Part

I

THE INTERNATIONAL SURVEY OF UPPER SECONDARY SCHOOLS

I.1 Introduction

Upper secondary education is recognised as a major stage in educational progression across OECD countries. The ISUSS study aimed to provide insights into key aspects of upper secondary education previously not studied by OECD. The main aspects examined were:

- '*Human resources*': the composition of school staff, the employment status of teachers, teacher supply and recruitment, the responsibility for recruiting teachers, teacher absenteeism, the demand for teachers in different subject areas and the professional development of teachers (school budget, types and variety of professional development activities).

- '*School and student management*': the admission and grouping policies within schools, career guidance activities and the feedback on school functioning.

- '*Availability and use of ICT*': the technological conditions, network technologies in schools, their development between 1980 and 2001, teachers and ICT, professional development of teachers related to the use of ICT, integrating ICT into school learning, obstacles to the development of ICT in schools, co-operation for improving ICT in schools.

I.2 History of the ISUSS project

Countries participating in OECD's Indicators of Education Systems (INES) programmes tried to have a better knowledge of the organisation and management of upper secondary education in their schools. In INES programmes, Network C plays an important role in developing indicators related to the learning environment and organisation of schools. In particular, their activities focus on instructional settings, education service providers and systems. Surveys are an important tool in Network C's mission of focusing policy makers' attention on school and education processes. Responding to the request of the INES Steering Group, Network C began a systematic series of school surveys in 1995 to provide information on institutional processes with the objective of producing indicators on key characteristics of the learning environment and school organisation that contributed to student achievement. The distinctive characteristic of the indicators produced by these surveys was their international comparability.

To further its goal of providing information about educational processes in an international context, Network C extended its surveys to the upper secondary level, an area of international education systems that had not been previously surveyed. The proposal to do an international survey of upper secondary schools was made to the Steering Group of OECD/INES by Network C in 1998. In February 1999, the OECD/INES Steering Group instructed the INES Network C to begin the Survey.

The proposed survey comprised two phases: Phase I consisted of a Classification Study to define the target population for the survey and the design of the survey instrument and Phase II consisted of sampling, implementation and analysis. Based on specifications developed by the Network, the OECD Secretariat launched an international call for tender for Phase I. A contract for this first phase of the survey was awarded in July 1999 to the University of Twente and these activities were completed in February 2000.

Eighteen OECD countries participated in the Classification Study, including: Austria, Belgium (Flemish Community), Denmark, Finland, France, Hungary, Ireland, Italy, Korea, the Netherlands, Mexico, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom (England and Scotland) and the

United States. Each of these tentatively committed to participate in the main ISUSS study. After the completion of Phase I and in agreement with Network C, OECD launched a second call for tender for Phase II, the implementation of the survey. As a result of a competitive offer, the American Institutes for Research (AIR) was contracted in November 2001 to implement the upper secondary school survey using the questionnaire developed in Phase I.

When the contractor withdrew in March 2001, OECD presented Network C with the choice of either stopping work on the survey or continuing without contractor assistance. The Network voted to continue the implementation of the study.

To ensure the independence and technical quality of the work, normally the province of OECD in reviewing contractor plans and deliverables, OECD created a Review and Arbitration Board (RAB) to oversee the work of the international co-ordinator, resolve disputes, and approve technical direction. The RAB comprised experts in survey design, in international surveys and in the management of complex studies.

I.3 Management of the ISUSS project

OECD staff and the international co-ordinator

The International Co-ordinator and key OECD staff were responsible for the direction and co-ordination of the project. Experts at the OECD were assigned to help in managing specific aspects of the design and implementation of the survey at the international level. This included the following:

• Planning, conducting, and co-ordinating all international ISUSS activities, including meetings of the National Project Managers (NPMs), the Review and Arbitration Board (RAB and Network C meetings with respect to ISUSS;

• Continuing to develop and revise the questionnaire, prepare it for review and approval by the RAB and implement further changes as recommended by experts in questionnaire design;

• Implementing sampling procedures for efficiently selecting representative samples of programmes in each country and monitoring sampling operations to ensure that they conformed to OECD policies and standards;

• Developing and documenting operational procedures to ensure efficient collection of all data, including software development in a variety of programmes and programming languages;

• Designing and implementing a quality assurance programme encompassing all aspects of the data collection;

• Supervising the checking and cleaning of the data sets from participating countries and constructing the ISUSS international database; and

• Writing a report based on the first results of the ISUSS and provision of a Technical Report.

Review and arbitration board

When the OECD assumed control of the ISUSS project after the departure of the contractor, it was necessary to create an independent review and arbitration board to review the work of the international

co-ordinator, including the tasks of project implementation and technical acceptability. This was an unusual situation, where the OECD would be expected itself to provide this review. A review of operating plans and schedules, as well as quality assurance were of paramount importance and had to be provided in all survey operations. To this end, the Review and Arbitration Board was created, consisting of three outside experts including the chairperson of Network C.

The Review and Arbitration Board was created to:

• Review the project plan and all revisions for the ISUSS study;

• Monitor progress on ISUSS and call attention to technical and implementation feasibility issues that could have implications or present risks for quality and/or feasibility of data collection and indicator development; and

• Arbitrate between the OECD Secretariat and member countries on issues that might arise, particularly with respect to aspects of survey implementation and data quality requirements.

External assistance contracts

Whereas the OECD team was responsible for implementing the ISUSS study, several important ISUSS functions (including questionnaire development, questionnaire cultural adaptation, sampling design, data entry and processing and creating composite variables) were conducted by centres around the world under the direction of the ISUSS international co-ordinator. In particular, the following centres and individuals have played important roles in ISUSS:

• Network C was responsible for the overall design of the study, approval of the survey instrument and approval of the indicators developed. It also supervised the development of the survey report, advising OECD on its structure and content;

• The University of Twente developed the first draft of the questionnaire and assisted in writing the survey report;

• The American Institutes for Research developed the Sampling Manual and the Survey Operations Manual;

• Aletta Grisay provided invaluable assistance by reviewing the questionnaire and helping to find an alternative to back-translation for the generic version of the ISUSS questionnaire;

• Statistics Canada provided the final refinement of the questionnaire, including a review of format, data entry issues and internal consistency;

• John Coyle of the Educational Research Centre at St Patrick's College in Dublin designed and programmed the ACCESS data entry and cleaning programs in several versions of ACCESS;

• Tamás Káldi and Gábor Lukács of Mentor in Budapest, Hungary designed the table generator programme and provided raw summary reports which were presented at the Network C meeting in Toronto. They have been also used for final checking and cleaning of the data;

• Simon Reusch of UNI-C Denmark designed the final weighting scheme for data analysis and advised on the treatment of missing data in specific cases. He also developed composite indices;

• The Project Management Team, consisting of the National Project Managers and the Network C delegate of the country were responsible for the implementation of the study in the participating countries including translation and adaptation of the survey instrument, sampling, calculation of weights, data collection and data checking, editing of the national database, checking data summaries and reporting tables for accuracy and consistency. The National Project Managers met twice throughout the survey to plan major activities and to monitor progress.

I.4 Coverage of educational programmes in ISUSS

ISUSS is designed to gather information at a critical juncture in the education system: the transition between compulsory education and either further education or the world of work. The transition is complex; each country has developed unique institutional structures at the transition point. ISUSS is the first attempt by the OECD to provide internationally comparable survey data for this area of schooling.

The field of upper secondary education is, from a comparative point of view, rather more complex than the primary grades or even than higher education. This complexity is due to various factors. First, the age of transition from lower secondary to upper secondary education varies between countries (from 14 to 16 years of age). Second, the duration of upper secondary programmes varies considerably between and even within countries, with the consequence that the theoretical age of leaving upper secondary education is notably variable, ranging from about 15 years to about 22 years. Third, the structures of upper secondary education differ markedly between countries.

In some countries there is a distinction between institutions providing general upper secondary education and institutions providing vocational education and training, while in other countries such a differentiation in upper secondary institutional settings does not occur. In addition, a distinction can be made between school-based education and training and dual education and training – a distinction which mainly has relevance for vocational education and training. Though several countries have vocational schools alongside a form of dual training (like apprenticeships and the dual systems in Austria and Germany), the relative sizes of age cohorts enrolling in them differs considerably.

The difference between countries is most marked in vocational programmes. Different countries rely on quite different structures to provide vocational instruction: institutions providing theoretical instruction on a part-time basis in a dual system, schools providing part-time vocational programmes, schools providing only non-dual training, vocational programmes that provide short periods of training in enterprises and vocational programmes providing both dual and non-dual training.

In the context of INES, a programme is considered as a set of (related) subjects or modules put together with known combination and sequencing rules, generally lasting for more than one year of study. In the ISUSS study, it refers to the programmes listed at level 3 of the International Standard Classification of Education (ISCED) for a given country. The focus of the ISUSS is on initial education, such as education offered in programmes and/or special institutions that a student might enrol in directly after completing a lower secondary education or by transferring directly from another initial programme at upper secondary education (*e.g.*, the Transition year in Ireland, or the first (general) cycle of vocational school in Hungary). Excluded from consideration in ISUSS are:

• Corporate training/vocational programmes in enterprises which are not under the supervision of a public authority;

• Programmes that are primarily distance or correspondence education; and

• Special education programmes.

The distinction between initial and continuing (adult) education is not always clearly defined. However, when the distinction can be made, ISUSS is concerned with initial, not continuing education programmes and institutions. Classification studies such as the OECD *Classifying educational programmes, Manual for ISCED-97, Implementation in OECD countries* (OECD, 1999) and the ISUSS Classification Study have made clearer what age populations are served by the various upper secondary institutions and programmes, so the problem can be partially addressed.

Each country was invited to provide a description of the organisation of mainstream upper secondary education. Annex 2 provides the name of the programme, its destination (A: unlimited access to higher education; B: limited access to education at ISCED 5 level; C: Labour Market); its orientation (G: General; P: Pre-vocational and V: Vocational); the minimum cumulative years of education from entry to primary education (grade) and its entry-requirement (ISCED level).

I.5 Countries participating to ISUSS

Eighteen countries participated in the first phase of the ISUSS study, which consisted of a **classification of programmes**, and the **development of a questionnaire**: Austria, Belgium (Flemish Community), the Czech Republic, Denmark, Finland, France, Hungary, Ireland, Italy, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom (England and Scotland) and the United States.

Countries participating in the Classification Study provided a description of their upper secondary school programmes and qualification systems. The main focus of inquiry was the qualitative description of various ISCED 3 level programmes and the institutions in which these programmes are offered. In most countries, data on enrolments for different programmes and for different types of providers were available.

Except for Austria, the Czech Republic and the United States, countries participating in the Classification Study committed themselves to implement the survey as well. Korea joined the study in the implementation phase.

During implementation the following countries did not satisfy the guidelines for sample sizes after the sample school replacements: the Netherlands, England and Scotland. Although the Netherlands agreed that their results could be published, they are not included in the international comparisons because of the sampling deficiencies. Data for England and Scotland were withdrawn at the request of the national authorities.

The final international database containing comparable data is therefore composed of the following countries: Belgium (Flemish Community), Denmark, Finland, France, Hungary, Ireland, Italy, Korea, Mexico, Norway, Portugal, Spain, Sweden and Switzerland.

I.6 Design of the survey

OECD education surveys generally focus on measuring factors related to student achievement and outcomes. ISUSS represents a somewhat different focus, in part because it is the first OECD survey at

this level of the education system. Accordingly, the factors typically associated with student outcomes are surveyed without a direct measure from students (tests, interviews, or follow-up). In other words, the characteristics of schools that are surveyed in ISUSS are those which are likely to be influential to student outcomes and to be amenable to change through national or local policy initiatives, such as:

• Student recruitment factors;

• Teacher recruitment and professional development;

• Support of transition;

• Co-operation with various stakeholders;

• Resource sources and allocations;

• Availability and use of information and communication technology for both students and teachers; and

• Curriculum contents and duration.

Such school level and classroom features are of course embedded in the political context of the local education structure, which in turn are aspects of each country's education system. However, they represent characteristics that are generally accepted correlates of student outcomes.

The ISUSS study mainly focuses on institutional structures and resources and not on students' outcomes. The respondents to the survey are principals or school heads. Much of the requested data is about programme types, funding, enrolments, personnel (number, managing vacancies and professional development activities), aspects of school functioning, use of information and communication technology, school policies and practices to enhance transition. As the number of years at upper secondary education ranges from two to five years for completion, it is not easy to collect data on students' outcomes; there is no provision for a longitudinal follow-up. Nevertheless, ISUSS provides a first look at disparities in resources for these students; it can also give information on the structure and approach for follow-up surveys.

ISUSS is a descriptive survey of upper secondary school education providers. As such it:

• Examines the school system at the transition point between upper secondary education and post-secondary education or higher education thus enhancing our knowledge of how school systems help students to find suitable options for further studies or work;

• Provides a means for improving the methodology of collecting core data on education providers across countries; and

• Provides information potentially useful to the standardisation of classifications and inquiry methods for international comparisons.

1.7 ISUSS Questionnaire

Overview

The ISUSS study was focussed on schools providing upper secondary (ISCED 3) programmes in the participating countries with the aim of providing school level data for indicators on various aspects of school functioning in upper secondary education. Data on schools were collected through a '*School and Program*' Questionnaire asking about school level data and about data from specific upper secondary (ISCED 3) programmes offered at the school site.

The questionnaire was intended to obtain data that could be used to produce indicators of the learning environment and the organisation of schools at the upper secondary level. These indicators were to give an overview of the organisation of upper secondary education in such a way that comparisons could be drawn amongst the participating countries. The questionnaires were completed by the school principals. The expected completion time for the questionnaire was 45 minutes.

The policy questions which ISUSS was aiming to answer were:

- Are the teaching personnel in schools sufficiently qualified? Can teachers keep up with professional development activities? How are teacher vacancies managed?

- How diversified and organised is upper secondary education in different countries? What are admission and grouping policies applied in upper secondary schools? How selective is the initial education system at the upper secondary level?

- How well prepared are schools to use 'new technologies'? How much information and communication technology is used by students and by teachers?

- What per cent of students leave upper secondary education without completing any programme? To what extent does the school help students in their decisions about further studies and/or transition from school to work?

The questionnaire was to address four key issues:

- *Human resources*: Since all education programmes, vocational and general, depend on teacher qualities, indicators on this issue were sought. Questionnaire data were to be gathered on the ratio of staff to students, stability of staff and turnover, difficulties in hiring teachers in various subject/skill areas methods of covering and responding to teacher vacancies; teacher absenteeism and forms of supporting teacher professional development.

- *Aspects of school functioning*: A key policy concern is variability in the quality of education provided by upper secondary institutions. The following topics were recommended for inclusion in the survey: equity in admission and grouping policies; selection policies; monitoring of student progress and transparency; school contacts and co-operation in various areas of development.

- *Availability and use of information and communication technology (ICT):* There was little knowledge about ICT in the upper secondary levels of schooling. Not just the quantitative counts of computer availability, although this was an interesting unknown, but more important was the issue of utilisation of ICT in

schooling. Were data available to indicate whether new technologies were being used for innovative teaching (*e.g.,* individual instruction, simulations)? Could data be gathered to indicate whether teachers possessed the necessary ICT skills? Not only factual information was desired, but also information about the opinions and perceptions of school directors, especially with regard to obstacles to the realisation of computer-related goals.

• *School policies and practices to enhance transition*: upper secondary education has a dual role in preparing students for the labour market or for further education. In some cases the link between upper secondary education and labour market or further education may be a direct one. In other cases it may be left to the individual student to decide among future opportunities. The indicators would require data on the amount of time spent by students in practice, human resources available for student counselling and career guidance, school efforts to help students find a job and monitoring of students after they leave school.

Organisation of the Questionnaire

The 'School and Program' Questionnaire was divided into three parts:

• Part I: Background questions about the school;

• Part II: Questions about Upper Secondary Schools (Human Resources, Aspects of Functioning, Feedback, Stakeholders, Information and Communication Technology); and

• Part III: Questions related to programme (normally, a school which provides more than one programme at the upper secondary level should have completed a separate questionnaire for each available programme but not every country did this. In some cases, countries completed only one or two forms instead of required forms for each programme).

Annex 1 provides the questionnaire with all questions and possible answers.

Translation and cultural adaptation

The ISUSS questionnaires were prepared originally in English and translated into several languages (with one of the countries collecting data in three languages). These languages were Dutch, Flemish, Finnish, French, German, Hungarian, Irish, Italian, Korean, Norwegian, Portuguese, Spanish and Swedish. In addition, for some countries the international versions needed to be modified for cultural reasons, including in Ireland where the questionnaires were available in English as well as in Irish. For example, the international categories 'ISCED 1', 'ISCED 2' and etc. had to be replaced with the actual national programme names coded as ISCED 1 and ISCED 2 for international comparative statistical purposes. Similarly, 'Grade' appeared to be a term used only in countries with specific types of curriculum control, whereas 'Stage', 'Year' or 'Cycle' seemed more appropriate in other countries. Even the numbering of years is very different across countries depending on institutional structure and programme structure. The generic questionnaire in this case stated the cumulative number of school years targeted in the question, while countries were required to use the local name and number which school principals understand.

Unlike student achievement surveys, where it is essential that testing instruments maintain task equivalence, the ISUSS questionnaire needed to ensure conceptual comparability. From recent international surveys, it was discovered that word-by-word translation of education system terms turned out to present significant

difficulties even to professional translators. Therefore, ISUSS sought to establish comparable meanings for terms that were commonly used by school administrators, since these were the respondents who would be answering the questions.

To check the appropriateness of translation into national languages, back-translation is commonly used in international surveys. However, this method in itself does not ensure conceptual and linguistic appropriateness of the translation. For this reason, ISUSS relied on the expertise of local school policy personnel to translate the questionnaire. An in-depth discussion on the intention of each question and the desired indicators was organised at one of the National Project Managers' Meetings to raise awareness of the eventual differences in usage of terms across countries. Also, a Translation and Adaptation Guide and a Glossary of Key Terms were developed as an aid to translation and adaptation to national contexts.

This process was a significant administrative change that served to streamline the work of the National Project Managers (NPMs).

Countries translated and adapted the international questionnaire following the guidelines in the Translation and Adaptation Guide. The national translated and adapted version was pre-tested and discussed with a national panel of school administrators (principals and experts) for cultural appropriateness, after which it was submitted for international verification to the OECD Secretariat.

In the international verification procedure countries were requested to submit the translated and adapted national questionnaire version accompanied by a Cultural Adaptation Record (CAR) in which they recorded the translated version, the deviations, and their explanation on why the deviation was necessary. The CAR and the translated version were reviewed and annotated where necessary. The final approval of the national version was the result of clarifications and negotiations between the Secretariat and the NPMs.

I.8 Sampling procedures

Overview

Countries carried out all sampling and weighting procedures using NPM staff within the country, following the guidelines in the Sampling Manual and in the Survey Operations Manual developed by the contractor American Institute for Research (AIR) for the purposes of the ISUSS study. These manuals are included in electronic files on website for completeness, though much of the key guidance is reproduced here in the Technical Report. The sampling manual covered procedures for survey sampling, including forms to be completed to ensure compliance with the sampling design as well as to encourage internal checks. The process was described in full, from drawing the sampling frame to final delivery of the completed data sets to OECD.

The sampling procedure was assisted and monitored by the international co-ordinator. Countries documented their sampling procedures by filling in a sequence of sampling forms, which were then submitted for approval to the international co-ordinator.

To be acceptable for ISUSS, national sample designs had to result in probability samples that gave accurately weighted estimates of population parameters and from which estimates of sampling variance could be computed. The ISUSS design was chosen to balance analytical requirements and operational constraints, while keeping it simple enough for all participants to implement. Representative and efficient samples in all countries were crucial to the success of the project.

Under the organisational structure of ISUSS, much of the operational work and all of the field work for the sampling procedures were to be carried out by the countries' National Project Managers (NPMs). The NPMs were aware that:

• ISUSS was the first OECD international survey of upper secondary schools of this type;

• Preparing efficient sample designs and sampling procedures would be complex; and

• Gathering the required information about the national education systems would place considerable demands on resources and expertise.

At the same time, those directing and coordinating the project realised that the NPMs had only limited numbers of qualified sampling personnel. Keeping the procedures as simple as possible and as similar to the procedures used in other international studies was thus a major consideration.

As well as providing the sampling manual and survey operations manual, AIR provided manuals and expert advice to help NPMs in adapting the ISUSS sample design to their national system and to guide them through the initial phases of sampling. The NPMs' School Sampling Manual (included in the CD-ROM) described how to implement the international sample design and offered advice on planning, working within constraints, establishing appropriate sample selection procedures and fieldwork. The NPMs' Survey Operations Manual (electronic copy available on the website) discussed sample selection field work and data collection procedures as well as administrative operations used to identify and track respondents and non-respondents.

With the change in contracting arrangements in April 2001, NPMs had access to expert support from the international co-ordinator who reviewed and approved later phases of the national sampling plans, sampling data frames, design procedures and sample selection. NPMs were allowed to adapt the basic ISUSS sample design to meet the needs of their particular education systems by using additional sampling information or more sophisticated designs and procedures. These adjustments were subject to review by OECD staff experienced in international survey operations.

Country responsibilities in sampling

The division of work in ISUSS was typical of OECD international surveys. Each of the participating countries had responsibilities for design and field work which were carried out by the NPMs. The specific tasks required by ISUSS in sampling were:

• Preparation of the sampling framework; based on the instructions provided in the Sampling Manual, each participating country created a sampling frame that reflected the targeted population for the study. The sampling frame included, at minimum, the following information for the first stage of selection:

  - The name of each eligible school site;

  - The contacting address for each school site;

  - If stratification was involved in the sampling, information on stratification variables for each of the school sites (*e.g.,* urban/rural; region of the country; etc.); and

  - Enrolment size at each of the school sites for all in-scope programmes (*i.e.,* upper secondary education) and preferably by programme.

- Implementation of the sampling plan: following the instructions provided in the Sampling Manual, each participating country was to carry out the sampling plan in its own country. Specifically, each NPM was to:

    - Prepare an appropriate sampling frame and put it into an electronic data set;

    - Stratify the sampling frame and appropriately allocate the sample to various strata;

    - Implement the probability sampling within each stratum;

    - Calculate the sampling probabilities and sampling weights;

    - Check the representativeness of the selected sample and the correctness of the weighting procedure; and

    - After the survey administration, calculate the response rates and derive the final sampling weights to take into account non-response.

- Documentation of the sampling process; each NPM was to carefully document every step of the sampling process and produce a final report. The final 'Survey Activities Report' was prepared and is on file at OECD for quality control and data verification. These reports include the following information:

    - The sampling frame used in the process and a basic assessment about its appropriateness;

    - The stratification involved in the sampling, with explanation;

    - Documentation of adherence to the procedures to calculate the sampling probabilities;

    - Documentation of adherence to the procedure to calculate the response rates and the final sampling weights; and

    - An electronic copy of the selected sample of school sites, including: enrolments, programme type, stratification variables, selection probabilities, and sampling weights.

Sample design

According to the guidelines set by Network C, a sampling plan was developed which would:

- Allow the production of indicators framed in terms of the percentage of students in schools with certain characteristics; and

- Reflect the major national programme orientation, even though the aim is not to produce estimates at the programme level.

The result was a single-stage sample of school sites drawn with probability proportional to enrolment size that met the general guidelines while, at the same time, greatly simplified the operational aspects of implementing the sample design. The sampling procedures were reduced to mechanical steps, easily followed sequentially, which resulted in a properly defined and drawn sample. The procedures used were in common use and the forms were those used in previous international surveys. There was, therefore, an additional advantage of adopting a system with which there was already some familiarity with the tasks and processes.

The ISUSS sample generally consisted of 400 school sites, selected with probability proportional to the site's enrolment of students at upper secondary education. This number of school sites was selected to meet

a sampling precision requirement roughly equivalent to that of other established international studies. This sample size was estimated as necessary to ensure that each country would, within 95 per cent probability limits, produce estimates for population values that would be within +/- 0.1 of the standard deviation.

In some countries, the sample size was large compared to the population size of school sites. In these cases, the sample size requirement was reduced by the 'finite population correction'. Although the precision requirements of the study required an effective sample size of 400 schools, in many countries the actual sample size differed because of the total number of schools in the country. It is well known that for a random sample of size from an infinite population, the variance of the mean is σ^2/n. When the population is finite (*i.e.*, when we know the total number of school sites in the population = N) the factor (N-n)/N is introduced in computing the variance. This factor is called the finite population correction and its effect is to adjust the variance based on the known population size.

When applied to the determination of sample size for the country samples in ISUSS, the finite population correction reduced the number of sampled units needed to achieve a given precision level. NPMs were given a chart listing the actual number of schools to be sampled in a country given its total number of schools with upper secondary programmes. NPMs could therefore look up the number that corresponded most closely to the number of school sites with upper secondary programmes in their country and find the corresponding number of schools to be drawn in their sample. The resulting number of sample schools was the minimum number of schools a country was expected to sample. Countries could, of course, sample additional units if they wished to increase the precision of their estimates, especially within explicit strata selected for national reporting.

Because previous school surveys indicated that a predictable number of schools would not be able to participate, the ISUSS sampling manuals allowed for 'replacement' schools to be drawn in such a way as to minimise selection bias. As the school sites were drawn into the sample (using the prepared forms), replacement school sites were simultaneously identified according to rules that limited choices and required pre-selection of schools rather than post hoc substitutions. In other words, should school sites be needed to replace non-participating sampled sites, there would be minimum non-response bias because substitute schools had been pre-selected. The required response rate for this study was set at 50 per cent as the initial response rate and 85 per cent after replacement school sites were included.

Target population

The *international desired target population* for the ISUSS sample was the set of all school sites containing at least one programme at upper secondary level (as defined by Phase I of the survey). In the vast majority of countries, a school site was equivalent to a school. However, in countries where a school encompassed many educational units, the school site was the physical entity where the upper secondary programme is administered.

The following upper secondary (ISCED 3) programmes were *included*:

• ISCED 3A general and 3C vocational programmes (unless they were identified as being one of the programmes mentioned below); and

• ISCED 3A pre-vocational or pre-technical programmes through ISCED 3C pre-vocational or pretechnical programmes were included only if they (predominantly) prepare for a higher ISCED level,

another ISCED 3 programme, or for the labour market, they do not fall outside the typical age range (16-19 year-olds), and they do not fall outside the typical range of cumulative duration (11-13 year-olds).

The following programmes were *excluded* from the definition of the target population:

• Adult education that is not similar to regular educational programmes. In particular, courses or classes for adults that are primarily for general interest or personal enrichment and/or for leisure or recreation were excluded;

• Labour market training schemes (for employed or unemployed persons) provided outside the formal educational system (*e.g.,* enterprises);

• Special education that deliver programmes adapted to mentally, physically or emotionally disadvantaged students and other groups with special learning needs; and

• Programmes established to function as a safety net catering to early school leavers or youth at risk.

National desired populations

National Project Managers (NPMs) were strongly encouraged to provide complete coverage when defining their *national desired target population*. Exclusions were allowed in certain cases where the loss of information would not be a threat to national estimates or international comparisons. ISUSS expected all participating countries to define their *national desired population* to correspond as closely as possible to the definition of the *international desired population*. Sometimes, however, NPMs had to make changes. For example, some countries had to restrict geographical coverage by excluding remote regions or atypical segments of their education system. The national sampling forms document any deviations from the international definition of the ISUSS target population. All significant deviations were documented in the required forms (see Annex 3 for Sampling Forms) submitted for approval to the original contractor or, later, to the international co-ordinator.

National defined populations: school exclusions

Using their national desired population as a general framework, participating countries had to operationally define their population for sampling purposes. This definition, known in OECD terminology as the *national defined population*, was essentially the sampling frame from which the first stage of sampling took place. The *national defined population* could be a subset of the national desired population, reduced, for example, by excluding certain schools because their enrolment was radically different from the mainstream education system. All schools that were excluded from the *national defined population* are referred to as the excluded population.

NPMs were expected to keep the excluded population to no more than 5 per cent of the *national desired population*. Exclusions could occur at the school level, within schools, or both. Because the *national desired population* was restricted to schools that contained the targeted programmes, schools not containing these programmes were considered to be outside the scope of the sampling frame and not part of the excluded population. Participants could exclude schools from the sampling frame for the following reasons:

• They were in geographically remote regions;

• They were of extremely small size;

• They offered a curriculum or a school structure that was different from the mainstream education system(s).

NPMs were required to define anticipated within-sample exclusions. Because these definitions varied across countries, NPMs were also asked to fully explain any rules and reasons for exclusions. These were noted in the sampling forms and large exclusions were documented in the pertinent forms which were submitted for approval to the original contractor or, later, to the international co-ordinator. In addition, NPMs were asked to estimate the size of such exclusions so that compliance with the 5 per cent rule could be gauged in advance of approvals.

All other sources of exclusions constituted exclusions from the national desired target population. Exclusions therefore described the difference between the national desired and defined target populations.

Units of analysis and sampling units

The ISUSS analytical focus took into account both the resources available and the educational structures in place. The sample design had to address the measurement of financial and staff resources as well as specific characteristics of the institutions. Because the upper secondary programmes in schools as well as the schools themselves were considered to be potential units of analysis, both were originally considered as sampling units. This led to debate, since several countries did not possess explicit listings of their upper secondary programmes with detailed enumerations of student enrolments. Without this information, it would not be possible to create a sampling frame at the school programme level. Accordingly, the final decision was to use the *school site as the sampling unit*, with some flexibility for countries where school programs were distributed between multiple, but nearby, school sites.

Sampling precision and sample size

Sample sizes for ISUSS were specified so as to meet the analytic requirements of the study. Although school sites were the principal units of analysis, the ability to produce reliable estimates for programme characteristics was considered desirable. The ISUSS standard for sampling precision required that all population samples have an effective sample size of at least 400 school sites, which would produce an unpredictable number of programs with either vocational or general characteristics. In other words, the school samples were planned so that data at the school level would have predicable sampling errors, but data at the level of the upper secondary programmes would have predictable sampling errors only when the data was aggregated to the school site.

The general computation that led to the decision to require an effective sample size of 400 school sites was based on calculating the results in the following 95 per cent confidence limits for sample estimates of population means, percentages, and correlation coefficients. An effective sample size of 400 school sites results in the following approximate 95 per cent confidence limits for sample estimates of population means, percentages and correlation coefficients:

• Means: m +/- 0.1 s (where 'm' is a school mean estimate and 's' is its estimated standard deviation);

• Percentages: p +/- 5% (where 'p' is a school-level percentage estimate);

• Correlations: r +/- 0.1 (where 'r' is an estimated school correlation).

Stratification

Prior to sampling, NPMs could order schools, or stratify them, in the sampling frame of all upper secondary schools in the country. Stratification was recommended when there was some evidence that the school sites within the strata would be less variable than schools in general. Stratification under these conditions would produce low within-stratum variability and would lower the overall sampling error.

There were three conditions cited as good reasons to stratify schools in ISUSS:

• To produce reliable estimates for sub-national domains;

• To improve the sampling efficiency, thereby improving the reliability of national estimates; and

• To ensure that different parts of the population were appropriately represented in the sample.

Examples of commonly used stratification variables that were recommended for consideration included:

• Regions (states, provinces);

• Urbanisation (rural, urban);

• School size (large, small);

• School types (public, private); and

• School programme type (general, vocational).

NPMs were given the option to use a combination of explicit or implicit stratification variables in drawing their school site sample, thus allowing them to increase either precision or representation of specific groups of interest (*e.g.*, private schools). Explicit strata were optional and their use was recommended to provide distinct subsets of the sampling frame that could be of particular policy importance for that country. Implicit strata were part of the overall sampling design, which ordered schools by size and then selected them systematically to ensure proportional allocation across the implicit strata.

Explicit stratification

For those countries that chose to use explicit stratification, the list of all upper secondary schools was divided into separate lists, or frames, of schools for each stratum, according to the number of variables used to define the strata. For example, if geographic region was used as an explicit stratification variable, then separate school sampling frames were constructed for each geographic region. Although it was possible to then use different sample designs within each stratum, this was not desired or needed in ISUSS. However, for some strata, such as a stratum of large schools, the design was changed from proportional sampling to either sampling with a constant sample size or a census of that stratum.

The example of a stratum of large schools demonstrates the major reason for considering explicit stratification, which was to implement a disproportionate allocation of the school sample to the explicit strata. In the example of a large school stratum, the same number of schools was sampled from the explicit stratum, regardless of their relative sizes. The objective in this situation was to produce predictably reliable estimates for this stratum.

In theory, a reason for considering explicit stratification in ISUSS was to ensure adequate sample size for a stratum, justifying the disproportionate allocation of the school sample to that stratum. For example, a country might require an equal number of schools from each stratum, regardless of the relative size of each stratum, to ensure comparability for policy reasons. Another reason for defining explicit strata was to deal with specific sample design issues. For example, explicit strata were sometimes required to deal with small schools, as well as with very large schools.

Implicit stratification

In general, implicit stratification consists of sorting the upper secondary schools in the sampling frame(s) by a set of implicit stratification variables. For ISUSS, this variable was enrolment size or some reasonable measure of enrolment size. This type of stratification is very effective in reducing sampling errors and is a well-regarded design with a long history of use in population sampling. It has the merit of providing a relatively simple way of ensuring a strictly proportional sample allocation of schools across the implicit strata. This ordering produces a simple way of ensuring proportional sample allocation without the complexity of creating additional explicit strata and the extra work of drawing a sample from each stratum.

In addition, implicit stratification typically leads to improved reliability of survey estimates, provided the implicit stratification variables being considered are known to have a significant between-strata variance component. Since school size is almost always a factor in school resources, it appeared a reasonable choice as a variable for implicit stratification.

Replacement schools

From prior experience in other international surveys, albeit not with upper secondary schools, it was anticipated that a 100 per cent participation rate of schools would not be reached in all countries. To avoid losses in sample size, a mechanism was devised to identify, *a priori*, two replacement schools for each sampled school. The use of implicit stratification variables and the subsequent ordering of the school sampling frame by a measure of school size led to a method of assigning replacement schools that was deemed likely to produce a low response bias if replacement schools were needed in the final sample.

The method of identifying replacement schools relied on the ordering of the sampling frame by school size as an implicit stratification. For each sampled school site, the next two school sites immediately following it in the sampling frame were designated as replacement school sites. The use of school enrolment size as the implicit stratification variable, and the subsequent ordering of the school site sampling frame by size, ensured that any sampled school site's replacements would be of a comparable size and likely to share other characteristics.

Although each sampled school site in the survey was assigned the next two replacement school sites in the ordered sampling frame, there were constraints. First was the fact that the distribution of schools in a country might mean that adjacent schools were both selected into the original sample. In this case, one school could not serve as replacement for the other. The following rules were devised to be followed by NPMs in assigning replacement schools:

• An already sampled school site could not serve as the replacement for another school site;

• A school site could not serve as replacement for more than one sampled school site;

• If a sampled school site were the next to last school site listed, then the school sites immediately above and below it could serve as its replacement school sites; and

• If a sampled school site was the last school listed, then the two school sites immediately above it could serve as its replacement school sites.

Several countries used replacement schools to meet the requirements for response rate. Their use and the resulting calculations of response rates were tallied in Form 12 (Annex 3) and approved as appropriate by the international co-ordinator. Figures are shown in Table I.1.

Single-stage sampling

The sample selection method used in ISUSS made use of a systematic probability proportional to size (PPS) technique. Use of this method required some measure of size (MOS) of the school sites (sampling units). Ideally this was the enrolment in upper secondary programmes in the school. But if this information was unavailable, some other highly correlated measure, such as total school enrolment, was used.

The schools in each explicit stratum were listed in order of the implicit stratification variables, together with the MOS for each school. They were further sorted by MOS within variable. The measures of size were accumulated from school to school, and the running total (the cumulative MOS) was listed next to each school. The cumulative MOS was a measure of the size of the population of sampling elements; dividing it by the number of schools sampled gave the sampling interval.

The first school was sampled by choosing a random number in the range between 1 and the sampling interval. The school whose cumulative MOS contained the random number was the sampled school. By adding the sampling interval to that first random number, a second school was identified. This process of consistently adding the sampling interval to the previous selection number resulted in a PPS sample of the required size.

As each school was selected, the next school in the sampling frame was designated as a replacement school for use should the sampled school not participate in the study, and the next after that as a second replacement for use should neither the sampled school nor its replacement participate.

Two of the many benefits of the PPS sample selection method are that it is mechanically straightforward to implement and that it is relatively easy to verify that it was implemented properly. The latter was critical since one of the criteria of credibility of ISUSS was to be able to verify that a sound sampling methodology had been used.

Small schools

Small schools tend to be problematic in PPS samples because programmes sampled from these schools get disproportionately large and variable sampling weights. A school was deemed small in ISUSS if the total in-programme enrolment in the school was smaller than the average in-programme school enrolment in the country (defined as ASEC) divided by 4 (defined as ASEC4). Any school where enrolment was less than ASEC4 was considered to be a small school.

Since the weights applied to small schools were numerically large and variable, they introduced a source of error in computing statistical estimates, such as weighted averages. The more small schools there are, the

greater this problem becomes. Because the population of upper secondary schools was known to include a sizeable proportion of small schools, this problem received special attention in the original sampling design. There were two solutions proposed: to exclude small schools where possible, thereby eliminating the problem; and to separate small schools for separate estimations, thus limiting the error propagation.

NPMs who could demonstrate that enrolments in small schools represented less than 10 per cent of all national enrolments in upper secondary schools were allowed to include small schools in the school sampling frame and let them be subject to normal sampling procedures. The assumption here was that with less than 10 per cent of the enrolments, such schools would not significantly affect the standard errors.

If, however, enrolments in small schools exceeded 10 per cent, NPMs were to define an explicit stratum of small schools. The number of schools to sample from this stratum remained proportional to the stratum size, but all schools had an equal probability of selection. This action ensured greater stability in the resulting sampling weights.

If enrolments in these schools were less than 2 per cent of the eligible population, they could be excluded, provided the overall exclusion rate of school sites in the country did not exceed the 5 per cent limit. In other words, NPMs could choose to exclude small schools (MOS < ASEC4) if the resulting exclusion rate was less than 2 per cent. There was a special form designed to establish this exclusion (Sampling Form 4 in Annex 3). In the original design of this form, there were errors. The form was corrected and used in the few countries where it applied.

Optional preliminary sampling stage

It was originally planned that some very large countries would chose to introduce a preliminary sampling stage before sampling schools. This would have consisted of a PPS sample of geographic regions. A sample of schools would then be selected from each sampled region. This design was proposed as a cost reduction measure where drawing up a comprehensive list of schools would have been either impossible or prohibitively expensive. Also, this additional sampling stage would reduce the dispersion of the school sample, thereby potentially reducing travel costs. However, computer listings of school sites were evidently easily available in all countries, so this design preparation was not implemented.

School response rates

Response rates were computed by NPMs in each participating country for the originally selected schools as well as for the final sample that included replacement schools. A form was provided to simplify calculations and to ensure conformity to definitions and operations (Sampling Form 12 in Annex 3). The study response rates were calculated only at the school site level, not for the upper secondary programmes within schools. This was because of the difficulty in enforcing responses to the extensive data requests in Part III of the questionnaire.

Response rates, therefore, apply to both complete and incomplete questionnaire returns. If the respondent did not or was not able to complete the upper secondary programmes' section for all of the school's ISCED 3 programs (there could be up to 10 in some countries) then the questionnaire was accepted with as many of the ISCED 3 program sections as completed. The response rates reported on Form 12 at the end of the data submission deadline are shown in Table I.1.

Table I.1
Sampling information

	Initial sample - before school replacement			Final sample - after school replacement		
	Number of selected schools	Number of participating schools	Response rate (per cent)	Number of selected schools	Number of participating schools	Response rate (per cent)
Belgium (Fl.)	256	175	68	256	233	91
Denmark	176	160	91	176	162	92
Finland	294	235	80	294	257	87
France[2]	401	305	76	401	338	84
Hungary	310	263	85	310	299	96
Ireland	255	198	78	255	231	91
Italy	400	247	62	400	358	90
Korea	324	323	100	324	323	100
Mexico	400	378	95	400	379	95
Netherlands [1]	275	114	41	315	136	43
Norway	212	180	85	212	180	85
Portugal	282	272	96	282	276	98
Spain	370	355	96	370	363	98
Sweden[2]	235	183	78	235	198	84
Switzerland	Census	582	100	Census	582	100

OECD COUNTRIES

1. Response rate is too low to ensure comparability
2. Although the response rates for France and Sweden were technically below the target of 85 per cent, they were deemed close enough to be acceptable.

I.9 Weighting procedures

Sample weights

A sampling weight was assigned to each school; it corresponds to the inverse of the adjusted probability of selection of the schools. Since probability of selection was based on the number of enrolled students in the target population, the smaller a school is, the larger weight it was assigned. For any school listed, the school weight was calculated as:

$$W_i = \frac{1}{H_i}$$

where H_i is simply the probability of selection adjusted for non-response rate.

Thus, the sum of the school weights multiplied by the measure of size *(MOS)* for each school in the sample approximates the aggregate measure of size for the upper secondary student population.

Adjusted school weights

Countries were invited to complete the sampling forms 1 to 13 (Annex 3).

After the ISUSS database had been built, sampling weights were calculated and necessary weight corrections and adjustments were made following similar methods as used in the Programme for International Student Assessment (PISA) database (see the OECD PISA 2000 Technical Report, Chapter 8).

Trimming of weights

The original sample weights calculated by the countries were designed to make the PPS-sample represent the true population of schools in each country. Typically a small school would have little probability of being drawn in to the sample, so a small school in the sample typically represents a large number of equally small schools in the population, resulting in a relative large sample weight. In some cases, extreme weights were encountered (*e.g.*, sample weights exceeded the mean sample weight by three to five times). To minimise the bias effect of these in the estimation of variance, it was technically advisable to 'trim' the extreme weights; in other words to set a maximum for acceptable weights. This was done through studying country level distribution of weights and identifying out-liers. Adjustments were necessary in no more than three schools in any country (except for Portugal). The adjusted school weights were used as the school component of the weight formula used in the estimation of frequencies, ratios, and indices.

Table I.2 lists those countries where school weights had to be trimmed and the number of schools in each country that had their weights trimmed.

Table I.2.
Weights of the samples and corrections for adjusted weights

	Mean weight of the sample	Weight of the school greater than	Number of schools where it occurs	'Trimmed' weight for these schools
Belgium (Fl.)	2.9938	10	1	3 * mean
Denmark	1.9115	20	1	5 * mean
Finland	3.8809	20	2	5 * mean
Hungary	4.1723	50	1	4 * mean
Italy	13.9605	100	3	5 * mean
Korea	5.3211	20	1	3 * mean
Mexico	21.2115	200	3	5 * mean
Portugal	3.5016	20	11	4 * mean

Sample weights less than one

In the case of sample weights that were less than 1 (it would mean that the size of the school sample is larger than the sampling interval) the weights have been replaced by 1 (the non-response rates are quite correct; so their weights are not affected); such adjustments were necessary for one school in Finland and Hungary, for four schools in Mexico and for eleven schools in Portugal.

Other adjustments

France: Post-hoc weighting was necessary because of misunderstandings by completing the sampling forms. Recalculated weights were based on the formula used in the Sampling manual and applied to French data with their approval.

Here, the actual number of upper secondary enrolments in the ISUSS database has been used as 'MOS (measure of size)'.

Probability of selection of a school (i = stratum; j = school)

$P_{ij} = (N_{ij} * n_j) / N_i$

where:

N_{ij} = school MOS (ENR3TOT = sum of SC05Q03 to SC05Q22)

N_i = stratum size students (Sampling form 8 in Annex 3)

n_j = number of school in the sample for stratum j

Weight: $W_{ij} = 1 / P_{ij}$.

Ireland: There were two schools which were picked outside of the normal selection process. These were large schools whose size exceeded the sampling interval and they were therefore put in a stratum of their own for 'very large schools'. Strict applications of the sample weight calculation resulted in weights equal to 0.95 and 1.05 but as the two schools were the only schools in the stratum, and thus their probability of selection was equal to one, both school weight values were set to 1.

The Netherlands: As this country did not meet international sampling requirements, every school weight is equal to 1. Therefore, results for this country cannot be compared to those for other countries.

Use and calculation of weights in the analysis of results

Since the weighting model is optimized for assumptions about students rather than about schools, in order to have each case represent the number of students in the sampled schools, sample weights were combined with the number of students enrolled in the schools. The sum of these combined student weights then approximates the total number of upper secondary students in the target population.

Four student weights are used in the analyses:

- To estimate values for school level indicators, the adjusted school weights are used in combination with the upper secondary (ISCED 3) student enrolments in the school. This weight is used in weighted frequencies, ratios, and unstandardised composite indices related to school-level data;

- To estimate values for indicators split by programme type, the adjusted school weights are used in combination with the programme enrolments. This weight is used in programme-level ratios and frequencies;

- To estimate country values on an international standard scale in school-level data, a combination of country weights, schools weights and upper secondary (ISCED 3) enrolment weights is used; and

- To estimate country values on an international scale in programme level data, a combination of country weights, schools weights and programme enrolment weights is used.

Inflating the weight of cases (which is the number of cases observed) leads to underestimation of the standard error of estimation. To avoid this, all four student weights are rescaled to ensure correct standard error estimations. For this reason, the final formulae for the student weights used in calculating results are as follows:

Weights for estimating national variance and standard error

Weight for estimating school-level indicators

Is3EnrWt is used to weight the school questionnaire variables. This weight ensures that each item has the relative weight of the total upper secondary (ISCED 3) student enrolment combined with the sample weights. The weights have been scaled to ensure correct standard error estimations.

$$Is\,3EnrWt_{ij} = Wght_{ij}\ isced\,3\_t_{ij}\ \frac{n_j}{N_j}\ ,\ j = 1\ to\ 15$$

where $Wght_{ij}$ is the weight of school i in country j, $isced3\_t_{ij}$ is the number of upper secondary students in school i in country j, and n_j is the size of she school sample in country j, and

$$N_j = \sum_{i=1}^{n_j} Wght_{ij}\ isced\,3\_t_{ij}.$$ is the sum of Isced3 enrolment weights in the national sample.

Weight for estimating indicators by programme type

$PrgEnrWt_{ij}$ is used to weight the programme questionnaire variables. This weight ensures that each item has the relative weight of the total programme-enrolment combined with the sample weights. The weights have been scaled to ensure correct standard error estimations.

$$PrgEnrWt_{ij} = Wght_{ij}\ prg\_t_{ij}\ \frac{n_j}{N_i}\ ,\ j = 1\ to\ 15$$

where $Wght_{ij}$ is the weight of school *i* in country j, Prg_t_{ij} is the number of students in programme i in country j, and n_j is the size of she school sample in country j, and

$$N_j = \sum_{i=1}^{n_j} Wght_{ij}\ prg\_t_{ij}$$ is the sum of programme enrolment weights in the given programme in the national sample

Weights used for estimating the international mean and standard deviation

Some of the indices are standardised across countries. For these indices an international mean and standard deviation was calculated. The indices were then transformed into standard scales with the international mean set to zero, and the international standard deviation used as scale unit.

Weights for estimating the international mean and standard deviation based on upper secondary student enrolment in the school

To obtain the international mean, and standard deviation, the scores of all schools in the international sample were pooled. Countries had different sample sizes, however, which meant that a country with a bigger sampling size would have had a larger weight in shaping the international mean and standard deviation. To avoid this bias, a weighting scheme was used that defines all countries as having equal weight. In addition to the sample weight and the enrolment weight, in the composite weight used for standardisation, a country weight was also included, which equalized the contribution of each country in shaping the OECD international standard.

Thus, the weight used in standardisation is based on the following formula:

$$Is3TotWt_{ij} = Wght_{ij} \; isced \, 3\_t_{ij} \; \frac{\overline{n}_{14}}{N_j}, \; j = 1 \text{ to } 14 \text{ (excluding the Netherlands)}$$

where $Wght_{ij}$ is the weight of school *i* in country *j*, $isced3\_t_{ij}$ is the number of upper secondary students in

school i in country j, $\overline{n}_{14} = \dfrac{1}{14} \displaystyle\sum_{j=1}^{14} n_j$ is the average *number of students* in the approved countries (excluding

The Netherlands), and $N_j = \displaystyle\sum_{i=1}^{n_j} Wght_{ij} \; isced\, 3\_t_{ij}$ is the sum of enrolment weights in the total OECD sample.

Weight for estimating international mean and standard deviation based on student enrolment in the programme

Following the same reasoning as in the calculation of standardised school level indicators, a similar weight is used to weight the programme questionnaire variables. This weight ensures that each item has the relative weight of the total programme-enrolment combined with the adjusted school weight. The weights have been rescaled to the sample size to ensure correct standard error estimations. To estimate programme enrolment weight, the following formula was used:

$$PrgTotWt_{ij} = Wght_{ij} \; prg\_t_{ij} \; \frac{\overline{n}_{14}}{N_j}, \; j = 1 \text{ to } 14 \text{ (excluding the Netherlands)}$$

where $Wght_{ij}$ is the adjusted school weight of school *i* in country *j*, Prg_t_{ij} is the number of students in programme i in country j, and n_j is the size of she school sample in country j, and

$$N_j = \sum_{i=1}^{n_j} Wght_{ij} \; prg\_t_{ij} \text{ is the sum of enrolment weights in the total OECD sample.}$$