ANNEX 11 Methodology and design of the sample

Extracted from *Reflections on and outlook for Higher Education in Latin America. Tuning – América Latina. Final report 2004 - 2007.* Pablo Beneitone, César Esquetini, Julia González, Maida Marty Maletá, Gabriela Siufi y Robert Wagenaar (ed.) University of Deusto. June 2007. Page 40-43

It was decided to use a system of cluster sampling, given that the people surveyed are grouped in the universities themselves. It may not be valid to presume random sampling, given that the people surveyed are not strictly independent of each other. At the same time, the universities have a certain clustering effect at the level of each country.

Cluster designs are widely used in research[1] and do not represent a source of partiality. Cluster sampling can affect the error rate of sampling of the study of any calculation generated. The sampling error increases depending on the differences in the questions measured between conglomerates.

The design effect due to cluster sampling has to be calculated using an intraclass correlation. A high intraclass correlation indicates that differences among the conglomerates are high and, therefore, increases the sampling error in the research. It should be noted that a low interclass correlation in any question, i.e close to zero, indicates that a simple random sample would have given similar results.

All the calculations and conclusions take into account the nature of data clusters, at both university and country level, using multi-level models. This model was considered to be the most suitable, because it takes into account the structure of data clustering (e.g., it does not assume that the observations are independent as they are in a random sample). These models have been extensively used in educational research since the segmented structure is nearly always present.

At the same time, multi-level models allow for simultaneous appreciation of individual differences and conglomerates, giving suitable calculations of typical errors and making any deduction at an individual and conglomerate level (countries/universities) appropriate.

In this context, the conglomerates are not seen as a fixed number of categories of an explanatory variable (e.g., the list of the universities selected as a fixed number of categories), but rather it is considered that the selected conglomerate belongs to a totality of conglomerates. At the same time, it provides better calculations at an individual level for groups with a small number of observations.

With regard to the variables to be considered, it was decided to consult subjects on:

- the degree of **IMPORTANCE**: the relevance of the competence, in their opinion, for work in their profession,
- the level of **ACHIEVEMENT**: the achievement of this competence as a result of having taken this university degree.

To evaluate these two variables, the interviewer had to use a scale: 1 = none; 2 = weak; 3 = considerable; 4 = strong.

---

[1] BRYK, A.S. and RAUDENBUSCH, S.W. (1992) Hierarchical Linear Models: Applications and Data Analysis Methods. Sage Publications.
DRAPER, D.. (1995) Inference and hierarchical modelling in the social sciences. *Journal of Education and Behavioral Statistics 20*, 115-147.
GOLDSTEIN, H. (1992) Statistical information and the measurement of education outcomes (editorial). *Journal of the Royal Statistical Society, A,* 155: 313-15.
GOLDSTEIN, H (1995) Multilevel Statistical Models. London, Edward Arnold: New York, Halstead Press.
GOLDSTEIN, H. and SPIEGELHALTER, D. (1996) League tables and their limitations: Statistical issues in comparisons of institutional performance. *Journal of the Royal Statistical Society, Series A* 159, 385-443.
GOLDSTEIN, H., RASBASH, J., YANG, M., WOODHOUSE, G., PAN H., and THOMAS, S. (1993) A multilevel analysis of school examination results. Oxford Review of Education, 19: 425-33.

- **RANKING**: Based on the categorisation of the five most important competences according to academics, graduates, students and employers, a new variable was created for each competence. The competence that was ranked highest in the survey was allocated five points, four for the second and so on, with one point for the last in the selection. If the competence was not chosen in the survey, it scored zero points.

Once the variables had been defined, agreements were reached on who and how many people to consult:

Academics: University lecturers teaching on any of the theme areas of the project. Each university was asked to gather information from at least **30 academics** in the area in which the university was participating.

Graduates: people who had satisfactorily completed a complete study programme/university degree, in any of the areas of the project and had received the corresponding degree. Each participating university was asked to survey at least **150 graduates** from the area in which they were participating. The graduates selected had to have received their degree 3 to 5 years before the date of the survey. This criterion depended on the number of graduates who had received their degree during this period. If there were not many graduates each year, the sample had to include graduates from the 5 previous years. If there were enough, the sample was limited to graduates from the 3 previous years. In the case of participating universities which did not have sufficient graduates, graduates could be included from other similar institutions from the same country.

Employers: people and/or organisations who had employed graduates from the university, or people and/or organisations which, although there is no evidence that they had hired graduates from the university, appeared to have jobs of interest for graduates. Each university was asked to obtain information from at least **30 employers** of graduates in the subject area represented by the university in the project.