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## **How the novice researcher can make sense of mixed methods designs**

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### **ABSTRACT**

The use of mixed methods designs has gained immense popularity in recent years, but as common to the fields in their first phase of fast development, the terminology and the concepts proposed to define and frame mixed methods research are growing increasingly more varied and technical at the same time. This tendency brings with it some hidden problems which novice researchers have to face in their pursuit from the stage of neophyte to the expert in methodological issues. This article demonstrates that pouring over the logic of more traditional research strategies (survey, experiment, case study, ethnography, action research, etc.) and deconstructing research designs into methodological aspects can facilitate the comprehension of the essential issues in the methodological construct of empirical research and thereby help novice researchers to cope better with the plurality of mixed methods designs proposed in the methodological literature.

**KEY WORDS:** research methods, empirical research, mixed methods designs

### **INTRODUCTION**

The paradigmatic view on research methods, advocated mainly by American methodologists in the last decades of the past century (but widely adapted by other authors as well), propose that there are two or three competing paradigms - sets of basic beliefs (or metaphysics) - in social and educational research which the researcher follows or should follow in their choice of methods and methodology. This view has been widely criticised in methodological literature (see e.g. Smith 1983, 1989; Smith & Heshusius 1986, Lincoln & Guba 1985, Guba & Lincoln 1989, 1994). Since the beginning of the 1980s, several papers have been published which argue that, even if there are

differences in the philosophical assumptions, quantitative and qualitative methodologies they are not mutually exclusive, and even the use of the concept of 'paradigm' in social science research is not appropriate in general (see e.g. Bryman 1988; Ekeberg & Hill 1980; Hammersley 1992; Howe 1988; McNamara 1979; Niglas 1999b; Reichardt & Cook 1979).

By drawing on examples of actual research practice and by conducting historical/theoretical analyses of the relevant issues, these and other authors have argued that a paradigmatic view of social and educational research is not valid either empirically or historically.

It is often argued today that it is the concrete research problem or aim rather than the philosophical position which determines the design (or the 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 (Bryman 1988; Hammersley 1992; Niglas 2004). Furthermore, it is widely accepted that within each strategy there is a possibility of either using quantitative or qualitative data or both regardless of the overall strategy of the piece of research. And finally, there is a possibility to use techniques and methods for data processing and analysis usually associated with the chosen general approach or to combine the methods of a qualitative and quantitative nature (See Figure 1).

<INSERT FIG 1 ABOUT HERE>

However, I want to emphasize that to deny the paradigmatic view on research methods does not mean that one has to argue that there is no influence at all of philosophical or theoretical frameworks to research practice at all (see also Niglas 2004). Figure 1 illustrates the complexity of the actual research practice in a reasonably simplified way showing that the type of problems and questions we choose to study depend on several things, probably most importantly on the ways we are used to thinking of the role of scientific endeavour and the ways the phenomena are conceptualized in particular research traditions. Additionally there are also more pragmatic aspects like the need to improve some practices or methodological skills that we have as researchers, resources like time and money, etc (see also Bryman 2007). My argument is that even though our choice of methods and methodology is inevitably influenced by many aspects and factors, to ensure the highest quality of the study, we have to demonstrate that our methodological approach is congruous with the purposes and exact questions our inquiry is set to answer. Thus, the other influences on the choice of methodology are (or should be) indirect, i.e. mediated by our research aims and questions.

Regardless the latter developments and the fact that the calls for the use of multiple methods in the framework of one study or a series of related studies are even older than the quantitative-qualitative debate (see e.g. Campbell 1957; Campbell & Fiske 1959; Campbell & Stanley 1963), the area of 'how, when and why different [research approaches] and methods might be combined' has received much

less attention than the philosophical aspects of the paradigmatic view on research methods (Bryman 1988: 155). That is the reason why I consider it important to discuss some design issues of mixed methods studies in this paper addressed to novice researchers.

## TYPLOGIES OF DESIGN

As pointed out in the introduction, the integration of qualitative and quantitative aspects in social research has gained much popularity in recent years and the ongoing debates about the relationship between qualitative and quantitative research approaches seem to have taken a turn from a philosophical world view towards a more pragmatic aspects of using mixed methods strategies for studies in various fields of social sciences. Both of these developments are welcomed and compelling in general, but both bring some hidden problems.

First, there seems to be an increasing pressure and an aroused but 'immature' readiness for postgraduate students and novice researchers in many fields to use a mixed methods approach for their research projects without further questioning if their work really benefits from it or if they have enough resources (knowledge, skills, time) to ensure the high quality of the chosen type of project. This situation is not made easier by the fact that as common to the fields in their first phase of fast development, the terminology and the concepts proposed to define and frame mixed methods research are growing increasingly more varied and technical at the same time.

The latter tendency can be well illustrated by looking at numerous attempts that different authors have made to chart mixed methods designs by developing taxonomies for studies combining quantitative and qualitative research (see e.g. Patton 1980; Brewer & Hunter 1989; Creswell 1995; Tashakkori & Teddlie 1998; Onwuegbuzie et al. 2007). I have compared some of the broad classifications of research designs that different authors have proposed in Table 1. Studying definitions of given categories, it becomes clear that in spite of different labels and the lack of one-to-one correspondence it seems feasible to organise classifications into three columns, so that categories in each column are conceptually close to one another. One should note that the dotted lines separating the columns in Table 1 highlight the lack of one-to-one correspondence between categories proposed by different authors. For more detailed descriptions of different possibilities of combining quantitative and qualitative approaches, this broad classification is usually further elaborated and divided into numerous subcategories (see e.g. Creswell & Plano Clark 2007; Tashakkori & Teddlie 1998, 2003b; Onwuegbuzie et al. 2007). What we can learn from these different sources is that, as in any developing area, there is a lack of terminological and even conceptual clarity and coherence. We can find many different labels for the same ideas and at the same time, authors use identical terms for different meanings.

Furthermore, the leading authors who have converged to compile the *Handbook of Mixed Methods* (Tashakkori & Teddlie 2003) have seemingly agreed to use the label 'mixed methods' as an umbrella term for all different designs where qualitative and quantitative aspects are combined in one way or another. The term 'mixed method' is used in the book at least at three different levels of typology<sup>1</sup>. However there still does not seem to be a final agreement between the different authors on whether a study to be classified as 'a mixed method(s) study' has to involve data-collection and analysis methods from both approaches (qualitative and quantitative) or not. For example, Creswell and Plano Clark (2007) have lately introduced the term 'studies in the gray areas' to overcome this problem (see Table 1) while Onwuegbuzie et al. (2007) include not only the studies from 'gray areas', but also pure designs ('monotype monoanalysis') into their mixed analysis matrix, which is labelled as 'A Typology of Analyses Involving Mixed Methods'<sup>2</sup>

<INSERT TABLE 1 ABOUT HERE>

This plurality, on the one hand, and the attempts to build more and more exhaustive typologies on the other hand, have an expected effect on the terminology in the field: it gets very specific and complicated but remains ambiguous at the same time (see also Bryman 2007). To summarise some central aspects of this tendency (Tashakkori & Teddlie 2003a: 32):

- \* there is a growing number of typologies of mixed methods research designs;
- \* none of these typologies is exhaustive;
- \* typologies vary by the criteria that are used to distinguish among the research designs;
- \* in some cases, the researcher may have to develop a new mixed methods design because none of the existing designs is best for his or her research project.

All this makes grasping the field of mixed methods rather complicated for novice researchers in general and especially understanding the typologies of combined designs. This argument is made mainly on the basis of my experience as an instructor and consultant of research methods at the university level as well as a reviewer for several academic journals. Indeed, there are also some published papers which refer to similar concerns (see for example Earley 2007).

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<sup>1</sup> This label is used in the title of the book, as well as in the titles of most of the contributions. On the other hand, 'mixed method design' is described as one specific type of combined designs (alongside with 'multimethod designs'), which further breaks up into 'mixed method research' and 'mixed model research' (Tashakkori & Teddlie 2003b: 683).

<sup>2</sup> It's not to dissagree so much with the proposed classification, but to see it mostly as a problem of wrong, and therefore confusing, labelling.

## HELPING NOVICE RESEARCHERS TO COPE WITH THE PLURALITY OF DESIGNS

The question is then how to best help novice researchers who are only starting their long journey of ‘discovering’ methods and methodologies available for conducting social research. They need to develop an *open* and *innovative* understanding of the emerging and quickly developing field of mixed methods research so that they can more easily start making sense and use of various views on defining mixed methods research and organising different combined research designs.

I argue that neither the tactic where one of the typologies will be chosen to be introduced exclusively nor the tactic where several typologies are introduced in parallel would give the best results in the context given above. The first tactic would lead to the closed and exclusive view of the field from which there is no easy way for the novice researcher to move in exploring the multiplicity of views and possibilities that are available. While the other tactic to be effective and not overly confusing would need considerable experience on conceptualising and also preferably also using various methods and methodologies in research practice which novice researchers (by definition) do not have.

Instead, the best strategy would be to start with providing a holistic framework for understanding the design of any piece of empirical research (including qualitative, quantitative and combined) and to help novice researchers to learn to ‘deconstruct’ this framework into different methodological aspects which all together define the design of a particular study. Indeed, the discussion on combining qualitative and quantitative aspects could also be viewed in a wider context as non-empirical theoretical studies have had an important role and place in social research for a long time. Lately there has been a move towards the acceptance of the principles of design research as a useful means of advancing our understanding in social sciences (Niglas 2004, 2007). However for the sake of clarity we will concentrate on the following empirical research.

## DECONSTRUCTING MIXED METHODS DESIGNS

Before being able to fully understand typologies of mixed methods designs, it is important to understand the logic of more traditional research strategies (or designs) such as surveys, experiments, case studies, ethnography, action research, etc. It should be pointed out that while some of these strategies are traditionally either predominantly qualitative or quantitative, the design for any particular study can be combined either by integrating two sub-designs with different strategies into one research project, or by integrating divergent methodological aspects (for example collecting both quantitative and qualitative data) within one overall strategy (see also Figure 1 and relevant discussion). Indeed, according to the

reviews of research practice, the latter is rather common for well-developed research strategies like case studies and action research projects, which are usually taken as qualitative strategies.

Furthermore, to grasp the possibilities of mixed methods designs, one has to realize the nature of the relationships between different methodological aspects within the design of a study. Figure 2 provides an elaborated version of methodological aspects of empirical research by emphasizing that decisions made for one aspect which influence the decisions one can make for the other aspects. However there is no one-to-one relationship between the methods and techniques available for different methodological stages. This means that there is a possibility to combine quantitative and qualitative elements within or between any methodological aspects of the study if this will help to get a more adequate and plausible answer to the research questions. Thus, even though it is obviously impossible and not reasonable to avoid the terms *qualitative* and *quantitative research* or *pure* and *combined or mixed designs*, I first and foremost emphasize the wide variety of choices one has regarding every methodological aspect on the one hand, and the need for coherence between the chosen methodological aspects on the other.

When these background ideas are understood, it is then much easier for a novice researcher to learn to make sense of and relate to each of the various typologies of mixed methods designs, purposes, analyses, etc.

<INSERT FIG 2 ABOUT HERE>

#### AN EMPIRICAL STUDY OF DESIGNS IN EDUCATIONAL RESEARCH

To demonstrate how the ideas presented above can help to understand and explain various combined designs used in actual research practice, I will present in the following some results of an empirical study which were undertaken a few years ago with the aim to enhance and extend the existing systematic knowledge about the various 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 they might have in the context of educational research (Niglas 2004). The aims of this study were triggered by the results of a preliminary small scale empirical investigation which focused on the paradigmatic confrontation of qualitative and quantitative approaches. It suggested that in research practice, quantitative and qualitative methodologies are not taken as mutually exclusive and incompatible paradigms, and depending on the nature and the complexity of a particular research problem, the design of a study can be either qualitative, quantitative or a combination of both (Niglas 1999).

Proceeding from the overall objectives and in regard to the understudied areas which pertain to the use of combined designs, a content analytical method based meta-analysis of studies using various combined or mixed designs was undertaken with the aim of clarifying several important (methodological) issues (see Niglas 2004). For the purposes of this article, only the first two of these issues will be tackled: *How are quantitative and qualitative elements related?* and *What kind of combined designs are used in research practice?*.

These objectives have led to a rather descriptive approach by looking for regularities and relationships. It also assumes that the result of the analysis would not be an entirely idiosyncratic interpretation of the material. Indeed, there was a hidden pursuit for certain representativeness and even generalizability embedded in the aims because the emphasis was on finding *common* features rather than looking for exemplary specimens one could find. Thus, the overall task led to a survey rather than to a case study strategy which was mostly used before in similar inquiries (Brannen 1992; Brown et al. 1996; Bryman 1988; Carey 1993; Maxwell et al. 1986).

According to Table 2, 1156 journal articles were subjected to preliminary review in total and out of those, 145 were classified as combining qualitative and quantitative approaches at some stage, and were therefore included in the final sample. Being purposive, this sample is not statistically representative of the whole body of reports of educational studies, nor of the studies combining qualitative and quantitative approaches. However, the sampling procedures were designed and used to construct a sample which could give as complete an overview as possible of the different ways qualitative and quantitative approaches have been combined in most influential studies in various areas of educational research. Further details of the design and sampling issues of this study can be found in Niglas (2004).

As the results of the suggested preliminary study suggested that it is not possible to reliably define one variable describing the overall approach of the study empirical studies were divided into three groups. They were based on the analysis of the five methodological aspects of the empirical study which were already described in the first section of this article:

- \* Strategy of the research
- \* Type of sample
- \* Data gathering methods
- \* Data recording and representation methods
- \* Data analysis methods

The three subgroups of empirical designs were then defined as follows:

*quantitative design* – empirical research where all 5 aspects of design described above can be classified as quantitative.

*qualitative design* – empirical research where all 5 aspects of design described above can be classified as qualitative.

*combined design* – empirical research where some of the 5 aspects of design described above can be classified as qualitative and some as quantitative, or some aspects can be classified as combined or mixed.

For the purposes of the further analysis of the methodology of the studies a detailed data collection instrument was composed. Considering the experience from previous studies and from other related inquiries, it was clear that the most widely used unit in content analysis – the *word* or *word sense* – was not applicable to this inquiry. The *whole article* was seen as an appropriate unit for analysis and a structured instrument with categories for all theme units relevant to a wide range of research questions was developed. However, in some aspects, it was later decided to use more of an open approach and a lot of open remarks and memos were also collected.

Substantial data analysis of this inquiry can be divided into three broad stages. In the first stage, articles were read thoroughly and analysed with the help of the research instrument. In addition to the structured data, unstructured information in the form of keywords and comments was collected by the means of intensive memo writing. In the second stage, which was first planned mainly for data entry, articles were briefly reviewed and an initial classification of studies emerged on the basis of a qualitative analysis of both structured and unstructured data. In the third stage, computer aided data analysis was performed, first on the basis of structured data by the means of various statistical techniques, and thereafter, on the basis of unstructured data by the means of open coding and categorisation. Results of these preliminary reviews are outlined in Table 2.

<INSERT TABLE 2 ABOUT HERE>

Thus, one can see that while focusing on the analysis of the methodological aspects of mixed methods studies, the design of the described inquiry also combined qualitative and quantitative aspects (though quantitative aspects were prevalent): the purposive sample is usually connected with a qualitative approach; however, the size of the sample makes it closer to representative samples usually characteristic of quantitative studies. Moreover, initially textual unstructured data was categorized and analyzed using both qualitative and quantitative methods.



## TWO EMERGING CLASSIFICATIONS OF COMBINED DESIGNS

As described above different strategies of analysis were employed at consecutive stages of the project which led to an emergence of two classifications of designs used in the sample of studied articles. In the following, these classifications as well as the logic they are based on, will be described briefly in order to help novice researchers see how systematic deconstruction of designs can lead to a deeper understanding and reconstruction of the common ways the methodological elements are combined in practice. The latter is indeed a valuable source for getting ideas about the possibilities that could be utilised when novice researchers come to design their own research projects.

During the initial analysis of the articles, several categories emerged which describe the main types of studies with combined designs or the main ways in which the combination has been implemented. These categories were not exclusive in their nature, which is perfectly acceptable, because in the framework of a single study the combination can be implemented in multiple ways. The first set of categories takes as a basis the overall strategy of the study. Five categories emerged into the design with a strategy traditionally belonging to a quantitative or qualitative approach with some elements from the other approach being utilised. These categories are listed as the first five in Table 3.

The qualitative component in experiments was most often an initially qualitative data set (e.g. transcripts of conversations, video recordings, textual materials produced during the experiment). In addition, in the framework of quasi- and field-experiments, the sample was typically not random nor big, which makes the experiment closer to a case study design. Typically, the qualitative component in surveys was a small-scale follow-up study where more in-depth insights of a small sub-sample of participants were gathered, using different forms of interview techniques. The third category is often also connected with the surveys where the instrument can be designed on the basis of a small-scale preliminary qualitative study and piloting. The latter two designs can be seen as studies with two sub-designs and if described in the framework of various mixed methods typologies, they mostly retain features of two-phase as well as dominant-less dominant designs where qualitative research facilitates quantitative research and the results of different approaches are taken as complementary (see Table 1).

As the purpose of the initial classification was to filter out a rough typology of designs in which qualitative and quantitative approaches have been combined, the category *qualitative design* is used here in its' broadest meaning, including some case studies, ethnographical, evaluation and a few other traditionally qualitative research studies. Only action research studies were so distinct by their design that it was decided to keep them separate from other traditionally qualitative designs. Both of these design types can be seen as combining qualitative and quantitative elements within different methodological aspects, while the purposes for combining different methods can be widely vary (see Table 1).

There was quite an even proportion of experimental, survey and qualitative designs in the sample, showing that, within all most common research strategies, the possibilities of a combined use of different approaches have been utilised.

The second set of categories takes the type of the initial data set(s) used in the study and the way these data have been analysed as a basis. It can be seen from Table 3 that, almost in a quarter of the studies, the most characteristic way of combination was considered to be a quantitative analysis of initially qualitative data. Some systematic quantitative representation of qualitative data was present in more than half of the studies in the sample. It becomes clear that more than 40% of the studies with combined designs in the sample have used only one type of data, thus using the combination of quantitative and qualitative approaches at other levels of design.

However, in many studies, both types of data were collected either by different data collection techniques or by the same instrument, in which both closed and open questions were posed to the participants. Mixed instruments can be questionnaires, interviews, various tests, etc. Another possibility here is that unstructured data, whether the only data set or not, will be finally analysed by quantitative methods. It may first require a qualitative analysis to create categories and then a more structured approach by which categories will be counted and possibly further analysed by statistical techniques. In some cases, a pre-existing category-system was used to quantify qualitative data; and therefore, all analysis was considered to be quantitative.

<INSERT TABLES 3 AND 4 ABOUT HERE>

The second classification of combined designs was based on the structured data about design characteristics. Starting with the simplest overview, the frequencies for five methodological aspects under study are presented in Table 4. The results indicate that most of the studies combined qualitative and quantitative ways of data recording and reporting. In other words, along with textual representation of data, in order to support the results, numerical accounts were presented in many articles. At the same time, combining qualitative and quantitative approaches within other levels of design did not occur with similar homogeneity. This suggests that there is a need for a finer classification of studies on the basis of their design characteristics.

To get more adequate classification of design types, in addition to the five variables described above, three variables were developed to clarify whether only one hybrid method/technique or both qualitative and quantitative methods were used on a particular level of design. Thus, eight variables formed a basis for further classification of studies. Although there are many statistical procedures available for the classification of objects, the methods of cluster analysis were considered particularly

suitable as the classification had to emerge from data and the objects belonging to the sample were not known beforehand for.

Table 5 lists the descriptions for emerging clusters with their sizes in the sample. It can be seen that there are three big clusters, hypothetically representing the more common types of combined designs, and five smaller clusters, hypothetically representing the less common ways of combining quantitative and qualitative approaches. The volume and the main focus of the argument in this short article does not allow describing emerged 8 design clusters in full detail.<sup>3</sup> However, I hope that this section has shed some light on the ways how the logic of ‘deconstruction’ of the design into methodological aspects can help to describe and understand different types of studies combining qualitative and quantitative approaches.

<INSERT TABLE 5 ABOUT HERE>

## CONCLUSION

It has not been the aim of this article nor of the empirical study described above to generate another fixed and all inclusive typology or taxonomy of mixed methods designs. To the contrary, I have argued that the best understanding of different possibilities to compile a design for a piece of empirical research can be gradually achieved through an open and creative, but at the same time a systematic and organised, view on relationships between different methodological approaches and/or aspects of design.

The following is just one final example which clearly shows that quite often it takes some background knowledge to understand the actual role and meaning of the concepts used as a basis for mixed methods typologies. One of the most common aspects emphasized in classifying mixed methods designs is whether the design is simultaneous or sequential, interpreted usually as if the qualitative and quantitative data are collected in parallel or one after the other (see e.g. the summary of typologies in Creswell & Plano Clark 2007). However, it is usually not clearly discussed that the timing of data collection may be purely a matter of practical arrangements and to understand if the timing makes any substantial difference in the logic of the design, one has to understand if qualitative and quantitative data are collected in the framework of the same or different sub-designs. It also needs to be considered if there is a built-in logic of integration between these sub-designs<sup>4</sup>, data collection methods<sup>5</sup> or data

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<sup>3</sup> Interested readers can turn to the author to get access to the full text of the dissertation (Niglas 2004).

<sup>4</sup> For example, qualitative case study is used to generate an instrument for a quantitative survey.

<sup>5</sup> For example, questionnaire data are used as a basis for open interviews with the same sample of participants in the framework of a case study.

analysis processes<sup>6</sup> or if the integration is only occurs in the phase of discussion after both sets of data have been collected and analysed independently.

In conclusion, I do not want to argue that more detailed (theoretical) classifications generated, for example, following different purposes of mixing qualitative and quantitative approaches, are not valid. The argument I want to propose in this summary is that the ability to ‘deconstruct’ the design of an empirical study into methodological aspects and having methodology related broad classification as a flexible framework for organising new ideas and knowledge in the background is important. The novice researcher will be better prepared and can more easily move on to make sense of the many technicalities- and purpose-based classifications of mixed methods designs such as those proposed by Creswell & Plano Clark (2007) or other authors.<sup>7</sup>

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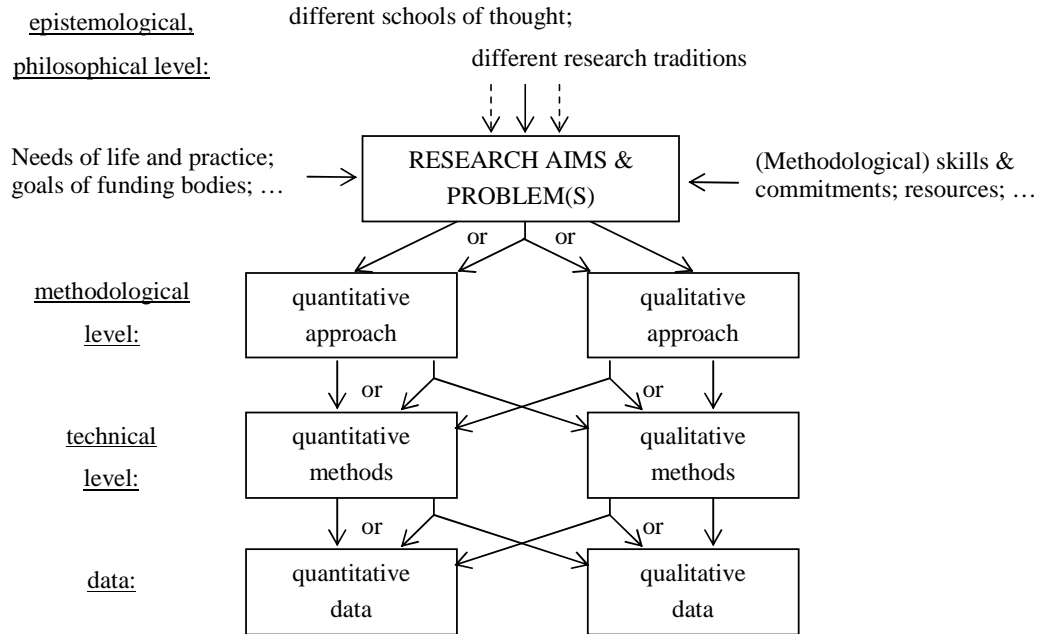
<sup>6</sup> For example, data are transformed so that different types of data can be analysed together.

<sup>7</sup> In the same book is an extended list of other similar classifications proposed by various authors since 1989.

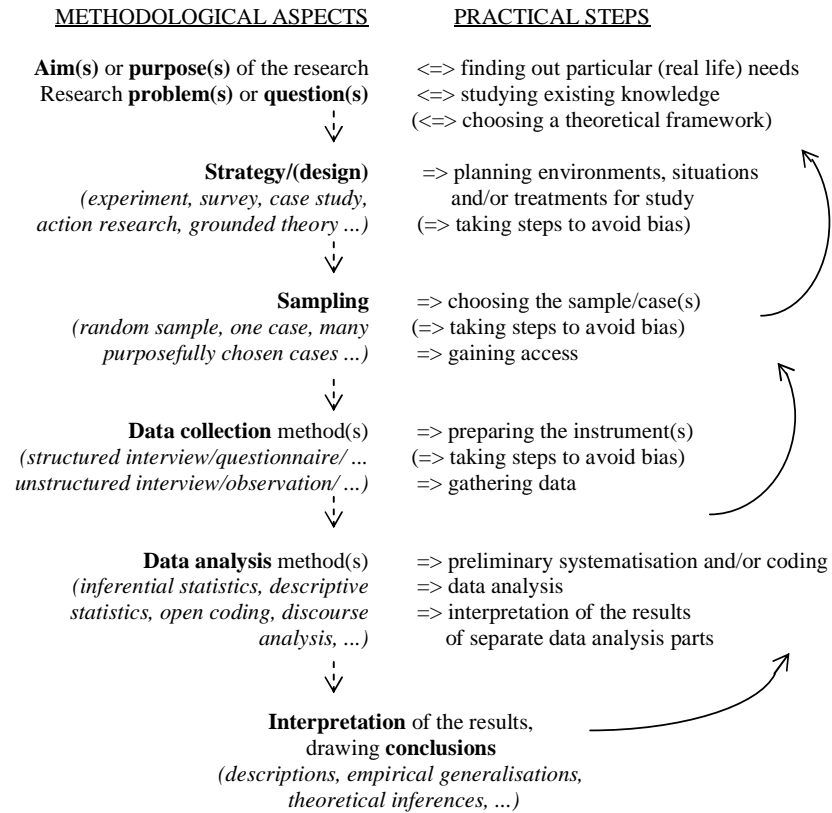
## REFERENCES

- Brannen J (1992) Combining qualitative and quantitative approaches: an overview. In Brannen J (ed.) *Mixing Methods: Qualitative and Quantitative Research*. Aldershot: Avebury.
- Brewer J and Hunter A (1989) *Multimethod Research: A Synthesis of Styles*. Newbury Park CA: Sage.
- Brown S, Riddell S and Duffield J (1996). Possibilities and problems of small-scale studies to unpack the findings of large-scale studies of school effectiveness. In Gray J, Reynolds D, Fitz-Gibbon C and Jesson D (eds) *Merging traditions: The future of research on school effectiveness and school improvement*. London: Cassell.
- Bryman A (1988) *Quantity and Quality in Social Research*. London: Unwin Hyman.
- Bryman A (2007) The Research Question in Social Research: What is its Role? *International Journal of Social Research Methodology* 10(1): 5-20.
- Campbell DT and Fiske DW (1959) Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin* 65: 81-105.
- Campbell DT and Stanley JC (1963) Experimental and Quasi-experimental Designs for Research on Teaching. In Gage NL (ed.) *Handbook of Research on Teaching*, Chicago: Rand McNally.
- Campbell DT (1957) Factors relevant to the validity of experiments in social settings. *Psychological Bulletin* 54(4): 297-312.
- Carey JW (1993) Linking qualitative and quantitative methods: Integrating cultural factors into public health. *Qualitative Health Research* 3: 298-318.
- Creswell JW (1995) *Research design: Qualitative and quantitative approaches*. Thousand Oaks CA: Sage.
- Creswell JW and Plano Clark VL (2007) *Designing and Conducting Mixed Methods Research*. Thousand Oaks: Sage.
- Earley MA (2007) Developing a Syllabus for a Mixed-Methods Research Course. *International Journal of Social Research Methodology* 10(2): 145-162.
- Eckeberg DL and Hill L (1980) The Paradigm Concept and Sociology: A Critical Review. In Guttin G (ed.) *Paradigm and Revolutions. Appraisals and Applications of Thomas Kuhn's Philosophy of Science*. Notre Dame, London: University of Notre Dame Press.
- Edelson DC (2002) Design Research: What We Learn When We Engage in Design. *The Journal of the Learning Sciences* 11(1): 105-121.
- Guba EG and Lincoln YS (1989) *Fourth Generation Evaluation*. London: Sage.
- Guba EG and Lincoln YS (1994) Competing Paradigms in Qualitative Research. In Denzin NK and Lincoln YS (eds) *Handbook of Qualitative Research*. London: Sage, pp. 105-117.
- Hammersley M (1992) *What's Wrong with Ethnography? Methodological Explorations*. London: Routledge.
- Howe K (1988) Against the Quantitative-qualitative Incompatibility Thesis or Dogmas die Hard. *Educational Researcher* 17(8): 10-16.
- Lincoln YS and Guba EG (1985) *Naturalistic Inquiry*. Beverly Hills CA: Sage.
- Mark MM and Shotland RL (1987) Alternative models for the use of multiple methods. In Mark MM and Shotland RL (eds) *Multiple methods in program evaluation: New Directions for Program Evaluation* 35. San Francisco: Jossey-Bass, pp. 95-100.

- Maxwell JA and Loomis DM (2003) Mixed Methods Design: An Alternative Approach. In Tashakkori A and Teddlie C (eds) *Handbook of mixed methods in social and behavioural research*. Thousand Oaks: SAGE, pp. 209-240.
- Maxwell JA, Bashook PG and Sandlow CJ (1986) Combining ethnographic and experimental methods in educational evaluation. In Fetterman DM and Pitman MA (eds) *Educational evaluation: Ethnography in theory, practice, and politics*. Beverly Hills CA: Sage.
- McNamara DR (1979) Paradigm Lost: Thomas Kuhn and Educational Research. *British Educational Research Journal* 5(2): 167-173.
- Niglas K (1999a) Quantitative and Qualitative Inquiry in Educational Research: is there a paradigmatic difference between them? Masters Thesis. Cambridge University, Faculty of Education.
- Niglas K (1999b) Quantitative and Qualitative Inquiry in Educational Research: is there a paradigmatic difference between them? Paper given at ECER99, Lahti, 22-25 September 1999; *Education Line*. Available at <http://www.leeds.ac.uk/educol/>.
- Niglas K (2004) The Combined Use of Qualitative and Quantitative Methods in Educational Research. Tallinna Pedagoogikaülikooli Sotsiaalteaduste Dissertatsioonid. Tallinn:TPÜ Kirjastus. Available at <http://www.tlulib.ee/files/arts/24/niglaf737ff0eb699f90626303a2ef1fa930f.pdf>
- Niglas K (2007). Introducing the quantitative-qualitative continuum: An alternative view on teaching research methods courses. In Murtonen M, Rautopuro J and Väisänen P (eds) *Learning and teaching of research methods at university* pp.185 – 203, Turku: Finnish Educational Research Association, Painosalama OY. Available at Education Line <http://www.leeds.ac.uk/educol/>
- Onwuegbuzie AJ, Slate JR, Leech NL, Collins KM (2007) Conducting mixed analyses: A general typology. *International Journal of Multiple Research Approaches* 1(1): 4-17.
- Patton MQ (1980) *Qualitative evaluation and research methods*. Newbury Park CA: Sage.
- Reichardt CS and Cook TD (1979) Beyond Qualitative versus Quantitative Methods. In Cook TD and Reichardt CS (eds) *Qualitative and Quantitative Methods in Evaluation Research*. Beverly Hills CA: Sage, pp. 7-32.
- Smith JK and Heshusius L (1986) Closing Down the Conversation: the End of the Quantitative-Qualitative Debate among Educational Inquirers. *Educational Researcher* 15(1): 4-12.
- Smith JK (1983) Quantitative versus Qualitative Research: An Attempt to Clarify the Issue. *Educational Researcher* 12(3): 6-13.
- Smith JK (1989) *The Nature of Social and Educational Inquiry*. Norwood NJ: Ablex.
- Tashakkori A and Teddlie C (1998) *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. Thousand Oaks CA: Sage.
- Tashakkori A and Teddlie C (2003a) Major Issues and Controversies in the Use of Mixed Methods in the Social and Behavioural Sciences. In Tashakkori A and Teddlie C (eds) *Handbook of mixed methods in social and behavioural research*. Thousand Oaks: SAGE, pp. 3-50.
- Tashakkori A and Teddlie C (2003b) The Past and Future of Mixed Methods Research: From Data Triangulation to Mixed Model Designs. In Tashakkori A and Teddlie C (eds) *Handbook of mixed methods in social and behavioural research*. Thousand Oaks: SAGE, pp. 671-702.
- Tashakkori A and Teddlie C (eds) (2003) *Handbook of mixed methods in social and behavioural research*. Thousand Oaks: SAGE.
- Tooley J (1998) *Educational Research: a Critique: a Survey of Published Educational Research*. London: Office for Standards in Education.



**Figure 1: The choice of methodology and methods for a study in practice**



**Figure 2: Methodological decisions to be made and steps to be taken in the process of an empirical research study**



**Table 1: Classifications of studies by their ways of using/combining quantitative and qualitative approaches and respective labels used by various authors** (adapted from Niglas 2004)

Proposed classifications:	pure designs	combined or mixed designs	
	<i>purely quantitative or purely qualitative designs (may involve the use of several data sources and/or data-gathering instruments from the same approach).</i>	<i>designs where both quantitative and qualitative approaches are used, but they remain relatively independent until the interpretation stage.</i>	<i>designs where elements of quantitative and qualitative approach are combined in various ways within different phases of the study.</i>
Creswell & Plano Clark 2007	quantitative study; qualitative study; (studies in gray areas)	triangulation design; explanatory design; exploratory design	embedded design
Tashakkori & Teddlie 1998	monomethod studies	mixed method studies	mixed model studies
Creswell 1995	quantitative study; qualitative study	two-phase design; dominant-less dominant design	mixed-methodology design
Brewer & Hunter 1989	monomethod studies	multimethod studies	composite method studies
Bryman 1988	quantitative study; qualitative study	ten different ways of integration	methodological hybrids
Mark & Shotland 1987	quantitative study; qualitative study	Triangulation*; bracketing model*; complementary multiplism	
Patton 1980	quantitative study; qualitative study	Triangulation	mixed-methodology design
* These models can be used within the purely quantitative or qualitative studies as well.			

**Table 2: Results of the preliminary review of journals included into the sample**

Journal	Where published	Total number of articles reviewed	Non-empirical study	Quantitative design	Qualitative design	Combined design	Combined (% of all)	Combined (% of empirical)
1 European Early Childhood Education Research Journal	eu/br	36	11	8	9	8	22%	32%
2 Educational Studies	br	83	31	21	13	18	22%	35%
3 European Journal of Teacher Education	eu/br	58	26	8	12	12	21%	38%
4 British Educational Research Journal	br	93	35	20	19	19	20%	33%
5 Educational Action Research	br	81	16	0	53	12	15%	18%
6 Teaching and Teacher Education	am	166	31	27	84	24	14%	18%
7 Scandinavian Journal of Educational Research	sc	71	22	27	12	10	14%	20%
8 Journal of Educational Research	am	95	6	68	9	12	13%	13%
9 Early Childhood Research Quarterly	am	68	6	50	5	7	10%	11%
10 The Journal of Experimental Education	am	42	17	20	1	4	10%	16%
11 Comparative Education	br	66	48	8	4	6	9%	33%
12 Higher Education	intern	66	27	20	14	5	8%	13%
13 International Review of Education	intern	85	60	10	10	5	6%	20%
14 International Journal of Qualitative Studies in Education	int/br	116	49	0	64	3	2,6%	4,5%
15 Adult Education Quarterly	am	30	10	3	17	0	0%	0%
		<b>1156</b>	395	290	326	<b>145</b>	13%	19%

**Table 3: Results of the qualitative overview**

Ways of combination	As a main feature		As used	
	Count	Percent	Count	Percent
(quasi-)experiment with a qualitative component	23	16%	42	29%
survey with a qualitative component	23	16%	40	28%
qualitative study for the development of an instrument	5	3%	7	5%
qualitative design with a quantitative component	16	11%	47	33%
action research with a quantitative component	12	8%	16	11%
qualitative data - quantitative analysis	34	24%	76	53%
mixed instrument	11	8%	33	22%
both types of data			85	56%
multiple ways of mixing	16	11%	26	18%
not mixed within the levels	4	3%	6	4%
<b>Total</b>	<b>144</b>	<b>100%</b>		

**Table 4: Categorisation of studies by five methodological design aspects (N=142)**

	quantitative	mainly quantitative	mixed can be both	mainly qualitative	qualitative	Total
Strategy	14.1%	5.6%	50.0%	2.1%	28.2%	100.0%
Sampling	9.2%	4.2%	41.5%	6.3%	38.7%	100.0%
Data gathering methods	2.1%	19.0%	23.9%	26.1%	28.9%	100.0%
Data recording and reporting	3.5%	2.1%	91.5%	2.1%	0.7%	100.0%
Data analysis methods	13.6%	24.3%	30.0%	25.0%	7.1%	100.0%

**Table 5: Eight clusters emerging from quantitative analysis**

	<b>Cluster description</b>	<b>Cluster size</b>
1	Mixed design or two sub-design studies with mainly QL data and anal	30
2	QL studies with some use of QN data and numeric reporting	33
3	QL studies with QL data and mainly QN analysis	12
4	Studies with mainly QL strategy and mainly QN data and anal	7
5	Two sub-designs - mainly QN (surveys)	32
6	QN studies with initially QL data and QN anal	9
7	QN studies with non-random sample and little use of QL data and anal	8
8	Mixed model designs with mainly QL data and anal	11

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