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Triangulation

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Triangulation is classically defined as looking at one research object from different perspectives. However, this large and consensual definition masks different approaches to triangulation and ignores its historical evolution since its emergence in social sciences literature. In order to gain a better insight into its current definitions, we will first propose a brief historical overview and highlight its different meanings. Then, we will illustrate how triangulation can be used in a research design in order to gain *extra-knowledge*. Finally, we will talk about **MIXED METHODS RESEARCH** and its relationship with triangulation.

A brief historical overview

In 1959, Campbell and Fiske proposed a multitrait-multimethod matrix in order to enhance the validity of the measurement of traits (e.g. personality traits). The basic idea was to increase the validity of a measurement by using different methods and by measuring different traits simultaneously. Webb *et al.* (1966) labelled this new technique *triangulation*, in reference to the navigation and military term describing the practice of locating the exact position of an object on the basis of two known points. Denzin (1978) introduced the concept in the discussion on qualitative research and further developed the concept. He distinguishes different kinds of triangulation: triangulation of data (comparing data at different times, in different spaces or for different persons), triangulation of researchers (in order to correct the **BIAS** from the individual), triangulation of theoretical perspectives (approaching a phenomenon with different theoretical points of view) and triangulation of methods. This latter strategy was defined as a process of playing “each method off against the other so as to maximize the validity of field effort” (Denzin, 1978: 304).

Also, triangulation, in its first meaning, echoed some of the main concerns about data validity (see **EPISTEMOLOGY**). However, in the context of qualitative research, the ongoing debate on validity issues highlighted that this question cannot be treated as in quantitative methods. Indeed, most criteria commonly adopted in quantitative methodology (e.g.: **REPLICATION**, standardisation, representative **SAMPLING**) are not relevant and other strategies should be pursued (Barbour, 2001). Triangulation, defined by Denzin (1978) supposes that there is *one* reality which can be analysed more *objectively* with multiple methods: if data obtained with different methods are similar they are right. Thus, this definition ignores some of the main principles of qualitative research: e.g. different actors have different context-dependent points of view and each method constitutes the subject under study in a specific way. Also, some authors heavily criticized Denzin’s definition and proposed that triangulation aims for broader

and deeper understanding of what is studied. In this perspective, each method is considered to shed light on a specific aspect of the phenomenon under study (Flick, 2017). Different metaphors were proposed to illustrate this perspective, such as for example:

"I propose that the central imaginary for validity for postmodernist texts is not the triangle – a rigid, fixed, two-dimensional object. Rather, the central imaginary is the crystal, which combines symmetry and substances, transmutations, multidimensionalities, and angles of approach .../... What we see depends upon our angle of repose." (Richardson 2000: 934)

Moreover, a rather pragmatic combination of methods developed too: i.e. different **RESEARCH QUESTIONS** call for different methods and each method answers a specific question.

Flick (2018) introduced a distinction between a weak program of triangulation (used as a criterion of validity, pursuing convergence between results, or as a pragmatic combination of methods) and a strong program of triangulation (or triangulation 3.0). The latter refers to the idea that triangulation is used as a source of extra-knowledge, i. e. different methods can provide convergent but also contradictory and complementary results. In a weak program of triangulation, contradictory results are considered doubtful and not valid; they are explained by referring to **BIAS** in the method. On the contrary, in a strong program of triangulation, the researcher plans the design of the study by referring to the theoretical frames of each method in order to understand, at a later stage of the study, why some results are contradictory and/or complementary. Thus a strong program of triangulation extends the research program in a *comprehensive* manner: the results' combination will hence allow for a deeper understanding of the phenomenon under study. Also, the aim should not be to confirm results from one method by comparing them to results from another. Rather, the aim is to include complementary and/or contradictory results.

Illustrations

Discussing the use of **FOCUS GROUPS** in a strong program of triangulation, we proposed two illustrations of this approach. The study (Caillaud & Flick, 2017) is about social representations of climate change and ecological practices in France and in Germany. The methodological design of the study includes focus groups, and episodic (or semi-structured) **INTERVIEWS**. Adopting a strong program of triangulation, we consider that interviews focus on the reconstruction of subjective knowledge whereas focus groups refer to social interactions underpinning the social construction of representations. Interestingly, results obtained from focus groups and from interviews sometimes complement or even contradict each other. Indeed, many German and French interviewees in individual interviews acknowledge their poor understanding of climate change. In France, participants in focus groups do the same. However, in focus groups, German participants present themselves as knowing about climate change. This discourse contradicts the statements from interviews. In a weak program of triangulation, the researcher will not be able to determine what the objective truth is: do they know or not about climate change?

However, as strong triangulation suggests, each method reveals different facets of the same phenomenon: subjective meaning and social construction of reality. Also, it becomes possible to give meaning to the apparent contradicting results: in Germany, climate change is a theme you have to know and speak about, even if you are not able to precisely explain the causes and consequences of climate change. In France, on the contrary, it is socially accepted to not know about climate change, it is something scientific experts know about, not citizens. Thus, the apparent contradiction between methods enables us to outline the normative dimensions of climate change in Germany (you have to talk about it in society) and its categorization as a scientific object in France. It provides a deeper understanding of the results (even in France, where results converge).

Concerning ecological practices and the way participants cope with the paradox that ecological practices are not effective if not all people act the same way (see also Caillaud & Flick, 2013), results from interviews and **FOCUS GROUPS** are complementary (and not in contradiction). Indeed, when talking about their ecological practices during interviews French and Germans refer to past habits in order to justify their daily practices (e.g. recycling household waste like in the past, in their family, organic waste was fed to chickens). During focus groups, the discussion about ecological practices and their effectiveness are anchored in a projection into a better future for humanity. Interpreting these different results by linking them to the theoretical perspectives of each method (social interactions and reconstruction of subjective knowledge), we obtain a deeper understanding of the meaning of ecological practices. Facing the paradox that ecological practices are only effective if everybody acts the same way, participants give different meanings to their habits by referring to the past during interviews (a method in which subjective knowledge is reconstructed) and by referring to the ideal future when group support is present.

The second illustration refers to a study about sleeping disorders and their management in long-term care facilities (Flick, et al, 2012). The authors wanted to understand the prevalence of sleep disorders in the institutions, the different proposed treatments (drugs, other), and the related health consequences for residents. At the same time, the study seeks to understand the professional (physicians' and nurses') constructions of managing sleep disorders (awareness of the problem, their motivation to act, their attitudes toward treatment of sleeping problems and toward medication) and the residents' representation of their own disturbed sleep and the treatment received. Also, this study proposed a triangulation design starting from a quantitative epidemiological approach (health indicators from 7,505 nursing homes residents and longitudinal data from 1,375 residents), a qualitative comprehensive approach (episodic interviews with physicians (N=20), nurses (N=32) and residents (N=30)). Finally, the routine practice (amount of drugs supplied, duration, etc.) was analysed on the basis of prescription data (N=2,109). The epidemiological data show the high relevance of sleeping disorders and help contextualise the qualitative results. The interviews outlined the ambivalence toward medication of sleeping disorders for all actors. More specifically, for physicians and nurses the use of hypnotics may be seen acceptable if there is medical indication; but residents' attitudes both varied from a strict rejection to seeing medication as indispensable for their own sleep. The interviews did not reveal treatment practices which became apparent through the quantitative

analysis of prescriptions: only 16,7% of the sample received hypnotic drugs at least once in the year, and only 1% of the residents were exposed to the risk of addiction. Thus, in light of the quantitative analysis of prescriptions, the ambivalence outlined in interviews on all sides indicates that decisions for or against medication is dealt with a case-by-case analysis resulting in low prescriptions. Finally, the assessment data provide evidence that other forms of treatment are applied (e.g. activation during in the day in order to reduce daily somnolence). Also, the triangulation of different methods complement each other and allow for a deeper understanding of the phenomenon under study.

Triangulation and/or mixed methods

Triangulation is often evoked in the context of **MIXED METHODS RESEARCH** (MMR) as well. In fact, in the context of the tensions opposing qualitative and quantitative research, triangulation (defined as corroboration through multiple methods) is used by MMR to justify that qualitative AND quantitative methods should systematically be articulated. Thus, contrary to triangulation, the use of multiple qualitative methods is not evoked, and mixing is always considered between quantitative and qualitative. MMR focuses on technical issues in order to bring the qualitative and quantitative together to the detriment of conceptual and epistemological issues. Thus, if the reference to Denzin (1978) is a common point of departure for triangulation and MMR, the latter calls for eliminating it from their terminology and ignores the changes the concept of triangulation has undergone (Fetters & Molina-Azorin, 2017). Behind the quarrel over the concept, Flick (2017) identifies a number of limits encountered by MMR and highlights that triangulation allows for the simultaneous use of qualitative and quantitative methods without, as in MMR, considering it as necessary.

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