



International Project
on
Mathematical Attainment
(IPMA)

COORDINATORS' MANUAL

Notes for Country Coordinators

(DRAFT)

Sponsored by

PRICEWATERHOUSECOOPERS

**CENTRE FOR INNOVATION IN
MATHEMATICS TEACHING**

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1 Project Aims

There have been many recent international comparisons in mathematics, most notably the *Third International Mathematics and Science Study* (TIMSS), but in all these projects only a snapshot picture of both mathematical attainment and other relevant factors has been given.

Here, we propose to set up a longitudinal, international project in mathematical attainment, to monitor the progress made by pupils from their first year in primary school (or in some cases nursery school) onwards and involves:

- collecting all relevant information, including
 - methods of teaching,
 - curriculum content
 - resources used
 - training provided
- observing lessons
- interviewing teachers and pupils.

In this way, we aim to provide both local (i.e. for each country) and international recommendations for good practice in:

- teaching style
- mathematics curriculum each year and sequencing of topics,
- recruitment, training and support of teachers
- assessment in mathematics
- use of IT to enhance mathematics teaching
- setting and streaming of pupils.

The project is scheduled to begin, in a pilot phase, in September 1998 with the second and main cohort to start in September 1999.

Initial sponsorship has been provided by

PRICEWATERHOUSECOOPERS

and we are very grateful for their support.

2 Project Personnel

The central team at *The Centre for Innovation in Mathematics Teaching (CIMT)*, University of Exeter, consists of:

Director	:	Professor David Burghes
Administration	:	Margaret Roddick
Computing Officer	:	Frank Tapson

Proposed participation by country:

Code	Countries	Coordinator(s)	Institute
E	England	Prof. David Burghes	Exeter University
S	Scotland	"	"
H	Hungary	Dr. Tibor Szalontai	Bessenyei College, Nyiregyhaza
I	Ireland	Dr. Sean Close Dr. Elizabeth Oldham	St. Patrick's College Trinity College, Dublin
J	Japan	Professor Tadao Nakahara Professor Masataka Koyama	Hiroshima University "
L	Holland	<i>(Not finalised)</i>	<i>(Not finalised)</i>
P	Poland	Dr. Irena Skipor-Rybacka	Adam Mickiewicz University
R	Czech Republic	Dr. Stepan Pelikan Miroslav Bélik	J. E. Purkyne University "
U	USA	<i>(Not finalised)</i>	<i>(Not finalised)</i>
Y	Singapore	Berinderjeet Kaur Dr. Yap Sook Fwe	National Institute of Education, Nanyang Technological University

Other countries not directly funded by PRICEWATERHOUSECOOPERS are expected to participate.

3 Summary of Procedures

The project will monitor the progress of two cohorts of pupils over a number of years, starting in September 1998. In each country, the choice of schools/pupils will be based on the following criteria:

- whole school year cohorts
- where possible schools feeding into one secondary school (in order to help continuity if the project continues into secondary)
- in total, schools providing a balanced and broadly representative sample.

In each country there will be a

Country Coordinator (Section 2)

and in each participating school there will be a

Contact Teacher

who will be responsible for the school's participation; all school correspondence should normally be addressed to this teacher.

The attainment tests (**Section 4**) will be administered by the Contact Teacher, usually at the end of each teaching year. We will follow two cohorts, namely:

- pupils in Year 1 in 1998/9
- pupils in Year 1 in 1999/2000.

Initially, and also in subsequent years, we would also like to test **all** pupils in the school, so that we can provide a comparative analysis between cohorts within each school.

Details of the questionnaires to be used are given in **Section 5**.

The age of the Year 1 cohort will depend on the educational system used. Where pupils do not start until age 6+ (or 7+), it would be interesting to test pupils aged 5+ at the feeder kindergarten schools.

Data analysis will be used to provide schools with both summary statistics and (after two rounds of testing) a value-added analysis. This will help coordinators to decide which classes should be given priority with observations and interviews.

For a limited number of schools a more detailed, question by question, analysis may be provided which will be used for diagnostic feedback based on an error analysis.

4 Administration of Tests

The tests (**Appendix 1**) have been designed to assess progress on key mathematical topics and concepts over a yearly period of time. Further questions are added each year to the original questions. In this way, we hope that there will be sufficient new and relevant questions to assess progress, whilst having at least some questions on the test paper for children who are progressing slowly.

A summary of the number of questions set is given in the chart below.

TEST 0	Q. 1 – 4	Use at beginning of Y1	(5+)
TEST 1	Q. 1 – 7	Use at end of Y1	(6+)
TEST 2	Q. 1 – 17	Use at end of Y2	(7+)
TEST 3	Q. 1 – 29	Use at end of Y3	(8+)
TEST 4	Q. 1 – 42	Use at end of Y4	(9+)
TEST 5	Q. 1 – 56	Use at end of Y5	(10+)
TEST 6	Q. 1 – 81	Use at end of Y6	(11+)

As the number of questions increases, the time required for pupils to answer the questions increases, so it is planned that:

Test 4 and 5 are divided into two parts (A and B)

Test 6 is divided into three parts (A, B and C).

Please note that:

- we are trying to test mathematical knowledge, so help can be given with language in the early tests (for example, *Test 0* is probably better given verbally by the teacher to individual pupils).

Test papers should be marked by the school (Contact Teacher or class teacher) and the data returned on a spreadsheet either on disk or by e-mail. (See **Appendix 2**)

5 Questionnaires

For each country involved there will be a detailed questionnaire to complete giving details of both early years and primary education relating to mathematics.

For each school involved, there will be a questionnaire and also for each teacher. This will help to take into consideration factors such as:

- schemes of work
- resources being used
- teacher training (preservice and inservice)
- use of IT, including calculators
- differentiation (setting and streaming)
- attitude to mathematics

and we also intend to gain insight into pupils' attitudes as they progress through their primary phase of education.

6 Observations and Interviews

We hope that there will be sufficient funds (either from central funds or from local funding) to observe lessons regularly, particularly for the two cohorts that we will follow throughout their primary phase of education.

The data analysis (after two rounds of testing) will help to decide which schools and classes should be visited and which teachers (and pupils) should be interviewed. Guidance for both the observation and interviewing will be given centrally, although ultimately it will be the responsibility of the local coordinator to organise and decide the appropriate actions to be taken.

7 Communication of Results and Confidentiality

Each country has been assigned an initial letter as the first part of any code within that country. These are given on *page 2*.

You will need to give each school in your country a unique, confidential 3-digit code number (plus P) and this should be used on all communications.

Each teacher and each of his/her classes within the school will also have a unique, confidential code number, allocated by the Contact Teacher. (See **Appendix 3**)

All participating pupils within each school cohort will be coded 1, 2, ... etc. We suggest that these numbers be allocated alphabetically by the *Contact Teacher* in each school. The boxes at the top of each test and questionnaire are for these numbers. An example is shown below. Thus the reference for each pupil is unique, e.g.

<i>Country</i>	<i>School</i>	<i>Teacher</i>	<i>Class</i>	<i>Pupil</i>
E	002	01	1A	013

Every teacher and pupil will retain his/her identifying number throughout the project. (See *Coding Form Sheets*)

Classes might change from one year to the next. In this case, new class codes should be assigned, using the next set of numbers.

e.g. Year 1 Class codes: 1A, 1B, 1C, 1D
 Year 2 Class Codes: 2A, 2B, 2C, 2D, 2E

The class results will remain confidential to the current class teacher throughout the project .

This is a research project and as such demands the highest integrity from all concerned. We rely on your professionalism, and likewise we will treat all results as completely confidential.

Finally, it should be stressed that individual pupils, teachers and schools will **not** be identified by name in any reporting or publicity.

8 Publicity and Publications

The main funders, PRICEWATERHOUSECOOPERS, will expect to gain some publicity for their sponsorship and you are welcome to help achieve this locally. We will provide annual reports outlining progress and giving interim results and conclusions.

You are welcome to publish local reports in research journals or newsletters in your country but any international publication related to this project should first be agreed with the project director at CIMT.

APPENDIX 1

Tests 0–6

(See separate files)

APPENDIX 2

Evaluation Data

To keep the computer input simple, and as uniform as possible, we ask that only the **total** scores in each test are recorded for each pupil, using the column headings shown in this example:

<i>Country</i>	<i>School</i>	<i>Cohort</i>	<i>Test No.</i>	<i>Teacher</i>	<i>Class</i>	<i>Pupil</i>	<i>Age-mths</i>	<i>Sex</i>	<i>Score</i>
X	008P	1	2	1	2A	24	75	M	16

Separate spreadsheets should be used for different Cohorts and/or Test Numbers.

It does not matter which spreadsheet program is used, only provided that, when it is complete, the whole thing can be saved as a .CSV file so that it can be read by any other spreadsheet program. All modern spreadsheet programs offer this facility.

Each file needs to be identified by a unique (and informative) name. Use this format to make the file name:

Country Letter + Cohort Number + Test Number + School Code

So, in Country X, for Cohort 1, taking Test 2, in School 008P, the file name would be

X12008P.CSV

(the .CSV should be added automatically by the program). Other file names might be E11010P.CSV or S20006P.CSV.

The main points are summarised below.

Country Letters	are given on <i>page 2</i> of this manual.
Cohort Number	depends upon the date that the group (not the individual) started taking part in this project. i.e. Cohort 1: September 1998, Cohort 2: September 1999, etc.
Test Number	is that given on the Test Paper (ranging from 0 to 6)
School Code	should be a 3-digit number (with appropriate leading zeros) plus P (for Primary) on the end.
Pupil Numbers	(normally starting at 1) need to be unique within the School, Cohort and Year only. So, whenever a new cohort is started, the <i>Pupil Numbers</i> can re-start at 1 in each Year. This number must be retained throughout the project.

The final file should be sent to CIMT as an e-mail attachment. The address to use is

cimt-data@ex.ac.uk

APPENDIX 3

Coding Forms

