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Methods Training and Formation in Sociology

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Contents

Editorial – Methods Training and Formation in Sociology

Mathilde Bourrier (University of Geneva), Rainer Diaz-Bone (University of Lucerne),
and Ben Jann (University of Bern)

Introduction

Methodological knowledge, competencies, and practical skills are key in sociological expertise and qualification. Therefore, empirical research methods are an important element in the training and formation of students in BA and MA as well as in PhD programs in sociology. Methodological competencies and standards are an established criterion for the evaluation of job applicants, research projects and publications in the social sciences.

Several foregoing bulletins have dealt with topics related to scientific standards, methodological programs and scientific self-reflection. Examples are the issues on the Bologna reform (no. 130, 2006), on ethics in sociology (no. 132, 2007), on master programs in sociology (no. 134, 2008), and on evaluation of sociology as a discipline (no. 148–149, 2015).[1] This bulletin continues these reflections on the state of the art of the discipline and the need for scientific standards in sociology, now targeting the theme of methods training and formation.[2]

Methods training matters

As such, methodological proficiency is one of the most important elements of sociological qualification when it comes to successful labor market participation or effective performance in academic research projects. Moreover, a sound knowledge of diverse methods is a prerequisite for sociologists to be able to participate in the discourses of the discipline but also of other social sciences.[3] One reason for that is that sociology, as a discipline, is so diverse, embracing so many different paradigms, theories and research questions, that, over the years, methods have become a pragmatic "lowest common denominator" based on which a fruitful discourse can occur. Furthermore, being well trained in sociological methods, students can advance their methodological skills later on and become experts in more specialized methods and methodologies. It is important to be aware of the difference between methods training and theoretical understanding from a student's perspective: because, typically, theoretical reasoning in sociology is not highly technical, sociology students will soon be able to read and evaluate theoretical expositions by themselves (although see the contribution by Opp and Voss in this issue), but achieving proficiency in methods and methodologies is difficult without well structured and consecutive formal training. Due to its complexity, methods training is an all-embracing endeavor, including epistemology, project management, skills in handling tools of different sorts (e. g., software programs), competencies in sampling, measuring, data collection, data analysis and interpretation, awareness of ethical issues, competencies on how to relate theoretical concepts to practical research, a good sense for the relevance of one's research question and the impact of research results, an intuition of the future potential (and possible applications) of research programs, and so on.

Methods are located at the crossroads of the complex diversity of scientific practices and are characterized by their huge range of factual and potential applications. Therefore, King, Verba and Keohane claimed methods to be the fundamental core of science: "The content of 'science' is primarily the methods and rules, not the subject matter,

1 These bulletins can be downloaded as pdf from the website of the Swiss Sociological Association (SSA), see https://www.sgs-sss.ch/die-gesellschaft/bulletin/

2 Also see the manifesto for qualitative research methods the contributions in Bergman *et al.* (2010).

3 For the situation in Germany see the contributions in Engel (ed. 2002) and in Stockmann *et al.* (eds. 2002).

since we can use these methods to study virtually anything" (King *et al.* 1994, 9). All in all, methods training is the main road to bring students into the (different fields of the) discipline and to equip graduates with a suitable tool kit for their careers.

Yet, at the same time, one should not be tempted to understand sociology mainly as a science of methods or to reduce sociologists to great methodologists only. Even if graduates who experienced thorough methods training and acquired a well-developed methodological tool kit do fare well on the job market, it should not be forgotten that methods training and formation cannot be a substitute for investments into deepening and enriching our understanding of crucial sociological phenomena. A thorough knowledge of social processes and a good sense of sociological relevance is what distinguishes sociologists from the "data scientists" who enter the emerging market of data and methods from various other fields (see the contribution of Diaz-Bone). After all, methods are only a means to an end; relevant are the questions one tries to answer with them. One of the great strengths of sociologists is that they know how to ask the right questions. Therefore, although we plea for rigorous methods training in sociology programs, we also warn against mistaking methods as the main goal of sociological education. The main goal must be the study of social phenomena.

What is going on?

But what is the state of the art of methods training and what are possible future developments? The contributions in this bulletin address topics, problems, developments, and perspectives around the issue of methods training in sociology. They analyze, for example, the structure and content of sociological methods training in Switzerland and Germany (see the contributions of Hoffmeyer-Zlotnik *et al.* and Jann), discuss new social and methodological innovations (see the contribution of Riom *et al.*), present foundational methodological positions – as explanatory logic, reflexive sociological methodology, or mixed methods methodology (see the contributions of Eberle and Bergman) – and reflect on teaching and didactics in methods training (see Tribelhorn's contribution).

Written as position papers, these contributions introduce the reader in a concise, precise, and factual way on why and how it is important to leave our comfort zone when addressing issues of methods in order to propose a renewed and inspiring agenda for research methods in sociology. We hope that this thematic bulletin will reinforce arguments to foster, develop, and reflect on our current and future offers to our students. We believe that ongoing reflection about methodological training is an important building block for promoting high-quality social science research and advancing the professionalization of our discipline.

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Methodological Reflexivity

Thomas S. Eberle (University of St.Gallen)

An important task of the Swiss Sociological Association has been, since its inception in 1955, fostering debate among sociologists in Switzerland on education and research, and acting as a major player for social science policy issues. I am very glad that the editors of this bulletin continue this tradition and launch a discussion on methods training in sociology and even ponder which further action the SSA could possibly take.

As sociology is a multiparadigmatic discipline there don't exist any methodological standards that are not contested. A consensus among sociologists on adequate curriculums, programs and contents of methods training is therefore not easy to reach. Standards are usually defined within the premises of a certain theoretical approach, and agreed upon by those who share these premises. If there is a clear mainstream approach, as the neoclassical model in economics or the positivist model that is still prevailing in much of U. S. empirical social science, it is much easier to formulate methodological standards that must be adhered to. However, if the basic theoretical premises are questioned, the "standards" usually become questionable, too. Validity assessments that are accepted within a peer-group who shares the same approach may appear highly disputable on the grounds of different methodological premises.

This multiparadigmatic character of our discipline is, in my view, neither an impediment nor an obstruction, but a promising chance. It has broadened our theoretical and methodological awareness considerably and produced a variety of prolific empirical methods. Among the social sciences, sociology has always been the key discipline as regards inventing new empirical approaches and developing and refining empirical methods. This is a specific strength and competence of our discipline that constitutes a crucial part of a sociological curriculum.

Such a stance meets essentially two opponents: Those, on the one hand, who consider sociology as a "Geisteswissenschaft" that does not do or that even abhors empirical research. Such proponents proclaim sometimes that sociology consists of "pure" theory, while empirical research is something that only the universities of applied sciences should do. On the other hand, there are those who consider empirical methods as pure techniques that do not require any serious relation to theory. Such an empiricist position reduces methodological reflexivity to methodical considerations.

I am pleading here for *methodological reflexivity*. I am always a little uneasy with the notion of (methodological) "standards." A "standard" usually implies that it is set, operationalized and measurable. And standards are usually expressed by numbers. As soon as "quality assessments" are turned into "quality standards," we get confronted with a system of numbers that seduces people to restrict their considerations to numbers instead of reflecting about quality issues. Maybe I am particularly wary of "standards" as my area of expertise refers above all to qualitative research, and it seems rather inadequate to talk of "standards" in regard to qualitative methods. Methodological reflexivity is, in my view, a much more adequate and more thorough concept.

Methodological reflexivity is inevitably theory-bound. It requires an awareness of the theoretical premises with which an empirical research project operates. These premises consist of epistemological and ontological assumptions as well as value implications (which are often latent). In addition, methodological reflexivity extends to all the common-sense assumptions and practices that are used in empirical research without further reflec-

tion. Some of them were exemplarily uncovered by Aaron Cicourel in his book "Method and Measurement in Sociology," which appeared more than half a century ago (1964). Also nowadays, Cicourel's basic message is highly topical.

A methodology of the social sciences must not only cover the "logic of research," but also the constitution of the social world. When Rudolf Carnap published his book "The logical structure of the world" (1928), Alfred Schütz answered with his book "The meaningful ('sinnhafte') structure of the social world." Social scientists deal with a pre-interpreted world, quite opposite to natural scientists. The crucial aspect is that the social world is not just pre-interpreted by the social scientists, but above all by the actors who are investigated. Exploring social action requires dealing with the meaning-contexts in which they are embedded. In such a context causal or functional explanations have inevitably a different character than in natural sciences. It is therefore fundamentally misleading to perceive the methodology of natural sciences as a role model for the social sciences. Quite the contrary, sociological methodology has two pillars: the logic of research and the constitution of the social world. The latter is more fundamental, as the social world is pre-interpreted before any scientific investigation. Sense comes before logic, as Schutz said.

In his methodological considerations, Max Weber suggested to pair causal adequacy with sense adequacy ("Sinnadäquanz"). I contend that sense adequacy is the most crucial methodological criterion for sociology. All sociologists deal with a pre-interpreted world and have to come to terms with how actors make sense. In regard to this challenge there is no difference between quantitative and qualitative researchers. But they handle this issue differently as they have different research questions and methodical procedures. Quantitative researchers, on the one hand, are usually interested in distributions and disseminations, in representativeness and generalizability. I can easily understand that many of these researchers are caught by the fascination of sophisticated statistical procedures and mathematical formulas – I know this fascination by my own experience. However, in order to make calculations in regard to social phenomena they standardize meaning constructions and transform them into numbers. And this is the crucial point where we all share the same basic problem. To illustrate this a little bit: I obviously belong to a preferred target group of surveys and am often contacted by call centers, and as a researcher I usually answer the questions. Then there is always a number of questions that I can answer easily: gender, age, nationality, level of education, level of income, and the like. But most of the virtually "interesting" questions are not so clearly answerable and would require to put them into context: Depending on the social situation, I would feel, or do, or decide differently. The caller, however, is not interested in contextualizing the questions and further differentiation, but rather in simple answers on a scale of 1 and 4 (or 5). In the end, the game remains the same: The caller's only interest is that I can eagerly make decisions on each item on the given scale, the faster the better. Each time I end our little conversation with a smile and the usual portion of resignation: What the hell are they going to compute now? What will they pretend to have found out about me? For there is no possible "average" between different meaning-contexts, and if the sense adequacy of the data is weak, one can use the most sophisticated procedures of data processing, the quality of the results remains weak. Undoubtedly, there are good and bad surveys. Good surveys are surveys that reach a high level of sense adequacy, and this is our common concern. A good survey researcher therefore is primarily interested in good quality of the data, otherwise it is better to abstain from processing it.

Qualitative researchers, on the other hand, spend more time in dealing with interpretive and hermeneutic procedures. They are primarily interested in capturing how actors make sense

and prefer to explore a few cases in-depth. Distributions, representativeness and generalizability are no major concerns and inadequate criteria to evaluate them. Again, the crucial methodological postulate is sense adequacy, with which qualitative researchers struggle as well. The field of qualitative research is quite fragmented, the use of qualitative methods is embedded in a variety of different theoretical and methodological assumptions that change methodical procedures as well as interpretations and truth claims. When I was president of the SSA and member of the Social Science Policy Council of the Swiss Academy of Humanities and Social Sciences, I started an initiative to promote qualitative methods in Switzerland and was supported by many allies. We built a network of qualitative researchers in Switzerland and had two retreats together in order to find a consensus on quality criteria of qualitative research. The resulting "manifesto," which appealed to the Swiss National Foundation as well as Journal Editors to prevent qualitative research projects from being assessed by inadequate criteria, was signed by about 60 persons, most of them professors. Although we had no fierce ideological fights with each other as they are known from some of our colleagues in Germany, it proved very difficult to agree on common quality assessment criteria. Our list of "important features of qualitative research" is a minimal consensus; it is certainly useful for quality assessments, but far away from "standards" (see the list in Bergman *et al.* 2010, 11). Fact is that there is much bad qualitative research produced, with little methodical know-how and insufficient theoretical and methodological reflection, and our list allows to discredit it.

Our "manifesto" also points out how qualitative methods should be taught (pp. 12–14), which I won't repeat here. It is my fundamental conviction that students of sociology should be trained in both qualitative and quantitative methods. Sociology as a discipline needs both groups of methods, both are apt to answer relevant sociological research questions. Therefore a sociologist should be competent to comprehend empirical research results, quantitative and qualitative, and ask the right questions to assess them. The sciences produce more and more specialties and particularities and so the experts' expertise becomes ever narrower. Our methods training therefore should emphasize methodological reflexivity. Students should learn

- that an interesting question becomes only a research question by relating it to theory and methodology, and that they should ponder how the research question gets transformed by relating it to different theories and methodologies;
- which kind of data are relevant to answer the research question and which are adequate methods to gather them (including practicalities like field access etc.) and how sense adequacy is ensured;
- which theoretical framework and which concepts are useful to interpret the data and why, and how would alternative concepts and theoretical frames transform the results? (For advanced researchers: Can new concepts be generated?)

This is only grossly sketched out here. But I am convinced that students learn much more if they write a research paper in which they don't only present an empirical project, but where they reflect carefully on the different options they perceived and on each single decision in the research process and write all these reflections down. Such a *research reflection paper* is apt to increase the methodological sensitivity and reflexivity greatly, and this should be our main educational goal.

There are some obstacles to mention. A first is that we obviously deter many students by our methods courses that are separated from doing research. Many of my students associate "methods" with something boring and scaring. I tried to reverse this by arousing their interest in a specific subject matter that they were curious to explore. Given this motivation, they suddenly realized that they need to learn about methods in order to pursue their

research interest. We should foster curiosity into the social world, paired with intellectual curiosity, and teach methods within concrete research projects that are intriguing. A second obstacle is set by the Bologna requirement to end a methods course within one semester. Developing an elaborated methodological reflexivity requires time, it matures slowly and continually. If there is no continuation of methods courses, this is difficult to achieve. And within the common time pressure, it is difficult to pursue a research project within one semester only. A third obstacle is the increasing pressure to write much and fast, which lures young researchers into copying other research papers and filling them with different contents. "Standards" can be met easily by replicating some existing research piece that was already accepted; developing methodological reflexivity, in contrast, is a much more challenging endeavor. I still believe that universities are a location where not "skills" should be taught but rather reflexivity, for this paves the way to creativity and innovation.

Methodological reflexivity is the key competence for any empirical research, quantitative or qualitative. The basic methodological requirement for both groups of methods is sense adequacy. The current practice to propagate mixed methods, however, is in my view rather misleading. It seems as if it has become a quality criterion for funding institutions. It is certainly good to acknowledge both groups of methods as potentially prolific, but it is usually not clear how they are mixed (or even confused) and if the involved researchers are really competent in both quantitative and qualitative methods.

To come back to my first paragraph – what could the SSA do in regard to methods training courses? First, it could continue this debate, establish a forum on the website and invite reactions to this bulletin issue. Second, it could publish an official declaration of what methods training at universities should ideally consist of. A decade ago, for example, the German Sociological Association issued a paper on methods training in sociology and called for a mandatory training in both quantitative and qualitative methods. This declaration was used by many colleagues to request complementary methods courses from their universities in order to meet the GSA's requirements. Third, such a declaration could also contain statements on the adequate share of methods courses in the curriculum (how many ECTS) and maybe suggest follow-up courses. In addition, it could state clearly that methods are not just techniques but must always be linked to theory and methodology. – Of course, it won't be easy to reach a consensus within the SSA on these issues. Furthermore, the SSA has not the same professional prestige as the GSA. And last, the universities adopt increasingly a competitive approach in designing their curriculums. But nevertheless – let's try!

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Positioning Methods

Rainer Diaz-Bone (University of Lucerne)

Methods as the professional core

A plurality of social sciences deal with different aspects of society, as economics, law, political science, pedagogy or sociology. Sociology as a discipline was established more than hundred years ago not because of its own scientific object, but because of its genuine methodological foundation, which has been multi-paradigmatic from its start. At the end of the 19th, beginning of the 20th century the founders of this new discipline offered different perspectives to implement this methodological foundation, all these perspectives are still present in contemporary sociology. In 1895, the French sociologist Emile Durkheim worked out sociology's specific position in the field of scientific disciplines by identifying its own methodological strategies to access social institutions (Durkheim 1982). Durkheim claimed for a comparative and anti-reductionist methodology, regarding social entities as realities sui generis and explaining social phenomena by (foregoing) social processes. At the same time in Germany, Max Weber continued the neo-kantian tradition by developing the methodological principles for the analysis of subjective meaning ("Sinn") and interpretation ("Verstehen"). Weber centered his definition of sociology by its task to explain and understand meaningful action (Weber 1978). In the USA Franklin H. Giddings at Columbia University in New York was one of the first to develop a quantitative and formalistic approach to the analysis of social structure (Giddings 1901). At the University of Chicago pragmatist sociologists worked out a socio-ecological and interactionist methodology for the study of cities and social groups (Bulmer 1984). In the second part of the 20th century step by step departments of sociology were institutionalized in university departments. The sociology programs were always built up with research methods and research skills as core content. And it is to emphasize that qantitative methods (standardized methods and statistics) were dominant for some decades (Lazarsfeld and Rosenberg eds. 1955). Soon, from the 1970ies on, qualitative methods experienced a revival and were re-established in the methods training.

Today, there is no other social science like sociology offering such a method-centered self-identity and offering such a huge variety of different methods – in the sense of techniques – and methodologies – in the sense of research strategies and designs (Diaz-Bone and Weischer eds. 2015). BA-, MA- and PhD-programs in sociology always include an obligatory set of methods courses. Methodological training (in quantitative and qualitative methods) is regularly regarded as being a substantial element in evaluations of programs. Methods competencies are regarded as the core professional competence of sociologists. Pierre Bourdieu has developed a modern sociological standpoint about a contemporary professional sociologists' habitus, which is based on methodological and epistemological reflexivity – not on theoretical positions (Bourdieu and Wacquant 1992). Methodological issues are of main concern in peer reviewing for journals, in the recruitement of academic staff and for the labor market in general. Professional practice of sociologists outside the academia is "methods-driven" in many fields as for example in market research, media analysis, program evaluation, official statistics, and (to a lesser extent) counselling services, organizational development or human resource management. Professional associations (as ASMS/VSMS, the Swiss association of market and social researchers) or social research infrastructures (as FORS, the Swiss social research infrastructure organization) offer also methodological training and services, for some years now events like summer schools for

methods (or the so-called methods festival). These trainings, services and events indicate the growing need for advanced methods training.

Although there has never been a "methods canon" in the strict sense of the word, there has been for some decade a kind of "loose consensus" about the main contents of the first semesters' methods training in sociology. Inspecting established methodology and statistic textbooks offers an impression of conventional contents of the first methods courses, starting with elements of philosophy of science, quantitative and qualitative research designs, standardized and non-standardized methods of data collection, and basics in inferential and multivariate statistics (especially correlation and regression techniques). These contents are normally accomplished by training courses of statistics software and by students' empirical research projects in research seminars. The amount of more specialized and advanced courses depends on the number and specialization of academic staff at departments of sociology. In this regards, there is a big diversity of sociology programs at different universities – especially concerning the offer in more advanced statistical methods or in qualitative methodologies. In fact, it is difficult to identify the effective teaching content at universities by analyzing course descriptions.

Challenges and problems

But the situation is changing. Changes in the structure of study programs, methodological innovations and societal change bring in new dynamics.
(1) The Bologna reform has opened the space for an increasing amount of specialized study programs, which focus on specific sociological topics, but some of these BA programs do not adequately train research methods while some of these MA programs do not continue the methods education (and expect students to bring in a complete BA methods training). The fit of consecutive study programs step by step and the idea of an existing "loose consensus" erode.
(2) Continuous technological change ("computerization") and methodological innovation have resulted in a series of new methodological practices, new data formats and advanced methods as new statistical techniques (e. g. Williams and Vogt eds. 2011). The number of specialized scientific journals devoted to social research methods is rising. Nowadays, it is impossible to keep up with all the innovations in a more and more diversified field of social research methods. In parallel, the development of methodological pluralism and different methodological cultures leads to new cleavages. So, it is not only the former simple cleavage of "quantitative versus qualitative social research"; instead, statistical methodologies internally split up as well as different qualitative research cultures have emerged. New analytical tools as new software for (qualitative and/or quantitative) data analysis, for text, audio, and video analysis, and devices for recording (and transscripting) these media formats are developed in a separate small industry in which companies steadily release new versions of these tools. Open access and open source software tools – as the statistical platform R – are countervailing the commercialization of research devices. However, all in all methodological and technical sophistication have induced a gap between the traditional methods training and the actual standards in social research.
(3) Maybe the most important change is the emergence and growth of the Internet and the collection and analysis of huge amounts of digital data labelled with the buzz word "big data" (Mayer-Schönberger and Cukier 2013). More and more "data scientists" in mostly private companies analyze these data and try to identify behavioral patterns which can be exploited for commercial usages. This way, not only data masses, but also new research methods and methodological expertise are gathered outside the universities and the established public research infrastructures. Algorithms and big computer capacities are applied to classify customers, generate simulations and score individuals.

Most of these activities are invisible for the public but also for sociologists. In the context of this phenomenon, some British sociologists have discussed the so-called "coming crises of empirical sociology" thereby questioning the relevance and the formerly leading position of methods as random sampling and surveys (Savage and Burrows 2007, 2009; Gane 2011). Former areas of sociological expertise as network analysis became a domain for natural scientists also, and network analysis transformed into an interdisciplinary field in which sociologists are in danger to be marginalized because of its increasing mathematical sophistication. The big data phenomenon, privatization of new analytical strategies and the "intrusion" of other disciplines in former sociological domains bring in dynamics into "chaos of disciplines" (Abbott 2001) and into the system of (academic) professions (Abbott 1988), in which sociology – as mentioned above – has had a privileged position because of its methodological expertise. Sociology as discipline risks to lose this position and the response has to be developed in the field of methods development, methods competence and methods training.

(4) A longtime impact of social research is its establishment as a generator of appreciated societal knowledge, for example in official statistics and some other forms of international and national administrative reporting. People take it for granted that sociology delivers scientific knowledge as societal self-representation. But people also became more reluctant to participate in surveys and the public opinion deliberates the validity and the purposes of social sciences research. Ironically, this is also a result of the success of the social sciences in delivering conceptual "blueprints" to the public, how to evaluate and criticize the social. Individuals realize the political power of scientific research as a dispositive for governance and they counter-react in different ways. To refuse surveys is only one form; another one is the questioning of the validity of statistics, also of statistics as such and to resist its societal usages and social impact (Desrosières 2015). On the other side, politics and enterprises rely more and more on engineering and economics and less on empirical sociological expertise. The societal acceptance of sociological research has declined in many areas, because its practical relevance is questioned. The question is here, how to train sociologists so that they can cope with this skepticism and are able to engage for the relevance of empirical research?

Perspectives and propositions

(1) Facing the blurring of disciplinary borders and the dynamics in the field of methods, considerations are needed about minimal requirements and optional focuses in BA methods courses as well as about needed methods competencies for beginners in MA programs and different methodological specializations in MA programs. Professional boards and organizations (as the Swiss Sociological Association, SSA) should develop recommendations for volume and structure of methods training. These recommendations should not be conceived as a fixed and too detailed "canon" but as a more general frame for basic standards and optional profiles.

(2) Actually, there is no methods section in the SSA which could process the evaluation of methodological trends and innovations or work out standpoints to methodological problems. A good example is the "task force" of the American Association of Public Opinion Research, which works out reports as "Big data in survey research" (Japec *et al.* 2015). Collaboration with specialists in social research infrastructures (as FORS) is useful not only for this purpose.

(3) Students should be trained in topics and methods of applied social research as (program) evaluation, quasi-experimental designs, mixed method designs and practices for social research with new technologies. Courses are needed which introduce methods and strategies that reflect new data forms generated by new technologies (e. g. geocoded data, mobility data etc.) as correspondence analysis, network analysis, exploratory data analysis. It is

evident that sociologists will need more skills in handling more flexible data analysis programs as R which can be applied not only to rectangular files (cases in rows and variable in columns) but can be used also for different purposes (as web scraping). Also important are skills of handling complex qualitative data analysis software (as ATLAS/ti) which integrates the analysis of different media formats and has interfaces to quantitative analysis.
(4) Methods training especially for MA-students should be organized in a more realistic way. Research seminars are one possibility. MA-students could also participate in scientific research projects which are hosted at universities. But sociologists at universities should also cooperate for research projects with NGOs, social movements, ministries, public administrations, private companies and include students in these inter-organizational and inter-disciplinary projects, where they have to face practical problems of knowledge production, handling different technologies, and cooperating with a variety of professions and coping with a higher level of labor division. And here students realize the relevance of social research, experience ethical and normative problems of applied research and they have to reconcile (and not to abandon) a scientific habitus with these practical aspects.
(5) Finally, there is a need for a more elaborated and updated "sociology of social research" (which Paul Lazarsfeld initiated) studying ongoing methodological innovations, new forms of research organization, the empirical research cultures (with their biases and problems), labor markets for social researchers etc. (Leahey 2008).

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Mixed Methods Research and Designs

Manfred Max Bergman (University of Basel)

Scope

In its most fundamental form, mixed methods research is contrasted with mono-method research, and it refers to a specific research design, which includes at least one qualitative and at least one quantitative component. Although often used interchangeably with methods triangulation, for reasons outlined later, I would advise against this. Mixed model research ostensibly refers to a research design, which goes beyond mixed methods research in that it combines qualitative and quantitative approaches throughout the research process. This, too, is problematic, and for the same reasons. Combining two or more qualitative components, or combining two or more quantitative components, in one research design is referred to as a qualitative or quantitative multimethod research design, respectively. Multi-mode refers to a specific sampling and data collection design, unrelated to the main aims of mixed methods research. A number of scholars have expressed a dislike for the term "mixed" in mixed methods – I remember that Alan Bryman has railed for years, correctly, that no methods are actually mixed in the mixed methods research process. Some have proposed to refer to this design as blending methods or a patchwork methods design. While not happy with the current nomenclature, I am not sure if these alternatives represent improvements. And even Alan works well with it these days (e. g. Bryman 2016).

Evolution

A more detailed overview of the origins and development of mixed methods research can be found in Tashakkori and Teddlie (1998). Although mixed methods research has been around for nearly as long as modern social science – about one hundred years, typologies and nomenclature have been formalized from the 1990s. At the risk of omitting others, the main instigators of this second generation of mixed methods scholarship are Julia Brannen, Alan Bryman, John Creswell, Abbas Tashakkori, and Charles Teddlie. Before declaring mixed methods a fool's errand, Norman Denzin wrote excellent and important texts on triangulation in the 1970s, and should therefore also be mentioned, if not as a representative of a generation of scholars that prepared the field for the formalization stage of this research design. Formalization and popularity brought with them a rigidity and overconfidence, which, in my opinion, have obstructed necessary development (Bergman 2008, 2010a, 2011). While some mixed methods scholars predict dominance of mixed methods over mono-methods in the future, I do not share this optimism. Instead, much meta-theoretical, conceptual, and componential clean-up work is necessary to strengthen the basis and justification for this design. This will be the task of a third generation, which, although closely tied to the second, will evolve research designs beyond their ideological and systemic trappings.

Justification

Many reasons for this design have been listed elsewhere (Tashakkori and Teddlie 1998, 2010; Creswell 2013). Five are sketched here: (1) augmentation: an additional perspective enriches the research results; (2) pluralism: mixed methods research improves on mono-methods research because the former takes advantage of the strengths and controls for the weaknesses of each individual method; (3) holism: by controlling for the biases that each method inherently holds, we obtain complete and objective research results; (4) convergence: both methods cross-validate each other in that the qualitative results confirm the findings from the quantitative results and vice versa. Incidentally, this is where triangulation as a metaphor is most

adequately placed – the identification of a "correct" location, the unbiased results, based on two reference points – the qualitative and the quantitative; (5) complementarity: the results of one component enrich interpretation based on the findings from the other component. With the exception of complementarity, all other positions are problematic, which is not necessarily due to the mixed methods design in itself but due to the way in which qualitative and quantitative methods have been conceptualized since the 1980s, which today govern the basic assumptions behind qualitative and quanitative methods and, thus, assumptions and justifications of mixed methods design. This is the problem I alluded to at the beginning of this text.

Assumptions

Since the 1980s, most mainstream social science methods books adopt at least some of the following assumptions about qualitative research methods:

- A belief in a constructed (or co-constructed) reality, multiple (or multiply-constructed) realities, or a nonexistent reality;
- An interdependence between the knower and the known, i. e. the impossibility to separate the researcher from the research subject;
- The inadvertent value-ladenness of the research process and its output, i. e. the impossibility to conduct research and interpret research findings independently of personal, social, cultural, historical, political, etc. values;
- The centrality of the context to the research process and findings, e. g. time-space, politics, specific situation during data production, interpretation, presentation, etc.;
- The impossibility to generalize research findings beyond the limits of the immediate context;
- The impossibility to distinguish between causes and effects;
- The insistence of all qualitative research being fundamentally inductive and exploratory;
- The smallness and non-representativity of samples;
- The belief that research in this vein is or should be non-reductionistic, i. e. the belief in the ability to describe or explain in its entirety the complexity of the phenomena under investigation.

In an unhelpful "opposition" to the above, qualities attributed to quantitative research include:

- A belief in a single reality and the ability to access it through the research process;
- The possibility and necessity of separating the knower from the known;
- The possibility and necessity of value-free research;
- The possibility to generalize findings beyond the contextual limits of the researched units and research situation;
- The pursuit of identifying universal, causal laws;
- The necessity to work with large, so-called representative samples;
- A problematic belief that (all) quantitative research is deductive research via falsifiable hypotheses and formal hypothesis testing.

If we were to take these propositions seriously, we would have to concede that qualitative research would be pointless in its self-indulgence and inability to make contributions beyond researchers' thought and experiential horizons, while quantitative research would be utterly impossible because it is impossible to ever measure the distance between a human-generated coefficient and a reality for which it stands outside of human processing. And if only some of these assumptions were really true, then mixed methods research would not be possible as these lists are incommensurable (an argument that is often used by mono-method researchers, despite the fact that mixed methods research has been quite productive for a long time, and its popularity is increasing, albeit sometimes for the wrong reasons).

Of course, active researchers do not subscribe to these positions when they conduct substantive research (even though they may hold them briefly when they lecture on methods). It is precisely because of this – the usefulness of qualitative, quanti-

tative, as well as theoretical and mixed methods research – that puts into question the fundamentals, based on which research methods, including mixed methods research, are positioned. It could be argued that a clean-up in mixed methods assumptions as argued above will help clean up the unwarranted assumptions in mono-method research as well.

Limitations

Mixed methods research will not replace mono-method research because of many excellent reasons, including cost, focus, skill sets, and disciplinary boundaries. Furthermore, mixed methods research will not pacify the paradigm war between qualitative and quantitative proponents, primarily because of the misapplication of the paradigm concept and because the stances of both tribes, if taken seriously, are incommensurable.

Another major limitation in current mixed methods research is the separation of the qualitative and quantitative components with its implicit assumption that this design allows more objectivity and, with this, the prioritization of the quantitative component (cf. Bergman, 2010b). Based on the institutionalization of contemporary reward and punishment structures in the social sciences, mixed methods research (as well as multidisciplinary or transdisciplinary methods) will continue to have difficulties in matters relating to funding, evaluation, execution, and publishing.

Many mixed methods project are the result of an overambitious and unfocussed research problem, which often leads less experienced researchers to collect multiple data sets, and which, when analyzed, yield multiple quasi-results. Popularity of this design may lead some to incorrectly label this effort a mixed methods research project. The inadvertent complexity of a mixed methods research design makes it difficult to present and publish in appropriate detail, which, apart from the considerable skills necessary to do justice to each component, will usually lead to piecemeal publications, incomplete and superficial narratives in order to meet word limits of journals and book chapters, or relegation to project reports and lengthy online papers.

Outlook

Mixed methods research potentially offers exciting and innovative approaches to conduct social science, particularly if it is focused on substantive specifics of a research issue, rather than based on ideology, pragmatism, or simplistic and incorrect mantras (e. g. quantitative research = positivism; qualitative research = constructivism; mixed methods research = pragmatism). It will continue to prosper because it is well-equipped to deal with three other major trends in the social sciences: multidisciplinary (and its cross- and interdisciplinary cousins), transdisciplinarity, and policy-relevance. The necessity and increasing pressure to contribute to research arenas such as sustainability will require the intensive collaboration of researchers not only from different disciplines but also with different research skills. When theorists start addressing their own shortcomings by reflecting on some of their untenable assumptions, as well as by observing some of the excellent practices of researchers who are applying methods in creative ways, and as soon as qualitative and quantitative researchers free themselves from straightjackets that have been placed on social science methods thinking , especially since the 1980s, we will make magnificent advances in what can be researched and how the social science can contribute to a world no longer framed or frameable by the socioeconomic and politico-cultural understandings of the consequences of European industrialization. I am talking less of a dawn of mixed methods but of a renaissance of the social sciences, global or local, for which mixed methods can be an excellent research tool and lens.

Teaching mixed methods

Often, there is a mismatch between what attracts masters' or doctoral students to mixed methods research and what students the mixed methods

instructor would like to have in the course. Ideally, I would like to work with course participants who have a good grounding in qualitative and quantitative research methods in order to focus on teaching how to understand and apply various mixed methods designs. However, most of my students, even in specialized doctoral schools, can be divided into four groups: theoreticians who are interested in debates on the philosophy of science or sociology of knowledge (of course, there is much to debate in this regard as well); statisticians who have become interested in or are compelled by their (non-statistician) supervisor to attend a qualitative or at least mixed-methods course; qualitative researchers in a similar position; and participants without any methods background, often carried by hope that they can acquire qualitative and quantitative research skills by attending a single mixed methods course. Substantively, most participants who want to apply mixed methods designs to their masters' or doctoral dissertation tend to have an unfocussed and overambitious research question, often a result of a wonderful ambitiousness that should not be reigned in too quickly, as well as of supervisors who are less familiar with applying research methods. Instead of imposing a narrower focus, less experienced researchers hope to maintain their ambitions by engaging in mixed methods research (often in combination with multidisciplinary and multi-site research designs). However, mixed methods research performs much better on narrowly focused research questions.

In my experience, the most successful way to teach mixed methods is to start with a basic introduction of, and critical reflection on, the problematic assumptions around qualitative and quantitative methods. I will then have to decide, depending on the strengths and interests of the attendees, to teach mixed methods from a qualitative or quantitative perspective, which means that, depending on the skills of the participants, I will explain the material from their perspective and strengths. For example, most participants in a mixed methods course, for many understandable reasons, tend to be more qualitatively "oriented." Based on their skills and interests, I will present multiple ways in which qualitative researchers can collaborate with quantitative researchers to contribute to a mixed methods project, from conceptualization to analysis and interpretation of results. Although the theoretical lectures at the beginning of the course draw much interest and discussion, it is the focus on substantive research components, steps, and connections, where mixed methods as a method and research design come alive.

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Methods of Theory Construction in Empirical Research

Karl-Dieter Opp (University of Leipzig) and Thomas Voss (University of Leipzig)

Training in the methods of empirical social research should enable students to collect valid data for descriptive purposes but also to test theoretical propositions. Where do these hypotheses come from? Often, these empirical hypotheses are generated in an ad hoc manner from general theoretical orientations. This is unsatisfactory because it is not clear whether the propositions in fact can be deduced or are at least logically consistent with certain explanatory theories. We suggest methods of constructing social theory (cf. Stinchcombe 1968) to be included into courses on methods of social research – at least at the graduate level training. These methods come from two sources. First, explanatory sociology and related approaches in sociological theory (such as so-called "analytical sociology") draw on work from general philosophy of science. *Philosophy of science* contains a set of methodological rules which are useful to explicate theoretical concepts and to evaluate competing theories. Secondly, many sociological explanations require that testable propositions about empirical phenomena are deduced from general theories. This may be particularly important in cases where theoretical transitions between micro- and macro- levels are important. *Mathematical sociology* as pioneered by Coleman (1964) and others aims at what has been termed "synthetic theory" building. This means, mathematical concepts and models are used to represent basic theoretical propositions about individual behavior and interactions among individuals in order to deduce empirically testable hypotheses about phenomena on the "system" or macro level. There are also methods (such as *agent-based modeling* and *simulation*) which provide appropriate tools to derive consequences from theoretical propositions in cases where analytical solutions (via mathematical models) are not available. We suggest to integrate certain elements from these fields (philosophy of science; mathematical sociology; and simulation methods) into curricula of methods classes of the undergraduate and graduate level.

1 Philosophy of science

In this section we discuss themes of the philosophy of the social sciences that are most relevant for training in methods classes. These themes refer to theory construction in the widest sense. This is the theme of a recent textbook by one of the authors of this article (Opp 2014, with further references). We proceed by selecting and discussing topics from this book that seem most relevant for being addressed in methods training. There is no other textbook that addresses all these issue in greater detail.

a) Logical structure of hypotheses and theories

A first step in empirical research is to specify the propositions that are to be tested. These should be clear and scientifically fruitful. Therefore, students should know the basic structure of statements, should be familiar with the concepts of law and theory, and know the difference between descriptive and theoretical statements. It is further of utmost importance to know what is denoted by a tautology or circular statement. Finally, the students should learn to depict complex theoretical statements as causal diagrams.

b) Explanation

Many empirical studies aim at testing theories in the sense of general statements with no reference to times and places. These general statements are applied to explain specific (i. e. singular) phenomena. These are the explananda. The initial conditions are the causes addressed in the theories. The logic of explanation should be clear in order to avoid studies in which factors are selected ad hoc and unrelated to theoretical propositions.

c) Concept formation

Statements to be tested in empirical research consist of concepts (such as income or deviant behavior). In a first step these concepts are operationalized, i. e. items for measuring the concepts (such as interview questions) are formulated. The starting points are often some vague nominal definitions in hypotheses. The researcher should be aware of the relationships between nominal and operational definitions. Often different nominal definitions exist and different operational definitions are possible. The researcher should have learned some guidelines advising him or her to select the most fruitful definitions. A particular important skill should be to distinguish between a concept (or a definition) and a hypothesis.

d) Logic of theory construction

Theoretical statements that are tested are often not independent of other statements. The researcher should be informed about possible relationships between statements. This implies knowledge about deductive and contradictory relationships and logical independence. There should further be some basic knowledge on how to derive statements from other statements. These issues are further addressed in the second part of this essay.

e) Testing theoretical propositions

The empirical test of propositions raises several important questions. One is to what extent the findings are in line with the propositions that are tested. What could "in line" mean? Students should learn that no empirical proposition can be verified (i. e. proven as true). Theoretical statements refer to an infinite number of objects that cannot be investigated. Descriptive statements may be false as well for different reasons. If the results are in line with the proposition this can be regarded only as a confirmation, for the time being. Falsification is nonetheless possible in future research.

It is still widely believed that there can be an induction from the data to the theory. It should be learned that there is no possibility of inductive reasoning (in a strict logical sense): no general statement can be inferred from a singular statement (referring to certain times and places). For example, if we find that in Germany women have a lower crime rate than men, it cannot be inferred that in general women commit fewer crimes than men. "Induction" often means that a person is inspired by findings to generate general hypotheses. But this has nothing to do with a logical inference, it is rather a psychological process, and there is no guarantee that the "inspiration" yields a true hypothesis.

Students in methods classes should also know something about the severity of tests. The question here is: how likely is it that a hypothesis can be falsified, given a certain test procedure? For example, a survey is normally a less severe test than an experiment. The reason is that in an experiment more factors can be controlled that might influence the result of an investigation. For some research findings it is difficult to denote them as tests at all, they are rather illustrations. This holds if a research such as a case study is used to generate propositions. Then other research is necessary to test these propositions.

2 Mathematical sociology and agent-based models and simulations

Other fields of empirical social science, in particular economics, are very strong in linking deductive theory building via mathematical models and empirical research. In sociology, mathematical sociology intends to develop theoretical models of social processes. Coleman (1964) uses elementary mathematical tools from calculus (e. g. ordinary differential equations), stochastic processes models and from algebra. As a case in point, differential equations can be used to represent social diffusion processes as functions of the kind of social embeddedness of the involved actors (see the classic Coleman *et al.* diffusion study where it was argued that social contagion via social networks may yield

a logistic pattern of the diffusion process). Other branches of mathematical sociology are at the intersection of sociology and economics. Game theory models provide theoretical tools for generating testable predictions about the outcomes of social interactions. Game theoretic equilibria (in particular Nash equilibria) yield predictions which can be tested empirically in the laboratory. As an illustration consider the production of collective goods in situations of a volunteer's dilemma (see Diekmann 2016). Using elementary concepts of game theory, namely the mixed strategy Nash equilibrium, one can predict that group size will have negative effects on the probability of cooperation on the individual level and on the group level (i. e. the chance that there will be at least one volunteer in a group of N agents decreases strictly monotonically with N). The latter prediction is not particularly obvious but is a strictly deductive consequence of game theoretic rationality assumptions. These hypotheses are empirically testable in laboratory experiments. The evidence with respect to the group level hypothesis seems to be mixed at best. Relaxing the rationality assumption by using certain theoretical concepts of bounded rationality yields different predictions about the group level effects (Tutic 2014). Still another class of mathematical models is used in social network analysis (Bonacich and Lu 2012). According to social psychological balance theory there is a cognitive motive to prefer interpersonal relations which are in equilibrium ("structural balance"). Elementary models from graph theory suggest certain hypotheses with respect to the macro effects on the structure of the social networks, e. g. the formation of cliques or clusters. It has been demonstrated that the predicted macro effects are heavily dependent on the particular concepts of structural balance which are adopted (cf. Easley and Kleinberg 2010, Ch. 5). At Leipzig University, graduate classes on methods of theory construction comprise the following exemplars of theoretical models: Basic concepts from neoclassical microeconomics and Coleman's models of social exchange systems; principles of non-cooperative game theory, repeated games and signaling games with applications to collective action, conventions, norms and other institutions; topics from social network analysis such as structural balance, the "strength" of "weak" ties (Granovetter) and social contagion models (Coleman *et al.*). Other classes (optional) provide an introduction to agent-based simulation (Gilbert 2008; Braun and Saam 2015). We suggest that, at least in graduate school, some elementary mathematics classes should be taught to those students who did not yet acquire the relevant mathematics knowledge. This mathematics is also important for an understanding of more advanced topics in applied statistics: basic ideas from logic, set theory, and probability; calculus of one and many variables; linear algebra.

3 What is most important?

Addressing the findings of the philosophy of science mentioned before in methods classes requires time and, thus, less discussion of the methods is possible. This holds for including parts of mathematical sociology as well. There is thus a tradeoff: if instructors who did not so far include topics discussed in this essay decide to address these issues, themes on methods have to be cut. We cannot imagine any syllabus where this is not possible. Just imagine that for some reason a session is canceled and the instructor has to decide how to rearrange the program. Such rearrangements should be done – perhaps one should think of a canceled session – in order to include the topics discussed in this article. In order to do so many of those topics can be presented intuitively so that students are at least aware of the issues. If then students are dealing with concrete research projects they will decide to get acquainted with the respective issues in more detail. Anyway, we think that the topics discussed here are of utmost importance to increase the quality of empirical research and should thus be addressed in classes on empirical research methods.

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Methodological Training in Undergraduate and Graduate Programs for Sociology/Social Sciences in the Federal Republic of Germany

Jürgen H. P. Hoffmeyer-Zlotnik (University of Gießen), Stefanie Eifler (Catholic University of Eichstätt-Ingolstadt), and Dagmar Krebs (University of Gießen)

Introduction

A working group initiated by the section "Social Science Research Methods" within the German Sociological Association (DGS, Deutsche Gesellschaft für Soziologie) has examined the methodological training in all 48 universities in the Federal Republic of Germany offering an undergraduate degree in Sociology (31) or the Social Sciences (17) using the module descriptions of 2009/10 (Eifler *et al.* 2011, 443–465). In 2015 an examination of the methodological training at all 26 German universities offering a graduate program in Sociology and 5 German universities offering a graduate program in Sociology with a focus on methods was conducted, also using the module descriptions (Eifler *et al.* 2015, 292–313). Five years after the first examination of the undergraduate programs Hoffmeyer-Zlotnik (2016, 23–41) examined in the winter semester 2014/15 how the methodological training at the universities offering an undergraduate program has changed since the re-accreditation of the program.

Undergraduate programs in sociology and the social sciences 2009/10

The examination of the methodological training in the undergraduate programs in the Social Sciences followed the recommendations of the DGS (Rehberg 2003), which were issued for the methods training in the diploma program in Sociology (see Table 1). These recommendations (DGS 2006, 82 ff.) were transferred onto the design of the methodological training in undergraduate programs in Sociology in 2006.

Following these benchmarks, courses introducing students into the methods of empirical social research (termed "methods") lasted between 2 and 12 class contact hours (SWS) in the undergraduate programs in the social sciences in 2009/10. Around half of the universities offering such a program provided more than 6 hours of teaching-input. The

Table 1 DGS recommendation for methodological training

Module 1: Introduction into the methods of the empirical social research	
Research logic	SWS 2
Empirical social research I (quantitative and qualitative)	SWS 2
Empirical social research II (quantitative and qualitative)	SWS 2
Module 2: Statistics	
Statistics 1	SWS 4
Statistics 2	SWS 4
Module 3: Research internship (quantitative or qualitative)	SWS 4
Module 4: In-depth module (quantitative or qualitative)	2 times SWS 2

Reference: Rehberg 2003, 72. SWS = class contact hour = teaching-input.

Table 2 "Methods" training in undergraduate programs in sociology and the social sciences 2009/10 according to or exceeding the recommendations of the DGS from 2003 or 2006

	Sociology	Social Sciences
Methods	16 of 31	9 of 17
Statistics/data analysis	22 of 31	9 of 17
In-depth methods	9 of 31	9 of 17
Research internship	16 of 31	9 of 17
Universities in total	31	17

Reference: Eifler *et al.* 2011, 452–454.

amount of courses offered in "statistics" varied between 2 and 14 SWS, and in 22 out of 31 programs in Sociology the benchmark of 8 SWS was reached or exceeded. 9 institutions offering a BA-program in Sociology or Social Sciences provided a number of courses in in-depth modules either reaching or exceeding the benchmark (see Table 2).

In addition to "statistics" an independent module in computing using statistical software was offered in 12 programs in Sociology and in 4 in the Social Sciences.

In accordance with the recommendations of the DGS the "methods" training in an undergraduate program in Sociology should encompass 22 SWS. Only 12 out of 48 examined universities reached or exceeded the recommended benchmark for "methods" training in 2009/10.

The plight in "methods" training is masked by the relation between class contact hours ("input by the lecturers") and self-study. The time spent attending lectures plus the time spent for self-study equals the workload. If only a small amount of teaching in the sense of courses is provided (measured by class contact hours), the ratio of class contact hours to self-study is shifted towards increased self-study. Assumed that a ratio of 1:2 of class contact hours to self-study is ideal, one can wonder how a ratio of 1:4 and in "statistics" even 1:5 can be regarded as sensible for "methods" training.

The aim of the Bologna-Process (HRK 2016) was to enable a standardization of study programs by establishing undergraduate and graduate programs. It is at least questionable whether this goal has been reached: According to the different definitions of workload – resulting from the assignment of points in the European Credit Transfer Systems (ECTS)[1], – a higher amount of points can be assigned to courses by increasing the percentage of time for self-study to 2.5 instead of of 1 : 2 ratio of the recommended ideal situation. This might occur in situations where universities face a lack of teaching resources. Self-study is designed for preparing and consolidating teaching-input, but cannot replace it.

The analysis of the module manuals 2009/10 showed that knowledge transfer in "methods" is neglected in favour of "statistics." Both of these "basic research principles" for sociologists, however, are taught to a lesser extent than the recommendations of the DGS require. This leads to a blurry profile in "methods" capabilities of students in undergraduate programs. Actually, the bachelor degree is meant to be a professional qualification. Schnell (2002) has already emphasized that the profession of the sociologist requires methodological expertise in data collection. According to Schnell a stronger emphasis on data analysis than data collection puts graduates in the Social Sciences at a disadvantage compared to graduates in Economics, who are attributed a higher level of expertise in analysis.

1 1 ECTS-Point = 30 hours of workload.

Table 3 Number of undergraduate programs in 2014/15 reaching or exceeding the benchmarks recommended by the DGS in 2006

Module	Amount of SWS	Number of universities	Universities in total
Methods	≥ 6	16	30
Statistics/data analysis	≥ 8	13	30
In-depth methods	≥ 4	27	30

Reference: Hoffmeyer-Zlotnik 2016, 33.

Undergraduate programs in sociology in 2014/15 after the re-accreditation

Five years after the first accreditation of a BA-program the re-accreditation is pending. This offers a chance to correct shortcomings of the curriculum. Given the inconsistency of training "methods" in the undergraduate programs in Sociology and the Social Sciences not only colleagues teaching the graduate programs might despair at the knowledge level of BA graduates but even more the labour market cannot evaluate the methodological competence of a BA graduate.

The re-assessment in winter 2014/15 of undergraduate programmes in Sociology offered by 30 out of 31 universities in 2009/10[2], showed, that the situation concerning methodological training has deteriorated (see Table 3).

A comparison of Table 3 and 2 shows that the number of universities offering courses in "methods" with 6 or more class contact hours stayed constant. However, the number of universities offering courses in "statistics" with 8 or more class contact hours decreased from 22 (2009) to 13 (2014). Additionally, the number of universities offering extra courses in computing using statistical software in addition to "statistics" shrank to 4. In contrast, the number of universities offering "in-depth methods" with 4 or more class contact hours tripled from 9 to 27 since 2009/10.

When examining the "methods" training in undergraduate programs in Sociology between 2009/10 and 2014/15 (more detailed, Hoffmeyer-Zlotnik 2016, 33 f.), it becomes apparent that while the share of class contact hours spent for "methods" training has stayed constant, the ratio of class contact hours to self-study has shifted to 1:6.7 in the workload. The number of courses in "statistics" was drastically reduced. In 2014/15 this number ranged between 0[3] and 12 class contact hours. In the workload the ratio of class contact hours to self-study ranges between 1 and 2 at universities offering more courses and between 1 and 8 at universities compensating a lack of teaching capacity by increasing the share of self-study. A remarkably high share of research seminars or projects is concealed within the "in-depth methods." These can encompass an amount of 12 SWS of teaching input with a share of 1 : 6.7 of self-study. The question is whether research seminars can replace a reduced amount of courses offered in basics in "methods" and "statistics."

Graduate programs in sociology in 2014/15

Assumed that a graduate program in Sociology should provide an "in-depth methods" training to accompany a comprehensive theoretical training, one has first to take a look at the requirements of the undergraduate programs. 19 out of 30 universities define a minimum average grade as mandatory entry requirement. 19 of 30 universities demand that between 30 and 90 ECTS points out of the 180 obtained in an undergraduate program stem

2 One university ceased to offer an undergraduate degree program in Sociology.

3 One university ceased to offer courses in Statistics.

Table 4 Number of universities by number of class contact hours in data collection, data analysis and research training according to the descriptions in the module manuals of graduate programs

Field of instruction	Class contact hours							Universities
	0	1	2	4	5–6	7–8	10	N
Methods	11	2	9	4				26
Statistics/data analysis	5	2	8	8	1	2		26
Research training	5		6	5	5	4	1	26

Reference: Eifler *et al.* 2015, Table 8 to 10.

from Sociology or a related subject. 18 of 30 universities do not at all specify a minimum extent of "methods" training required. Only 10 universities demand the proof of "methods" training ranging between less than 10 and 30 ECTS points. 2 universities offering a graduate program in Sociology focused on "methods" require a certificate of at least 30 ETCS points in "methods" training. Only one university requires candidates to participate in a 90 minutes exam for admission.

Table 4 shows that at 11 universities good knowledge in "methods" without further testing is assumed and as a result, no further courses are offered. Correspondingly, this applies to 5 universities in the field of data analysis. In the field of research training 15 universities offer between 4 and 10 hours of teaching input. However, taking a look at the ratio of class contact hours to self-study, it becomes apparent that the share of self-study becomes high when the extent of courses offered is low. The ratio of class contact hours to self-study can be as high as 1 to 10.3. When a higher amount of courses is offered the ratio of class contact hours to self-study levels off at around 1 to 4. In the graduate program with a focus on "methods" this ratio ranges between 1 to 4 and 1 to 6.5.

Conclusion

In undergraduate programs in Sociology, which should lay the basics for starting a job career or for understanding the content of the curriculum in a graduate program, teaching input in the "methods" training occurs to a very different degree. The lower the number of teaching hours, the higher the percentage of time students have to dedicate for self-study. After the re-accreditation this disproportion has even increased resulting in a reduction in teaching-input in the areas of data collection ("methods") and data analysis ("statistics"). To be eligible for a graduate program in Sociology a bachelor's degree in Sociology is no longer mandatory. Students can even have obtained an undergraduate degree in related subjects. This could mean that the prerequisites with respect to a comprehensive methodological training might be very low, especially since many universities do not require or test for such comprehensive methodological training. In a whole set of universities graduate students of Sociology are not provided with a refreshing or an in-depth methodological training. 11 of the examined universities provide no courses in "methods" and 5 no courses in "statistics." Last but not least, a crucial remaining question is: How successful can participation in a "teaching research project" possibly be without knowledge of basics in "methods" and "statistics"?

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Methods Training in Swiss Bachelor and Master Programs in Sociology

Ben Jann (University of Bern) and Tina Laubscher (University of Bern)

Inspired by the contribution by Hoffmeyer-Zlotnik, Eifler and Krebs on the situation in Germany, we analyzed the curricula of Swiss bachelor and master programs in sociology (or social sciences) to compile an overview of the (minimum) requirements of the programs with respect to methods training. The overview includes the Universities of Basel, Bern, Fribourg, Geneva, Lausanne, Lucerne, Neuchatel, and Zurich. The ETH Zurich, the EPFL (École polytechnique fédérale de Lausanne), the USI (Università della Svizzera italiana), and the University of St. Gallen were not included because they do not offer specific study programs in sociology.

Table 1 displays a brief summary of the methods training modules implemented in the different bachelor programs and also indicates the minimum requirements in terms of the number of methods-training credit points that students have to com-

Table 1 Minimum methods training in Swiss bachelor programs in sociology or social sciences

Study programs	Minimum requirements (ECTS)
Basel – Bachelor Soziologie	25
Module "Qualitative und Quantitative Methoden und Methodologie" (12 ECTS) containing several lectures with accompanying colloquia ("Empirische Sozialforschung und Methodologie I," "Empirische Sozialforschung und Methodologie II," "Quantitative Methoden") and a further class at one's own choice	
Module "Einführung in die Forschung" (13 ECTS) containing a seminar, a practical course, and a term paper	
Bern – Bachelor Sozialwissenschaften	36
First-year module (17 ECTS) containing "Einführung in die empirische Sozialforschung" (lecture) and several lectures with accompanying exercises on mathematics and statistics ("Statistik I," "Statistik II," "Mathematik I," "Mathematik II")	
Second/third-year module (19 ECTS) containing "Sozialwissenschaftliche Statistik" (lecture with exercises), "Qualitative Methoden der Sozialwissenschaften" (lecture), and practical research seminars ("Forschungspraktikum" and "Arbeitstechniken")	
Fribourg (in French) – Bachelor en sociologie	35
First-year module "Introduction en méthodologie" (15 ECTS) containing classes such as "Épistémologie générale," "Analyse conversationnelle et données audiovisuelles," "Techniques d'enquête qualitative," "Analyse de données quantitatives"	
Second-year module "Approfondissement en méthodologie" (15 ECTS) containing classes such as "Elaboration pratique d'une recherche,"" Écriture scientifique et présentations orale," "Analyse de données qualitatives," "Lectures critiques des textes"	
Third-year module "Application en méthodologie" (15 ECTS) containing a pro-seminar and the bachelor thesis*	

Continuation of Table 1 on the next page.

Continuation of Table 1.

Study programs	Minimum requirements (ECTS)
Fribourg (in German) – Bachelor Sozialwissenschaften: Soziologie	36
First-year module "Grundlagen: Sozialforschung" (15 ECTS) containing "Wissenschaftstheorie," "Sozialforschung" and "Statistik I"	
Second/third-year module "Methoden der Sozialforschung" (15 ECTS) containing "Datenerhebung und -analyse I," "Datenerhebung und -analyse II," and "Statistik II"	
First-year module "Forschungspraktikum und Bachelorarbeit" (15 ECTS) containing two research workshops and the bachelor thesis*	
Geneva – Baccalauréat universitaire en sociologie	50
First-year module (12 ECTS) containing "Introduction à la démarche scientifique" (lecture and seminar) and "Introduction aux méthodes quantitatives" (lecture and seminar)	
Second/third-year module (48 ECTS) containing "Epistémologie des sciences sociales" (lecture), "Les étapes de la recherche en sociologie" (lecture and seminar), "Méthodes qualitatives" (lecture and seminar), "Méthodes quantitatives" (lecture and seminar), and a research project** with accompanying seminar	
Lausanne – Baccalauréat en sciences sociales	48
First-year module "Introduction à la recherche" (12 ECTS) containing a lecture and a seminar	
Second/third-year module (36 ECTS) containing "Méthodes qualitatives" (lecture and seminar), "Méthodes quantitatives" (lecture and seminar), and two research seminars	
Lucerne – Bachelor Soziologie	21
First-year module (8 ECTS) containing "Einführung in die Methoden der empirischen Sozial- und Kommunikationsforschung I" (lecture and exercises) and "Einführung in die Methoden der empirischen Sozial- und Kommunikationsforschung II" (lecture and exercises)	
Second/third-year module (13 ECTS) containing "Grundlagen der multivariaten Statistik" (lecture) and a research seminar including a seminar paper	
Neuchatel – Bachelor en sociologie	31
First-year module (11 ECTS) containing "Introduction aux méthodes en sciences sociales" (lecture), "Atelier d'introduction aux méthodes en sociologie" (practical course), and "Introduction à la statistique" (lecture and practical course)	
Second-year module (10 ECTS) containing "Atelier de méthodes qualitatives en sciences sociales" (practical course) and "Statistique appliquée aux sciences sociales" (lecture and practical course)	
Third-year module (10 ECTS) containing a "Séminaire d'introduction à la recherche quantitative"	
Zurich – Bachelor in Sozialwissenschaften: Major Soziologie	32
First-year module (12 ECTS) containing "Empirische Sozialforschung I" (lecture), "Empirische Sozialforschung II" (exercise course), and "Statistik I" (lecture)	
Second/third-year module (20 ECTS) containing "Statistik II" (lecture) and two practical courses ("Methodenpraktikum I" and "Methodenpraktikum II")	

* For sake of comparability with the other programs, we excluded the bachelor thesis from the minimum requirements count (assuming 10 ECTS for the BA thesis in the French program; in the German program the BA thesis accounts for 9 ECTS).
** We assume the "Projet de recherche" includes the BA thesis. Hence we deducted 10 ECTS from the minimum requirements count.

plete (the summary refers to the major programs; minor programs have reduced requirements).

Drawing general conclusions from the comparison is difficult due to the heterogeneity of the programs. However, while Hoffmeyer-Zlotnik *et al.* paint a rather gloomy picture for Germany, we note that all Swiss bachelor programs contain methods training as an important component of their curriculum. Moreover, many programs provide a broad mix of training in quantitative and qualitative methods or, if they primarily focus on one of the domains, offer at least an introduction to the other domain.

Basel and Lucerne have the lowest formal requirements in methods training (21–25 ECTS); Bern, Fribourg, Neuchatel, and Zurich are in the middle (31–36 ETCS); Geneva and Lausanne have the highest requirements (48–50 ETCS). Of course, however, the comparison may not say too much as the programs may, in fact, offer many additional methods classes as optional components. Furthermore, the programs differ in the degree to which self-study (as opposed to teaching hours) is included in the formal requirements.

With respect to quantitative versus qualitative methods we can say that Bern and Zurich are clearly on the quantitative side and that the French-language program in Fribourg has a strong qualitative focus. The other programs are more mixed.

Table 2 provides a similar summary of methods training requirements in master programs. In contrast to the bachelor programs, we see that methods training in the master programs is much less formalized. Several programs, such as the one in Basel or Bern have only very little requirements. Other programs have more extensive requirements, with a maximum of 28 ECTS in Lucerne (including a significant self-study component), but none of them offers a comprehensive in-depth methodological training program.

Overall we conclude that Swiss bachelor programs in sociology are clearly devoted to providing students with solid training in empirical research methods, some more on the quantitative side, some more on the qualitative side, but most of them providing good coverage of both domains. Nonetheless, there is considerable variation in the organization of methods training among the study programs, both with respect to the number of teaching hours and with respect to content. In order to foster mobility of students and to facilitate a smooth transition between different sites from the bachelor to the master level, further standardization of the methodological curricula in the bachelor programs might be beneficial. In the current situation, teaching at the master level can be a challenge because the students' methodological knowledge depends significantly on where they completed their bachelor degree. Although heterogeneity does have merit and complete standardization may not be desirable, some further harmonization of methods training in Swiss sociology bachelor programs would ease the implementation of high-quality master programs.

At the master level, methods training appears to be less formalized. A reason for this may be that at the master level a clear distinction between subject matter research and methods training makes less sense. Yet, given the high degree of methodological specialization that has been achieved in many areas of the discipline over the last decades, we believe that rigorous and in-depth methods training should be an important component of graduate studies in sociology. It is tempting to avoid too much specialization in a master program to keep the program attractive for a broad audience. Specialization, also with respect to methods, however, should be a main goal of graduate studies. That is, while methods training in bachelor programs would benefit from additional standardization, we see a lot of space for sharpening the methodological profiles of Swiss sociology master programs.

Table 2 Minimum methods training in Swiss master programs in sociology

Study programs	Minimum requirements (ECTS)
Basel – Master Soziologie	6
"Methoden der Soziologie: quantitativ" (3 ECTS)	
"Methoden der Soziologie: qualitativ" (3 ECTS)	
Bern – Master Soziologie	6
At least 6 ECTS from designated methods courses	
Fribourg (in French) – Master en sociologie	15
Module "Méthodologie de recherche et stage" (15 ECTS)	
Fribourg (in German) – Master Soziologie	15
Module "Methoden und Forschungspraxis" (15 ECTS)	
Geneva – Master en sociologie	9
3–9 ECTS from module "Méthodes qualitatives"	
At least 6 ECTS from module "Méthodes quantitatives"	
Lausanne – Master en Sciences sociales	24
Module in quantitative and qualitative methods (12 ECTS)	
"Atelier pratique de recherche" (12 ECTS)	
Lucerne – Master Soziologie	28
8–12 ECTS in qualitative and quantitative methods module	
Module "Forschungsseminar" (20 ECTS) including a two-semester research seminar and two research papers	
Neuchatel – Master en Sciences sociales: Pilier sociologie	20
10 ECTS in the interdisciplinary methods module	
10 ECTS in the module "Méthodes d'analyse empirique"	
Zurich – Master Sozialwissenschaften: Major Soziologie	18
"Multivariate Datenanalyse" (6 ECTS)	
A research seminar or a research paper (12 ECTS)	

Table 3 Sources

Bachelor programs	
Basel	https://www.unibas.ch/de/Studium/Studienangebot/Studiengaenge-faecher/Soziologie-BA.html
Bern	http://www.sowi.unibe.ch/studium/
Fribourg (F)	http://www.unifr.ch/travsoc/fr/ETUDES/Sociologie/Bachelor
Fribourg (G)	https://lettres.unifr.ch/de/sozialwissenschaften/soziologie-sozialpolitik-und-sozialarbeit/bachelor.html
Geneva	http://www.unige.ch/sciences-societe/formations/bachelors/ba-soc/
Lausanne	https://www.unil.ch/ssp/fr/home/menuinst/enseignement/bachelor/sciences-sociales.html
Lucerne	https://www.unilu.ch/studium/studienangebot/bachelor/kultur-und-sozialwissenschaftliche-fakultaet/soziologie/
Neuchatel	http://www2.unine.ch/socio/page-3247.html
Zurich	http://www.suz.uzh.ch/de/studium/bachelor.html
Master programs	
Basel	https://www.unibas.ch/de/Studium/Studienangebot/Studiengaenge-faecher/Soziologie-MA.html
Bern	http://www.soz.unibe.ch/studium/studienprogramme/master_soziologie/
Fribourg (F)	http://www.unifr.ch/travsoc/fr/ETUDES/Sociologie/Master
Fribourg (G)	https://lettres.unifr.ch/de/sozialwissenschaften/soziologie-sozialpolitik-und-sozialarbeit/master.html
Geneva	http://www.unige.ch/sciences-societe/formations/masters/ma-socio/
Lausanne	https://www.unil.ch/ssp/home/menuinst/enseignement/master/sciences-sociales.html
Lucerne	https://www.unilu.ch/studium/studienangebot/master/kultur-und-sozialwissenschaftliche-fakulta-et/soziologie/
Neuchatel	http://www2.unine.ch/socio/page-43926.html
Zurich	http://www.suz.uzh.ch/de/studium/master.html

Digital Research and Methods For All (Researchers)

Loïc Riom (University of Geneva), Julien Ruey (University of Geneva), Sami Coll (Université du Québec à Montréal), and Mathilde Bourrier (University of Geneva)

Who has never used Google to find information about his research project? More or less consciously and deliberately, Internet is already deeply rooted in our practices as researchers. Digital methods can be used for a wide spectrum of research questions, whether they are digital related or not. Today, almost any research on any subject can benefit from using them, whether relying on quantitative or qualitative methods.

Exploring the wide spectrum of researches using digital-based methods

Web-based methods have already become popular, because they enable researchers to build large samples at a relatively low cost (Snee *et al.* 2016). This is especially the case when it comes to collecting data with "classic" quantitative methods (e. g. a survey). Moreover, it also offers new venues to collect data. In particular, social media offers a rich quantity of data, allowing for example to study listening practices (Berkers 2012) or political mobilization during social movements (e. g. during UK riots, Beguerisse-Díaz *et al.* 2014 and Occupy, Thorson *et al.* 2013). For instance, Grandjean (2016) made use of Twitter to map researchers working in the field of digital humanities. The Digital world can be used as a fieldwork too. Golub (2010), for example, conducted participatory observation as a player of the online game *The World of Warcraft* to study how specific knowledge is produced. Social media is not the only source of social data. Recently a research team collected mobile phone geolocalization data and metadata from *Open Street Map* to study street activity of six Italian cities (De Nadai *et al.* 2016).

More generally Internet offers a massive archive on various subjects for content analysis (Ackland 2013; Rogers 2013). Lee and Peterson (2004) studied the *Alt-country* amateur's scene through *Postcard Tow*, a forum devoted to this musical genre. Thelwall, Wilkinson and Uppal (2010) gathered thousands of comments on *MySpace* to study gender differences regarding emotional communication. Balleys and Coll (2015) studied teenagers' behavior on social networks to shed light on the way they build their social prestige amongst peers, whether it be offline or online. Beside textual data, video or photo-sharing platforms such as *Youtube*, as well as *Instagram* or *Flickr* offer large amount of available audiovisual content. For example, Horsti (2016) collected videos on *Youtube* to study the production and the diffusion of collective memory of illegal migration in Europe. In addition, the way Internet – as a culture artifact (Hine 2000) – is shaped can tell us a lot about societies, even beyond the digital sphere. For instance, Zimmermann (2015) made a comparison between *Facebook* and *Happy Network* – a former popular social media in China – to investigate how digital technologies are differently used in different cultural settings.

As these examples show, online-gathered data can be divided into two categories. The first category regroups works where primary data is produced through "nethnography" or online surveys. The second category includes works that use data already produced for other purposes and, in most cases, which are available and free. Both of these categories of data production attest the potential of digital methods whether it be to study the digital world or not. They offer a great opportunity to enrich sociological research at little cost. However, the reliability of methods and the quality of data gathered must be questioned. For example, it must be examined to what extent collected data for other purposes carries unacknowledged biases.

Questioning digital methods and tailoring algorithms to the needs of social scientists

For more than a decade, several books and articles have been published about the development and the use of digital methods (see for instance Hine 2000; Mason *et al.* 2005; Ackland 2013; Rogers 2013; Snee *et al.* 2016). Authors discuss methodological issues such as selection biases that online recruitment can induce, especially when it comes to social media. They introduce researchers to the use of practical tools that can help handle digitally generated data when conducting online interviews (Ackland 2013). Also, they offer a general introduction to the Web and most of them point out to the necessity to understand how Internet works, in order to have the necessary critical view on the generated data (Hine 2000; Ackland 2013; Snee *et al.* 2016). Furthermore, collecting data on the Internet raises questions ranging from informed consent to participant anonymity via the distinction between private and public sphere (e. g. when collecting data on social media or forums) (Beaulieu 2004; Garcia, *et al.* 2009; Ackland 2013). In this regard, the Association of Internet Researcher (AoIR) has established a code of ethics for research on Internet since 2002[1].

The potential of computer algorithms to analyze data should also be taken into account. However, they have mostly been developed by private companies for marketing purposes. *Google* and *Facebook* are probably the ones, which develop the most sophisticated algorithms. Yet, these algorithms are still opaque (Cardon 2015; Pasquale 2015). Consequently, there is a need to pioneer and sponsor the development of algorithms specifically oriented to the benefit of social sciences. Hence, sociologists have a role to play not only in the way data is collected, but also in how it can be produced and analyzed.

Introducing digital methods to social science education

Such development of digital methods should be taken into account as quickly as possible within our education programs (Bachelors, Masters and PhDs). Indeed, already many of our students already have to deal research on the Internet during their investigations. Thus, we should be able to give them the right tools to conduct their research. There is an urgent need for both a better understanding of the "digital world" and an expertise on digital methods. This should include a wide range of courses from applied statistics to programming and data visualization. Social sciences' institutes should not neglect the development of those skills.

Some universities, for example the University of Uppsala, in Sweden, and the University of Sheffield in the UK, have already introduced Master's programs called "Digital media and society." In Switzerland, the University of Lausanne has just introduced a Master's program in digital humanities. These programs are designed both to introduce students to the evaluation of social shifts due to digital technologies and to train them in the practice of inquiry based on online data. If we look more closely at the courses they provide, they are deeply rooted in the already existing research practices of social sciences. Following the steps of this existing programs, it can be recommended the following to be incorporated into the sociological curricula:

- An introduction on the main key concepts of the social and semantic web (e. g. key words, tags, hashtags, links, data identifiers, etc.)
- A presentation of quantitative and qualitative digital methods to gather data online, along with related research ethics and data protection.
- An initiation to technical tools such as web-scraping, visualizing and mapping software, web archives, social networks' APIs (Application Programming Interfaces) and coding techniques.

1 Available at http://aoir.org/ethics/

Thus, applying digital methods does not mean giving up on older methods, like ethnography or interviews, but carrying on the necessary adaptation and development of our research tools. Moreover, testing new ways of inquiry is also an interesting opportunity to reinforce the tradition of critical thinking when it comes to research design, and to stimulate what Mills (1959) named our "sociological imagination."

In sum, digital methods clearly raise a lot of important questions. This paper does not have the pretense of being exhaustive, but rather a way identify the main challenges regarding digital methods. Digital methods are not completely new, contrary to what some of us may think, and they call to be integrated in the everyday work of researchers as soon as possible. They need to be demystified as they are more accessible than we commonly believe. Furthermore, since digital giants such as *Google* or *Facebook* already claim to be able to produce more relevant research than academic researchers, it is important to step in and be part of the game (Boyd and Crawford 2012).

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Teaching Methods in Social Sciences

Thomas Tribelhorn (University of Bern)

Student X

… following the lecture in *Statistics 1* is asking himself, "What the heck am I doing here?" The professor is quite friendly, but only the Einsteins or Hawkings of this world are able to understand what she is explaining. And he still cannot see the link to his personal interest in the subject he is studying. Diligently he does his assignments every week and passes the exam. Similarly, one year later he passes *Statistics II* before taking part in a block-seminar on qualitative methods, particularly because the professor has a breezy way of explaining mainly by way of example. A one-semester introductory course in SPSS completes the compulsory minimum in methods. Student X continues his studies choosing his favourite modules and eventually gets totally zealous when working on his thesis. His biggest problem now is the fact that he has heard and read a great deal about methods yet now he should be able to analyse his data. He has a peculiar feeling when suddenly noticing a strange metamorphosis of his being, including a reactivated interest in methods. How had he neglected this for so long? Troubled by a mix of self-pity, anger and regret he starts to dig for his old lecture notes.

The protagonist of this – of course totally fictional – story can be blamed of being ignorant, somewhat immature or just having chosen the wrong subject. However, his initiative awakens as soon as he understands, induced by his own project, the relevance and value of methodological skills

Why study social sciences?

According to the *Swiss Federal Statistical Office (SFSO)*[1] graduates of social sciences explain their difficulties in finding a job with a lack of experience. A considerable number of alumni work in areas with hardly any relation to their studies, which raises the question of whether or not *employability* is taken into account adequately in study programmes. Clearly, education at university is not vocational education. However, the *canon* is put into perspective in favour of focussing on what students should be able *to do* at the end of a learning process. This shifted point of view from input to outcome still troubles many teachers in higher education, often due to a scenario of intimidation called *economisation of higher education*, which blurs the fact that scientific work too is a profession based on competencies. But there is a vast amount of research evidence showing that lectures alone contribute very little to the development of competencies. During his inaugural speech at the University of Auckland, John Hattie put it like this: *"We know that students in lectures learn most in the first 8 minutes, only recall three things at most after one hour, and that if the content does not shake their prior beliefs they file away the fascinating facts in the deepest recesses of their brain, if at all."* More recent studies report around 15% of remembered content one week after the lecture. Just demonstrating a method clearly does not prepare the audience for its application.

Learning outcomes as a starting point

The focus on input predominantly promotes *inert knowledge*,[2] not being accessible during problem solving. Everyone who had been learning grammar for years and then suddenly had to explain to someone in that language how to reach a certain destination will understand. Information alone is not knowledge, and knowledge alone is not competence. If methods are to be taught for their application this has implications for the conception of study programmes. Teaching methods, in particular, only fosters the ability to work on

1 BFS 2014.

2 Renkl 1996.

questions in a scientifically proficient way through the elaborate combination of theory, skills training and critical reflection.

Additionally, there is increasing claim for transdisciplinarity[3], i. e. the ability of researchers to deliver scientific findings to society. Hence, they need to "translate" complex interrelations into everyday language or the verbiage of a specific target group respectively. Facing global challenges, it is beyond any doubt that academics need to deploy their knowledge and skills. This world needs people to analyse social phenomena and contribute to explanatory models. But they also should be able to explain and comment their approach and insight to others. This idea, already promoted in 2004 through the *Dublin Descriptors*, today is an integral part of the *Swiss National Qualifications Framework for Higher Education (nqf.ch-HS)*[4]. In addition to *knowledge and understanding*, *applying knowledge and understanding*, and *making judgements*, also *communication skills* and *learning skills* are essential *generic competences* to be developed, mainly to prevent from raising *fachidiots* i. e. blinkered specialists in higher education.

Furthermore, for the last fifty years at least, research has consistently shown, that students with better metacognitive strategies achieve greater academic success. Personal goals, deliberate planning, blocking distractors, evaluation of milestones, emotional self-regulation or the ability to appraise one's own proficiency are features of elaborated learning skills. They may be seen as preconditions but excellent higher education institutions, in fact, place emphasis on supporting them to prepare beginners for their further studies.

Thus it can be questioned whether or not higher education in general or the introduction of methods in particular suitably prepares students for the real world. More than ten years ago, the OECD funded a project led by a Swiss team to detect and define key-competences for future society. The *DeSeCo*[5] report describes three categories: *using tools interactively*, *interacting in heterogeneous groups* and *acting autonomously*. A more recent model published at the University of Aalborg[6] argues for a development of competences integrating *academic knowledge, professional skills* and *critical reflection*.

In the past, a substantial number of competence models have been published. The team at the educational development unit at the University of Bern employs a synthesis of different approaches, defining competence as mastering a specific situation using four types of knowledge: theoretical concepts, professional skills, motivational beliefs and metacognitive strategies, with the latter being seen as the awareness of one's own learning and working strategies. There is research evidence showing that approximately 40% of individual learning gain can be explained by metacognitive strategies. Being able to identify the type of task and selecting the matching strategy from an extensive repertoire leads to greater success. Sounding like a truism in the first place this is still hardly considered in academic reforms.

Regarding learning outcomes in a holistic way, rather than emphasising content solely, opens new perspectives on the education of academic professionals with the aim of real agency.

Opportunities through innovative teaching

According to the SFSO data, alumni report a lack of generic competences such as time-management, the ability for teamwork, negotiation- and communication-skills or the ability of tackling complex problems. In addition, there seems to be a demand for the qualified use of IT and software tools. This self-appraisal is remarkably congruent with the areas of competence, as defined in the DeSeCo report or the Dublin Descriptors and reveals some shortage in metacognitive strategies. Appropriately

3 E. g. Froese *et al.* 2016.
4 swissuniversities 2011.
5 Rychen and Salganik 2003.
6 Jamison *et al.* 2014.

supporting the development of competences despite adverse staff-student ratio represents one of the great challenges in curricular reforms. Still, applying innovative learning scenarios may be expedient. Corresponding to Bruner's *spiral curriculum*[7] education for methodology regarding the flaws mentioned must lead students from less complex problems level by level to more challenging ones, and inclusion of software and tools seems essential. Many institutions of higher education by now have a policy of *bring your own device (byod).* Students work and learn on a campus with sufficient WiFi coverage. This is another great opportunity to design an up-to-date education. For almost any software, plenty of tutorials in good quality can be found on *YouTube*. In addition, interactive online-content[8] is available, supporting cognitive modelling of statistical relations when integrated into cleverly designed learning scenarios.

Fostering social skills, problem-solving and professional use of IT in an integral way requires adaptation of modules. Some Swiss institutions used the Bologna reform to reconsider the support for development of generic competences[9] but learning scenarios beyond "standard" hardly go beyond project-based learning, although there is a great number of models available as the following examples will illustrate. What they have in common is a problem or case as a starting point to stimulate the learning process.

Case Studies: Students reconstruct well-documented real cases in groups or individually, thereby gaining knowledge about the theory-practice-nexus and widening their aptitude to evaluate, judge and decide based on evidence.

Problem-Based Learning: PBL was deployed by the end of the sixties at Harvard University and later implemented by McMasters and Maastricht. The *seven steps* became famous and today many variations of this phase model are used around the world. Instead of starting "ex cathedra" with content, problems serve as starting points. Alongside the problem-solving process, the information needed has to be researched by the learners, thus reproducing the task of tackling real-life challenges. In the approach's original form, students meet twice weekly in groups of eight supported by a tutor.

Scenario Analysis:[10] Scenario planning (also known as scenario analysis), a "classic" of strategic planning, can be used as teaching tool too. Aimed at the analysis of possible future developments and illustrating complex relations, students refer to content, facts and data to eventually shape their assumptions and conclusions.

Project-Based Learning: Projects are quite common in higher education but all too often the full potential for learning is not fully exploited due to the omission of a joint debriefing session at the end of the project. Discussing and reflecting project phases, roles within teams or lessons learned and good practice leads to a deeper understanding of project work, thus fostering metacognitive strategies and better preparing for the next project.

Simulation Games: Simulations reflect real social systems in a less complex way. *Serious games* today are part of the repertoire of learning scenarios in many institutions. They can be bought or developed according to specific needs. Currently, their possibilities for teaching in higher education are being explored by a growing research community. Although new technologies provide great opportunities, a vast number of simulation games has been developed during the last forty years without the use of IT, sometimes with a very simple but intriguing rationale.

In addition to the examples outlined, the following can be put into action, even with large groups of students as alternatives to traditional lectures. In combination with technology, they

7 Bruner 1960.

8 E. g. www.lernstats.de; www.mlbk.de.

9 Schweizerische Gesellschaft für Soziologie 2006; Eberle 2006.

10 Sprey 2003; Engartner 2010.

are representatives of the *Inverted Classroom Model (ICM)*[11], also known as the *Flipped Classroom.*

Peer-Instruction:[12] This model is promoted by Harvard professor Eric Mazur. In many of his speeches on YouTube, he explains the basic idea and talks about his experiences. His team does research on peer-instruction and papers can be downloaded for free. Students receive pre-reading assignments before every lecture, which then starts with simple tests to check the basic understanding of the concepts read. In the past students had to raise their hands for the correct answer but now the test is done with the help of a live-voting tool. Everyone then tries to convince a neighbour with a different opinion of his or her own answer. When the test is done a second time, the percentage of correct answers usually rises dramatically. If not, the professor explains the concept, otherwise he moves to the next topic.

Just-in-Time-Teaching:[13] This model is like teaching on demand with the help of IT. Students take short online self-tests at home based on their pre-reading assignments. Tests have to be completed by a certain deadline before the lecture in order to give the professor sufficient time to analyse the data. Depending on the needs, certain topics are skipped, more emphasis is placed on others or minor alterations are made. Mazur uses JiTT in combination with peer-instruction.

Team Based Learning:[14] In team based learning, teams are formed during the first lecture of the semester according to individual achievements in a pre-test. Learning teams stay in their constellation for the whole semester and with help of a seating plan students meet in their particular sector each lecture. Based on their pre-reading tasks, they work on additional assignments, problems and self-tests, occasionally interspersed by short talks by the professor or plenary discourses.

This list is far from being complete. Educational development teams can provide useful support for design and implementation of adequate curricula and learning scenarios.

Opportunities through proper modularisation

It is important to design learning scenarios according to principles with high impact on learning. Regarding research findings concerning learning and teaching, there is still considerable work to do in higher education. The "collection of information on stock" in lectures, for example (student x), primarily fosters inert knowledge if not linked to meaningful assignments to process the information. Students benefit from a project- or problem-based approach, but for this to take place, a curricular concept by proper modularisation is essential. *Mock modularisation*, where lectures remain disconnected to the seminars or other formats within the module, does in no way harvest the full potential for learning. Correlated courses located around complex problems provide opportunities on several levels. Firstly, challenges close to reality better support the development of competences needed and, secondly, content has to focus on essentials. The challenge as a starting point hereby serves as an important filter to sort out what is only "nice to have." Thirdly, assessment of competences on the module level inhibits the widespread inflation of exams which emerges as a consequence of widespread mock modularisation. But this can of course only be done through a constructive collaboration of all lecturers in charge of a module, as every course must meet its specific intra-modular function within the constellation. Insisting on "favourite content" or traditional teaching loads being passed on are still prevalent impediments for curricular reforms.

11 Handke and Sperl 2012; Handke *et al.* 2012.
12 Mazur 1997.
13 Watkins and Mazur 2009.
14 Michaelsen *et al.* 2002.

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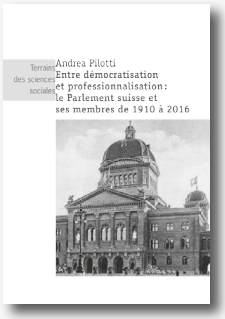

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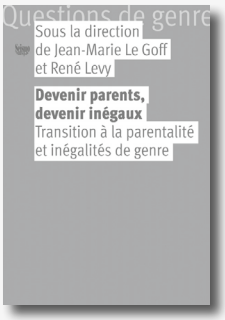

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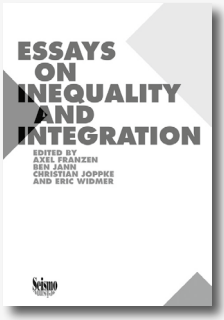

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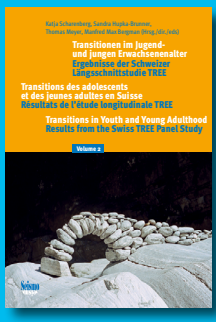

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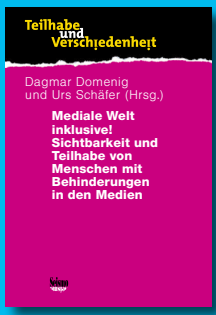

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Secrétariat SSS/SGS
Catherine Marin-Descloux E-mail: sss@unifr.ch

Rédaction / Redaktion
Prof. Dr. Muriel Surdez
Université de Fribourg
Domaine Sociologie, politiques
sociales et travail social
Rte des Bonnesfontaines 11
1700 Fribourg
muriel.surdez@unifr.ch

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