



***Survey of Schools: ICT in Education
(ESSIE)
2011***

SAMPLING MANUAL

European Schoolnet (EUN)

Service d'Approches Quantitatives des faits éducatifs (SAQFE)

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Introduction

This sampling manual is intended to guide the National Coordinator (NC) through the necessary steps of sampling schools in the *Survey of Schools: ICT in Education* (ESSIE) 2011¹.

The main objective of ESSIE is to benchmark recent progress made in ICT in education across countries. We will administer online questionnaires to students, head teachers and teachers on the availability and use, including perceptions and attitudes, of ICT in schools.

In order to internationally compare progress in ICT, it is very important to obtain quality samples in each country. Only properly selected and representative samples can yield unbiased, accurate, and internationally comparable survey estimates.

The ESSIE 2011 study will collect data at three levels:

1. The school level,
2. The classroom level, and
3. The student level.

At a first stage, schools are sampled with probabilities according to their size; at a second stage classrooms are sampled with equal probabilities, and at a final stage students are sampled, although generally all students in the selected classrooms are included in the sample. Therefore the sample design is referred to as a *two-stage stratified cluster sample* (for information about statistical definitions, see: <http://stats.oecd.org/glossary>).

It is very important that you follow all the procedures specified in this manual in order to obtain valid international comparative data. You will be supported by the sampling experts at the 'Service d'Approches Quantitatives des faits éducatifs (SAQFE) from the Department of Education of the University of Liège, Belgium, and European Schoolnet (EUN).

¹ This Sampling Manual has been inspired by the PIRLS and PISA sampling manuals.

1. OVERVIEW OF THE STUDY DESIGN

This study will collect data from schools (head teachers), classrooms (teachers), and students at ISCED² level 1 (primary level of education), ISCED level 2 (lower secondary level of education) and ISCED level 3 (upper secondary level of education). Due to financial, technical and time constraints, no student questionnaires will be administered at ISCED level 1.

The international sample design framework for ESSIE is a stratified two-stage cluster sample design.

- In a first stage, the schools will be stratified, explicitly and/or implicitly, and selected with probabilities according to their size. Replacement schools will be identified in advance to compensate for school refusal.
- In a second stage, one classroom will be randomly selected within the sampled schools, and all the students in the selected classroom will be surveyed. Thus, classrooms are selected with equal probabilities within schools.

Table 1. Overview of the Study design

		ISCED1	ISCED2	ISCED3 ACADEMIC	ISCED3 VOCATIONAL
Schools	Schools	N=300	N=300	N=300	N=300
	Head of Teachers	N=300	N=300	N=300	N=300
	Head of Teachers Questionnaire	Head of Teachers Questionnaire	Head of Teachers Questionnaire	Head of Teachers Questionnaire	Head of Teachers Questionnaire
Classrooms Within Schools	Classrooms	N=1	N=1	N=1	N=1
	Teachers	N=1	N=3	N=3	N=3
	Teacher Questionnaire	Teacher Questionnaire	Teacher Questionnaire	Teacher Questionnaire	Teacher Questionnaire
Students Within classrooms and schools		N=0	N=All students in sampled classroom	N=All students in sampled classroom	N=All students in sampled classroom
		No student questionnaire	Student questionnaire	Student questionnaire	Student questionnaire

This sampling procedure will be applied at ISCED level 1, 2 and 3 academic and vocational (see Table 1). Thus, 300 sampled schools, 1 sampled classroom within each school, 1 teacher per classroom in ISCED level 1, and 3 teachers per classroom in ISCED levels 2 and 3 will result in a total of 1200

² ISCED is the International Standard Classification in Education (ISCED-97) adopted in 1997 by the UNESCO General Conference.

schools, 1200 classrooms, 3000 teachers, and approximately 18000³ students for each country. For small countries with less than 300 schools, all schools will be sampled. In consultation with the sampling experts at SAQFE, these small countries may increase their within school sample size in order to increase the amount of data. The (within-school) sampling of teachers and classrooms is not the task of the NC but of the school coordinator.

At the classroom-level, a teacher questionnaire will be filled out at ISCED level 1 by the teacher who has the main responsibility of the class. If more than one teacher has the main responsibility, then one of the teachers will be randomly selected. At ISCED level 2 and 3, the teacher questionnaire will be filled out by three teachers (a Science, Mathematics and Language teacher – L1 not foreign languages). If there are more than one Science and Mathematics teachers, only one of the Science and Mathematics teachers will be randomly selected. However, it will first be necessary to define the concept of class as students might move from one class to another depending on the subject in ISCED level 2 and 3 (see later).

At the school-level, a Head Teachers' questionnaire is completed by the school principal. . The school principal may be supported by the schools' ICT coordinator (or equivalent) for completing questions about technical aspects if needed.

2. RESPONSIBILITIES

A joint collaboration of two institutions (Consortium) is responsible for conducting the study. These are the European Schoolnet (EUN) and the Service d'Approches Quantitatives des Faits Educatifs (SAQFE) from the Department of Education of the University of Liège, Belgium.

The development and implementation of the national sampling plans will be the result of a close collaboration between NCs and the sampling experts at SAQFE.

The responsibility of the NCs is to provide accurate, up-to-date information on all sample parameters.

- Determining the school unit
- Determining the coverage of the national population
- Determining the school and student level exclusions in the country. These exclusions must remain at a minimum level, their nature and their quantity must be documented.
- Obtaining the lists of schools that contain the classrooms covering the target grade. These lists are referred to as the sampling frames.
- Identifying which stratification variables are suitable for the schools on each sampling frame and ensuring that these variables are present and correct for all schools.
- Submitting the school sampling frames to the Consortium who will draw the school samples.
- Keep track of school participation and the use of replacement schools.

The consortium, SAQFE in particular, is responsible for the following tasks:

- Making sure that the school sampling frames received from the participating countries are complete and satisfactory.

³ Assuming a mean of 20 students per classroom. Note that no students in ISCED level 1 are sampled to fill out the questionnaire.

- Checking that the exclusions in each country are clearly defined, necessary and minimal.
- Assisting each country in determining stratification that will meet ESSIE's standards.
- Drawing the school samples and returning to NC, with documentation.
- Defining exclusions, measuring the appropriate school and student coverage and exclusion rates.
- Developing school and student sampling weights and replicates to estimate population parameters and their respective sampling variances
- Computing participation rates.

3. CONTACT INFORMATION

All questions concerning sampling should be addressed to the sampling experts at SAQFE, Valérie Quittre, and Eva Van de gaer:

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4. OVERVIEW OF SAMPLING TASKS AND THEIR TIMELINES

Table 2 gives an overview of the most important sampling tasks and their respective timeline. The first and the final task are the responsibility of the Consortium whereas the other tasks of the NCs. The main task of the NC is Task 5 and consists of creating a national list of *all* the target schools (i.e. four lists), which is called a sampling frame. The other four tasks that need to be carried out first can be considered to some extent as tools to help you prepare such lists of schools.

For each of these five tasks, a sampling form needs to be filled out electronically. We provide an ESSIE secure website: <https://w3.fapse.ulg.ac.be/ESSIE/> (your username and your password will be sent by email) that enables you to:

- download documents such as the sampling forms
- and upload the sampling frame as well as the completed sampling task forms.

In the following chapters, we will discuss each of the sampling activities and their corresponding tasks and forms. We will guide you step by step in completing, submitting, and using information within the forms. For your convenience, empty forms are provided at the end of the manual. If you have any questions concerning the completion of these forms, please do not hesitate to contact the sampling experts at SAQFE.

Table 2. Sampling tasks and their timelines

Responsibility		Task – step by step	Description	Sampling Forms (SF)				Timelines
				ISCED1	ISCED2	ISCED3 ACADEMIC	ISCED3 VOCATION AL	
Consortium		Defining target populations	- define target grades					See Appendix A
NC	Task 1	School Definition	- define the school unit and the size of the extremely small school - describe school measure of size	SF1				2 weeks after receiving this sampling manual
NC	Task 2	National Coverage and exclusions	- define national coverage and exclusions - provide reasons	SF2A	SF2B	SF2C	SF2D	2 weeks after receiving this sampling manual
NC	Task 3	Stratification	- describe explicit and/or implicit stratification variables to be used during sampling	SF3A	SF3B	SF3C	SF3D	2 weeks after receiving this sampling manual
NC	Task 4	Sampling Overlap	- describe sampling overlap	SF4				2 weeks after receiving this sampling manual
NC	Task 5	Sampling Frame	- provide national list of schools	SF5A	SF5B	SF5C	SF5D	4 weeks after receiving this sampling manual
Consortium		Sample of schools, classrooms and students	- provide list of sampled and replacement schools to NCs					Mid June

5. DEFINITION OF THE TARGET POPULATIONS

5.1. Student target populations

The information in this section is provided for information purposes only. The NC is not required to deal with the definition of the target populations.

The first task of the **Consortium** consists of defining the target grades meaning the grades in which a country administers a survey. In the Appendix A, you may find for each country the target grades. The definition must meet the requirements of the international student target population. The UNESCO's International Standard Classification of Education (ISCED) is used to define the international student target population because it is an internationally accepted classification scheme for educational systems. In this system, grades are numbered starting from the first grade of primary school. Thus, grade 1 corresponds to the first year of primary education. ISCED level 1 refers to primary education, ISCED level 2 to lower secondary education and ISCED level 3 to upper secondary education.

For this study, it is proposed to define the international student target populations as follows:

1. ISCED 1 Level: all students enrolled in the grade that represents four years of schooling, counting from the first year of ISCED Level 1, providing the mean age at the time of the testing is at least 9.5 years.
2. ISCED 2 Level: all students enrolled in the grade that represents eight years of schooling, counting from the first year of ISCED Level 1, providing the mean age at the time of the testing is at least 13.5 years.
3. ISCED 3 Level academic: all students enrolled in an academic track that represents eleven years of schooling, counting from the first year of ISCED Level 1, providing the mean age at the time of the testing is at least 16.5 years.
4. ISCED 3 Level vocational: all students enrolled in a prevocational or vocational track that represents eleven years of schooling, counting from the first year of ISCED Level 1, providing the mean age at the time of the testing is at least 16.5 years.

Thus, four different student populations need to be identified in each country. In most countries, these will be grade 4 (ISCED level 1), grade 8 (ISCED level 2), grade 11 academic (ISCED level 3), and grade 11 vocational (ISCED level 3). Note that we include an age restriction in the definition. In some countries, students may start primary education at an earlier age than in other countries. Therefore, we require students to have a minimum mean age to ensure that we are testing students at an age when they are developmentally ready. Differences between countries in school entry age may result in differences in target grades between countries.

5.2. School target populations

In order to identify students, we first need to identify the schools in which the students can be found. Schools eligible for ESSIE are schools that are under the authority of the Ministry of Education including target grade students.

The definition of the school target population is derived from the definition of the student target populations, i.e.

1. ISCED 1: all schools with students enrolled in the selected ISCED 1 target grade (i.e. grade 4 in most cases);

2. ISCED 2: all schools with students enrolled in the selected ISCED 2 target grade (i.e. grade 8 in most cases);
3. ISCED 3 academic: all schools with students enrolled in a academic track in the ISCED 3 target grade, (i.e. grade 11 in most cases);
4. ISCED 3 vocational: all schools with students enrolled in a prevocational or vocational track in the ISCED 3 selected grade (i.e. grade 11 in most cases).

The task of identifying schools will be the first task of the NC.

5. 3. Head teacher target populations

Within each sampled school, the head teacher/school principal completes the Head Teachers' Questionnaire. As this questionnaire will cover technical topics as well as more educational topics such as ICT pedagogical use policy, it might be necessary that both the school principal mainly in charge of policy development and staff management and the ICT coordinator in charge of school ICT equipment need to answer it together.

5. 4. Class/teacher target populations

As soon as the school head agrees to participate in the study, he/she will have to nominate a school coordinator who will be responsible for identifying the class and the teacher target population. The sampling of the class and teachers will be done interactively online by the school coordinator (see school coordinator manual). The information in the section below is provided for information purposes only.

Classes eligible for ESSIE are all the classes (within schools) that include target grade students. For the identification of teachers, there are different procedures for ISCED level 1 and ISCED level 2 and 3.

At ISCED level 1, the teacher who has the main responsibility of the class will be part of the teacher target population. If more than one teacher has the main responsibility, then both teachers belong to the teacher target population.

At ISCED level 2 and ISCED level 3 academic, all mathematics, science, and language teachers who teach any student in the sampled class belong to the teacher target population. For this study, it is proposed to base the definition of the class as the learning group of students for the language of the survey (i.e. a class learning their mother tongue: English in England, German in Austria). In most countries, such a definition will be associated with larger classes than optional subjects.

For ISCED level 3 vocational, we have to use another definition of the class because language is not a compulsory subject for vocational students in certain countries. Preferentially, the class should be defined as for ISCED level 3 academic, i.e. as the learning group of students for the language of the test. If this definition is not possible, the administrative unit of the class might be used or any other alternative discussed with the sampling experts at SAQFE. Within each sampled classroom, the sampled teachers consist of the three teachers that have the most contact hours with the students.

6. SAMPLING TASKS

6.1. TASK 1: School definition

Complete Sampling Form 1.

You should complete Sampling Form 1 to define your school unit. You also have to define the “extremely small schools” which could be excluded from the survey. In addition, you should specify the school measure of size (MOS).

An example of a completed Sampling Form 1 is shown in Figure 1.

6.1.1. School unit

The definition of a school unit is a complicated matter. We suggest considering whole schools rather than tracks or programmes or shifts within schools (i.e., “multi-shift schools” where students attend schools at different times of the day) unless they are actually more like separate schools with for instance a different location or a different school department head. In most cases, we expect that you can consider the administrative unit of schools that is defined by the Ministry of Education in your country.

As explained previously, the schools need to be defined for the four target population of the surveys. (i.e. ISCED level 1, 2, 3 academic, and 3 vocational). **The school unit definition has to be identical for each type of school to enable the management of overlaps with the same school identification.** In most of countries, schools may cover several or even all target grades meaning that schools belong to more than one school target population.

The school definition is quite obvious for the ISCED level 1 and level 2 but more complex for the ISCED 3 level because academic and vocational tracks are considered in two distinct populations:

- 1) ISCED level 1: all schools with students enrolled in the selected ISCED 1 target grade (i.e. grade 4 in most cases).
- 2) ISCED level 2: all schools with students enrolled in the selected ISCED 2 target grade (i.e. grade 8 in most cases) whatever the track. The end of this level often coincides with the end of compulsory education in countries and often, at the beginning of this level, several teachers start to conduct classes in their field of specialization.
- 3) ISCED level 3 academic: all schools with students enrolled in an academic track in the ISCED 3 target grade, (i.e. grade 11 in most cases). Academic track is defined according to the programme orientation type 1 of the ISCED-97 classification. Type 1 is “education which is not designed explicitly to prepare participants for a specific class of occupations or trades or for entry into further

vocational or technical education programmes. Less than 25% of the programme content is vocational or technical”⁴. In most cases, academic tracks are classified as ISCED 3A.

4) ISCED level 3 vocational: all schools with students enrolled in a vocational or pre-vocational track in the ISCED 3 target grade, (i.e. grade 11 in most cases). Prevocational and vocational tracks are defined according to the program orientations type 2 and type 3 of the ISCED-97 classification.

Type 2 (pre vocational or pre technical) is “education which is mainly designed to introduce participants to the world of work and to prepare them for entry into further vocational or technical education programmes. Successful completion of such programmes does not lead to a labour-market relevant vocational or technical qualification. For a programme to be considered as prevocational or pre-technical education, at least 25% of its content has to be vocational or technical”.

Type 3 (vocational or technical) is “education which prepares participants for direct entry, without further training, into specific occupations. Successful completion of such programmes leads to a labour-market relevant vocational qualification”.

Prevocational and vocational tracks are in most cases classified as ISCED 3B or 3C, but in some countries it could be ISCED 3A.

As mentioned earlier, only schools that fall under the authority of the Ministry of Education will be considered in this study; they may be publicly funded state schools or independent, fee-paying private schools.

If you encounter any difficulties identifying schools, please do not hesitate to contact the sampling experts at SAQFE.

6.1.2. Size of “extremely small school”

As fully explained here below (Task 2), even if the national target population includes all eligible ESSIE students, it is possible to remove a small proportion for several reasons, one being school size. In most cases, extremely small schools, with very few students in the target grade, will have to be removed from the national target population for practical reasons. An extremely small school is usually defined as a school with five or fewer students in the target grade, but a country with many such schools should reduce the cut-off (e.g. to fewer than three students) to keep the exclusion rate as low as possible.

6.1.3. School measure of size

For each school, you need to provide the school measure of size. The preferred school measure of size (MOS) is the number of students in the target grade(s) in that school. If such information is not available, the next choice would be the total enrolment of students in the school. The enrolment data should be based on the most recent school year.

⁴ Organisation for Economic Co-operation and Development (OECD). (1999). *Classifying educational programmes. Manual for ISCED-97 implementation in OECD countries*. 1999 Edition. Paris : Author.

Figure 1. Example of completed Sampling Form 1

Sampling Form 1: School Definition

Participant country:

This Sampling Form is unique for the four target populations.

1. National Coordinator (NC) information

Last Name:

First Name:

Email address:

Tel:

2. School unit definition

What are you planning to use as main school unit?

If "Other unit" than please describe:

3. Max size of "Extremely small school "

students at the target grade.

4. School measure of size

Please specify the school measure of size (MOS) to be used in the sampling frame. (*Note: the preferred MOS is the enrolment in the target grade.*)

If "Other" than please describe:

Please specify the school year for which enrolment data will be used for the school MOS

6.2. TASK 2: National coverage and exclusions

Complete Sampling Form 2.

You should complete Sampling Form 2 to indicate your estimated coverage of the national target population. Please refer to the sections below in order to indicate and describe any planned school-level exclusions. In order for SAQFE to measure the extent of school-level exclusions and decide whether any large group exclusion should be considered as “reduced population coverage” rather than school-level exclusion, you should also provide the enrolment data. If possible, please provide aggregate estimate of the number of students and the number of schools that will be excluded.

An example of a completed Sampling Form 2 is shown in Figure 2.

6.2.1. National coverage reduction

Although the national target population should include all eligible ESSIE students, it is possible that in some countries not all the students can be covered due to political, organizational, or linguistic constraints. Such situations may occur when NCs find it necessary to reduce their national coverage by removing, for instance, a small language group. In cases where the national desired target population deviates from full national coverage of all eligible students, these deviations must be described and enrolment data provided in Sampling Form 2 to measure the extent of the reduced coverage. Moreover, this means that if a significant proportion of students are excluded from the full national population, then the national desired target population will differ from the international desired target population and the survey results will not be deemed representative of the entire national school system. In the international report, such exclusions will be marked as “reduced population coverage”.

6.2.2. Exclusions

Next to national coverage reduction, NCs and the school coordinator may decide to exclude schools, classes within schools, or students within classes for practical reasons such as difficult test conditions. All such exclusions need to be documented in Sampling Form 2 and should be kept to a minimum.

The following three categories are considered for student-level exclusions:

1. **Non-native language speakers:** These are students who are unable to overcome the language barrier of the test. Typically, a student who has received less than one year of instruction in the language of the questionnaire should be excluded.
2. **Students with severe learning difficulties:** These are students who are considered, in the professional opinion of the school principal or another qualified staff member, to be intellectually unable to complete the questionnaire.
3. **Physically disabled students:** These are students who are permanently physically disabled in such a way that they cannot fill in the questionnaire.

We will refer to the last two categories of students as special needs students (SEN).

These exclusions can occur at the student-level but also at the class or school level. The NC is only responsible for identifying school-level exclusions whereas the school coordinator is responsible for identifying class-level exclusions and exclusions of students within classes.

NCs may decide to exclude schools for the following reasons:

- If all students in a school correspond to one of the above defined categories, then the whole school can be removed from the list of schools.
- Extremely small schools (see Task 1).

The same principle will be used by the school coordinator to exclude classes and students within classes.

The sum of all the school-level exclusions (excluding school-level exclusions due to national coverage reduction) must not exceed 5% of the national target population. If the overall percentage of excluded students is higher than 5%, this will have to be annotated in the international report.

6.2.3. Exclusions for ICT unfeasibility

Due to financial and time constraints, it is not realistic to administer this survey through a paper and pencil version, and student testing is not feasible by phone. Online administration is the only possible way to manage this survey. Therefore, after being identified, the schools without access to the internet will have to be excluded from the study⁵.

School non-participation is always a source of bias, since we cannot guarantee that the characteristics of the non-participating schools are the same as the characteristics of the participating ones. And specifically for this ICT survey, non-participation because of ICT unfeasibility is directly linked to the measure. To minimize the bias due to technical reasons (i.e. no internet access), it has been found that the best solution was first to identify those schools and then to exclude them from the list of schools rather than excluding them for technical reasons once they are already sampled.

This category of exclusions is not considered in the 5% exclusions rate.

⁵ The results of PISA 2006 showed that in Bulgaria, Turkey, Romania and Greece more than 5% of the students are in schools with fewer than 5 computers connected to the internet. Due to a lack of technical equipment, we decided to administer the surveys through a paper and pencil test in these four countries.

Figure 2. Example of completed sampling form 2B

Sampling Form 2B: Coverage and Exclusions

Participant country: Name of the NC:

This Sampling Form refers to:

1. Total enrolment in the target grade in most recent year and if available in previous years

Year	# of schools	# of students
2010-2011	2740	56790
2009-2010	2752	57003
2008-2009	2738	56730

2. Reduced national coverage

Description of reduced coverage	# of schools	# of students
Very small linguistic group: German	25	485
Total	25	485

3. SCHOOL-level exclusions

Description of school-level exclusion	# of schools	# of students
Students with special educational needs	12	210
Extremely small schools	26	102
Total	38	312

	# of schools	# of students
Total enrolment after exclusions	2702	56478
Percentage of exclusions		0.5 %

4. SCHOOL-level exclusions due to technical reasons (no internet, no email address)

# of schools	# of students
26	650

6.3. TASK 3: Stratification

Complete Sampling Form 3.

You should complete Sampling Form 3 to specify the explicit and implicit stratification variables.

An example of a completed Sampling Form 3 is shown in Figure 3.

In ESSIE, you have the opportunity to propose your own stratification variables. Stratification is generally used for the following reasons:

- to improve the efficiency of the sample design, thereby making survey estimates more reliable;
- to apply different sample designs, such as disproportionate sample allocations, to specific groups of schools, such as those in states, provinces, or other regions;
- to ensure that all parts of a population are included in the sample;
- to ensure adequate representation of specific groups of the target population in the sample; and
- to obtain reliable estimates for each stratum, if so required.

Stratification refers to grouping of schools into strata that share common characteristics. Examples of stratification variables include, but are not limited to:

- regions (states, provinces)
- urbanisation (rural areas, urban areas)
- school type (public, private)
- national examination scores of the schools
- socio-economic index variable
- school programme, specialism / distinctive feature
- language.

Use of stratification variables is desirable but not compulsory and the selection of three to five stratification variables is usually sufficient. A classification variable must be available and suitable for every school in order to be considered as a stratification variable. Defining very small strata should be avoided; at least four schools per stratum should be available for sampling. It is essential to identify stratification variables that correlate as much as possible with the ICT environment and practices in schools. This improves the accuracy of the estimates of the results.

A particular variable can be considered as an implicit or explicit stratification variable depending on the educational system of the country.

6.3.1. Explicit Stratification

Explicit stratification entails the grouping of schools into different strata. This results in the creation of separate school lists according to the strata (i.e. each explicit stratum is a “box” where several schools are obligatory selected). Every school belongs to one and only one stratum (“box”) and all the strata together cover the whole target school population. After schools have been stratified, independent samples of schools will be drawn from each of these different strata or school lists. The major reason

for considering explicit stratification is to implement a *disproportionate allocation* of specific groups of schools. This means that the same number of schools could be sampled from each stratum independent of the size of the stratum. The objective would be to produce equally reliable estimates for each stratum. For example, if we choose to use 'states' as an explicit stratification variable, then all the schools are classified into their corresponding state and in each state, the same number of schools will be sampled even if one state is larger (and contains more schools) than another state. Following this procedure, we ensure that we obtain equally reliable results for each state. By contrast, a *proportionate allocation* of states would result in more sampled schools in the larger states than in the smaller sized states. But often the sample size of the smaller states is too small to obtain estimates that are sufficiently reliable.

6.3.2. Implicit Stratification

Implicit stratification entails the sorting the school sampling frame by a set of implicit stratification variables. This sorting takes place within the explicit strata, or within the whole frame if explicit stratification is not used (i.e. each implicit stratification variable will be used to sort the schools within each "box"). As a minimum, in all countries, school frames will be sorted within explicit strata by school size prior to sampling schools. The combined use of implicit strata and systematic sampling is a very effective and a simple way of ensuring a strictly proportional sample allocation of students across all implicit strata.

For example, if countries have a highly tracked system at grade 11 it is strongly encouraged to use 'track' as an implicit stratification variable. Sorting the sampling frame by 'track' ensures the sampling of an equal proportion of sampled students in each track.

The main goal of implicit stratification is to ensure similar characteristics between sampled schools and replacement schools. Implicit stratification can also lead to improved reliability of survey estimates, provided the implicit stratification variables being considered correlate with the main surveys' measures.

Figure 3. Example of completed sampling form 3C

Sampling Form 3C: Stratification

Participant country: Name of the NC:

This Sampling Form refers to:

1. Explicit Stratification

Please list and describe the variables to be used for explicit stratification

Explicit stratification variables	# of levels
1. Communities: Flemish - French	2
2. School type: Private - Public	2
3.	
Total	4

$= 2 * 2$

2. Implicit Stratification

Please list and describe the variables to be used for implicit stratification

Implicit stratification variables	# of levels
1. Socio-economic status: high - medium - low	3
2.	
3.	
Total	3

Total number of strata
 $= 4 * 3$

6.4. TASK 4: Sampling overlap and measure of size

Complete Sampling Form 4.

You should indicate whether you want to minimize or maximize the chance to sample different target grades within the same school.

An example of a completed sampling form 4 is shown in Figure 4.

6.4.1. Sampling overlap

In some countries, schools may cover all (or at least ISCED level 2 and 3) target grades meaning that schools belong to more than one school sampling frame. In order to reduce the workload of these schools, countries may choose to:

- *minimize the number of sampled schools that would be involved in more than one target grade.* This option increases the number of schools sampled, but reduces the workload for the selected schools and may increase their willingness to participate.
- *maximize the number of sampled schools that would be involved in more than target grade.* This option reduces the number of schools sampled but increase the burden at the school level, or
- *ignore the school sample overlap,* and select the target grades independently.

In order to deal correctly with the overlap, it is very important that you apply the same school unit definition to each school (see also Sampling Form 1) and the same school identification.

Figure 4. Example of completed sampling form 4

Sampling Form 4: Sampling Overlap

Participant country: Name of the NC:

This Sampling Form is unique for the four target populations.

Please indicate for each target grade whether you want to:

- Minimize the number of sampled schools that would be involved in more than one target grade. (This option increases the number of schools sampled, but reduces the workload for the selected schools and may increase their willingness to participate.)
- Maximize the number of sampled schools that would be involved in more than one target grade. (This option reduces the number of schools sampled but increase the burden at the school level.)
- Ignore the school sample overlap (select the target grades independently).

	ISCED level 1	ISCED level 2	ISCED level 3 academic	ISCED level 3 vocational
ISCED level 1		1. Not applicable ▼	2. Not applicable ▼	3. Not applicable ▼
ISCED level 2			4. Minimize ▼	5. Minimize ▼
ISCED level 3 academic				6. Minimize ▼

Please explain briefly why you choose this option:

1.	
2.	
3.	
4.	Most of schools include the two targets grades. We prefer the workload for the selected schools
5.	Most of schools include the two targets grades. We prefer the workload for the selected schools
6.	To keep the same option

6.5. TASK 5: School Sampling Frame

Provide School Sampling Frame.

You should provide four school sampling frames, one for each target grade.

1) Identify the schools excluded (see Task 2)

*2) Provide for each school a unique school identification number, school name, contact information such as name, telephone number, **and email address**, school size, and-if applicable-stratification variables.*

An example of a school sampling frame is shown in Figure 5.

A school sampling frame refers to a comprehensive national list of all the target schools. A well-constructed sampling frame provides an accurate coverage of the national target population without incorrect entries, duplicate entries or entries that refer to elements that are not part of the defined target population. For ESSIE, four school study sampling frames need to be prepared, one for ISCED level 1, 2, 3 academic and 3 vocational.

6.5.1. What information is required in the school sampling frame?

It is essential to use the school unit and the school definition declared in the Sampling Form 1.

A template of the school sampling frame is provided on the ESSIE website for you to download. After you have completed the school sampling frame, it can be uploaded on the same website. . The preferred format for the school sampling frames is an MS Excel worksheet in which each school is represented by one entry. We accept also ACCESS, SPSS or SAS data files.

The following information has to be included in the worksheet.

1) School name and school identification number

A unique national identification number (School ID) should be included for every school in the sampling frame. If a national school identification number exists in your country, this number should be included. If no such school ID exists in your country, please provide one yourself that allows the unique identification of each school. A school that covers more than one ISCED target level **must** be identified with a unique school identification number in the different sampling frames.

Please also provide the name, address, telephone number, and contact person of each school whenever possible. If this information is not available or if it is not allowed to share this information due to privacy rules, you can omit this information.

2) School email address

Contacts with schools and administration of the survey will be implemented online. So, it is essential that you make every effort to supply a valid email address⁶ for each school that has an internet

⁶ If there are some confidentiality issues in your country regarding the distribution of email addresses of schools, you can choose to provide only the email addresses of the sampled and replacement schools after the selection of the school samples.

connection. Nevertheless, schools without an internet connection and therefore without an email address have to be stated as excluded for ICT unfeasibility in the Sampling Frame.

3) School measure of size and list of classrooms

For each school, please provide the school size and the same school measure of size should be used for all schools in the sampling frame. You should also provide - if available – the number of classes in each school.

4) Stratification variables

If you are planning to use stratification variables, please include them for each school in the sampling frame.

5) Language of instruction

If the survey is implemented in more than one language for a particular country, please provide the language of instruction for each school so we can ensure that each school receives the questionnaire in the correct language.

6) Exclusions

The NC should indicate for each school in the sampling frame whether it will be excluded or not and specify the reason why (e.g., national coverage reduction, extremely small schools, SEN schools, ICT unfeasibility).

In Figure 5, an example of a school sampling frame is shown.

Figure 5 Example of a School Sampling Frame

School ID	Region	Type	Grade 4	Grade 4 classes	Language of instruction	School name	School Address	Postal Code	Town	Contact Person	Tel	E-mail	Exclusion	Reason for Exclusion
15104	South	Public	207	8	Dutch	St Vincent Primary school	Tiensesteenweg 23	3090	Leuven	Mr. G. Toepson	040/908765	Toepson@skynet.be	Yes	SEN school
15112	South	Private	8	1	French	L'Arc	Geldenaaksebaan 102	9000	Gent	Ms. I. Verkimmen	0987/901234	Verkimmen@arc.be	No	
15113	North	Private	89	4	Dutch	Regenboog	Dirk Boutsiaan 44	2000	Antwerpen	Mr. V. Jonssens	070/658903	Jonssens@telenet.be	No	
15114	North	Public	52	4	French	Santa Maria	Dieststesteeuweg	1020	Brussel	Mr. I. Clessins	/	/	Yes	ICT unfeasibility
...

Stratification variables

6.6. CONSORTIUM TASK: Selecting the sample

The information in this section is provided for information purposes only.

6.6.1. Selection of the sampled and replacement schools

Once we receive the school sampling forms that meet all international and national requirements, schools can be sampled. Schools will be sampled by SAQFE whereas classes and teachers will be sampled online by the school coordinator.

In order to avoid a loss in the number of schools due to non-participation, two replacement schools for each sampled school are drawn. Identifying replacement schools in advance ensures that we will replace a school with a school that has similar characteristics. This helps in maintaining the structure of the sample.

You should try to secure participation of as many of the sampled schools as possible. The replacement schools should only be considered if a sampled school refuses to participate.

Schools that became ineligible because they closed at the time of testing or didn't have any students left in the target grades at the time of testing should not be replaced.

SAQFE will provide the list of sampled and replacement schools to the NCs.

7. MOTIVATING SCHOOLS TO PARTICIPATE

After SAQFE has drawn the sample of schools, you will receive the four lists of sampled schools with their respective replacement schools including information such as the name, address, and contact information. An official letter from the ministry of education to them could assist in ensuring participation.

Schools will be automatically contacted to ask for their participation at the start of the school year in September.

The tasks of the school coordinator will be described in the *School Coordinator Manual* of which you will receive a copy for information purposes. Briefly, the school coordinator will be responsible for the sampling of the classes and teachers within schools using an online interactive sampling tool.

Do not hesitate to contact us (ESSIE@ulg.ac.be) if you have any questions and many thanks in anticipation for the work you will do. Your help with ESSIE is very important to its success.

Appendix A: Target grades by country

Country	ISCED 1		ISCED 2		ISCED 3		Comment
	Target grade	Min mean age	Target grade	Min mean age	Target grade	Min mean age	
Austria	4	9.5	8	13.5	11	16.5	
Belgium	4	9.5	8	13.5	11	16.5	
Bulgaria	4	10.5	<u>7</u>	13.5	11	17.5	Grade 8 is either ISCED2 or ISCED3
Cyprus	4	9.5	8	13.5	11	16.5	
Czech Rep.	4	9.5	8	13.5	11	16.5	
Denmark	4	9.5	8	13.5	<u>12</u>	17.5	Grade 11 is either ISCED2 or ISCED3
Estonia	4	10.5	8	14.5	11	17.5	
Finland	4	10.5	8	14.5	11	17.5	
France	4	9.5	8	13.5	11	16.5	
Germany	4	9.5	8	13.5	11	16.5	
Greece	4	9.5	8	13.5	11	16.5	
Hungary	4	9.5	8	13.5	<u>12</u>	17.5	Grade 11 is either ISCED2 or ISCED3
Ireland	4	9.5	8	13.5	11	16.5	
Italy	4	9.5	8	13.5	11	16.5	
Latvia	4	10.5	8	14.5	11	17.5	
Lithuania	4	10.5	8	14.5	11	17.5	
Luxembourg	4	9.5	8	13.5	11	16.5	
Malta	<u>5</u>	9.5	<u>9</u>	13.5	<u>12</u>	16.5	First grade of compulsory primary school is earlier and is ISCED0
Netherlands	<u>5</u>	9.5	<u>9</u>	13.5	<u>12</u>	16.5	First grade of compulsory primary school is earlier and is ISCED0
Poland	4	10.5	8	14.5	11	17.5	
Portugal	4	9.5	8	13.5	11	16.5	
Romania	4	9.5	8	13.5	11	16.5	
Slovakia	4	9.5	8	13.5	11	16.5	
Slovenia	4	9.5	8	13.5	11	16.5	
Spain	4	9.5	8	13.5	11	16.5	We suggest to exclude artistic education due to ISCED level shift in this program
Sweden	4	10.5	8	14.5	11	17.5	
UK England	<u>5</u>	9.5	<u>9</u>	13.5	<u>12</u>	16.5	First grade of compulsory primary school is earlier

UK Wales	<u>5</u>	9.5	<u>9</u>	13.5	<u>12</u>	16.5	First grade of compulsory primary school is earlier
UK Northern Ireland	<u>6</u>	9.5	<u>10</u>	13.5	<u>13</u>	16.5	
UK Scotland	<u>5</u>	9.5	<u>9</u>	13.5	<u>12</u>	16.5	First grade of compulsory primary school is earlier
Croatia	4	9.5	8	13.5	11	16.5	
Iceland	4	9.5	8	13.5	11	16.5	
Norway	4	9.5	8	13.5	11	16.5	
Turkey	4	9.5	8	13.5	11	16.5	

Appendix B: Blank sampling forms

Sampling Form 1: School Definition

Participant:

This Sampling Form is unique for the four target populations.

1. National Coordinator (NC) information

Last Name:

First Name:

Email address:

Tel:

2. School unit definition

What are you planning to use as main school unit?

If "Other" than please describe:

3. Max size of "Extremely small school "

students at the target grade.

4. School measure of size

Please specify the school measure of size (MOS) to be used in the sampling frame. (*Note: the preferred MOS is the enrolment in the target grade*).

If "Other" than please describe:

Please specify the school year for which enrolment data will be used for the school MOS

Sampling Form 2A: Coverage and Exclusions

Participant country: Name of the NC:

This Sampling Form refers to

1. Total enrolment in the target grade in most recent year and if available in previous years

Year	# of schools	# of students

2. Reduced national coverage

Description of reduced coverage	# of schools	# of students
Total		

3. SCHOOL-level exclusions

Description of school-level exclusion	# of schools	# of students
Total		

Total enrolment after exclusions	# of schools	# of students
Percentage of exclusions		

**4. SCHOOL-level exclusions due to technical reasons
(no internet, no email address)**

# of schools	# of students

Sampling Form 2B: Coverage and Exclusions

Participant country: Name of the NC:

This Sampling Form refers to

1. Total enrolment in the target grade in most recent year and if available in previous years

Year	# of schools	# of students

2. Reduced national coverage

Description of reduced coverage	# of schools	# of students
Total		

3. SCHOOL-level exclusions

Description of school-level exclusion	# of schools	# of students
Total		

	# of schools	# of students
Total enrolment after exclusions		
Percentage of exclusions		

**4. SCHOOL-level exclusions due to technical reasons
(no internet, no email address)**

	# of schools	# of students

Sampling Form 2C: Coverage and Exclusions

Participant country: Name of the NC:

This Sampling Form refers to

1. Total enrolment in the target grade in most recent year and if available in previous years

Year	# of schools	# of students

2. Reduced national coverage

Description of reduced coverage	# of schools	# of students
Total		

3. SCHOOL-level exclusions

Description of school-level exclusion	# of schools	# of students
Total		

Total enrolment after exclusions	# of schools	# of students
Percentage of exclusions		

**4. SCHOOL-level exclusions due to technical reasons
(no internet, no email address)**

# of schools	# of students

Sampling Form 2D: Coverage and Exclusions

Participant country: Name of the NC:

This Sampling Form refers to

1. Total enrolment in the target grade in most recent year and if available in previous years

Year	# of schools	# of students

2. Reduced national coverage

Description of reduced coverage	# of schools	# of students
Total		

3. SCHOOL-level exclusions

Description of school-level exclusion	# of schools	# of students
Total		

	# of schools	# of students
Total enrolment after exclusions		
Percentage of exclusions		

**4. SCHOOL-level exclusions due to technical reasons
(no internet, no email address)**

# of schools	# of students

Sampling Form 3A: Stratification

Participant country: Name of the NC:

This Sampling Form refers to:

1. Explicit Stratification

Please list and describe the variables to be used for explicit stratification

Explicit stratification variables	# of levels
1.	
2.	
3.	
Total	

2. Implicit Stratification

Please list and describe the variables to be used for implicit stratification

Implicit stratification variables	# of levels
1.	
2.	
3.	
Total	

Total number of strata

Sampling Form 3B: Stratification

Participant country: Name of the NC:

This Sampling Form refers to:

1. Explicit Stratification

Please list and describe the variables to be used for explicit stratification

Explicit stratification variables	# of levels
1.	
2.	
3.	
Total	

2. Implicit Stratification

Please list and describe the variables to be used for implicit stratification

Implicit stratification variables	# of levels
1.	
2.	
3.	
Total	

Total number of strata

Sampling Form 3C: Stratification

Participant country: Name of the NC:

This Sampling Form refers to: ISCED level 3 ACADEMIC – Grade 11 (in most countries)

1. Explicit Stratification

Please list and describe the variables to be used for explicit stratification

Explicit stratification variables	# of levels
1.	
2.	
3.	
Total	

2. Implicit Stratification

Please list and describe the variables to be used for implicit stratification

Implicit stratification variables	# of levels
1.	
2.	
3.	
Total	

Total number of strata

Sampling Form 3D: Stratification

Participant country: Name of the NC:

This Sampling Form refers to:

1. Explicit Stratification

Please list and describe the variables to be used for explicit stratification

Explicit stratification variables	# of levels
1.	
2.	
3.	
Total	

2. Implicit Stratification

Please list and describe the variables to be used for implicit stratification

Implicit stratification variables	# of levels
1.	
2.	
3.	
Total	

Total number of strata

Sampling Form 4: Sampling Overlap

Participant country: Name of the NC:

This Sampling Form is unique for the four target populations.

Please indicate for each target grade whether you want to:

- Minimize the number of sampled schools that would be involved in more than one target grade. (This option increases the number of schools sampled, but reduces the workload for the selected schools and may increase their willingness to participate.)
- Maximize the number of sampled schools that would be involved in more than one target grade. (This option reduces the number of schools sampled but increase the burden at the school level.)
- Ignore the school sample overlap (select the target grades independently).

	ISCED level 1	ISCED level 2	ISCED level 3 academic	ISCED level 3 vocational
ISCED level 1		1. < Choose > ▾	2. < Choose > ▾	3. < Choose > ▾
ISCED level 2			4. < Choose > ▾	5. < Choose > ▾
ISCED level 3 academic				6. < Choose > ▾

Please explain briefly why you choose this option:

1.
2.
3.
4.
5.
6.

