************************************************************
.................................................................
.................................................................
..   IEA SECOND MATHEMATICS STUDY                              ..
..   DATA DOCUMENTATION FILE                                   ..
..   POPULATION A                                              ..
..   CLASSROOM PROCESS (LONGITUDINAL)                          ..
.................................................................
..   INTRODUCTION                                              ..
.................................................................
```

THIS IS A DATA DOCUMENTATION FILE FOR POPULATION A OF THE IEA SECOND INTERNATIONAL MATHEMATICS STUDY, SPECIFICALLY FOR THE EIGHT COUNTRIES THAT PARTICIPATED IN THE CLASSROOM PROCESS (LONGITUDINAL) VERSIONS OF THE STUDY. IT IS INTENDED TO BE READ BY PROGRAMS THAT WILL PRINT CODEBOOKS AND PROVIDE ENTRY INTO STATISTICAL ANALYSIS SYSTEMS. IT PROVIDES UNIFIED INFORMATION ABOUT THE STORAGE AND CODING OF ALL THE COUNTRIES, COVERING THE INTERNATIONAL STANDARD SYSTEMS AS WELL AS PARTICULAR NOTES ABOUT THE NATIONAL VARIATIONS, SAMPLING DESIGNS, ETC. THE RESPONSE DATA DESCRIBED IN THIS DOCUMENTATION ARE STORED IN SEPARATE DATA FILES, AS DESCRIBED IN SECTION 2 BELOW.

```
.................................................................
.    TABLE OF CONTENTS                                          .
.                                                               .
.       SECTION 1.  BASIC PARAMETERS AND SIZES.                 .
.       SECTION 2.  DEFINITION OF THE RESPONSE DATA LAYOUT.     .
.       SECTION 3.  COGNITIVE ITEM TABLE.                       .
.       SECTION 4.  QUESTIONNAIRE ITEM TABLE.                   .
.       SECTION 5.  SAMPLING NOTES AND STRATUM DEFINITIONS      .
.       SECTION 6.  DETAILED CODING AND TEXTUAL EXPLANATIONS.   .
.................................................................
```

EACH SECTION BEGINS WITH A LINE FILLED WITH ASTERISKS. THIS IS FOLLOWED BY AN INTRODUCTORY TEXT, WHICH ENDS WITH A LINE FILLED WITH MINUS SIGNS (-). THEN, EXCEPT FOR SECTION 2, THERE FOLLOWS A SPECIALLY FORMATTED TABLE OR CODED LISTING THAT IS INTENDED FOR VISUAL INSPECTION OR PROGRAMMED INTERPRETATION. THE FINAL LINE OF A SECTION IS FILLED WITH SLASHES (/), SUCH AS NOW TERMINATE THIS INTRODUCTION.

```
$ type document:a.1
==================


////////////////////////////////////////////////////////////////////
********************************************************************
....................................................................
....................................................................
..   SECTION 1                                                    ..
..                                                                ..
..   BASIC PARAMETERS AND SIZES                                   ..
....................................................................
....................................................................
```

THE TABLE PRESENTED IN THIS SECTION DEFINES THE BASIC PARAMETERS AND SIZES OF THE DATASET FOR EACH COUNTRY BEING DOCUMENTED IN THIS FILE. THESE INCLUDE THE NUMBERS OF ITEMS (INTERNATIONAL AND NATIONAL) IN EACH COGNITIVE TEST FORM, THE SAMPLE OF APPLICATION AND QUESTIONS ASKED WITH EACH FORM, FOR TEACHER QTL AS WELL AS STUDENT PRETEST AND POSTTEST. THERE IS ALSO INDICATION OF THE UTILIZATION OF EACH OF THE POSSIBLE QUESTIONNAIRES AND DATA SOURCES, TOGETHER WITH THE NUMBER OF INTERNATIONAL AND NATIONAL VARIABLES INCLUDED IN THEM. FOR EACH COUNTRY BEING DOCUMENTED, THERE IS ONE LINE WITH THE CODE NUMBER AND NAME OF THE COUNTRY, FOLLOWED BY ONE LINE FOR EACH COGNITIVE TEST FORM, FOLLOWED BY ONE LINE FOR EACH QUESTIONNAIRE OR DATA SOURCE. LINES MAY BE OMITTED IF THE CORRESPONDING FORM, QUESTIONNAIRE, OR SOURCE WAS NOT USED FOR A COUNTRY. THERE MAY BE COMMENTS AT THE END OF A LINE. THE LAYOUT IS AS FOLLOWS...

```
....................................................................
.12345678901234567890123456789012345678901234567890123456789012345.
....................................................................
.CC                    NAME OF THE COUNTRY                         .
.   O U III NNN SQSQSQ CORE TEST                                   .
.   1 U III NNN SQSQSQ TEST FORM A                                 .
.   2 U III NNN SQSQSQ TEST FORM B                                 .
.   3 U III NNN SQSQSQ TEST FORM C                                 .
.   4 U III NNN SQSQSQ TEST FORM D                                 .
.   5 U III NNN SQSQSQ SPECIAL JAPANESE PRETEST                    .
.   P U III NNN S      POPULATION DATA                             .
.   Q U III NNN S      STRATUM DATA                                .
.   S U III NNN S      SCHOOL QUESTIONNAIRE                        .
.   K U III NNN S      BEGINNING-OF-YEAR CLASSROOM DATA            .
.   L U III NNN S      END-OF-YEAR CLASSROOM DATA                  .
.   T U III NNN S      TEACHER QUESTIONNAIRE                       .
.   F U III NNN S      TOPIC-SPECIFIC FRACTIONS                    .
.   R U III NNN S      TOPIC-SPECIFIC RATIO PROPORTION PERCENT     .
.   M U III NNN S      TOPIC-SPECIFIC MEASUREMENT                  .
.   G U III NNN S      TOPIC-SPECIFIC GEOMETRY                     .
.   A U III NNN S      TOPIC-SPECIFIC ALGEBRA                      .
.   C U III NNN S      CLASSROOM PROCESS GENERAL                   .
.   X U III NNN S      BEGINNING-OF-YEAR STUDENT QUESTIONNAIRE     .
```

...

| | | | |
|---|---|---|---|
| 15 | | | BELGIUM FLEMISH |
| | 0 2 040 | 272323 | CORE TEST |
| | 1 2 035 | 271111 | TEST FORM A (NB. Rotated forms used |
| | 2 2 035 | 271111 | TEST FORM B at pretest and posttest, |
| | 3 2 035 | 271111 | TEST FORM C with complete rotation) |
| | 4 2 035 | 271111 | TEST FORM D |
| | S 1 017 | 2 | SCHOOL QUESTIONNAIRE |
| | T 1 051 | 2 | TEACHER QUESTIONNAIRE |
| | Y 1 084 | 2 | END OF YEAR STUDENT QUESTIONNAIRE |
| | P 2 001 | 2 | POPULATION DATA |
| | Q 2 003 | 2 | STRATUM DATA |
| | S 1 017 | 2 | SCHOOL QUESTIONNAIRE |
| | K 2 001 | 2 | BEGINNING-OF-YEAR CLASSROOM DATA |
| | L 2 001 | 2 | END-OF-YEAR CLASSROOM DATA |
| | T 1 051 | 2 | TEACHER QUESTIONNAIRE |
| | G 2 182 | 2 | TOPIC-SPECIFIC GEOMETRY |
| | A 2 153 | 2 | TOPIC-SPECIFIC ALGEBRA |
| | C 2 014 | 2 | CLASSROOM PROCESS GENERAL |
| | X 2 007 | 2 | BEGINNING-OF-YEAR STUDENT QUESTIONNAIRE |
| | Y 1 084 | 2 | END OF YEAR STUDENT QUESTIONNAIRE |
| 22 | | | CANADA BC |
| | 0 2 040 | 272323 | CORE TEST |
| | 1 2 035 | 27 13 | TEST FORM A (NB. No rotated forms |
| | 2 2 035 | 27 13 | TEST FORM B on the pretest) |
| | 3 2 035 | 27 13 | TEST FORM C |
| | 4 2 035 | 27 13 | TEST FORM D |
| | S 1 017 | 2 | SCHOOL QUESTIONNAIRE |
| | T 1 051 | 2 | TEACHER QUESTIONNAIRE |
| | Y 1 084 | 2 | END OF YEAR STUDENT QUESTIONNAIRE |
| | P 2 001 | 2 | POPULATION DATA |
| | Q 2 003 | 2 | STRATUM DATA |
| | S 1 017 | 2 | SCHOOL QUESTIONNAIRE |
| | K 2 001 | 2 | BEGINNING-OF-YEAR CLASSROOM DATA |
| | L 2 001 | 2 | END-OF-YEAR CLASSROOM DATA |
| | T 1 051 | 2 | TEACHER QUESTIONNAIRE |
| | F 2 135 | 2 | TOPIC-SPECIFIC FRACTIONS |
| | R 2 103 | 2 | TOPIC-SPECIFIC RATIO PROPORTION PERCENT |
| | M 2 150 | 2 | TOPIC-SPECIFIC MEASUREMENT |
| | G 2 182 | 2 | TOPIC-SPECIFIC GEOMETRY |
| | A 2 153 | 2 | TOPIC-SPECIFIC ALGEBRA |
| | C 2 014 | 2 | CLASSROOM PROCESS GENERAL |
| | X 2 007 | 2 | BEGINNING-OF-YEAR STUDENT QUESTIONNAIRE |
| | Y 1 084 | 2 | END OF YEAR STUDENT QUESTIONNAIRE |

```
25                          CANADA ONT
   0 2 040      272323 CORE TEST
   1 2 035      271515 TEST FORM A  (NB. Rotated forms at pre
   2 2 035      271515 TEST FORM B       and post, with complete
   3 2 035      271515 TEST FORM C       rotation)
   4 2 035      271515 TEST FORM D
   S 1 017      2      SCHOOL QUESTIONNAIRE
   T 1 051      2      TEACHER QUESTIONNAIRE
   Y 1 084      2      END OF YEAR STUDENT QUESTIONNAIRE
   S 1 017      2      SCHOOL QUESTIONNAIRE
   T 1 051      2      TEACHER QUESTIONNAIRE
   Y 1 084      2      END OF YEAR STUDENT QUESTIONNAIRE
   P 2 001      2      POPULATION DATA
   Q 2 003      2      STRATUM DATA
   S 1 017      2      SCHOOL QUESTIONNAIRE
   K 2 001      2      BEGINNING-OF-YEAR CLASSROOM DATA
   L 2 001      2      END-OF-YEAR CLASSROOM DATA
   T 1 051      2      TEACHER QUESTIONNAIRE
   F 2 135      2      TOPIC-SPECIFIC FRACTIONS
   R 2 103      2      TOPIC-SPECIFIC RATIO PROPORTION PERCENT
   M 2 150      2      TOPIC-SPECIFIC MEASUREMENT
   G 2 182      2      TOPIC-SPECIFIC GEOMETRY
   A 2 153      2      TOPIC-SPECIFIC ALGEBRA
   C 2 014      2      CLASSROOM PROCESS GENERAL
   X 2 007      2      BEGINNING-OF-YEAR STUDENT QUESTIONNAIRE
   Y 1 084      2      END OF YEAR STUDENT QUESTIONNAIRE
40                          FRANCE
   0 2 040      272727 CORE TEST
   1 2 035      271717 TEST FORM A   (NB. Same rotated form
   2 2 035      271717 TEST FORM B        given at posttest as
   3 2 035      271717 TEST FORM C        at pretest)
   4 2 035      271717 TEST FORM D
   P 2 001      2      POPULATION DATA
   Q 2 003      2      STRATUM DATA
   S 1 017      2      SCHOOL QUESTIONNAIRE
   K 2 001      2      BEGINNING-OF-YEAR CLASSROOM DATA
   L 2 001      2      END-OF-YEAR CLASSROOM DATA
   T 1 051      2      TEACHER QUESTIONNAIRE
   F 2 135      2      TOPIC-SPECIFIC FRACTIONS
   R 2 103      2      TOPIC-SPECIFIC RATIO PROPORTION PERCENT
   M 2 150      2      TOPIC-SPECIFIC MEASUREMENT
   G 2 182      2      TOPIC-SPECIFIC GEOMETRY
   A 2 153      2      TOPIC-SPECIFIC ALGEBRA
   C 2 014      2      CLASSROOM PROCESS GENERAL
   X 2 007      2      BEGINNING-OF-YEAR STUDENT QUESTIONNAIRE
   Y 1 084      2      END OF YEAR STUDENT QUESTIONNAIRE
```

```
54                      JAPAN
   0 1 040     27  27 CORE TEST      (NB. Crosssectional forms
   1 1 034     27  17 TEST FORM A         used at posttest,
   2 1 034     27  17 TEST FORM B         special 60-item pretest
   3 1 034     27  17 TEST FORM C         used at pretest)
   4 1 034     27  17 TEST FORM D
   5 9 060       21   SPECIAL JAPANESE PRETEST
   S 1 017     2      SCHOOL QUESTIONNAIRE
   T 1 051     2      TEACHER QUESTIONNAIRE
   Y 1 084     2      END OF YEAR STUDENT QUESTIONNAIRE
   P 2 001     2      POPULATION DATA
   Q 2 003     2      STRATUM DATA
   S 1 017     2      SCHOOL QUESTIONNAIRE
   K 2 001     2      BEGINNING-OF-YEAR CLASSROOM DATA
   L 2 001     2      END-OF-YEAR CLASSROOM DATA
   T 1 051     2      TEACHER QUESTIONNAIRE
   G 2 182     2      TOPIC-SPECIFIC GEOMETRY
   A 2 153     2      TOPIC-SPECIFIC ALGEBRA
   C 2 014     2      CLASSROOM PROCESS GENERAL
   X 2 007     2      BEGINNING-OF-YEAR STUDENT QUESTIONNAIRE
   Y 1 084     2      END OF YEAR STUDENT QUESTIONNAIRE

. . .


81                      UNITED STATES
   0 2 040     272323 CORE TEST
   1 2 035     271515 TEST FORM A    (NB. Rotated forms given at
   2 2 035     271515 TEST FORM B         pretest and posttest,
   3 2 035     271515 TEST FORM C         with complete rotation)
   4 2 035     271515 TEST FORM D
   S 1 017     2      SCHOOL QUESTIONNAIRE
   T 1 051     2      TEACHER QUESTIONNAIRE
   Y 1 084     2      END OF YEAR STUDENT QUESTIONNAIRE
   P 2 001     2      POPULATION DATA
   Q 2 003     2      STRATUM DATA
   S 1 017     2      SCHOOL QUESTIONNAIRE
   K 2 001     2      BEGINNING-OF-YEAR CLASSROOM DATA
   L 2 001     2      END-OF-YEAR CLASSROOM DATA
   T 1 051     2      TEACHER QUESTIONNAIRE
   F 2 135     2      TOPIC-SPECIFIC FRACTIONS
   R 2 103     2      TOPIC-SPECIFIC RATIO PROPORTION PERCENT
   M 2 150     2      TOPIC-SPECIFIC MEASUREMENT
   G 2 182     2      TOPIC-SPECIFIC GEOMETRY
   A 2 153     2      TOPIC-SPECIFIC ALGEBRA
   C 2 014     2      CLASSROOM PROCESS GENERAL
   X 2 007     2      BEGINNING-OF-YEAR STUDENT QUESTIONNAIRE
   Y 1 084     2      END OF YEAR STUDENT QUESTIONNAIRE
////////////////////////////////////////////////////////////////
```

```
$ type document:a.2
===================

*****************************************************************
.................................................................
..   SECTION 2                                                 ..
..                                                             ..
..   DEFINITION OF THE RESPONSE DATA LAYOUT                    ..
.................................................................
```

THE RESPONSE DATA FILES ARE STORED SEPARATELY FROM THIS DOCUMENTATION FILE. THERE ARE THREE RESPONSE DATA FILES FOR EACH POPULATION OF EACH COUNTRY. ONE FILE CONTAINS ALL THE RESPONSE FROM THE STUDENT DATA COLLECTION LEVEL, ONE CONTAINS ALL THE DATA FROM THE TEACHER, AND ONE CONTAINS ALL THE DATA FROM THE SCHOOL.

```
.................................................................
.    PHYSICAL RECORD LAYOUT                                     .
.                                                               .
.      - 80-CHARACTER RECORDS                                   .
.................................................................
```

THESE MAY BE BLOCKED ACCORDING TO THE PARTICULAR SPECIFICATIONS OF THE TAPE OR DISK. ALSO, UNUSED TRAILING COLUMNS MAY BE LEFT BLANK OR TRIMMED OFF.

```
.................................................................
.    RECORDS PER CASE                                           .
.                                                               .
.      -  THERE ARE A FIXED NUMBER OF RECORDS PER CASE, THAT IS .
.         PER SCHOOL, TEACHER OR STUDENT.  THE NUMBER OF RECORDS.
.         VARIES FROM COUNTRY TO COUNTRY, DEPENDING ON WHICH    .
.         INSTRUMENTS WERE EMPLOYED (SEE SECTION 1)             .
.                                                               .
.                                                               .
.      -  AT THE END OF THIS DOCUMENTATION SECTION THERE IS A   .
.         TABLE SHOWING THE NUMBER OF RECORDS FOR EACH KIND OF  .
.         FOR EACH COUNTRY.                                     .
.................................................................
```

```
.....................................................................
.   IDENTIFICATION RECORD                                           .
.                                                                   .
.     - A BLOCK OF RECORDS, CORRESPONDING TO A SCHOOL, A            .
.       TEACHER, OR A STUDENT, BEGINS WITH A SPECIAL                .
.       IDENTIFICATION RECORD, WHICH GIVES THE ID CODES FOR         .
.       THE POSITION OF THE CASE IN THE DATA HIERARCHY AND          .
.       ALSO GIVES SPECIAL DATA AVAILABILITY CODES FOR EACH         .
.       OF THE POSSIBLE DATA COLLECTION INSTRUMENTS THAT COULD      .
.       APPLY TO THE CASE, TOGETHER WITH SAMPLING WEIGHTS, ETC..    .
.                                                                   .
.     - THE LAYOUT OF THE IDENTIFICATION RECORD DEPENDS ON THE      .
.       DATA LEVEL                                                  .
.....................................................................

...

---------------------------------------------------------------------
15      Belgium Flemish
  2     Records for each school
    1   Identification record
    1   Data record, school questionnaire (800)
 33     Records for each teacher/classroom
    1   Identification record
    4   Data records, teacher background questionnaire (600)
    5   Data records, geometry questionnaire (613)
    5   Data records, algebra questionnaire (614)
    3   Data records, general classroom process questionnaire (615)
    3   Data records, OTL, core test (620)
    3   Data records, OTL, rotated form A (621)
    3   Data records, OTL, rotated form B (622)
    3   Data records, OTL, rotated form C (623)
    3   Data records, OTL, rotated form D (624)
  9     Records for each student
    1   Identification record
    1   Data record, pretest background questionnaire (500)
    1   Data record, pretest core (510)
    1   Data record, pretest rotated form (511-514)
    3   Data records, posttest background questionnaire (520)
    1   Data record, posttest core (520)
    1   Data record, posttest rotated form (521-524)
```

22 British Columbia
2 Records for each school
1 Identification record
1 Data record, school questionnaire (800)
46 Records for each teacher/classroom
1 Identification record
4 Data records, teacher background questionnaire (600)
5 Data records, fractions questionnaire (610)
3 Data records, ratio/proportion/percent questionnaire (611)
5 Data records, measurement questionnaire (612)
5 Data records, geometry questionnaire (613)
5 Data records, algebra questionnaire (614)
3 Data records, general classroom process questionnaire (615)
3 Data records, OTL, core test (620)
3 Data records, OTL, rotated form A (621)
3 Data records, OTL, rotated form B (622)
3 Data records, OTL, rotated form C (623)
3 Data records, OTL, rotated form D (624)
10 Records for each student
1 Identification record
1 Data record, pretest background questionnaire (500)
1 Data record, pretest core (510)
3 Data records, posttest background questionnaire (520)
2 Data record, posttest core (520)
2 Data record, posttest rotated form (521-524)
25 Ontario
2 Records for each school
1 Identification record
1 Data record, school questionnaire (800)
46 Records for each teacher/classroom
1 Identification record
4 Data records, teacher background questionnaire (600)
5 Data records, fractions questionnaire (610)
3 Data records, ratio/proportion/percent questionnaire (611)
5 Data records, measurement questionnaire (612)
5 Data records, geometry questionnaire (613)
5 Data records, algebra questionnaire (614)
3 Data records, general classroom process questionnaire (615)
3 Data records, OTL, core test (620)
3 Data records, OTL, rotated form A (621)
3 Data records, OTL, rotated form B (622)
3 Data records, OTL, rotated form C (623)
3 Data records, OTL, rotated form D (624)
13 Records for each student
1 Identification record
1 Data record, pretest background questionnaire (500)
2 Data record, pretest core (510)
2 Data record, pretest rotated form (511-514)
3 Data records, posttest background questionnaire (520)
2 Data record, posttest core (520)
2 Data record, posttest rotated form (521-524)

```
40      France
  2     Records for each school
    1   Identification record
    1   Data record, school questionnaire (800)
 46     Records for each teacher/classroom
    1   Identification record
    4   Data records, teacher background questionnaire (600)
    5   Data records, fractions questionnaire (610)
    3   Data records, ratio/proportion/percent questionnaire (611)
    5   Data records, measurement questionnaire (612)
    5   Data records, geometry questionnaire (613)
    5   Data records, algebra questionnaire (614)
    3   Data records, general classroom process questionnaire (615)
    3   Data records, OTL, core test (620)
    3   Data records, OTL, rotated form A (621)
    3   Data records, OTL, rotated form B (622)
    3   Data records, OTL, rotated form C (623)
    3   Data records, OTL, rotated form D (624)
 17     Records for each student
    1   Identification record
    1   Data record, pretest background questionnaire (500)
    3   Data record, pretest core (510)
    3   Data record, pretest rotated form (511-514)
    3   Data records, posttest background questionnaire (520)
    3   Data record, posttest core (520)
    3   Data record, posttest rotated form (521-524)

. . .

81      U.S.A.
  2     Records for each school
    1   Identification record
    1   Data record, school questionnaire (800)
 46     Records for each teacher/classroom
    1   Identification record
    4   Data records, teacher background questionnaire (600)
    5   Data records, fractions questionnaire (610)
    3   Data records, ratio/proportion/percent questionnaire (611)
    5   Data records, measurement questionnaire (612)
    5   Data records, geometry questionnaire (613)
    5   Data records, algebra questionnaire (614)
    3   Data records, general classroom process questionnaire (615)
    3   Data records, OTL, core test (620)
    3   Data records, OTL, rotated form A (621)
    3   Data records, OTL, rotated form B (622)
    3   Data records, OTL, rotated form C (623)
    3   Data records, OTL, rotated form D (624)
 13     Records for each student
    1   Identification record
    1   Data record, pretest background questionnaire (500)
    2   Data record, pretest core (510)
    2   Data record, pretest rotated form (511-514)
    3   Data records, posttest background questionnaire (520)
```

```
    2  Data record, posttest core (520)
    2  Data record, posttest rotated form (521-524)
////////////////////////////////////////////////////////////////
```

```
$ type document:a.3
===================

*****************************************************************
.................................................................
.................................................................
..   SECTION 3                                                 ..
..                                                             ..
..   COGNITIVE ITEM TABLE                                      ..
.................................................................
.................................................................
```

IN THIS TABLE, THERE ARE FOR EACH OF THE 199 INTERNATIONAL COGNITIVE ITEMS TWO LINES OF INTERNATIONAL INFORMATION PLUS ONE LINE OF NATIONAL INFORMATION FOR EACH COUNTRY DESCRIBED IN THIS FILE. THE INTERNATIONAL INFORMATION INCLUDES THE ITEM NUMBER AND ABBREVIATED TEXT, THE KEY, THE CONTENT CODES, THE STANDARD FORMS AND ITEM POSITIONS, AND THE SUBTEST MAPPINGS. THE NATIONAL INFORMATION INCLUDES THE NATIONAL FORM AND ITEM POSITION AND APPLICATION KEYS FOR TEACHER OTL, STUDENT PRETEST, AND STUDENT POSTTEST USE OF THE ITEM. INFORMATION ABOUT NATIONAL OPTION ITEMS IS ALSO INCLUDED, AS DESCRIBED LATER.

```
.................................................................
.    INTERNATIONAL LINE ONE                                     .
.................................................................
```

1-3 ITEM REFERENCE NUMBER FROM ITEM BANK

5-80 ABBREVIATED TEXT OF THE INTERNATIONAL FORM OF THE ITEM

INTERNATIONAL LINE TWO

5 CORRECT RESPONSE ALTERNATIVE
- 1 A
- 2 B
- 3 C
- 4 D
- 5 E

7-9 POSITION IN INTERNATIONAL CONTENT GRID
- 000 ARITHMETIC
- 001 WHOLE NUMBERS
- 002 COMMON FRACTIONS
- 003 DECIMAL FRACTIONS
- 004 RATIO, PROPORTION, PERCENT
- 005 NUMBER THEORY
- 006 POWERS
- 100 ALGEBRA
- 101 INTEGERS
- 102 RATIONALS
- 103 INTEGER EXPONENTS
- 104 FORMULAS
- 105 POLYNOMIALS EXPRESSIONS
- 106 EQUATIONS AND INEQUATIONS
- 107 RELATIONS
- 200 GEOMETRY
- 201 CLASSIFICATION
- 202 PROPERTIES
- 203 CONGRUENCE
- 204 SIMILARITY
- 205 GEOMETRIC CONSTRUCTIONS
- 206 PYTHAGOREAN
- 207 COORDINATES
- 208 DEDUCTIONS
- 209 TRANSFORMATION (INFORMAL)
- 212 SPATIAL VISUALIZATION
- 215 TRANSFORMATIONAL GEOMETRY
- 300 PROBABILITY AND STATISTICS
- 302 ORGANIZATION
- 303 REPRESENTATION
- 304 MEAN, MEDIAN, MODE
- 306 PROBABILITY
- 400 MEASUREMENT
- 401 UNITS
- 402 ESTIMATION
- 403 APPROXIMATION
- 404 DETERMINING MEASURES

11 BEHAVIOURAL LEVEL
- 1 COMPUTATION
- 2 COMPREHENSION
- 3 APPLICATION
- 4 ANALYSIS

13 ANCHOR ITEM STATUS
- 0 NOT AN ANCHOR
- 1 ANCHOR ITEM
- 2 MODIFIED ANCHOR ITEM

15 FORM PLACEMENT FOR THE CROSSSECTIONAL STUDY
17-18 POSITION WITHIN FORM FOR THE CROSSSECTONAL STUDY

20 FORM PLACEMENT FOR THE LONGITUDINAL STUDY
22-23 POSITION WITHIN FORM FOR THE LONGITUDINAL STUDY

NOTE... THE PLACEMENT AND POSITION NUMBERS ARE ZERO FOR ITEMS NOT INCLUDED IN A GIVEN STUDY. THE PLACEMENT AND POSITION NUMBERS FOR THE LONGITUDINAL STUDY ARE THOSE OF THE SUGGESTED STANDARD.

25 LONGITUDINAL CORE TYPE
- 0 NOT LONGITUDINAL INTERNATONAL CORE
- 1 LONGITUDINAL INTERNATIONAL CORE

27 STRATUM FOR CROSSSECTIONAL FORM CONSTRUCTION
- 1 ARITHMETIC
- 2 ALGEBRA
- 3 GEOMETRY
- 4 PROBABILITY AND STATISTICS
- 5 MEASUREMENT

29 STRATUM FOR LONGITUDINAL FORM CONSTRUCTION
- 1 FRACTIONS
- 2 RATIO PROPORTION PERCENT
- 3 ALGEBRA
- 4 GEOMETRY
- 5 MEASUREMENT
- 6 INTEGERS (NOT IN INTERNATIONAL CORE)
- 7 PROBABILITY AND STATISTICS (NOT IN INTERNATIONAL CORE)

31-32 SUBTEST CODE 1
34-35 SUBTEST CODE 2
...
79-80 SUBTEST CODE 17

THESE ARE THE SUBTESTS DEFINED IN MEMORANDUM A/369, WITH CORRECTIONS. THE NUMBER OF SUBTEST CODES PER ITEM VARIES. THE FOLLOWING SUBTEST CODES ARE USED.

| | |
|---|---|
| 01 | ESTIMATION AND APPROXIMATION |
| 02 | NEW MATHS IN 1ST STUDY |
| 03 | BASIC SKILLS |
| 04 | ALGEBRA (COMPUTATION) |
| 05 | CALCULATOR USE |
| 06 | ARITHMETIC (COMPUTATION) |
| 07 | PROPORTIONATE THINKING |
| 08 | ANCHOR ITEMS |
| 09 | WHOLE NUMBERS |
| 10 | COMMON FRACTIONS |
| 11 | COMMON FRACTIONS (COMPUTATION) |
| 12 | DECIMAL FRACTIONS |
| 13 | RATIO AND PROPORTION |
| 14 | PERCENT |
| 15 | ARITHMETIC |
| 16 | ARITHMETIC (OTHER THAN COMPUTATION) |
| 17 | INTEGERS |
| 18 | FORMULAS AND ALGEBRAIC EXPRESSIONS |
| 19 | EQUATIONS AND INEQUATIONS |
| 20 | ALGEBRA |
| 21 | ALGEBRA (OTHER THAN COMPUTATION) |
| 22 | CLASSIFICATION OF PLANE FIGURES |
| 23 | PROPERTIES OF PLANE FIGURES |
| 24 | CONGRUENCE OF PLANE FIGURES |
| 25 | SIMILARITY OF PLANE FIGURES |
| 26 | PLANE FIGURES |
| 27 | COORDINATES |
| 28 | INFORMAL TRANSFORMATIONS IN GEOMETRY |
| 29 | GEOMETRY |
| 30 | GEOMETRY (COMPUTATION) |
| 31 | GEOMETRY (OTHER THAN COMPUTATION) |
| 32 | REPRESENTATION OF DATA |
| 33 | (NOT USED) |
| 34 | PROBABILITY AND STATISTICS |
| 35 | PROBABILITY AND STATISTICS (OTHER THAN COMPUTATION) |
| 36 | STANDARD UNITS OF MEASURE |
| 37 | DETERMINATION OF MEASURES |
| 38 | MEASUREMENT |
| 39 | MEASUREMENT (COMPUTATION) |
| 40 | MEASUREMENT (OTHER THAN COMPUTATION) |
| 41 | PROBABILITY AND STATISTICS (COMPUTATION) |
| 42 | MODIFIED ANCHOR ITEMS |
| 43 | NON-VERBAL |
| 44 | VERBAL |
| 45 | ANCHOR (NON-VERBAL) |
| 46 | ANCHOR (VERBAL) |
| 47 | DIAGRAMMATIC ITEMS (PAIRED WITH NON-DIAGRAMMATIC) |

48 NON-DIAGRAMMATIC ITEMS (PAIRED WITH DIAGRAMMATIC)

NATIONAL LINE (ONE FER COUNTRY)

2-3 COUNTRY CODE

5 FORM PLACEMENT FOR THE NATIONAL STUDY
7-8 POSITION WITHIN FORM FOR THE NATIONAL STUDY

NOTE. THE PLACEMENT AND POSITION NUMBERS, AND ALL APPLICATION KEYS WHICH FOLLOW, ARE ZERO FOR ITEMS NOT INCLUDED IN THE NAT ONAL STUDY. THE TOTAL NUMBER OF INTERNATIONAL ITEMS PER FORM IS GIVEN IN SECTION 1 ABOVE. IN ADDITION, THERE MAY BE NATIONAL OPTION ITEMS AS DESCRIBED LATER.

10-12 APPLICATION KEY FOR USE OF THE ITEM AS A TEACHER OTL ITEM
14-16 APPLICATION KEY FOR USE OF THE ITEM AS A STUDENT PRETEST
18-20 APPLICATION KEY FOR USE OF THE ITEM AS A STUDENT POSTTEST

NOTE. THESE ARE 3-DIGIT CODES IN THE FORM (ABC). FOR EACH APPLICATION KEY, THE FIRST DIGIT (A) INDICATES THE QUALITY OF THE ITEM IMPLEMENTATION.

0 NOT USED (IMPLIES ZERO POSITION NUMBER ABOVE)
1 USED BUT SPOILED
2 NON-STANDARD ALTERNATIVES AND TEXT
3 NON-STANDARD ALTERNATIVES
4 NON-STANDARD TEXT
5 USED IN STANDARD FORM

THE SECOND AND THIRD DIGITS (BC) WILL GENERALLY BE IN AGREEMENT WITH THE INFORMATION PROVIDED FOR THE FORM IN SECTION 1 ABOVE, BUT THERE MAY BE ERRORS OF PRINTING, CODING, ETC., THAT CAUSE AN ITEM'S USAGE TO DIFFER FROM THE FORM AS A WHOLE, PERHAPS JUST FOR ONE KIND OF APPLICATION. THE SECOND DIGIT (B) INDICATES THE SAMPLE TO WHOM THE ITEM WAS APPLIED.

0 NO ONE
1 A SAMPLE OF THE ELIGIBLE RESPONDENTS
2 ALL RESPONDENTS

THE THIRD DIGIT (C) INDICATES WHICH QUESTIONS WERE ASKED WITH THE QUESTION. FOR THE TEACHER OTL APPLICATION KEY,

0 NOT USED
1 ESTIMATION
2 TAUGHT OR REVIEWED
3 1+2
4 IF NOT WHY
5 1+4
6 2+4
7 1+2+4

FOR THE STUDENT PRETEST OR POSTTEST APPLICATION KEY,

0 NOT USED
1 TEST RESPONSE
2 TAUGHT THIS YEAR
3 1+2
4 CALCULATOR
5 1+4
6 2+4
7 1+2+4

22 (FOR JAPAN ONLY) The part of the item on the special pretest. This is blank if the item is not in the pretest, or 1 or 2 for part one or two of the pretest. The first part had 20 items, and the second had 40.

24-25 (FOR JAPAN ONLY) The item number within the part of the special pretest, or blank if the item is not in the pretest.

27-80 COMMENTS CONCERNING PROBLEMS WITH QUALITY OR RESTRICTION OF SAMPLING APPLICATIONS OR QUESTIONS ASKED.

...

```
001 (22 * 18) - (47 + 59) IS EQUAL TO
    1 001 1 1 0 20 2 34 0 1 6 03 05 06 08 09 15 45
15 2 34 527 513 511
22 2 34 527 000 513
25 2 34 527 515 515
40 2 34 527 517 517
54 0 20 527 000 523
63 2 34 527 517 517
79 2 34 527 517 517
81 2 34 527 515 515
002 MATCHSTICKS ARE ARRANGED AS FOLLOWS. IF THE PATTERN IS
    2 001 3 0 0 31 4 12 0 1 6 09 15 16
15 4 12 527 513 511
22 4 12 527 000 513
25 4 12 527 515 515
40 4 12 527 517 517
54 0 31 527 523 523 2 34
63 4 12 527 517 517
79 4 12 527 517 517
81 4 12 527 515 515
003 2/5 + 3/8 IS EQUAL TO
    5 002 1 1 0 17 0 31 1 1 1 03 06 08 10 11 15 43 45
15 0 31 527 523 521
22 0 31 527 523 523
25 0 31 527 523 523
40 0 31 527 527 527
54 0 17 527 523 523 1 01
63 0 31 527 527 527
79 0 31 527 527 527
81 0 31 527 523 523
004 WHICH OF THE FOLLOWING IS A PAIR OF EQUIVALENT FRACTIONS?
    4 002 2 0 0 14 3  3 0 1 1 10 15 16
15 0 04 527 523 521          3-3
22 3 03 527 000 413       /e "1/2 and 14/24" -> "1/2 and 14/15"
25 3 03 527 515 515
40 3 03 527 517 517
54 0 14 527 000 523
63 3 03 527 517 517
79 3 03 527 517 517
81 3 03 527 515 515
005 0.40 * 6.38 IS EQUAL TO
    3 003 1 1 0 18 0 26 0 1 1 03 05 06 08 12 15 43 45
15 2 10 527 513 511          0-26
22 0 26 527 523 523
25 0 26 527 523 523
40 0 26 527 527 527
54 0 18 527 000 523
63 0 26 527 527 527
79 0 26 527 527 527
81 0 26 527 523 523
```

. . .

```
198 WHICH OF THE FOLLOWING PATTERNS CAN BE FOLDED ALONG THE
    3 212 4 0 0  0 3  4 0 3 4 29 31
15 3 04 527 513 511
22 3 04 527 000 513
25 3 04 527 515 515
40 3 04 527 517 517
54 0 00 000 000 000
63 3 04 527 517 517
79 3 04 527 517 517
81 3 04 527 515 515
199 THE AREA OF THE SHADED CIRCLE IS WHAT PART OF THE AREA OF THE
    3 404 3 0 0  0 4  9 0 5 5 37 38 40
15 4 09 527 513 511
22 4 09 527 000 413
25 4 09 527 515 515
40 4 09 527 517 517
54 0 00 000 000 000
63 4 09 527 517 517
79 4 09 527 517 517
81 4 09 527 515 515
////////////////////////////////////////////////////////////////////////
```

```
$ type document:a.4
===================

*************************************************************
.............................................................
.............................................................
..   SECTION 4                                             ..
..                                                         ..
..   QUESTIONNAIRE ITEM TABLE                              ..
.............................................................
.............................................................
```

THIS TABLE DEFINES THE DATA LEVEL, VARIABLE NAME, LONGITUDINAL INSTRUMENT LOCATION, DATA RECORD AND POSITION AND COLUMN WIDTH, SCALE IDENTIFICATION (FOR ATTITUDES), CROSSREFERENCE TO THE CROSSSECTIONAL INSTRUMENTATION, AND VARIABLE TITLE FOR EACH RESPONSE ITEM FROM ALL THE SURVEY QUESTIONNAIRES, EXCEPTING ONLY THE COGNITIVE INSTRUMENTS. THE TABLE CONTAINS INFORMATION CONCERNING ANY EXCEPTIONS IN THE APPLICATION OF AN ITEM IN A PARTICULAR COUNTRY. IN ADDITION TO THE INTERNATIONALLY DEFINED VARIABLES, THE TABLE INCLUDES INFORMATION ABOUT ALL NATIONAL OPTION VARIABLES.

THE INFORMATION IN THE TABLE IS PRESENTED AT THE MOST DETAILED LEVEL, WITH SEPARATE INFORMATION FOR EACH PART OF EACH MULTI-PART QUESTION. FOR EACH SUCH ITEM, THERE IS ONE LINE OF INTERNATIONAL INFORMATION PLUS ONE LINE OF NATIONAL INFORMATION FOR EACH COUNTRY DOCUMENTED IN THIS FILE FOR WHICH A NON-STANDARD APPLICATION OF THE ITEM WAS MADE. THE NATIONAL LINE WILL BE OMITTED IF THE INSTRUMENT CORRESPONDING TO THE ITEM WAS NOT USED AT ALL IN THE COUNTRY (SEE SECTION 1 ABOVE), OR IF THE USE WAS STANDARD AND WITHOUT SAMPLING. THE NATIONAL LINE IS REQUIRED FOR NATIONAL OPTION ITEMS, WHICH ARE IDENTIFIED BY THE LETTER 'Z' APPEARING AS THE SECOND LETTER OF THE NAME.

INTERNATIONAL LINE

1 LEVEL

0 POPULATION
1 STRATUM (THERE ARE NO INTERNATIONAL ITEMS HERE)
2 SCHOOL
3 CLASS (THERE ARE NO INTERNATIONAL ITEMS HERE)
4 TEACHER
5 STUDENT

3-10 VARIABLE NAME FOR THE ITEM. THIS CONTAINS UP TO EIGHT CHARACTERS. THE FIRST LETTER INDICATES THE DATA SOURCE, AS FOLLOWS...

P POPULATION IDENTIFICATION
Q STRATUM INFORMATION (NO INTERNATIONAL ITEMS)
S SCHOOL QUESTIONNAIRE
K BEGINNING-OF-YEAR CLASSROOM DATA
L END-OF-YEAR CLASSROOM DATA
T TEACHER BACKGROUND QUESTIONNAIRE
F FRACTIONS TOPIC-SPECIFIC QUESTIONNAIRE
R RATIO-PROPORTION-PERCENT TOPIC-SPECIFIC QUESTIONNAIRE
M MEASUREMENT TOPIC-SPECIFIC QUESTIONNAIRE
G GEOMETRY TOPIC-SPECIFIC QUESTIONNAIRE
A ALGEBRA TOPIC-SPECIFIC QUESTIONNAIRE
C CLASSROOM PROCESS GENERAL QUESTIONNAIRE
X BEGINNING-OF-YEAR STUDENT BACKGROUND AND ATTITUDE QUESTIONNAIRE
Y END-OF-YEAR STUDENT BACKGROUND AND ATTITUDE QUESTIONNAIRE

GENERALLY, THE SECOND, AND POSSIBLY THE THIRD AND FOURTH LETTERS, INDICATE BLOCKS OF ITEMS, AND THE LAST LETTER OF THE NAME IS USED TO DIFFERENTIATE THE VARIABLES CORRESPONDING TO SUBPARTS OF THE SAME QUESTION (E.G., T FOR TYPICAL WEEK, L FOR LAST WEEK). WHEN THE SECOND LETTER IS ' , THE VARIABLE IS A NATIONAL OPTION VARIABLE.

12-14 LONGITUDINAL INSTRUMENT NUMBER.
16-18 LONGITUDINAL QUESTION NUMBER.
20-21 LONGITUDINAL SUBQUESTION NUMBER OR CODE.

23 CARD (RECORD) NUMBER, FROM THE LONGITUDINAL CODEBOOK.

25-26 FIRST POSITION (COLUMN) NUMBER, FROM THE LONGITUDINAL CODEBOOK.

28 WIDTH OF THE DATA FIELD. NOTE THAT IT IS A UNIFORM CONVFNTION OF THIS STUDY THAT MISSING DATA IS CODED AS A FIELD FILLED WITH 9'S (9, 99, 999, ETC.). ALSO, EXCEPT POSSIBLY FOR NATIONAL SAMPLING DATA, ALL DATA ITEMS ARE INTEGERS, RIGHT-JUSTIFIED WITH LEFT ZERO FILL.

FURTHERMORE, IT IS UNDERSTOOD THAT CODE 8 WAS USED IN FRANCE FOR 'UNCODABLE' INFORMATION.

30 ATTITUDE SCALE IDENTIFICATION.

1 HOME SUPPORT
2 MATHEMATICS IN SCHOOL
3 MATHEMATICS AS A PROCESS
4 MATHEMATICS AND MYSELF
5 MATHEMATICS ANXIETY
6 SEX STEREOTYPING
7 MATHEMATICS AND SOCIETY
8 COMPUTERS, CALCULATORS, AND MATHS

32-33 QUESTION NUMBER FOR THE CROSSSECTIONAL VERSION OF THE ITEM. MANY LONGITUDINAL ITEMS HAVE NO CROSSSECTIONAL COUNTERPARTS.

35-74 SHORT TITLE FOR THE VARIABLE, SUITABLE FOR PROGRAM LABELS.

.. NATIONAL LINE ..

3-4 COUNTRY CODE NUMBER.

6 ITEM QUALITY.

0 NOT USED
1 USED BUT SPOILED
2 NON-STANDARD CODING AND TEXT
3 NON-STANDARD CODING
4 NON-STANDARD TEXT
5 USED IN STANDARD FORM
9 NATIONAL OPTION ITEM

12-80 COMMENTS CONCERNING PROBLEMS WITH QUALITY, REASON FOR NON-APPLICATION, NONSTANDARD POSITION, ETC., OR NATURE OF NATIONAL OPTION QUESTION.

```
-----------------------------------------------------------------
0 PCOUNT                0  0 2      NAME OF THE COUNTRY
1 QSTRAT                0  0 2      PRINCIPAL STRATIFICATION CODE
2 SAREA    800   1     1 20 1    1 KIND OF COMMUNITY SERVED BY SCHOOL
  15 3     Expanded and reordered coding
  40 3     Contracted coding?
  54 3     Added code 6 for undecided
2 SENROLB  800   2  1 1 21 4    2 BOYS..TOTAL ENROLMENT IN SCHOOL
2 SENROLG  800   2  2 1 25 4    2 GIRLS..TOTAL ENROLMENT IN SCHOOL
2 SAPOPB   800   3 A1 1 29 4    3 BOYS..POPULATION A STUDENTS IN SCHOOL
2 SAPOPG   800   3 A2 1 33 4    3 GIRLS..POPULATION A STUDENTS IN SCHOOL
2 SNOMTHB  800   3 B1 1 37 4    3 BOYS..POP A WHO DO NOT TAKE MATH
  15 0     Not used, since all take math
  22 0     Not used, since all take math
  40 0     Not used, since all take math
  54 0     Not used, since all take math
2 SNOMTHG  800   3 B2 1 41 4    3 GIRLS..POP A WHO DO NOT TAKE MATH
  15 0     Not used, since all take math
  22 0     Not used, since all take math
  40 0     Not used, since all take math
  54 0     Not used, since all take math
2 STCHS    800   4     1 45 3    4 NUMBER OF FULL-TIME TEACHING STAFF
2 SSOMMM   800   5  1 1 48 3    5 MALES..TEACHING ONE OR MORE MATHS
2 SSOMMF   800   5  2 1 51 3    5 FEMALES..TEACHING ONE OR MORE MATHS
2 SALLMM   800   6  1 1 54 3    6 MALES..TEACHING MATH EXCLUSIVELY
2 SALLMF   800   6  2 1 57 3    6 FEMALES..TEACHING MATH EXCLUSIVELY
2 SSPECM   800   7  1 1 60 3    7 MALES..QUALIFIED MATH.SPECIALISTS
  22 4     Defined specialist as math majors or math ed.concentration
  63 4     Defined specialist form 3 level teachers of math
2 SSPECF   800   7  2 1 63 3    7 FEMALES..QUALIFIED MATH SPECIALISTS
  22 4     Defined specialist as math majors or math ed concentration
  63 4     Defined specialist form 3 level teachers of math
2 SDAYSYR  800   8     1 66 3    8 OFFICIAL SCHOOL DAYS PER YEAR
  15 4     Not asked, imputed by national centre
  40 4     Not asked, imputed by national centre
2 SSCHPER  800   9     1 69 2    9 AVERAGE NUMBER OF PERIODS PER SCHOOL DAY
  15 4     Not asked, imputed by national centre
  54 2     Records periods per school week of 5.5 days
2 SPERLEN  800  10     1 71 3   10 AVERAGE LENGTH OF EACH PERIOD IN MINUTES
  15 4     Not asked, imputed by national centre
2 SCALSUB  800  11     1 74 1   11 WHICH SUBJECTS CALCULATORS ENCOURAGED
2 SMEET    800  12     1 75 1   12 FREQUENCY MEETINGS MATHEMATICS TEACHERS
  15 3     Expanded coding with 6=2+3, 7=3+4, 8=1+2
  54 2     Could be per term or per year, question was unclear
2 SDOWHAT  800  13     1 76 1   13 ACTIVITIES AT THE MATH TEACHER MEETINGS
  15 3     Expanded coding
  40 3     Contracted coding
2 SPOLFF   800  14     1 77 1   14 POLICY ON FOUR FUNCTION CALCULATOR
2 SPOLPP   800  15     1 78 1   15 POLICY ON PROGRAMMED CALCULATOR
2 SSTREAM  800  16     1 79 1   16 SETTING OR STREAMING POP A MATH
  15 3     Modified coding with 3=stream, 4=set, 2=no, 1=both
  22 4     Modified question
```

```
 25 2     Streaming omitted and modified codes, but recoded ok
 81 3     Contracted coding?
...
```

```
4 TSEX     600   1     1 20 1     1 YOUR SEX
4 TAGE     600   2     1 21 2     2 YOUR AGE IN YEARS
4 TEXPTCH  600   3     1 23 2     3 YEARS OF EXPERIENCE AS A TEACHER
4 TEXPMTH  600   4     1 25 2     4 YEARS TEACHING MATHEMATICS TO POP A
4 TEDMATH  600   5     1 27 2     5 SEMESTERS POSTSECONDARY MATHEMATICS
  15 0     Not used
  22 2     Asked how many courses
  25 2     Multichoice format recoded ok
4 TEDMED   600   6     1 29 2     6 SEMESTERS POSTSECONDARY MATH PEDAGOGY
  15 0     Not used
  22 2     Asked how many courses
  25 2     Multichoice format recoded ok
4 TEDGED   600   7     1 31 2     7 SEMESTERS POSTSECONDARY GENERAL PEDAGOGY
  15 0     Not used
  22 2     Asked how many courses
  25 2     Multichoice format recoded ok
4 THRSTCH  600   8     1 33 2     8 TOTAL NUMBER OF TEACHING PERIODS
4 THRSMTH  600   9     1 35 2     9 PERIODS PER WEEK TEACHING MATHEMATICS
4 TSCITCH  600  10  A  1 37 1    10 ALSO TEACHER OF SCIENCE
4 TOTHTCH  600  10  B  1 38 1    10 ALSO TEACHER IN OTHER AREAS
4 THOD     600  10  C  1 39 1    10 ALSO HEAD OF THE MATHEMATICS DEPARTMENT
  40 0     Not used, inadequate
4 TADGEN   600  10  D  1 40 1    10 ALSO SCHOOL ADMINISTRATOR GENERAL
  15 4     Asked about class administrator
  40 0     Not used
4 TADSUB   600  10  E  1 41 1    10 ALSO SCHOOL ADMINISTRATOR SUBJECT AREA
  15 4     Asked about other duties
  40 0     Not used
4 TPOPAC   600  11 A1  1 42 1    11 CLASSES..POPULATION A
  81 0     Not used?
4 TPOPAH   600  11 A2  1 43 2    11 HOURS..POPULATION A
4 TLOWAC   600  11 B1  1 45 1    11 CLASSES..LOWER THAN POPULATION A
  81 0     Not used?
4 TLOWAH   600  11 B2  1 46 2    11 HOURS..LOWER THAN POPULATION A
4 THIGHAC  600  11 C1  1 48 1    11 CLASSES..HIGHER THAN POPULATION A
  81 0     Not used?
  54 0     Not used
4 THIGHAH  600  11 C2  1 49 2    11 HOURS..HIGHER THAN POPULATION A
  54 0     Not used
4 TSBJCTS  600  12    1 51 1    12 HOW MANY SUBJECTS TO THE TARGET CLASS
  22 3     Codes reversed, recoded ok
  54 3     Codes reversed, recoded ok
4 TNTCHS   600  13    1 52 1    13 OTHER TEACHERS MATH TO TARGET CLASS
4 TNSTUDS  600  14    1 53 2    14 STUDENTS ENROLLED IN THE TARGET CLASS
4 TPPWEEK  600  15    1 55 2    15 PERIODS OF MATH INSTRUCTION EACH WEEK
4 TLENPER  600  16    1 57 3    16 AVERAGE LENGTH OF CLASS PERIOD MINUTES
4 THPYEAR  600  17    1 60 3    17 HOURS OF MATH INSTRUCTION BY END OF YEAR
4 TCFMATH  600  18    1 63 1    18 TARGET CLASS COMPARED WITH OTHER CLASSES
  22 2     Did not include no other classes alternative, recodes ok?
4 TRANGE   600  19    1 64 1    19 RANGE OF MATHEMATICS ABILITIES CLASS
4 TMASTRY  600  20    1 65 3    20 MASTERY OF PREVIOUS CURRICULUM
4 TMTHSUB  600  21    1 68 1    21 CHARACTER OF MAIN MATH SUBJECT MATTER
```

. . .

```
5 YMTHRUL  520  84    3 64 1 3 43 MATHEMATICS IS A SET OF RULES
5 YNOUSE   520  85    3 65 1 7 70 MOST PEOPLE DONT USE MATH IN THEIR JOBS
  25 4     Referred to arithmetic rather than mathematics
5 YESTIMP  520  86    3 66 1 3 36 ESTIMATING IS AN IMPORTANT MATH SKILL
5 YMNYWYS  520  87    3 67 1 3 37 MANY WAYS TO SOLVE MOST MATH PROBLEMS
5 YCALM    520  88    3 68 1 5 62 I USUALLY FEEL CALM WHEN DOING MATH
5 YCALHLP  520  89    3 69 1 8 79 CALCULATOR CAN HELP YOU LEARN MATH TOPIC
  25 4     Question was, Computer make learning math more enjoyable
5 YBOYSND  520  90    3 70 1 6 67 BOYS NEED MORE MATHEMATICS THAN GIRLS
5 YNOMORE  520  91    3 71 1 4 53 IF CHOICE I WOULDNT LEARN ANY MORE MATH
5 YNEWDSC  520  92    3 72 1 3 34 NEW DISCOVERIES IN MATH ARE BEING MADE
  25 0     Not used
5 YDIFWAY  520  93    3 73 1 3 44 MATH CAN BE SOLVED IN DIFFERENT WAYS
  25 0     Not used
////////////////////////////////////////////////////////////////////
```

```
$ type document:a.5
==================

**********************************************************************
......................................................................
......................................................................
..   SECTION 5                                                      ..
..                                                                  ..
..   SAMPLING NOTES AND STRATUM DEFINITIONS                         ..
......................................................................
......................................................................

THIS SECTION CONTAINS SPECIAL INFORMATION ON EACH COUNTRY'S
SAMPLE DESIGN.  THIS IS NEEDED TO CALCULATE OR APPLY SAMPLING
WEIGHTS, EVALUATE SAMPLING ERROR THROUGH FXAMINATION OF DESIGN
EFFECTS OR ANALYSIS OF REPLICATE SUBSAMPLES, AND TO IDENTIFY
NATIONAL SUBPOPULATIONS OF IMPORTANCE FOR ANALYSIS AND
INTERPRETATION.  THE INFORMATION IS TAKEN FROM THE WELLINGTON
SAMPLING ANALYSIS AND REPORT.

......................................................................
.   - EXACT DEFINITION OF EACH STRATUM                              .
.   - STRATUM POPULATION SIZES                                      .
.   - SAMPLING METHOD WITHIN STRATUM                                .
.   - SAMPLING METHOD FOR CLASSES AND STUDENTS                      .
.     WITHIN SCHOOLS                                                .
.   - SAMPLING WEIGHTS FOR STRATA AND SCHOOLS                       .
......................................................................

----------------------------------------------------------------------
```

15 BELGIUM (FLEMISH) POP A

POPULATION DEFINITION: ALL STUDENTS IN THE SECOND YEAR OF THE GENERAL SECONDARY EDUCATION, TECHNICAL SECONDARY EDUCATION AND VOCATIONAL SECONDARY EDUCATION PROGRAMMES IN BOTH TYPE I AND TYPE II FORMS OF SCHOOL ORGANISATION.

EXCLUDED POPULATION: STUDENTS IN PROVINCIAL 'GENERAL AND TECHNICAL' AND 'GENERAL' SCHOOLS.

STRATA: INITIAL STRATIFICATION VARIABLES:

ORGANISING AUTHORITY

COURSE TYPE

LIST OF (NATIONAL CENTRE) STRATA:

1) ORGANISING AUTHORITY: CATHOLIC
GENERAL AND TECHNICAL (COMPREHENSIVE) SCHOOL, TYPE I (NON-TRADITIONAL)

2) ORGANISING AUTHORITY: CATHOLIC
GENERAL SCHOOL, TYPE II (TRADITIONAL)

3) ORGANISING AUTHORITY: CATHOLIC
TECHNICAL SCHOOL, TYPE II

4) ORGANISING AUTHORITY: CATHOLIC
VOCATIONAL SCHOOLS, TYPE I AND II

5) ORGANISING AUTHORITY: STATE
GENERAL AND TECHNICAL (COMPREHANSIVE) SCHOOL, TYPE I

6) ORGANISING AUTHORITY: STATE
GENERAL SCHOOL, TYPE II
NO SCHOOLS IN THIS STRATUM.

7) ORGANISING AUTHORITY: STATE
TECHNICAL SCHOOL, TYPE II
NO SCHOOLS IN THIS STRATUM

8) ORGANISING AUTHORITY: STATE
VOCATIONAL SCHOOLS, TYPE I.

9) ORGANISING AUTHORITY: PROVINCIAL
GENERAL AND TECNICAL, TYPE I
NO SAMPLE SCHOOLS

10) ORGANISING AUTHORITY: PROVINCIAL
GENERAL, TYPE II
NO SAMPLE SCHOOLS

11) ORGANISING AUTHORITY: PROVINCIAL
TECHNICAL, TYPE II.

12) ORGANISING AUTHORITY: PROVINCIAL
VOCATIONAL SCHOOLS, TYPES I AND II

13) ORGANISING AUTHORITY: COMMUNAL
GENERAL AND TECHNICAL, TYPE I.

14) ORGANISING AUTHORITY: COMMUNAL
GENERAL, TYPE II.

15) ORGANISING AUTHORITY: COMMUNAL
TECHNICAL, TYPE II.

16) ORGANISING AUTHORITY: COMMUNAL
VOCATIONAL, TYPE I AND TYPE II.

THESE STRATA WERE COLLAPSED AT THE INTERNATIONAL CENTRE FOR TWO REASONS. FIRST, THE NATIONAL CENTRE ADVISED THAT DURING THE COURSE OF THE STUDY THE BALANCE BETWEEN TYPE I AND TYPE II COURSES CHANGED VERY RAPIDLY AND, SECOND, SOME STRATA CONTAINED INSUFFICIENT SCHOOLS TO ALLOW RELIABLE WEIGHTING.

THE NEW STRATA FORMED WERE AS FOLLOWS:

STRATUM 1 : 1 + 2 ABOVE
STRATUM 2 : 3 + 4 ABOVE
STRATUM 3 : 13 + 14 ABOVE
STRATUM 4 : 11 + 12 + 15 + 16 ABOVE
STRATUM 5 : 5 ABOVE
STRATUM 6 : 8 ABOVE

THUS THE STRATA FOR WEIGHTING CONSIST OF :

1) CATHOLIC 'GENERAL AND TECHNICAL' AND 'GENERAL' SCHOOLS
2) CATHOLIC 'TECHNICAL' AND 'VOCATIONAL' SCHOOLS
3) COMMUNAL 'GENERAL AND TECHNICAL' AND 'GENERAL' SCHOOLS
4) PROVINCIAL AND COMMUNAL 'TECHNICAL' AND 'VOCATIONAL' SCHOOLS
5) STATE 'GENERAL AND TECHNICAL' SCHOOLS
6) STATE 'VOCATIONAL' SCHOOLS

SAMPLING PROCEDURES:

SCHOOLS SELECTED WITH PROBABILITY PROPORTIONAL TO SIZE OF TARGET GRADE USING RANDOM START, CONSTANT INTERVAL.

ONE CLASS RANDOMLY SELECTED WITHIN SCHOOL.

WEIGHTS CALCULATED:

STRATUM WEIGHTS W1 = (M/N)*(NI/MI)
W2 = (M/N)*(NI/(SI*NIJ))

M = TOTAL NUMBER OF STUDENTS IN THE ACHIEVED SAMPLE.
N = TOTAL NUMBER OF STUDENTS IN THE POPULATION
NI = NUMBER OF STUDENTS IN THE POPULATION IN STRATUM I.
MI = NUMBER OF STUDENTS IN THE ACHIEVED SAMPLE IN STRATUM I.
SI = NUMBER OF SCHOOLS IN THE ACHIEVED SAMPLE IN STRATUM I.
NIJ = NUMBER OF STUDENTS IN THE ACHIEVED SAMPLE FOR SCHOOL J OF STRATUM I.

NOTE: FURTHER NOTES RE LOSS OF SOME TEACHER INFORMATION FROM SAMPLE TO BE ADDED.

WEIGHTING - BELGIUM(FLEMISH) - POP A

M=3103
N=88758

COL 1 = ORIGINAL STRATUM
COL 2 = ORIGINAL SCHOOL NUMBER
COL 3 = NEW STRATUM
COL 4 = NEW SCHOOL NUMBER
COL 5 = CLASS NUMBER
COL 6 = ACHIEVED SAMPLE
COL 7 = STRATUM WEIGHT (W1)
COL 8 = SCHOOL/CLASS WEIGHT (W2)

M1 = ACHIEVED SAMPLE OF STUDENTS IN STRATUM 1

N1 = POPULATION OF STRATUM 1. I.E. STRATUM 1 SUB-POPULATION

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| | | | M1=1291<br>N1=32291 | | | | |
| 01 | 003 | 01 | 103 | 01 | 022 | 0.874 | 0.855 |
| 01 | 005 | 01 | 105 | 01 | 018 | 0.874 | 1.045 |
| 01 | 006 | 01 | 106 | 01 | 014 | 0.874 | 1.344 |
| 01 | 007 | 01 | 107 | 01 | 027 | 0.874 | 0.697 |
| 01 | 008 | 01 | 108 | 01 | 021 | 0.874 | 0.896 |
| 02 | 001 | 01 | 201 | 01 | 024 | 0.874 | 0.784 |
| 02 | 002 | 01 | 202 | 01 | 017 | 0.874 | 1.107 |
| 02 | 004 | 01 | 204 | 01 | 027 | 0.874 | 0.697 |
| 02 | 005 | 01 | 205 | 01 | 016 | 0.874 | 1.176 |
| 02 | 006 | 01 | 206 | 01 | 026 | 0.874 | 0.724 |
| 02 | 007 | 01 | 207 | 01 | 024 | 0.874 | 0.784 |
| 02 | 008 | 01 | 208 | 01 | 026 | 0.874 | 0.724 |
| 02 | 009 | 01 | 209 | 01 | 018 | 0.874 | 1.045 |
| 02 | 010 | 01 | 210 | 01 | 006 | 0.874 | 3.136 |
| 02 | 011 | 01 | 211 | 01 | 024 | 0.874 | 0.784 |
| 02 | 012 | 01 | 212 | 01 | 026 | 0.874 | 0.724 |
| 02 | 013 | 01 | 213 | 01 | 024 | 0.874 | 0.784 |
| 02 | 015 | 01 | 215 | 01 | 021 | 0.874 | 0.896 |
| 02 | 016 | 01 | 216 | 01 | 027 | 0.874 | 0.697 |
| 02 | 017 | 01 | 217 | 01 | 011 | 0.874 | 1.710 |
| 02 | 018 | 01 | 218 | 01 | 018 | 0.874 | 1.045 |
| 02 | 019 | 01 | 219 | 01 | 027 | 0.874 | 0.697 |
| 02 | 020 | 01 | 220 | 01 | 025 | 0.874 | 0.753 |
| 02 | 021 | 01 | 221 | 01 | 023 | 0.874 | 0.818 |
| 02 | 022 | 01 | 222 | 01 | 011 | 0.874 | 1.710 |
| 02 | 024 | 01 | 224 | 01 | 028 | 0.874 | 0.672 |
| 02 | 025 | 01 | 225 | 01 | 023 | 0.874 | 0.818 |
| 02 | 026 | 01 | 226 | 01 | 023 | 0.874 | 0.818 |
| 02 | 027 | 01 | 227 | 01 | 023 | 0.874 | 0.818 |
| 02 | 028 | 01 | 228 | 01 | 024 | 0.874 | 0.784 |
| 02 | 029 | 01 | 229 | 01 | 020 | 0.874 | 0.941 |
| 02 | 030 | 01 | 230 | 01 | 014 | 0.874 | 1.344 |
| 02 | 031 | 01 | 231 | 01 | 015 | 0.874 | 1.254 |
| 02 | 032 | 01 | 232 | 01 | 021 | 0.874 | 0.896 |

...

```
$ type document:a.6
===================

**********************************************************************
..................................................................
..................................................................
..   SECTION 6                                                  ..
..                                                              ..
..   DETAILED CODING AND TEXTUAL EXPLANATIONS                   ..
..................................................................
..................................................................
```

IN THIS SECTION IS GIVEN THE FULL TEXT OF ALL QUESTIONS IN ALL QUESTIONNAIRES AND OTHER DATA SOURCES, TOGETHER WITH THE FULL TEXTS OF THE RESPONSE ALTERNATIVES, THEIR NUMERIC CODES, AND ABBREVIATED (16-CHARACTER) VERSIONS SUITABLE FOR STATISTICAL PROGRAM LABELS. SOME OF THE INTERNATIONAL STANDARD INSTRUCTIONS TO THE RESPONDENTS FOR GROUPS OF QUESTIONS (E.G., ATTITUDE SCALES) ARE ALSO GIVEN.

IN ADDITION TO THE INTERNATIONAL STANDARD INFORMATION, WHICH CORRESPONDS MORE OR LESS TO THE INTERNATIONAL CODEBOOKS, DEFINITIONS ARE GIVEN OF THE TEXTS AND RESPONSE CODINGS OF NATIONAL OPTION VARIABLES, AND NOTES ON NATIONAL EXCEPTIONS AND VARIATIONS FROM INTERNATIONAL FORMS ARE PRESENTED. THIS IS DONE IN SUCH A WAY THAT A CODEBOOK SPECIFIC TO A NATIONAL STUDY CAN BE DERIVED.

CONCERNING THE COGNITIVE ITEMS, THIS SECTION CONTAINS THE FORMS FOR ELICITING THE OTL AND CALCULATOR QUESTIONS, AND THE FULL TEXTS OF THE NATIONAL OPTION COGNITIVE ITEMS (BUT NOT THE INTERNATIONAL COGNITIVE ITEMS).

. . .

```
.....................................................................
.                          POPULATION VARIABLES
.....................................................................
9          POPULATION VARIABLES.
PCOUNT     COUNTRY.
            /10 ARGENTINA
            /11 AUSTRALIA
            /15 BELGIUM FLEMISH
            /16 BELGIUM FRENCH
            /20 BRAZIL
            /21 CANADA ALBERTA
            /22 CANADA BRITISH COLUMBIA =CANADA B C
            /23 CANADA MANITOBA
            /24 CANADA NEWFOUNDLAND AND LABRADOR =CANADA NWFL LAB
            /25 CANADA ONTARIO
            /26 QUEBEC
            /27 CHILE
            /30 COLOMBIA
            /31 COSTA RICA
            /34 DOMINICAN REPUBLIC =DOM REPUBLIC
            /35 ECUADOR
            /37 ENGLAND
            /39 FINLAND
            /40 FRANCE
            /41 GERMANY FEDERAL REPUBLIC =GERMANY FR
            /43 HONG KONG
            /44 HUNGARY
            /45 INDIA
            /46 INDONESIA
            /47 IRAN
            /49 IRISH REPUBLIC
            /50 ISRAEL
            /51 ITALY
            /52 IVORY COAST
            /54 JAPAN
            /57 KOREA SOUTH
            /59 LUXEMBOURG
            /61 MEXICO
            /62 NETHERLANDS
            /63 NEW ZEALAND
            /64 NIGERIA
            /68 POLAND
            /70 PUERTO RICO
            /72 SCOTLAND
            /74 SPAIN
            /75 SWAZILAND
            /76 SWEDEN
            /79 THAILAND
            /81 USA
            /82 VENEZUELA
```

```
.....................................................................
.                          STRATUM VARIABLES
.....................................................................
9         STRATUM VARIABLES.
*SLEVEL   (*NATION-SPECIFIC*)
QSTRAT    PRINCIPAL STRATIFICATION CODE. *SLEVEL
.....................................................................
.                          SCHOOL QUESTIONNAIRE
.....................................................................
 (+22 BRITISH COLUMBIA MADE SEVERAL MINOR CHANGES TO THE INTRODUCTIION
   SO THAT THE QUESTIONNAIRE WAS MORE RELEVANT TO THE B C SITUATION+)
9         SCHOOL QUESTIONNAIRE
7         SECTION A - TO BE COMPLETED BY SCHOOL PRINCIPAL
SAREA     WHICH OF THE FOLLOWING BEST CHARACTERIZES THE COMMUNITY SERVED
            YOUR SCHOOL?
            /1 RURAL
            /2 SUBURBAN
            /3 URBAN
            /4 URBAN-SUBURBAN  =URBAN SUBURBAN
            /5 INNER CITY METROPOLIS (I.E., FOR CITIES WITH A TOTAL
            POPULATION GREATER THAN HALF A MILLION) =INNER CITY METRO
(+15 BELGIUM(FL) CHANGED TO:
     /1 URBAN
     /2 SUBURBAN
     /3 RURAL
     /4 URBAN + SUBURBAN
     /5 URBAN + RURAL
     /6 SUBURBAN + RURAL
     /7 URBAN + SUBURBAN + RURAL
RECODED ON TABLES: /1  = 3
                   /3  = 1
                   /5  = 3
                   /6  = 2
                   /7  = 4+)
(+54 JAPAN ADDED CODE 6 - UNDECIDED+)
2         WHAT IS THE TOTAL ENROLMENT OF FULL-TIME (OR FULL-TIME
            EQUIVALENT) SECONDARY STUDENTS IN YOUR SCHOOL?
SENROLB   BOYS
SENROLG   GIRLS
2         WHAT IS THE NUMBER OF POPULATION A STUDENTS IN YOUR SCHOOL?
(+22 BRITISH COLUMBIA CHANGED "POPULATION A" TO "GRADE 8" FOR ALL
PARTS OF THIS QUESTION+)
SAPOPB    BOYS
SAPOPG    GIRLS
2         WHAT IS THE NUMBER OF POPULATION A STUDENTS WHO DO NOT TAKE A
            MATHEMATICS COURSE IN YOUR SCHOOL?
SNOMTHB   BOYS
(+40 FRANCE DELETED THIS VARIABLE,WITH THE COMMENT THAT ALL POP A
STUDENTS TAKE MATHEMATICS+)
(-54 JAPAN DELETED: 99% CODED 0; ONE SCHOOL APPARENTLY HAS 320 BOYS
NOT TAKING MATHEMATICS. THIS COULD BE A CODING ERROR.-)
(-54 JAPAN CODED 999 BUT PROBABLY MEANT TO BE "0". RECORDED ON TABLE
AS SUCH-)
```

```
YHAPPY    WORKING WITH NUMBERS MAKES ME HAPPY. *AGREE
YSCARED   IT SCARES ME TO HAVE TO TAKE MATHEMATICS. *AGREE
YCALM     I USUALLY FEEL CALM WHEN DOING MATHEMATICS PROBLEMS. *AGREE
YFUN      I THINK MATHEMATICS IS FUN. *AGREE
YINMAZE   WHEN I CANNOT FIGURE OUT A PROBLEM, I FEEL AS THOUGH I AM LOST
            A MAZE AND CANNOT FIND MY WAY OUT. *AGREE
YMENBET   MEN MAKE BETTER SCIENTISTS AND ENGINEERS THAN WOMEN. *AGREE
YBOYSAB   BOYS HAVE MORE NATURAL ABILITY IN MATHEMATICS THAN GIRLS. *AGREE
YBOYSND   BOYS NEED TO KNOW MORE MATHEMATICS THAN GIRLS. *AGREE
YWOMCAR   A WOMAN NEEDS A CAREER JUST AS MUCH AS A MAN DOES. *AGREE
YMTHJOB   IT IS IMPORTANT TO KNOW MATHEMATICS IN ORDER TO GET A GOOD JOB
            *AGREE
(-15 BELGIUM(FL) DELETED THIS QUESTION-)
YNOUSE    MOST PEOPLE DO NOT USE MATHEMATICS IN THEIR JOBS. *AGREE
YJOBUSE   I WOULD LIKE TO WORK AT A JOB THAT LETS ME USE MATHEMATICS.
            *AGREE
YUSEDAY   MATHEMATICS IS USEFUL IN SOLVING EVERYDAY PROBLEMS. *AGREE
YGOWO     I CAN GET ALONG WELL IN EVERYDAY LIFE WITHOUT USING MATHEMATICC
            *AGREE
YPRACT    MOST OF MATHEMATICS HAS PRACTICAL USE ON THE JOB. *AGREE
YNONEED   MATHEMATICS IS NOT NEEDED IN EVERY DAY LIVING. *AGREE
YNOTNEC   A KNOWLEDGE OF MATHEMATICS IS NOT NECESSARY IN MOST OCCUPATION
            *AGREE
YLSSFUN   IT IS LESS FUN TO LEARN MATHEMATICAL IDEAS IF YOU USE A HAND-HELD
            CALCULATOR. *AGREE
(+25 ONTARIO CHANGED TO: "COMPUTERS CAN THINK"+)
YNOCOMP   IF YOU USE A HAND-HELD CALCULATOR YOU DO NOT HAVE TO LEARN TO
            COMPUTE. *AGREE
(+25 ONTARIO CHANGED TO: "SOMEDAY COMPUTERS WILL RUN EVERYTHING"+)
YCALHLP   USING A HAND-HELD CALCULATOR CAN HELP YOU LEARN MANY DIFFERENT
            MATHEMATICAL TOPICS. *AGREE
(+25 ONTARIO CHANGED TO: "COMPUTERS MAKE LEARNING MATHEMATICS MORE
ENJOYABLE"+)
YFUNCAL   SOLVING WORD PROBLEMS IS MORE FUN IF YOU USE A HAND-HELD
            CALCULATOR. *AGREE
(+25 ONTARIO CHANGED TO: "EVERYONE SHOULD LEARN ABOUT COMPUTERS"+)
YCMPSLV   COMPUTERS SOLVE PROBLEMS BETTER THAN PEOPLE DO. *AGREE
(+25 ONTARIO CHANGED TO: "USING A HAND CALCULATOR MAKES IT MORE
FUN TO SOLVE PROBLEMS IN MATHEMATICS"+)
YBORING   USING COMPUTERS MAKES LEARNING MATHEMATICS MORE MECHANICAL AND
            BORING. *AGREE
(+25 ONTARIO CHANGED TO: "MATHEMATICAL IDEAS CAN BE LEARNED FASTER
IF YOU USE A HAND CALCULATOR"+)
YALLCMP   EVERYONE SHOULD LEARN SOMETHING ABOUT COMPUTERS. *AGREE
(+25 ONTARIO CHANGED TO: " IF YOU USE A HAND CALCULATOR YOU DO
NOT HAVE TO LEARN HOW TO COMPUTE"+)
YCOMPOK   COMPUTERS DO LOTS OF GOOD THINGS FOR PEOPLE. *AGREE
(+25 ONTARIO CHANGED TO: "USING A HAND CALCULATOR CAN HELP YOU
LEARN MANY DIFFERENT MATHEMATICAL TOPICS"+)

. . .
9         END OF FILE
////////////////////////////////////////////////////////////////
```

# Appendix V. Weighting, Sampling Errors, and Non-sampling Errors

This appendix is reprinted from Sampling Report for the Second IEA Mathematics Study by Robert A. Garden, New Zealand Department of Education.

## 9. Weighting

Although the recommended sampling method was designed to give self-weighting samples, data from all systems, with the exception of Swaziland population A and Scotland Population A, have had weights applied in the computation of cognitive statistics. For many systems this made little difference to subscores and p-values but other systems for which differential response rates across strata were obtained or in which some small strata were over-sampled weighting was clearly necessary.

Swaziland and Scotland Population A samples were not stratified.

Almost all countries sampled intact classes because a principal aim of the study was to detect teacher effects. For between-class analyses for this purpose weighting of cognitive data is of doubtful value.

Teacher Opportunity-to-Learn data was also weighted.

The effect of weighting on other teacher variables and on student background variables was found to be negligible.

### 9.1 Weights for Cognitive Data

Weights calculated for estimates of national parameters of student cognitive sub-scores and p-values depended for each sample on the sampling unit, the amount of variation in cluster (school or class) sizes and various other factors.

#### 9.1.1 Stratum Weights

These were calculated for all samples using the formula

$$w_i = \frac{n}{N} \cdot \frac{N_i}{n_i}$$

where $w_i$ is the weight for stratum i
$n$ is the total sample size
$N$ is the total population size
$n_i$ is the stratum i sample size
and $N_i$ is the stratum i population size.

Stratum weights were used to weight England and Wales data. In England and Wales students (not classes) were sampled within school and this, coupled with the loss of data at the data preparation stage, gave a large variation in (school) cluster size.

Stratum weights gave p-values and sub-score means which were more stable than obtained using school weights.

9.1.2 School Weights

School weights were calculated where sampling was by schools and where the variance of class size within school was substantial. The formula used was:

$$w_{ij} = \frac{n}{N} \cdot \frac{N_i}{s_i N_{ij}}$$

where $w_{ij}$ is the weight for school j in stratum i
$s_i$ is the number of schools in the sample for stratum i
$N_{ij}$ is the number of students in the sample in school j in stratum i.
n, N and $N_i$ are as in 9.1.1

Systems for which school weights were applied are:

Belgium (Flemish) Populations A and B, Belgium (French) AB, British Columbia A, England and Wales B, France A, Israel A, Japan AB, New Zealand AB, Ontario AB, Scotland B, Thailand AB, U.S.A. AB.

Note: where only one class per school was chosen the terms school weight and class weight are synonymous.

9.1.3 Class Weights

Where sampling was by classes the weights were calculated by the formula in 9.1.2 but with $s_i$ = number of classes in the stratum i sample and $n_{ij}$ = number of students in the sample in class j of stratum i.

Samples for which class weights were calculated are:

Hong Kong AB, Hungary AB, Luxembourg A, British Columbia B, Finland AB, Israel B, Sweden AB.

Note: where only one class per school was chosen the terms school weight and class weight are synonymous.

9.1.4 Weighted p-values and Subscores

i) At school or class level (depending on the sampling method) the number of students responding correctly to an item was counted (and school or class level p-values obtained).

ii) National estimates of p-values were computed using

$$\frac{\Sigma\, p_{ij} w_{ij}}{\Sigma\, w_{ij}}$$

where $p_{ij}$ and $w_{ij}$ are the p-values and weights for school/class j in stratum i.

$w_{ij}$ used in this way is an estimate for the weight which would be obtained if the number of schools or classes in the population and in each stratum were known. $\Sigma\, w_{ij}$ will be approximately equal to the number of schools/classes in the sample.

iii) Weighted p-values were summed across sub-test items to give sub-test means.

It should be noted that for many countries there was little difference (1 or 2 percent) between unweighted and weighted p-values and sub-test means. In addition, use of school/class weights gave very similar results to the use of stratum weights.

Calculation of p-values using $\dfrac{\Sigma\, X_{ij} w_{ij}}{\Sigma\, n^{ij} w^{ij}}$

where $X_{ij}$ is the sum of correct responses to an item and $n_{ij}$ is the number of students in school/class j of stratum i also produced very similar results at subtest level, although non-systematic differences of several points were evident for some items f a few samples. Differences can be expected where cluster sizes vary considerably and class response patterns are very different.

### 9.1.5 Weighting Teacher Opportunity-to-learn

The calculated stratum weights were used to weight teacher OTL.

$$w_{ij} = \frac{n}{N} \cdot \frac{N_i}{n_i}$$

where $w_{ij}$ = weight for teacher j in stratum i.
$n$ = total number of students in the sample.
$N$ = total number of students in the population.
$n_i$ = number of students in the stratum i sample.
$N_i$ = number of students in the stratum i population.

$$\frac{n}{N} \approx \frac{n_c}{N_c} \approx \frac{n_t}{N_t}$$

and $$\frac{N_i}{n_i} \approx \frac{N_{ci}}{n_{ci}} \approx \frac{N_{ti}}{Nti}$$

Where the "c" ratios are school/class ratios and the "t" ratios are teacher ratios.

10. Sampling Errors

Standard errors have been calculated for cognitive forms Core and A at population A level and forms 1 and 7 at population B level and these are displayed in the tables below. The standard errors are, in general, stable across forms for both populations and will be representative of the error levels for subscores.

Intraclass correlations, and consequently Design Effects, were considerably higher than was anticipated. In spite of this errors for almost all countries lie within acceptable limits.

The high intraclass correlation coefficients (Rho) result from several factors:

i) Intact mathematics classes were sampled;

ii) The widespread practice of streaming/setting mathematics classes results in a considerable reduction in within class hetergeneity;

iii) Sampling systems with differing school types, or wide course variations in curricula between school/course types leads to relatively greater degree of within school/class hemogeneity.

iv) Learning in mathematics is probably sensitive to curricular and instructional differences than is learning in most other school subjects.

Thus population A intraclass correlation coefficients are high in Belgium, Hong Kong, Luxembourg, The Netherlands (differing school types) in Finland, Sweden and the USA (differing course types) and in New Zealand (a high level of streaming).

In some countries a combination of these factors applies. Lowest intraclass correlations occurred in Japan where the school system is almost uniform and where streaming/setting of classes is not practised.

Low intraclass correlations also occur where the tests were too difficult for a large majority of the samples (Nigeria and Swaziland) so that between class variance is considerably depressed.

Standard errors for Scotland population A were calculated by a jack-kniffing procedure since a relatively small sample was spread across a great number of schools. Sampling was not by selection of schools or classes so calculation of design effects is inappropriate.

For population B the intraclass correlation coefficient is affected by the factors mentioned above but, in addition, the retentivity of the school system has a marked effect. In school systems in which retention in grade 12 mathematics is low, between-class variance in likely to be low, as is within-class variance and the relative changes with respect to these are not easy to predict.

For rotated forms the clusters completing a given form have been treated as though they were complete "school/ classes" although they were, in effect, random selections of students within school/classes. The standard errors for rotated forms are therefore conservative. Futhermore, sampling fractions for some countries were sufficiently large to justify adjusting the variance by a factor (1-a/A) where 'a' clusters are selected from a population of 'A' clusters. The extreme case is Luxembourg where a/A = 1/2. Thus for Luxembourg (for example) the sampling error for the mean will be considerably less than is shown in the tables.



*U. S. GOVERNMENT PRINTING OFFICE 1987: 175-657/60226