

Study Design, Questionnaire and Method

1. Introduction

The International Mirror of Post Graduate Students (IMPS) was initiated from Sweden by the National Agency for Higher Education as a continuation of the nationwide Swedish survey 'Doktorandspegeln' with data collection during Spring 2003. The three additional countries/regions of this large scale European survey, including some 13,000 postgraduate students, are Catalonia, Finland and Ireland, all with data collection during Spring 2005.

The conditions for surveys are very different across Europe, being most favorable in Sweden and Finland with reliable frame information about the population and most challenging in Ireland and Catalonia as central registers of their postgraduate students are not available, and also because of other important conditions for surveys relating to data protection, privacy and integrity for both individuals and universities. This means that the quality of data and analysis vary across countries also after we have applied the available statistical tools for improving comparability and adjust for bias.

The Swedish Survey has been used as the IMPS Master Survey, the kind of study that we have aimed at repeating in the three other countries. As this is the first time a survey of this kind is conducted in the participating countries/region, the IMPS could be seen a pilot study in the sense that procedures and instruments have been developed with join forces for reaching out to post-graduate students in three different educational systems, adjusting it to each countries context and constraints.

This presentation of the IMPS survey method and data collection is a summary of the main features of the study in order to give the reader of this report information about how it was outlined and the quality of the data. The survey research coordinator for this study has been Ingrid Munck, professor in Education and Evaluation, Statistica Munck, Stockholm.

2. Questionnaire and International Scales

The English version of the Swedish Questionnaire, the Master instrument for the data collection in Catalonia, Finland and Ireland in 2005, contained some 50 questions, coded into about 100 variables. In the guidelines for IMPS and during the first planning meeting we have elaborated the revisions that each country has to perform in order to reach as far as possible to a common ground for comparative analysis. In addition we have welcomed all national adjustments and additions that make the study more relevant for the contextual situation of Postgraduate education in each country. This report focus on the international part of the IMPS variables and leave the potential of IMPS data for national analysis to each partner in the study to explore.

The design was driven by including the most important background variables taken both from the Swedish experiences and from a description of the differences and similarities of the participating educational systems. The guidelines for the new instruments defined the following 'international' background questions: (1) University Identification, (2) Gender, (3) Age, (4) Subject field, (5) Date of PhD study start, (6) Entry level – academic degree when registered as PhD student, (7) Number of years already spent in PhD program, (8) Enrolments in % of full-time in PhD program autumn 2004.

The main common core in capturing the post-graduate students views and experiences was seven scales, based on 34 items in the Master Questionnaire, developed and tested for the

Swedish Mirror. Through confirmatory factor analysis, testing the Swedish dimensions on the other three countries data, it was found that they reflected very well the situation in all the participating countries, being both relevant and reliable. The seven dimensions represent the following different aspects of post-graduate study life: *Introduction to postgraduate studies*, *Professional development*, *Dialogue with supervisors*, *Supervision in action*, *Relevance of taught courses*, (not available in the Irish dataset), *Reflection of values* and *Study environments*.

The answer format for single items in these scales is ranging from ‘1. Very little/not at all’¹, ‘2. Not very much’, ‘3. A great deal’ and ‘4. To a very great extent’, with some minor variations in labeling the four grade scale points across questions and questionnaires. These international scales are measures calculated as means of the included answer items at the individual level, each item ranging from 1 to 4. An observed mean of 2.5 for a group of students on these scales, the balance point, is telling us that, as a collective, there are about the same number of positive as negative individuals. Means above 2.5 show a dominance of positive answers and means below 2.5 of negative outcome.

To summarize the overlapping parts in the four questionnaires, the Master Questionnaire generated some 150 variables in all. Of these about 40 % were present in all four countries, 25 % in Sweden and two more countries, 10 % in Sweden and one more country (in most cases Finland) and the rest 25% were left out of the international study. This was mainly because they were mirroring the Swedish system and postgraduate students in aspects of no relevance for the other countries. All four questionnaires, in their English version, are enclosed in the report.

3. Design, Samples, Mode of Data Collection

The target population

The target population in Sweden was defined as follows: (1) PhD students in all fields of PhD education, (2) The sample was restricted to postgraduate students who pursued their studies 10% or more of a full time post during the spring semester 2002 available in Sweden in official registers, and (3) the sample was restricted to those students who had at least one year experience of postgraduate education.

The target population definition for the Mirror 2005 was widening the scope, also bringing in newcomers as post-graduate students, and included: (1) PhD students, active 10 % or more of a full time post and (2) registered as PhD student during autumn 2004. Note that this difference between the Swedish survey and the others on the criteria for participation in the data collection Spring 2003 vs. Spring 2005 has to be taken into account when interpreting the results with the Swedish survey targeted towards those students with at least one year of experience only. The Irish sample also included postgraduate research master students, as it is not uncommon for Irish students to register for a research masters degree at the outset of their programme and then to transfer at a later point to the PhD register.

International strata – Subject field

One of the purposes with a study design with several strata are to get a minimum number of students in the sample in each strata in order to make reporting statistically reliable across the subgroups. In the initial planning the subject field for postgraduate studies were chosen to be

¹ In Catalonia the answer format was ‘1. Not at all’. However, this does not seem to have any major influence on the results, since they are consistent with those obtained when using a scale with three alternatives where alternatives 1 and 2 are collapsed.

International Postgraduate Students Mirror

the main stratification variable, an experience from the Swedish results in which big differences across subject fields were reported.

These are based on a modified ISCED 97 Classification:

Subject fields	2 - digit code (ISCED 97)
Humanities and Arts	21 Arts 22 Humanities
Social science, Business, Education and Law	31 Social and behavioral science 32 Journalism and information 34 Business and administration 38 Law 142 (3 - digit code) Education science *
Science, Mathematics and Computing	42 Life science 44 Physical science 46 Mathematics and statistics 48 Computing
Engineering, Manufacturing and Construction	52 Engineering and engineering trades 54 Manufacturing and processing 58 Architecture and building
Agriculture	62 Agriculture, forestry and fishing
Health and Welfare	72 Health 76 Social services

* In the Swedish classification, Education is part of Social sciences. Therefore, these two fields are collapsed in the analyses for the other three countries as well.

In the data collection these 6 categories were differentiated further in order to reach higher comparability and in the table below the number of students per subject field across countries is reported:

Broad subject field EUROSTAT classification by Country/Region**Note: For Sweden Education is included in the Social Sciences**

Count		Country/Region				Number of students
		Catalonia	Finland	Ireland	Sweden	
Broad subject field EUROSTAT classification	Education	67	153	24	See Note	244
	Humanities and Arts	166	474	244	875	1759
	Social sciences, Business and Law	303	722	232	1436	2693
	Science, Mathematics and Computing	189	1077	579	1310	3155
	Engineering, Manufacturing and Construction	137	683	166	1518	2504
	Agriculture and Veterinary	24	87	12	283	406
	Health and Welfare	115	607	84	1535	2341
	other_missing	0	23	49	117	189
	Number of students in sample	1001	3826	1390	7074	13291

I den svenska klassifikationen ingår Education i Social sciences. I analyserna slås dessa två områden ihop även för de övriga länderna.

The Sample Design and Mode of Data collection

Each country has developed their own sampling plans according to the agreed upon guidelines aiming at nationally representative samples. The national teams were also administrating their own study all activities in close contact with the coordinating center in Sweden.

Mode of Data collection

The Finnish survey was carried out in cooperation with the Finnish Higher Education Evaluation Council (FINHEEC), which is currently evaluating doctoral education in Finland, and with a useful experience of web-based data collection. A web-adjusted questionnaire was early also developed by the Irish team, which had a vast experience in the field and offered help to guide us in the new approach for data collection compared with the Master. This mode of data collection where also chosen in Catalonia. The separate technical reports for each country report the way they reached out to their post graduate students and the experiences of adjusting the Master Questionnaire from being a postal questionnaire to the new mode to communicate the answers to the IMPS questions.

Catalonia

AQU Catalunya (The Agency for Quality Assurance in the Catalan University System) offered the 11 existing universities in Catalonia the chance to take part in the International Mirror Postgraduate Survey. In order to make data processing easier AQU Catalunya decided to conduct the survey through an Internet on-line questionnaire.

Universities were responsible to contact their own students (those ones registered as PhD students) by e-mail in order to inform them about the project and to provide them the Internet link to the survey. AQU took also steps to promote the Mirror among students through AQU's

website and by printing posters that were distributed to the universities. Although the on-line questionnaire was very useful and positive in terms of cost-results, it is interesting to remark some handicaps appeared in Catalonia. For instance the procedure made extremely difficult to know the number of students who received/read the invitation to join the study. In parallel it was difficult to collect data about enrolled students in each university and each programme. Finally, although it was designed a protocol to follow-up the survey progression, in which the universities should contact students again in the middle of the data collection process AQU doesn't know to what extent that step was applied.

In Catalonia the target population for the Mirror Survey included all doctoral students who were enrolled for a Doctoral degree in the 1st semester of 2004 (autumn term) in a Catalan University, that states 12,568 students in total. In the international report only public universities are included, due to difficulties in obtaining data on the number of students enrolled in each university and each subject field for the private universities.

Table: Subject Fields in Catalonia Number of Post-Graduate Students in the Population and in the Sample

Subject Field	Population N	Population %	Sample n	Sample %
Education	484	4,1	61	7,4
Humanities and Arts	2244	18,8	140	17,1
Social sciences, Business and Law	2678	22,5	171	20,8
Science, Mathematics and Computing	7168	18,8	188	22,9
Engineering, Manufacturing and Construction	1995	16,7	122	14,9
Agriculture and Veterinary	171	1,4	24	2,9
Health and Welfare	1897	15,9	115	14,0
Other	207	1,7	0	0
Total	11922	100	821	100,0□

Table: Universities in Catalonia Number of Post-Graduate Students in the Population and in the Sample

University	Population N	Population %	Sample n	Sample %
UB	3225	27,1	220	26,8
UAB	4109	34,5	351	42,8
UPC	2350	19,7	75	9,1
UPF	831	7,0	19	2,3
UdG	455	3,8	51	6,2
UdL	379	3,2	30	3,7
URV	573	4,8	75	9,1
Total	11922	100	821	100

The Catalan survey, based on the Swedish Master questionnaire, added some questions in order to make the questionnaire more relevant to the context of doctoral education in Catalunya. The new questions gathered more information about the intake profile (gender, age and previous degrees), labour conditions while studying the PhD programme and the future plans (expectations) after finishing doctoral studies. The thematic of those new questions was communicated to the Mirror management group, to see if there was another Mirror partner interested to share those questions. At the same time universities were required to check the questions of the original English version survey in order to detect possible misunderstandings or mismatches for the Catalan context.

The online survey was composed of 56 questions (coded into 111 variables), and it was operative during 61 days, since the 21st April 2005 to the 20th June 2005. The average time in minutes to complete the survey has been 16'41". And 1,001 graduates have answered the survey.

Finland

The Finnish survey was carried out on assignment by the Finnish Ministry of Education and in cooperation with the Finnish Higher Education Evaluation Council (FINHEEC), which coordinated an international evaluation on doctoral education in Finland in 2005. The target population included all doctoral students in all subject fields who were registered for a doctoral degree during autumn term 2004 in the Finnish universities, in total 22,105 students.

The Swedish questionnaire used in 'Doktorandspegeln' was used as the Master Questionnaire. Thus, the main common core in capturing the doctoral students' views and experiences was seven scales, based on 34 items in the Swedish Master Questionnaire. This common core of questions was kept intact. In regard to the questions outside the common core, national adjustments and additions were made in order to make the questionnaire more relevant for the context of doctoral education in Finland. Furthermore, a few general background questions such as university identification, gender, age and subject field had to be added. A number of questions related to different routes leading to and after doctoral studies, cooperation with working life and transferable skills were also inserted. The main reference period, valid for most of the questions, was autumn 2004.

The data was collected April 27 – May 18 with a web-adjusted questionnaire in English. Respondents were reached via the universities' e-mail lists. Since centered, national register of postgraduate students in Finnish universities was not available, each university was responsible to contact its students and to provide the web link to fill in the questionnaire. Bulletins of the survey (in Finnish, Swedish and English) were sent to all Finnish universities on April 21. Universities, in turn, disseminated the bulletins further to faculties and departments, and eventually as many students as possible. In addition, graduate schools were informed separately. Students were provided with one user ID. A reminder bulletin was sent on May 10. Unfortunately, universities were not able to provide data regarding how many doctoral students received the bulletins about the survey.

A commercial company was commissioned to adjust the questionnaire into the web and act as the data collection point. The company delivered the electronic data in Excel, which was then coded and transferred into SPSS.

In all, there were 3,826 respondents of which 1,182 expressed their views and experiences about doctoral education further by answering to the last open-ended question of the questionnaire "If there are other aspects of doctoral education or if you have specific or negative experiences that you would like to tell us about please use the space below".

Population figures from year 2004 in the following tables are based on the KOTA database, which includes statistics maintained by the Finnish Ministry of Education with data contents describing university performance by institutions and fields of study.

Table: Subject Fields in Finland Number of Post-Graduate Students in the Population and in the Sample

Subject Field	Population N	Population %	Sample n	Sample %
Education	1565	7,1	153	4,0
Humanities and Arts	3742	16,9	474	12,4
Social sciences, Business and Law	5186	23,5	722	18,9
Science, Mathematics and Computing	3101	14,0	1077	28,1
Engineering, Manufacturing and Construction	5777	26,1	683	17,9
Agriculture and Veterinary	641	2,9	87	2,3
Health and Welfare	2093	9,5	607	15,9
Other and Missing			23	0,6
Total	22105	100	3826	100

Table: Universities in Finland Number of Post-Graduate Students in the Population and in the Sample

University	Population N	Population %	Sample n	Sample %
Null response			2	0,1
Academy of Fine Arts	14	0,001	0	0
Helsinki School of Economics	393	1,8	36	0,9
Helsinki University of Technology	2762	12,5	698	18,2
Lappeenranta University of Technology	556	2,5	48	1,3
Sibelius Academy	133	0,6	12	0,3
Swedish School of Economics	179	0,8	24	0,6
Tampere University of Technology	1838	8,3	97	2,5
Theatre Academy of Finland	35	0,2	3	0,1
Turky School of Economics	252	1,1	30	0,8
University of Art and Design Helsinki	185	0,8	43	1,1
Univeristy of Helsinki	5488	24,8	815	21,3
University of Joensuu	763	3,5	94	2,5
University of Jyväskylä	1616	7,3	316	8,3
University of Kuopio	647	2,9	323	8,4
University of Lapland	378	1,7	23	0,6
University of Oulu	1783	8,1	368	9,6
University of Tampere	1779	8,0	341	8,9
University of Turku	2038	9,2	317	8,3
University of Vaasa	422	1,9	66	1,7
Åbo Akademi University	844	3,8	170	4,4
Total	22105	100	3826	100

Ireland

The target population of 7,275 included all students who were registered on a full-or part-time basis for a research degree (PhD or Masters) in nine higher educational providers. The rationale behind including research masters students in the Irish survey was based on the fact that many students in Ireland initially register for a research masters but they subsequently transfer directly to the PhD register without taking the masters award. The providers included all seven universities in the Republic of Ireland, the Dublin Institute of Technology and the Royal College of Surgeons of Ireland. Thus the study included all the major higher

International Postgraduate Students Mirror

educational providers in Ireland who have a significant number of students registered for postgraduate research degrees.

Table: Subject Fields in Ireland Number of Post-Graduate Students in the Population and in the Sample

Subject Field	Population N	Population %	Sample n	Sample %
Education	141	1,9	24	1,7
Humanities and Arts	1154	15,9	244	17,6
Social sciences, Business and Law	968	13,3	232	16,7
Science, Mathematics and Computing	2731	37,5	579	41,7
Engineering, Manufacturing and Construction	1191	16,4	166	11,9
Agriculture and Veterinary	188	2,6	12	0,9
Health and Welfare	662	9,1	84	6,0
Other and Missing	238	3,3	49	3,5
Total	7273	100	1390	100

Table: Universities in Ireland Number of Post-Graduate Students in the Population and in the Sample

University	Population N	Population %	Sample n	Sample %
Dublin City University	507	7,0	126	10,4
Dublin Institute of Technology	212	2,9	82	6,8
National University of Ireland, Galway	754	10,4	102	8,5
National University of Ireland, Maynooth	403	5,5	84	7,0
Royal College of Surgeons of Ireland	132	1,8	40	3,3
University of Dublin, Trinity College	1707	23,5	382	23,4
University College Cork	953	13,1	146	12,1
University College Dublin	1727	23,7	185	15,3
University of Limerick	880	12,1	160	13,3
Total	7273	100	1207	100

The Irish survey was conducted using a web-based questionnaire in the time period from the end of June though to the beginning of August 2005. All students in the sample were contacted exclusively by e-mail. Each of the nine higher educational providers that participated in the survey was responsible for issuing the initial notification and subsequent reminders to their students. The data collection system used was a 'Marks Class' system which facilitated the collation of data from the completed questionnaires. The data collection point was in the University of Limerick. Eight of the participants administered their survey on the 27 or the 28th June. Seven of these issued a reminder on the 4th July, with a final reminder on the 18th July. The eighth was not in a position to send out any subsequent reminders due to technical difficulties. A ninth participant was unable to issue the initial notification until the 11th July. A reminder e-mail was sent to this group of students a week later. The survey was completed on the 3rd August.

There were 1,454 respondents in total to the survey. After analysis, some responses were removed from the dataset based on the following criteria: Duplicate submissions and those

questionnaires that had less than 60 % of the questions completed were removed. At the end of this process a total of 1,390 responses remained for the comparative analysis.

Sweden

The Swedish original survey, 'Doktorandspegeln', was conducted by Statistics Sweden (SCB) and the details about sampling, data collection and non-response, etc is reported in their Technical Report (in Swedish) written by SCB's contact person Harald Theorin.

In short, the Swedish Mirror sample contained 9,186 individuals drawn randomly from the population of 16,878 persons, all defined as active in their doctoral studies during Spring 2002. The questionnaire was administered starting week 2, 2003, and after three reminders it was finished week 12, 2003. Adding to the information coming from the questionnaire, register variables are (1) University Id, (2) Gender, (3) Age, (4) Research field, (5) National subject, (6) Born abroad, (7) Year for immigration. The main reference period, valid for most of the questions, was Autumn 2002. Response rate is reported for Subject Field ranging from 61 % for Law students up to 82 % for Odontology, and for University ID, lowest for Jönköping University College 60 % and highest for Malmö University College 85 %. The dataset was calibrated by adjusting for non-response, using the known distributions in the population about not only 'subject field', 'University ID', but also 'age', 'enrollment in % of full-time', and 'immigrant status'. 95 % confidence intervals were reported and calculated on the weighted, calibrated, data. These weights take into account the varying sample probability, the willingness to respond and the actual number in the population in different groups. Part of the sample with immigrant background received an English version of the questionnaire in addition to the one in Swedish. Out of 1,050 persons that got a double set of questionnaires, 655 answered (409 used the English version).

Table: Subject Fields in Sweden Number of Post-Graduate Students in the Population and in the Sample

Subject Field	Population N	Population %	Sample n	Sample %
Humanities and Arts	1987	11,8	875	12,4
Social sciences, Business, Education and Law	3064	18,2	1436	20,3
Science, Mathematics and Computing	2937	17,4	1310	18,5
Engineering, Manufacturing and Construction	4000	23,7	1518	21,5
Agriculture and Veterinary	381	2,3	283	4,0
Health and Welfare	4336	25,7	1535	21,7
Other and Missing	173	1,0	117	1,7
Total	16878	100	7074	100

Table: Universities in Sweden Number of Post-Graduate Students in the Population and in the Sample

University	Population N	Population %	Sample n	Sample %
Umeå universitet	1034	6,1	556	7,9
Luleå tekniska universitet	441	2,6	250	3,5
Uppsala universitet	2122	12,6	893	12,6
Mälardalens högskola	60	0,4	35	0,5
Örebro universitet	174	1,0	134	1,9
Stockholms universitet	1800	10,7	636	9,0
Karolinska institutet	1700	10,1	414	5,9
KTH	1463	8,7	434	6,1
Linköpings universitet	1153	6,8	597	8,4
Högskolan i Jönköping	45	0,3	27	0,4
Göteborgs universitet	2043	12,1	833	11,8
Chalmers tekniska högskola	959	5,7	411	5,8
Karlstads universitet	154	0,9	125	1,8
Lunds universitet	2672	15,8	965	13,6
Högskolan i Kalmar	38	0,2	28	0,4
Växjö universitet	133	0,8	105	1,5
SLU	606	3,6	436	6,2
Handels STHLM	177	1,0	122	1,7
Blekinge tekniska högskola	41	0,2	26	0,4
Mitthögskolan	24	0,1	14	0,2
Malmö högskola	39	0,2	33	0,5
Total	16878	100	7074	100

4. Tools for Analysis

The statistical weighting procedure applied, to improve the representativity of each sample of their target population, is for the three Spring 2005 surveys based on aggregated statistics about the number of post-graduate students divided up according to University ID/Subject Field Code, so called post-stratification. The reference time period was chosen to be as close as possible to the time for data collection (cf. in Sweden being Autumn 2002). This information has been gathered for Catalonia, Finland and Ireland in a satisfactory way meaning that we know reasonably well the amount of postgraduate students at the different universities as well as which subject fields are present for post graduate studies in them. If the non-response rate is varying across these two variables, it will be taken into account in the weighted analysis. For Sweden and Finland, with probability samples, also within a stratum (university by subject field) the sub-sample is representative (with reservation for non-response bias). For the two other samples, from Catalonia and Ireland it isn't possible to tell how representative those students are that answered on the web. Their results should be seen as tentative, demanding also other sources of information that confirm the pattern of responses. The weights for Sweden were based on register information, including more variables for post stratification over and above university and subject field.

In the Swedish report the procedure for trying out the international scales is outlined. An exploratory factor analysis traced the seven factors in the data and these were also tested for unidimensionality with STREAMS/AMOS and refined into the set of items used for each of

the seven scales. In this international study a more limited check through confirmatory factor analysis was done and the reliabilities for the mean scores are reported in the table below:

Table: Alpha Reliability Coefficients for International Scales by Country

Description of international scale	No of items	Alpha reliability			
		Catalonia	Finland	Ireland	Sweden
Introduction to postgraduate studies	4	0,81	0,78	0,77	0,74
Professional development	4	0,84	0,71	0,71	0,74
Dialogue with supervisors	6	0,90	0,87	0,89	0,85
Supervision in action	3	0,56	0,71	0,76	0,80
Relevance of taught courses	4	0,86	0,77		0,74
Reflection and values	5	0,84	0,77	0,78	0,78
Study environments	4	0,78	0,75	0,77	0,76

Note 1: Ireland had approximately 75 % non-response on the items of the scale Relevance of taught courses and it was therefore deleted.

Note 2: The original scale Supervision in action had 4 items but Catalonia didn't cover the first question Q34C and it was therefore deleted and only three items are used across all countries.

With only one exception, all reliabilities are above 0.70 and the overall most reliable scale is Dialogue with supervisors.