

Basic knowledge of epistemology for the social sciences

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| *"Science begins with a NO"* (Bachelard, 1984).

One of the difficulties of sociology research is that we all possess experience of social life, and entertain perceptions of how nearly every aspect of society functions. These perceptions are expressed with commonly used words whose meaning is generally not precise. These perceptions most often are based on our experiences, beliefs, and desires rather than on models that have been validated through studies or experiments.

The production of scientific knowledge involves first making explicit, and then rejecting **pre-notions** and categories of analysis of common meaning that we use in day-to-day speech and discussions. This requires us to identify the model that encompasses the relationships between the facts and the phenomenon that we seek to explain, and assumes the paradigm -upon which the model is based- is updated.

"The researcher must break with the prejudices of his or her own common meaning (which may be those of his or her church or those of intellectual circles) which is not the same as that of everyone else. And, in an intercultural context, it is in accessing the common meaning of the groups studied that often is the way to an epistemological rift, the common meaning which should be mistrusted being that which projects exotic stereotypes onto others, whether this exoticism be familiar or foreign in nature." (Olivier de Sardan, 2003).

I. Notion and pre-notion:

Pre-notions form an organized system of ready-made thoughts, images, and implicit feelings that lead us to pseudo knowledge. Pre-notions often are plurivocal: they may hold several meanings. Fuzzy terms are topics for study, and must be conceptualized before they can be used in the production of scientific knowledge.

Examples: tradition, modernity, behavior of economic actors (dynamic, innovative, outdated,...) economic advantage, ...

Common meaning, the meaning given to daily life, is generated for us by very concrete mechanisms, through the media and images. It is based essentially on pre-notions. To conduct science, one must analyze and identify elements that appear indistinct in a topic of study or research to construct the subject of the research.

II. Concept:

Unlike plurivocal pre-notions, **concepts** are univocal, accepting only one, precise meaning within the context of a theoretical school of thought. The same term effectively can correspond to several concepts with different meanings when it is used in different disciplines or theoretical frameworks.

Example: The term, TERROIR, covers a range of meanings, each one very precise:

In geography, a terroir is [2]: *“a geographical limited area defined by a human community which, over the course of its history, builds an ensemble of distinctive cultural features, knowledge, and practices based on a system of interactions between biophysical and human factors. This combination of knowledge and practices reveals originality, confers typicity and allows products and services to be recognized as originating from this area and, therefore, its inhabitants. Terroirs are living, innovative spaces that cannot be reduced to tradition alone”* (UNESCO, 2005).

In agronomy, the terroir is a unit of the natural environment and a subset of landholdings that present specific agricultural potential and are farmed in a specific way (Sebillotte, 1974).

In oenology, the terroir is defined at the scale of the land parcel: it is composed of the set of vineyard ecosystem factors (soil, sub-soil, climate, topography) affecting the quality of wine.

The use of the term “terroir” as a concept thus requires one to specify the theoretical frame of reference.

III. (Scientific) law:

Concepts are linked together by relations of cause and effect, dependence, feedback, etc, which constitute laws, the mechanisms which form the foundations of models.

Example: The law of gravity connects weight, mass and gravity through a mathematical relation, $P=mg$.

In the social sciences, the relationships are not always mathematical. Economics may give the illusion of being dominated by mathematical models, but numerous relationships between social science concepts (sociology, psychology, education science,...) are not articulated with mathematical language.

Sociology rarely works with laws. In its early days, sociology stated some laws, only to renounce this kind of systematization. Few authors today evoke a need to formulate laws in sociology.

IV. Categories of analysis:

To analyze, compare, differentiate, and class, we use categories of analysis, which are classification systems. The categories of analysis of common meaning are almost always binary, functional, and borrow from value judgments.

Examples: inside/outside; before/after; us/them; modern/traditional.

Operational analysis categories are tools of analysis built by a research scientist to characterize and class social groups, phenomena studied...

Example: The concept of “pollution” is defined in the Dictionnaire de l’environnement (http://www.dictionnaire-environnement.com/pollution_ID722.html), a dictionary of the environment, as follows: *“Pollution designates the direct or indirect introduction, through human activity, of substances or heat in the air, water, or soil that are likely to affect human health or the quality of aquatic and terrestrial ecosystems, which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment: European Directive 2000/60/CE of 23 October 2000.*

To move beyond the binary classification, “polluted/not polluted”, which only allows an analysis of a pollution state, it is necessary to flesh out the classification by developing other categories of analysis.

Examples of possible categories of analysis for the concept of pollution:

- 1) origin: human-made pollution/non-human made pollution
- 2) sources of pollutants: diffuse pollution/chronic pollution
- 3) polluting agent: industrial, radioactive, electromagnetic, thermal, light, sound pollution...
- 4) resource polluted: air, soil, water pollution...

Examples of conventional categories of analysis in the field of social phenomena:

- 1) Profession
- 2) Gender
- 3) Age or age group
- 4) Religion
- 5) Ethnicity
- 6) Social group according to the date of arrival in the village

However, one should not limit oneself to what is current or conventional, and one must be able to create one’s own categories of analysis based on the topics and contexts studied.

For example:

Gender often is a relevant category of analysis, but it should not be over-estimated or used in a systematic fashion. This category of analysis must, like the others, be assessed in the light of the topic studied.

The same category of analysis may have different modalities according to the context and topic studied.

Most of the time, the modalities “man” and “woman” are relevant to describe gender, but for certain research studies, notably of “sexual identity”, the gender category of analysis also should include a wider range of modalities: man, woman, transexual, transsexual, transgender...

To be operational, the categories of analysis must be:

- Exhaustive → all observations can be classed,
- Exclusive → each observation is classed in either one category or another, not in two categories at the same time,
- Pertinent → reveal facts and provide meaning.

V. Model:

Theoretical framing is the process of making explicit the laws and concepts that give meaning to the terms used. It allows the search for pertinent categories of analysis. Concepts and theoretic laws provide analysis grids, put variables explaining a phenomenon into a hierarchy, and orient the approach to, and the collection of, data through the formulation of research hypotheses.

Models, whether they are theoretical or operational, are composed of concepts, categories of analysis, and propositions (laws) based on the links between concepts. Theoretical models are used for diagnosis while operational models are used for activities or action. The two types of models are closely linked: a framework of thought also is a framework of action. According to the German sociologist **Max Weber** (1864-1920), human beings, endowed with a conscious, act in accordance with how they understand the world and their intentions, and thus with their theoretical models. The actions of people are actions full of meaning, based on values, and comprehensible to others; this is the approach of comprehensive sociology (Weber, 1978). The comprehension may be rational or empathetic (capacity to put oneself in the shoes of another) (Lallement, 2009). See also (Porter, 1950).

Example drawn from the UVED course “Complexity and sustainable development”

Website: <http://cxdd.broceliande.kerbabel.fr/?q=node/29/17>

Concept
“organization”

*“The systematic approach of sustainable development emphasizes the interdependence between three spheres, three different and complementary forms of organization – economic, social, and environmental.
(René Passet, L’économique et le vivant, 1979).*

*To analyze the concept « organization », the category of analysis “form” of organization is chosen.
The form of organisation varies according to three modalities: “economic/social/environmental”.*

Example of the link between the three modalities of the category of analysis

This interdependence is asymmetrical: the economic sphere is embedded in the social sphere just as the human community (with its material and imaginary features) is part of the biosphere.

The economic sphere – often called, ‘the economy’—evolves and is transformed with a relative organizational autonomy (technical innovation, imperative of cost-effectiveness, law of supply and

*Characterization of a modality:
X (economic sphere) is linked to
Y1 (autonomy),
Y2 (reasons), and
Y3 (constraints)*

demand...) but also as a function of “reasons” invented or proposed by society and of societal and environmental constraints.

Political organization is, on one hand, a creation of the social, and, on the other, expresses a certain autonomy relative to the social (for example, the dialectics of the State in relation to the people, civil society, the public). It thus constitutes a fourth sphere in our model: conventions and procedures aiming to regulate the economy and society -- alone, and each in relation to each other and to the environment."

A fourth “political” modality is introduced to inform the category of analysis “form” of organization.

In the natural sciences, the interest of a theoretical model lies in its capacity to sum up a phenomenon and in the possibility to test the model in concrete situations that may or may not be experimental (notably through surveys) to test its veracity. A scientific theory is “a generalization that can be demonstrated or tested at the level of an empirical survey” (Castoriadis, 1987). This is the principle of falsifiability proposed by Popper¹. A proposition (law, model) that cannot be refuted is considered to be metaphysical.

Passeron (2013) shows how the refutation of social science models is not possible insofar as they are part of disciplines contextualized in time and space. In the social sciences, the falseness or veracity of propositions cannot be stated independent of the spatial-temporal context in which the propositions were constructed, whether through experiments or surveys. It follows that, while scientific knowledge in the natural sciences is produced through the successive accumulation of knowledge produced by the refutation of previous, self-sufficient, timeless and universal models, **in the social sciences, the Popper refutation of models, like the production of evidence, cannot function in the same manner.**

A **methodological dualism** thus distinguishes the social sciences from the natural sciences; social sciences are rarely or never based on the refutation of models and their probative force. Consequently, several theories co-exist in the social sciences without it being possible to say that one or another is “absolutely” true or false independent of the context in which the theory was constructed (Saillour 2010). What is sought is plausibility. See also (Kincheloe, 2005).

Constructing a scientific model summing up more or less complex phenomena is no longer the exclusive task of official institutions responsible for producing scientific knowledge (Morin, 1990), see also (Morin, 2007; Morin, 2008). Indigenous models, produced from local practices and local perceptions, exist without being validated by the scientific community. While the words used are univocal concepts, their operation categories of analysis, hypotheses, and laws can be tested at least locally in the context in which they are formed; these models thus can be considered to be scientific even though they are not produced by the scientific community.

¹ A theoretical model, a set of laws, is refutable if it is possible to construct an experiment or observation procedure that can produce outputs contradicting the propositions or laws of the model. In this school of thought, a refutable proposition is said to be scientific. If it is refuted, it ceases to be valid.

In contrast, an "epistemological rift" separates theoretical models of common meaning from theoretical models of science.

Theoretical models...	...of common meaning (often subject to the dominant ideology)	...scientific
Words	<ul style="list-style-type: none"> • plurivocal NOTIONS • Study topic concepts 	<ul style="list-style-type: none"> • Univocal CONCEPTS • Analytic tool concepts
Categories of analysis	<ul style="list-style-type: none"> • Valorized • Stated in a contradictory fashion • Hide contradictions • Exclude some of reality • Non exclusive • Relevant to justify • Ideological categories and practices of power • Baptize reality, seeks to resemble reality • Upholds the existing order or incites unreasoned action 	<ul style="list-style-type: none"> • Explanatory or Operational • Stated in a non-contradictory fashion • Reveals contradictions • Exhaustive • Exclusive • Relevant to understand • Analyses reality and proposes a synthesis • Transforms the order in place
Links between words	Opinions, contradictory judgments	Propositions, hypotheses : <ul style="list-style-type: none"> • of research • of interpretation
Objective	The speaker seeks to hide his contradictions	The scientist seeks to expose contradictions to reality

VI. Paradigm:

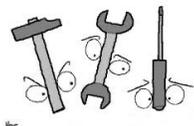
Scientific knowledge - and thus models - is based on **paradigms** (Kuhn, 1962): "*first, a "scientific paradigm" designates a set of theoretical, methodological, and pragmatic principles that are not necessarily precise or explicit but are operational, which are held by members of a scientific discipline or specialization and which underlie the effective practices of this group. The notion of "scientific paradigm" was introduced into the philosophy of science by T. Kuhn in 1962 in the first edition of his book, "The structure of Scientific Revolutions". The work quickly became well known outside the field of the philosophy of science, and the notion of paradigm had the same success. The social sciences in particular adopted and widely used it to designate patterns of thought with the value of models in a sector of their field.*" (Mesure and Savidan, 2006). See also (Calhoun, 2002).

For example, the works of Max Weber are marked by **the atomistic paradigm**: he emphasizes the action rationales of individuals (considered to be like social atoms) based on their values, understanding of the world, and rationality. These actions, the logic of which is first individual, pool together and shape the world of people.

In contrast, the works of Durkheim uphold the **holistic paradigm**. According to Durkheim, social acts "consist of ways of acting, thinking, and feeling outside the individual, and which are endowed with a power of coercion through which they impose themselves on the individual... A

purely psychological explanation of social acts thus cannot but miss everything which is specific to them, in other words, what is social... The determining cause of a social act must be sought among previous social acts and not in individual states of conscious." (Durkheim, 1964).

A paradigm is accepted by a sizable portion of the scientific community, and over a period of time that is sufficiently long to orient research, manifested through the choice of research programs. Scientific paradigms succeed each other, marking turns in the direction of scientific research. Several paradigms can be accepted simultaneously over a certain period of time. Building scientific knowledge in sociology requires one to be aware of the dominant paradigm in the scientific community to which one belongs.



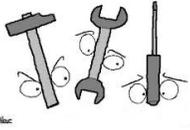
The exercise, "Concepts, laws and paradigms" asks you to identify the schools of thought and the concepts, laws and paradigms that characterize them in a scientific presentation on scientific approaches to integrated natural resource management that was produced through a UVED course (see the instructions in the course resources).

VII. Dimensions:

The topics of studies and surveys always cover several aspects known as "dimensions".

There are several principle dimensions that help breakdown a situation or topic. Within each dimension, the other dimensions also are present. The political dimension in particular traverses all of the other dimensions.

1. Technical: System of transforming environments and materials
2. Economic: System of production and exchange
3. Legal: Codes guiding actors' behavior
4. Ideological: System of perceptions and values
5. Political: System of choice
6. Social: System of relations
7. Ecological: System allowing life forms to maintain themselves in equilibrium with their environment



A discussion space is proposed for you to think about the words "dimension, concept, law, model, paradigm" by applying epistemological tools to two questions related to sustainable development: Globalization, climate change impacts. These questions are addressed in courses available on the UVED site (see the links below), they then are discussed in class or on the forum depending on the choice of the teacher.

Mechanism, principles	Dimensions of the topic, key concepts	Key concepts, mechanisms or laws (links between concepts), models and paradigms
Globalization	http://www.uved.fr/fileadmin/user_upload/modules_introductions/module4/site/html/1-approche_2.html	http://www.uved.fr/fileadmin/user_upload/modules_introductions/module4/site/html/1-approche_1.html#1-2-contexte http://www.uved.fr/fileadmin/user_upload/modules_introductions/module4/site/html/1-approche_1-2-contexte_1.html#1-2-2-ere
Impact of climate changes	http://www.uved.fr/fileadmin/user_upload/changements-globaux/site/html/3-politiques-societe_1.html	http://www.uved.fr/fileadmin/user_upload/changements-globaux/site/html/3-politiques-societe_1-impacts-socioeco_1-sp-impacts-socioeco_5.html

Before formulating research questions and response hypotheses, the initial subject is developed in relation to these dimensions.

This preliminary work of broadening the subject allows one to avoid staying boxed into a paradigm or model that limits the research by only according it one or two dimensions (in particular for topics that appear to be uniquely ecological, technical or economic).

The ideological and political dimensions are often forgotten in the initial formulation of topics of study and research.

Numerous research avenues are then identified and selected according to the objectives of the study commissioner and the resources and skills available. This is the stage in which the problem statement is constructed.

► Bibliography cited:

- Bachelard, G. 1984. *The new scientific spirit*. Boston: Beacon Press.
- Calhoun, C.J., ed. 2002. *Dictionary of the social sciences*. New York: Oxford University Press.
- Castoriadis, C. 1987. *The imaginary institution of society*. Cambridge: MIT Press.
- Durkheim, E. 1964. What is a Social Fact? In: *The rules of sociological method*. New York: Free Press of Glencoe, pp. 50-9.
- Kincheloe, J.L. 2005. *Critical constructivism primer*. New York: P. Lang.
- Kuhn, T.S. 1962. *The structure of scientific revolutions*. Chicago: University of Chicago Press.
- Lallement, M. 2009. Max Weber (1864-1920): aux sources de la sociologie allemande. *Sciences Humaines*, N° 147(3).
- Mesure, S. and P. Savidan. 2006. *Dictionnaire des sciences humaines*. Paris: PUF.
- Morin, E. 1990. *Introduction à la pensée complexe*. Paris: ESF Editeur.
- Morin, E. 2007. Restricted complexity, general complexity. *Worldviews, science and us: Philosophy and complexity*. Singapore: World Scientific, 1-25.
- Morin, E. 2008. *On complexity*. Cresskill, N.J: Hampton Press.
- Olivier de Sardan, J. 2003. *L'enquête socio-anthropologique de terrain: synthèse méthodologique et recommandations à usage des étudiants*. Nismay, Niger: LASDEL, No. 13 Etudes et Travaux.
- Passeron, J.C. 2013. *Sociological Reasoning: A Non-Popperian Space of Argumentation*. Oxford: The Bardwell Press.
- Porter, E.H. 1950. *An Introduction to Therapeutic Counseling*. Houghton Mifflin.
- Saillour, C. 2010. Passeron et le pluralisme irréductible des théories en sciences sociales [online]. *Implications philosophiques*. Available from: <http://www.implications-philosophiques.org/implications-epistemologiques/passeron-et-le-pluralisme-irreductible-des-theories-en-sciences-sociales/> [Accessed 22 Nov 2013].
- Sebillotte, M. 1974. Agronomie et agriculture. Essai d'analyse des tâches de l'agronome. *Cahiers de l'ORSTOM*, 24, 3-25.
- UNESCO. 2005. *A human, socio-economic, cultural and environmental dynamic: Planète Terroirs*.
- Weber, M. 1978. *Economy and society: an outline of interpretive sociology*. Berkeley: University of California Press.

► To go further:

- Cooper, D.E., ed. 1999. *Epistemology: the classic readings*. Oxford, UK ; Malden, Mass: Blackwell Publishers.
- Corbin, J.M. and A.L. Strauss. 2008. *Basics of qualitative research: techniques and procedures for developing grounded theory*. 3rd ed. Los Angeles, Calif: Sage Publications, Inc.
- Creswell, J.W. 2013. *Qualitative inquiry and research design: choosing among five approaches*. 3rd ed. Los Angeles: SAGE Publications.

Denzin, N.K. and Y.S. Lincoln, eds. 2005. *The SAGE handbook of qualitative research*. 3rd ed. Thousand Oaks: Sage Publications.

Dillon, M. 2010. *Introduction to sociological theory: theorists, concepts, and their applicability to the twenty-first century*. Chichester, U.K. ; Malden, MA: Wiley-Blackwell.

Glaser, B.G. and A.L. Strauss. 2012. *The discovery of grounded theory: strategies for qualitative research*. New Brunswick, N.J.: Aldine Transaction.

Olivier de Sardan, J.-P. 2008. *La rigueur du qualitatif: les contraintes empiriques de l'interprétation socio-anthropologique*. Louvain-La-Neuve: Academia-Bruylant.

Patton, M.Q. 1987. *How to use qualitative methods in evaluation*. Newbury Park, Calif: Sage Publications.

Solomonoff, R.J. 1964. A Formal Theory of Inductive Inference, Part 1. *Information and control*, 7(1), 1-22.

Thomas, D.R. 2006. A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation*, 27(2), 237-46.

Journals to consult:

<http://apad.revues.org>

<http://www.recherche-qualitative.qc.ca>

<http://www.qualitative-research.net/index.php/fqs/index>