

Paper presented at the European Conference on Educational Research, University of Geneva, 13-15 September 2006

**INTRODUCING THE QUANTITATIVE-QUALITATIVE CONTINUUM:
AN ALTERNATIVE VIEW ON TEACHING
RESEARCH METHODS COURSES**

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Published in Murtonen, M., Rautopuro, J., & Väisänen, P. (Eds.) (2007).
Learning and teaching of research methods at university. Research in
Educational Sciences: 30. Turku: Finnish Educational Research Association. Pages
185-203.

PS! Figures are in the end of the article!

Introduction

In this paper, I will tackle the issue of teaching research methods in a context where qualitative and quantitative approaches are not only seen as valid and useful ways of studying educational phenomena, but it is assumed that, in some cases, combined design may be the best choice for a particular research project. It is easy to perceive that in this context the current practice by which research courses are often either qualitative or quantitative, and even if taught in a single course, in a sequential manner and with no attempt to draw parallels between the two arguably polar approaches, is not pertinent.¹

The problems of teaching “mixed methods research” courses have recently been examined with considerable consistency by Tashakkori & Teddlie (2003a; 2003b). In addition, Creswell et al. (2003a) have surveyed 11 current practitioners who taught mixed methods courses or workshops to describe pedagogical approaches that instructors might teach and students might learn in mixed methods courses. My intention here is not to review these articles but to propose an alternative answer to the questions raised by Tashakkori and Teddlie (2003b, p.693) which require further elucidation:

- * In what sequence should courses from three methodological movements [QUAL, QUAN and mixed methods] be presented in graduate school?
- * How many courses are required to be trilingual (i.e., minimally literate in the QUAL, QUAN, and mixed research languages)?
- * What sort of projects should a mixed methods research course include, and what activities should students conduct?

¹ There are some new generation textbooks available where qualitative and quantitative approaches are given more or less equal space and where some discussion on combined designs is included (see, for example, Krathwohl, 1993; Bryman, 2001; McMillan & Schumacher, 2001; Creswell, 2002; Creswell, 2003).

In my recent studies I have discussed and analysed methodological problems of educational inquiry and especially the relationship between quantitative and qualitative approaches of research. Problems in the area have been of concern for a long time and have been the reason for many debates among educational researchers since the mid 19th century. During last decades, there has been a fundamental disagreement in many aspects concerning research methodology and in the principles which should underlie educational research. The critique against previously accepted ways of studying educational phenomena and the debates between the proponents of different positions have been so extensive that some authors have called this period an era of “paradigm wars” (Gage, 1989; Hammersley, 1992).

On the other hand, recently, there has been serious critique of the quality of the present educational research practice, especially in Britain and the United States but in other countries as well (e.g. Atkinson & Jackson, 1992; Tooley, 1998; Hargreaves, 1996; M.D. Gall, Borg, J.P. Gall, 1996; Davis, 1996). Many authors have been worried that the lack of consensus in methodological issues and continuing “paradigm wars” may have “serious implications for the nature and function of educational research” (Hammersley, 1993, p.xiii).

Induced by these reasons and my personal concern in the subject, I have focused my research interest on the problems of methodology in educational inquiry. I have given special attention to the ways in which quantitative and qualitative approaches are perceived and used in research practice. During my one-year study at Cambridge University from 1998 to 1999, I conducted an extensive literature review and a small-scale investigation with the aim to clarify whether quantitative and qualitative research can be and have been taken as distinct mutually exclusive paradigms, like some authors suggest (Niglas, 1999a).

In the second study (Niglas, 2004a), I took a step further and addressed several vital questions concerning the combined use of quantitative and qualitative approaches in educational research. The overall purpose of my study was to enhance and extend the existing systematic knowledge about the ways combined designs can be and are used in research practice, to explore possible justifications for a new kind of practice and to analyse the implications that might have in the context of educational research. These purposes served the goal to enrich the research practice and enhance the ways in which graduate students, that is, future educators and new researchers, are prepared in the academy.

Thus, my ideas on teaching research methods courses and relevant argumentation are based on the results of described research projects which suggest that instead of the classification of research methodology into two or into three clearly separate methodological paradigms or movements, we should look at methodology as a qualitative-quantitative continuum (Niglas, 1999; Niglas, 2004a).

Current developments of ideas and practice

The methodology of educational research has been in constant development during the past few decades. The “paradigm shift” from positivist-quantitative to interpretivist-qualitative ways of doing research has been advocated by many writers and methodologists as the most desired goal, especially in the field of educational research. Finland, for example, is one of the countries where this shift has been very rapid and where today “almost all master theses are based on interpretive-qualitative

approaches” (Lauriala, 2003). This tendency is strongly supported by the results of the survey conducted by Rautopuro and Väisänen (2004), where they found that proportions of quantitative master theses in different Finnish Faculties of Education varies between 10 and 50% with the median around 20%. While there are many researchers who are pleased with and proud of these developments, there are others who also see the problems connected with the dominance of one methodological approach over the other, no matter whether the superior position is given to qualitative or quantitative methodology (Professor Tapio Vaherva, personal communication, January 15, 2002; Professor Hannele Niemi, personal communication, October 24, 2003).

The discourse and contention of the present paper is based on the conviction that the practice of educational research benefits from both broad methodological approaches and can be enhanced if qualitative and quantitative methods will be taken as complementary ways of studying educational phenomena and not as mutually exclusive paradigms. That is not to deny the influence of the researcher’s ontological and epistemological beliefs on his or her practice nor to advocate that methodologically everything goes as far as it serves certain (noble) aims, but to argue that “one’s worldview and the theoretical lens affect the questions posed. Other aspects of the research should follow from the research questions” and be in concordance with one another (van Heter & Stevens, 2000).

During the last six years, the time I have studied the relationship between qualitative and quantitative ways of doing research, the development of the field has been very rapid. While in 1997, the “paradigm wars” were going on racyly, inflated by the ideas presented by Guba and Lincoln in the *Handbook of Qualitative Research* published in 1994, and only a few writers were advocating and grounding the combined use of qualitative and quantitative methods (see, for example, Brannen, 1992; Bryman, 1992; Greene, Caracelli, & Graham, 1989), in 2003 the voluminous *Handbook of Mixed Methods in Social and Behavioural Research* was published, preceded by a smaller-scale book on mixed methodology by Tashakkori and Teddlie in 1998.

In the preface to the *Handbook of Mixed Methods*, Tashakkori and Teddlie (2003, p.x) voice their belief that “the mixed methods research has evolved to a point where it is a separate methodological orientation with its own worldview, vocabulary, and techniques” and that “mixed methods designs will be the dominant methodological tools in social and behavioural sciences during the 21st century”. They see mixed methods as “the third methodological movement” and fit it into the framework of the “pragmatist paradigm” (Tashakkori & Teddlie, 2003b, p.679).

While I thoroughly appreciate the attempt to elaborate and to unify the understanding of the combined use of qualitative and quantitative approaches, I have been criticising this kind of paradigmatic view on mixed methods.¹ However, as the *Handbook of Mixed Methods* draws together the diverse theoretical and methodological viewpoints on the combined use of qualitative and quantitative methodologies, some other positions rise to the fore as well. For example, Greene and Caracelli (2003, Chapter 3 of the Handbook) and Creswell *et al.* (2003b, Chapter 8 of the Handbook) argue against the dominance of one paradigm over another, which is more in line with my view of quantitative and qualitative methodologies as a continuum. On the other hand, the idea of pragmatism as the paradigm for mixed methods research is challenged by Miller who argues that “mixed methods could be defended adequately, ..., from a (minimal) realist position (2003, p.425, Chapter 15 of the Handbook).

¹ See, for example, Niglas 1999 and 2004.

Qualitative-quantitative continuum

As I have argued elsewhere (see Niglas 2001; Niglas 2004), I do not feel comfortable with the classification of research methodology into two nor into three clearly separate methodological paradigms or movements, instead I prefer to look at methodology as a qualitative-quantitative continuum.

The results of studies described earlier have supported the argument that it is the concrete research problem or aim rather than the philosophical position which determines the design (or overall strategy) of the study whereby, depending on the nature and complexity of the problem, the design can be either qualitative or quantitative or a combination of both (Hammersley, 1992; Bryman, 1988). In addition, within each strategy there is a possibility either to use data-gathering techniques usually associated with the same approach or to combine the techniques of both types. And finally, there is a possibility to use both quantitative and qualitative data within each study regardless of the overall strategy of a piece of research or the concrete data-gathering techniques. Figure 1 illustrates the complexity of the actual research practice.

However, my intention is not to argue that there is no influence of philosophical framework to research practice at all. Figure 2 presents a scheme, which, in a reasonably simplified way, attempts to summarise the relationships between different philosophical schools of thought and methodological traditions as I see them.¹ On the scheme, there are two main dimensions: from left to right runs the quantitative-qualitative continuum and from top and bottom to the centre the philosophy-methodology continuum. If one starts from the philosophical level or paradigms (if one likes to use this term better), one can see that, unlike the proponents of the paradigmatic view, I see there an overlap and mutual influence between different traditions. When we (imaginably) fold the scheme, the overlap between the traditions at the upper and lower edge of the scheme becomes perceptible as well.

Although it has been quite common to talk about two big paradigms only: positivism and something which denies positivism (however differently authors name this new paradigm); today even radical proponents of the paradigmatic view extend their lists of paradigms to four or five and accept that there is an overlap between traditions. However, having seemingly moved from the two-paradigm picture to the flexible and evolving five-paradigm picture Guba and Lincoln (2005) still argue for two broad but incommensurable “philosophies”:

‘So, ..., *positivism* and *postpositivism* are clearly commensurable. In the same vein, elements of *interpretivist/postmodern* critical theory, constructivist and participative inquiry, fit comfortably together. Commensurability is an issue only when researchers want to “pick and choose” among the axioms of positivist and interpretivist models, because the axioms are contradictory and mutually exclusive’ (op. cit., p.201; italics in original; see also Table 8.5, p.198).

As it can be seen, I have fitted in six “big” terms on philosophical level, but it is an obvious simplification as there are several other traditions like pragmatism, various

¹ See Niglas (2004) for further discussion on the development and details of this scheme.

versions of realism, (social) constructivism, systems theory, etc. which can not be fitted very easily into the given six “paradigms”. Besides philosophical schools of thought, there are some important disciplines, like anthropology and linguistics, which have had and continue to have a remarkable influence on social scientific and educational research. On the scheme some of these disciplines or the broader scientific fields are given in the ovals with white background.

The circle of keywords right under the philosophical level illustrates the change in the main focus and research interest along the continuum of “paradigms”. From that level downward, it was my intention to follow with different disciplines and research traditions step by step to more concrete methods for doing research and analysing data; however, this scheme can only embrace the highest of the methodological levels – that is different strategies of research. More concrete methodological aspects, like different methods for data gathering and analysis, can not be fitted in because of several practical reasons. It is important to notice that the closer we move to the level of concrete methodology the more and more mixed the influence of philosophical schools of thought is, which on the other hand means that the same methods can be used in various research traditions and philosophical frameworks.

From left to right runs the quantitative-qualitative continuum which has its roots in the methodology of natural sciences and blends with the arts at the other end. Most importantly, in the present context, there is an area in the middle of this continuum where both quantitative and qualitative approaches are accepted and seen as useful, serving thereby as a convenient space for combined designs as well. Thus, while arguing in favour of the combined use of qualitative and quantitative methods, I apprehend that there are philosophical frameworks where only one type of method can satisfy the preconditions set for an empirical inquiry and thereby fulfil the relevant aims (see the ends of the continuum on Figure 2). However, most of the methods are not tightly bound to any particular philosophical “paradigm” and are therefore not incompatible. The most important conclusion from continuum-approach is that there is no one “right paradigm” for mixed methods research, but it can be used within several theoretical and worldview frameworks.

Implications for education: the structure and the order of the courses

Seeing the research practice in the framework described on Figure 2 has an important influence on my view on the organisation of research methods courses. Indeed, the first question set by Tashakkori and Teddlie will become rather pointless as I reject the idea that there should be different courses for qualitative, quantitative and mixed methods research. I argue that the first research methods course taken by graduate students should give an overall framework and overview of different approaches to study educational or social phenomena. I do agree with Tashakkori and Teddlie (2003b, p.695) that it should “develop an understanding of the similarities between the two orientations”, but I am reluctant to call or see this course as a “mixed methods course” as in my view, it should not focus straightaway and only on introducing the features of combined designs or mixed methods studies.

Furthermore, the empirical research is only one way to meet the divergent needs that the educational practice brings up. Non-empirical theoretical studies have had an important role and place in educational research for a long time, which is supported by the fact that most journals in the field include papers which are not based on empirical

research. In addition, lately there has been a move towards the acceptance of the principles of design science as a useful means of advancing our understanding in the field of education (Edelson, 2002). The *design research* approach is specially promising in advancing the ideas in the field of e-learning, but also in more traditional areas of educational sciences.

Though it is obviously impossible and not reasonable to avoid the terms *qualitative* and *quantitative research* or *pure* and *combined designs*, I would rather start the first research methods course by presenting the relationships between the three broad research types: theoretical, empirical and design research (see Figure 3).¹ Depending on the interests and the needs of students, the rest of the course can focus either on one of these types only or offer an overview of each.

The course (or a part of the course) introducing the methods for empirical inquiry would then introduce the methodological stages of an empirical study as described on Figure 4, emphasising the wide variety of choices at every stage on the one hand, and the coherence between the chosen methodological aspects on the other.² Keeping close to this model it would then be feasible not to structure the course(s) into two or three parts as qualitative methods, quantitative methods and mixed methods, but to build the course on explaining the logic of different research strategies (or designs) like survey, experiment, case study, ethnography, action research, etc. Indeed, it should be pointed out that while certain strategies are traditionally predominantly either qualitative or quantitative, the design for particular study can be combined either by integrating two sub-designs with different strategies into one research project, or by integrating divergent methodological aspects within one overall strategy. The recent textbook by John W. Creswell (2002) is excellently supporting this kind of approach to research methods courses.³

Finally, if we promote the idea that the combined designs are accepted in the research practice we have to provide a set of criteria according to which one could evaluate the quality of a particular piece of research. However narrow or broad a meaning we adopt for the term “validity” in different research contexts, there is a common notion of correctness and truth value of the research as well as (trust)worthiness of the results connected to it. In that overall meaning, most of researchers and research methodologists accept that the validity does matter though some of them prefer to avoid the term itself or substitute it due to several reasons.

In the light of the quantitative-qualitative debate, stressing the dichotomous nature of educational research, several methodologists have suggested entirely divergent lists of standards and criteria for quantitative and qualitative research (e.g. Erickson, 1986; Lincoln & Guba, 1985). The closest to my view on research and validity as well as the most useful starting point in the context of evaluating studies using various combined designs is the position developed by Eisenhart and Howe (1992). A crucial feature of

¹ It is essential that empirical as well as design research studies elaborate on at least some relevant theoretical ideas. On the other hand, design studies often include a small-scale empirical investigation, for example at the stage of evaluation or problem analysis. Furthermore, there are certain research designs, like evaluation and action research studies, which are more or less on the borderline of empirical and design research, or for example the historical studies which are on the borderline of empirical and theoretical research.

² For the present discussion, it is important to notice that, in my view, decisions made on earlier steps influence the decisions one can take on the later steps, but there is no one-to-one relationship between methods available at different stages. This means that there is a possibility of combining quantitative and qualitative elements at any of the described stages of research.

³ There are some other textbooks that are also to some extent consistent with this kind of integrated approach (see Järvinen, 2001; Bryman, 2001; Krathwohl, 1993)

their position is their distinction between *general* and *design-specific* standards of validity. I share their thrust that

“all educational research is subject to the same general criteria of validity even though quite distinct and specialised criteria are required to conduct and evaluate specific kinds of research studies” (*op. cit.*, p.644).

Eisenhart and Howe clearly deny the dichotomous and opposite nature of quantitative and qualitative methods and suggest that characterising all educational research studies in terms of the general concept of an argument leads rather straightforwardly to a general approach of validity that accommodates both “quantitative” and “qualitative” research designs. Given that assumption, I have accommodated their list of five general standards for the conduct of educational research that should cut across all forms of educational research. These general standards require that research studies be

- * *important and ethical*;
- * *cogently developed and presented* which means that there should be a fit between research questions, methodological aspects, and inferences drawn from data, whereby the report should give enough detail to make the methodological design of the study clear for the reader;
- * *competently produced* which means that all methods used within the project, like sampling techniques, instrument development, data collection and analysis techniques, etc. must be competently and effectively applied and the results correctly interpreted;
- * *meaningful and comprehensive* which means that there should be a balance between technical and theoretical quality, the scientific and practical value and importance of the study, the risks involved, as well as the alertness to the knowledge from outside the particular tradition within which the author is working, *but compactly reported* avoiding irrelevant detail and unsound prolixity;
- * *presented and drawn up impeccably* which means seemly formatting of the report and involves correct use of the language, tables, diagrams, etc.

These five general standards are interrelated and form a unitary construct of validity, which should encompass but not to dictate the specific standards and norms of particular research designs. Thus, *design-specific standards* are subsumed by the general standards and articulate the particular underlying assumptions, principles, methodological issues and skills that are associated with divergent designs (Howe & Eisenhart, 1990). As such, the general standards of validity should be introduced in a relatively early stage of introductory research methods course while the design-specific standards can be introduced in parallel with other aspects of particular designs chosen to be important for given group of students and therefore included into the program of (introductory or advanced) research methods course.

Implications for education: can we help the students to become trilingual?

The question about the number of courses needed to become fluent in understanding or conducting the variety of methodological aspects of different types of empirical research studies is indeed an unanswerable one, as pointed out by Tashakkori and Teddlie (2003b, p.695). I tend to believe that even at best (meaning a situation in which there is a

relatively big amount of time assigned for research methods courses), the students can only get an overall framework and understanding of different research methods. To become trilingual or fluent in the use of a wider range of methods takes considerable motivation, independent reading and practical experience.

However, we can help the students to achieve at least the minimal overall literacy in research methods necessary to make their further independent learning effective. For that, I propose we should increase integration between different methodology courses and increase the time spent on reading and commenting actual pieces of research in the field related to students' interest. In addition, the value of small-scale research projects carried out during the methods course and/or integrating theoretical studies with the design process of students' dissertation project must be acknowledged.

It is not realistic nor desirable to assume that one lecturer can or should cover all the aspects of research methodology in depth with great expertise, but it is essential that all the courses, which we are able to deliver within the constraints of the curriculum, would be based on and led by a common overall model for empirical research. Thus, I suggest that, indeed, we should offer, after one or two introductory integrative methods courses, several more specific (compulsory or elective) courses which focus on some aspects of either qualitative, quantitative or combined approaches, but these courses should be taught in a way that students can easily fit the pieces of specific information and knowledge into the overall scheme of methodological aspects of research design. This minimal requirement seems to be neglected far too often; and therefore, even the students who have taken several courses on research methodology exhibit confusion about the basic concepts of research and experience difficulties in designing their own research projects.

Is it the right way to go? – students' voices.

The ideas about the relationship between quantitative and qualitative approaches, designing the courses and teaching of research methods presented above are based on the synthesis of current research results and supported by logical argumentation. However, the critical reader may ask for more profound empirical evidence to support proposed approach before adopting and implementing it in their pedagogical practice. During past two academic years five introductory courses on research methods designed in the light of the principles introduced in the paper have been offered for doctoral and master students in the universities of Tallinn and Tampere. As the study is still ongoing it is not yet possible to give any systematic results, but the preliminary analysis of student feedback is very encouraging. Practically all 30 students who have given written feedback by now are satisfied with the way the material was chosen, structured and presented in the course and emphasise that gained knowledge is of great help for them in organising their knowledge about research methods and thereby in preparing their final theses:

“The course was of crucial importance for my studies and future work as a researcher and supervisor. Without that knowledge I would have been in trouble with preparing my research plan, so it has helped me a lot already” (anonymous student, 2005).

As the course was offered for the doctoral students, several of them had taken one or more research methods courses before. In the informal feedback discussion these students pointed out that this was the first time they really got the overall picture of the field and it would have been much easier for them to follow other more narrow courses on research methods if they had the current course as first introduction to research methods:

“Actually this course surpassed my expectations. I had taken two courses on research methods – one was only about quantitative and even this was covered in part, the other one focussed on textual analysis only. From this course I finally got a very good overview of research methodology.” (anonymous student, 2005).

In more critical comments, some students pointed out that the material was rather complicated and the pace on the course was sometimes too hasty. It was also pointed out that even though the discussions with students about the topic covered are very important, it sometimes created the situation where some sub-themes were discussed in great detail, but because of the lack of the time the others were introduced only superficially. As there was also a lot of practical exercises which demanded reading of articles and other printed materials, students would have liked to get copies from the lecturer or from the internet instead of fetching them from the library.

The latter are very important aspects to take into account in teaching research methods, but none of these critiques questions the general principles for setting up the research methods courses introduced in this article. Thus, although more serious evidence is yet to be collected, it is obvious, that students' attitudes so far have been highly positive about the arrangement of the new research methods courses and thereby encourage continuing to work on proposed direction.

Acknowledgements

The study was supported by the Estonian Science Foundation (grant no 6148). Earlier version of the paper was presented at 6th International Conference on Education, Athens, Greece, May 21-23, 2004 and published in the proceedings of the conference (see Niglas, 2004b).

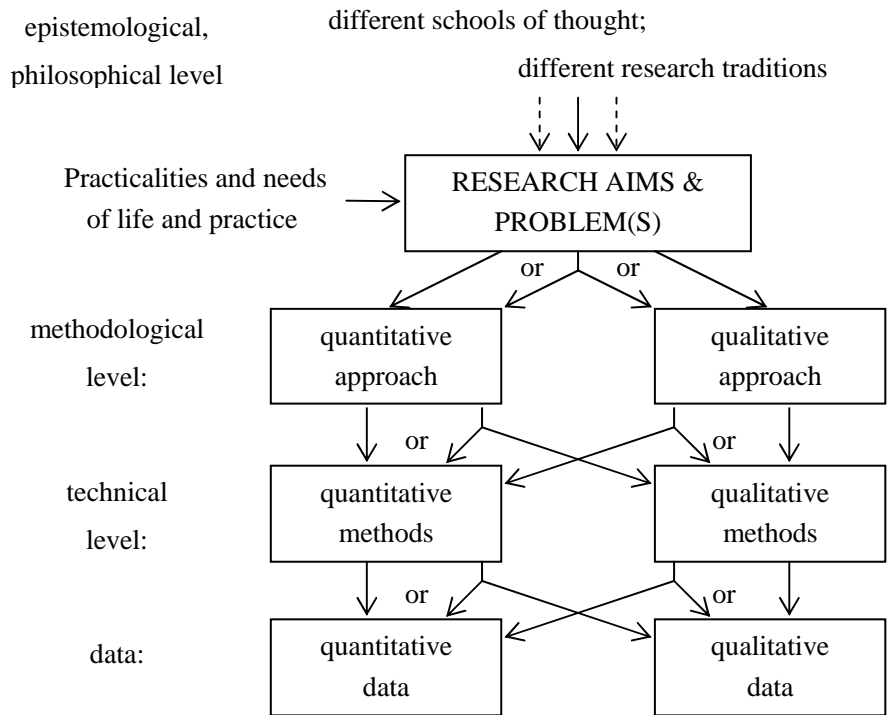
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Figure 1. *The levels of research in practice (adapted from Niglas 1999a)*



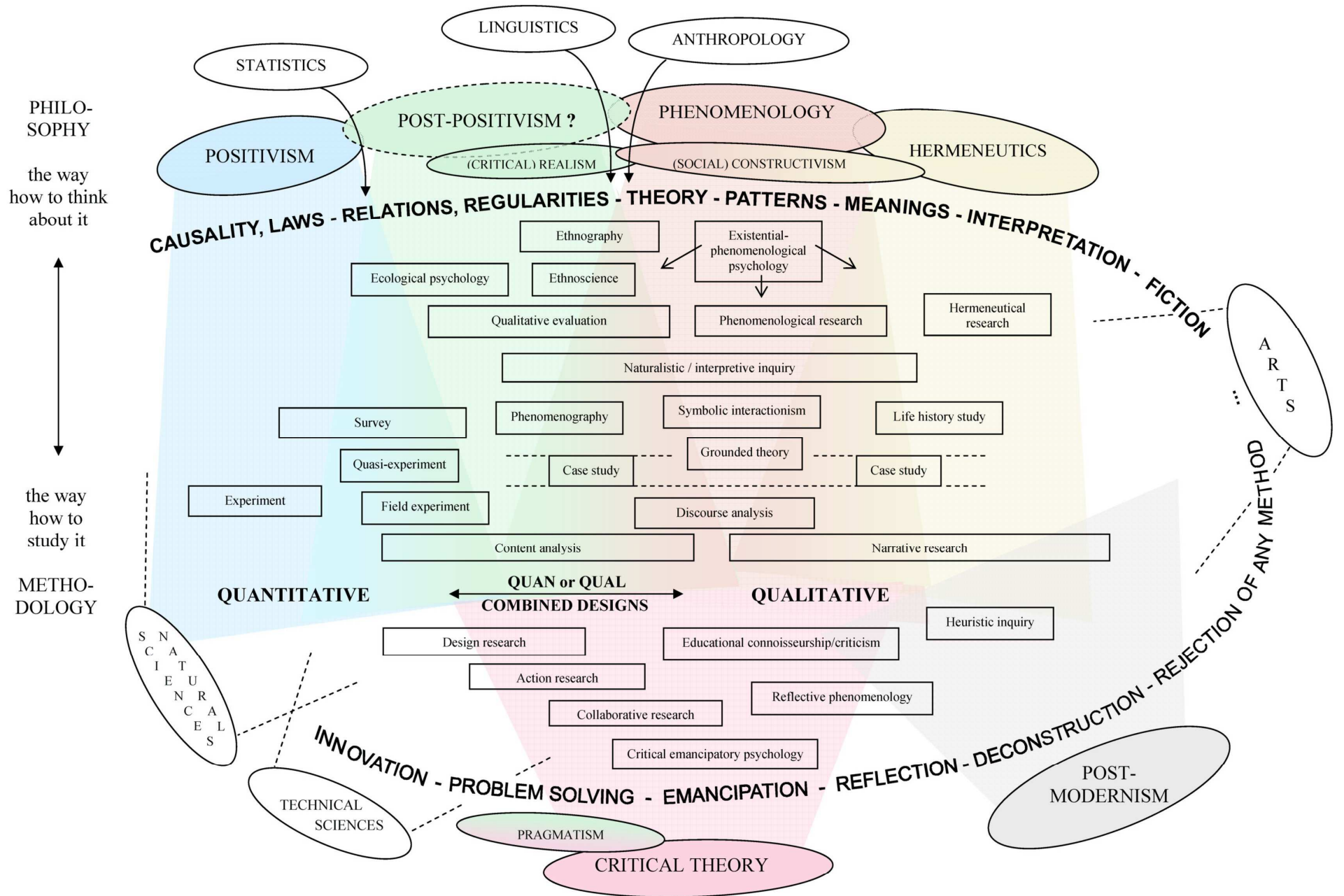


Figure 2: Relationship between philosophy and methodology in social science and educational research

Adapted from: Niglas, K. (2004) The Combined Use of Qualitative and Quantitative Methods in Educational Research. Tallinn Pedagogical University. Dissertations on Social Sciences. Tallinn:TPÜ Kirjastus. ISBN 9985-58-298-5. (short version: <http://www.ea.ee/e-rmtk/sotsiaalt.htm>)

Figure 3. *Three types of research for studying educational phenomena*

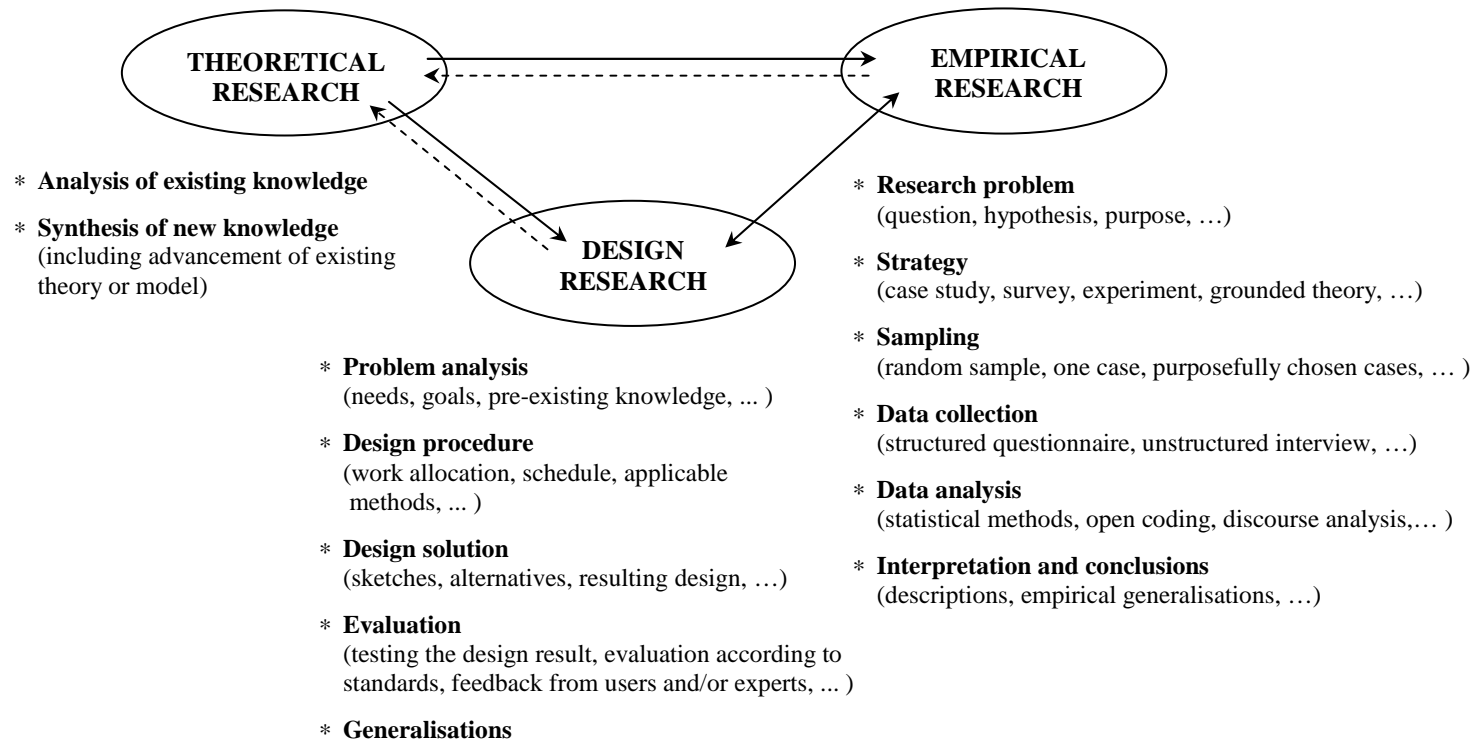


Figure 4. *Methodological decisions to be made and steps to be taken in the process of an empirical research study*

