

Course: 09

Collection and processing of research

Data Many students need to collect data to construct the empirical part of their dissertation or thesis. This is the most important part of the study! The data collected makes it possible, after their use, to provide answers to the investigator regarding his problem and his hypotheses.

Data collection is an essential phase of an empirical study or research work during which the student collects information which will be analyzed to confirm (or not) initial hypotheses, and respond to a problem.

Data collection: how to go about it? To collect data in an empirical study, there are two types of studies:

***Qualitative study.**

***Quantitative study.**

Data collection can be carried out using several techniques and helps the researcher understand the phenomenon, fact, or subject he is studying.

Summary Table

The following table summarizes the 5 main techniques for collecting data in an empirical study.

Type of study	Technics	Advantage in data collection
Qualitative study	Interview	The interview allows you to collect precise data from an expert on a very technical subject.
Qualitative study	Observation	Observation is useful for analyzing a real phenomenon, such as working conditions, a social conflict, a political situation or for

		carrying out a sociological study.
Qualitative study	Focus group	The focus group proves effective when it comes to collecting data to understand a phenomenon affecting a group of people or on a social subject where everyone can give their opinion.
Quantitative study	questionnaire	Le questionnaire permet d'interroger un ensemble de citoyens, afin de collecter diverses informations exploitables statistiquement pour avoir des informations sur un sujet donné.
Quantitative study	Survey	The survey collects data around a general question. This technique allows you to know a general opinion on a given subject.

II-Data analysis and processing

Despite its notoriety and ease of implementation, Excel has had its day when it comes to data analysis and processing. Technology today offers much less vulnerable solutions that guarantee speed and power of processing, precision, reproducibility and reliability of results, richness and relevance of explorations. Qualitative analysis, Machine and Deep Learning, assisted design with experimental plans and the creation of complex statistical models are all avenues to explore together.

III-data processing and visualization

Among the wide variety of software available, we highlight tools favored by a large community of users, whose robustness and quality are well established, and among which we will help you navigate based on your specific needs. These integrated tools do not require specific integration into your

Information systems or major modifications to your processes, a priori. However, mastering them and exploiting their full potential requires technical and professional skills: learning to use the tool, consolidating your knowledge to teach it what and how to process your data. We have put together a wide range of training on each of them to help you.

Statistics

Statistics is a complex field where many methods come together. It is not always easy to choose the right approach, and to understand the steps clearly and precisely. However, it is essential, whether you work in epidemiology, behavioral sciences, medicine, biostatistics or engineering.

NVivo is qualitative data analysis software designed to provide you with a work and reflection space where you can organize, visualize, and analyze your unstructured and qualitative data. NVivo manages multiple data sources and formats such as interviews, survey results, images, audio or video interviews, newspaper articles, web page content and social networks.

Image processing

Image analysis and processing represent a major challenge in generating precise results in laboratories. There are new innovative tools, using artificial intelligence and in particular Deep Learning, allowing the implementation of template databases.

Mipar is a powerful tool for analyzing images captured from numerous devices (optical, confocal, electronic, two-photon, radiography, etc. microscopes), suitable for life and materials sciences. Designed to address productivity concerns, Mipar is more powerful and faster than manual image analysis software. The integration of innovative tools such as “Recipes” (pre-configured sheets) saves time and increases precision in easy-to-value image analysis.