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QUANTITATIVE AND QUALITATIVE INQUIRY IN EDUCATIONAL RESEARCH:

Is There A Paradigmatic Difference Between Them?

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Introduction

This paper will discuss and analyse methodological problems of educational inquiry and especially the distinction between quantitative and qualitative approaches of research. Problems in that area have been of concern for a long time and have been the reason for many debates among educational researchers since mid 19th century. During the 1970s and 80s the critique against quantitative research which had dominated the field for several decades got so extensive that some authors have called this period an era of 'paradigm wars' (Gage 1989, Hammersley 1992b).

Thus, during last decades there has been fundamental disagreement in many aspects concerning research methodology and the principles, which should underlie educational research and it is obvious from the methodological literature that the debates on these matters are still going on. On the other hand there has been recently a serious critique of the quality of present educational research practice (Tooley 1998, Hargreaves 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: xiii).

I hope that the study presented in this paper can make a modest contribution to clarifying some of those important methodological issues and their connections with research practice.

Theoretical framework

It is very common in the debates between proponents of quantitative and qualitative methodologies and in methodological textbooks that several polar differences between qualitative and quantitative approaches are emphasised. The terms quantitative and qualitative research are usually seen to signify more than different ways of gathering data – they are taken to denote divergent assumptions about the nature and purpose of research in the social sciences (Bryman 1988). McLaughlin (1991) has thoroughly analysed this phenomenon and has composed a long (but not exhaustive as she notes) list of dichotomies, present in methodological papers and monographs of the field (see Table 1).

Although speaking about the history of debates between quantitative and qualitative methodologies we can refer back to the 19th and even the 17th centuries (Rizo 1991, Smith 1983a), I think that during past 30 years these debates have been taken to another level, especially after Thomas Kuhn had published his work concerning different paradigms in the research (Kuhn 1970). Originally the idea of paradigms was used in the context of natural sciences, but some social and educational researchers have very readily taken over his idea of paradigms and use it in the context of educational research.

Table 1. *Common dichotomies in methodological literature*

qualitative	**quantitative**
subjective	objective
inductive	deductive
participant observation	survey techniques
anthropology	sociology
naturalism	anti-naturalism
art	science
hermeneutics	positivism
aristotelian	galilean
teleological	causal
finalistic	mechanistic
understanding	explanation
verstehen	erklaren
phenomenological	logical positivism
micro	macro
* bad	good
descriptive	predictive
empiricism	rationalism
atheoretical	theoretical

* for oppositions under the line the side of the above list to which they should be attached would depend on the side with which the writer/reader has identified him or her self (McLaughlin 1991: 294)

In the earlier days of the debates between proponents of qualitative and quantitative approaches the issues were often technical in nature, concerning the precision, generalisability, relevance or practical value of research findings. During the 1970s these debates gradually became of a more fundamental nature. Some methodologists started to argue that to see the distinction between quantitative and qualitative methodologies only as a technical matter and to accept the complementary nature of different approaches is misleading as these methodologies are derived from fundamentally different epistemological and worldview positions and are therefore incommensurable (see for example Smith 1983a, 1989, Smith & Heshusius 1986, Lincoln & Guba 1985, Guba & Lincoln1989, 1994).

Smith (1983b, 1989) has identified three main areas of disagreement between quantitative-realist and interpretive-idealist perspectives: the relationship of the investigator to what is investigated, the relationship of facts and values and the goal of social and educational inquiry. According to him the fundamental differences in these three areas determine the divergent role of procedures in the inquiry process.

Probably the most systematic overview of the 'competing paradigms' in social and educational research has been given by Guba and Lincoln (1985, 1989). While in the earlier publications they write about the contrasting positivist and naturalist axioms (Lincoln & Guba 1985: 37) in recent papers they identify three interconnected fundamental questions which determine the paradigm – set of basic beliefs (or

metaphysics), which the researcher follows (or should follow) (Guba & Lincoln 1989, 1994). Table 2 gives a short overview of these three questions and distinctions between conventional and constructivist paradigms in relevant dimensions.

Table 2. *The conventional and constructivist Belief Systems (Adapted from Guba and Lincoln 1989)*

Fundamental questions	**Conventional beliefs**	**Constructivist beliefs**
What is there that can be known? – ONTOLOGY	REALISM	RELATIVISM
What is relationship of the knower to the known (or knowable)? – EPISTEMOLOGY	OBJECTIVIST	SUBJECTIVIST
What are the ways of finding out knowledge? – METHODOLOGY	INTERVENTIONIST	HERMENEUTIC

Thus, usually if somebody talks about paradigms in the educational research he/she refers to positivism and confronts it to interpretivism or constructivism. On that level paradigm means whole set of philosophical ideas, but what is important from the point of view of present study is that usually these paradigms are taken as tightly bound to specific ways of doing research. It has become very common in methodological literature that quantitative approach is described as belonging to positivistic paradigm and qualitative approach to interpretive paradigm. From that on there is a very little step towards talking about antagonistic quantitative and qualitative paradigms for educational research. This logic widely used by interpretivists/incompatibilists is presented on the Figure 1. Their assumption is that particular methods follow from the general methodological positions, which themselves follow from or are part of the '(meta)-theoretical positions' (Platt 1986: 502).

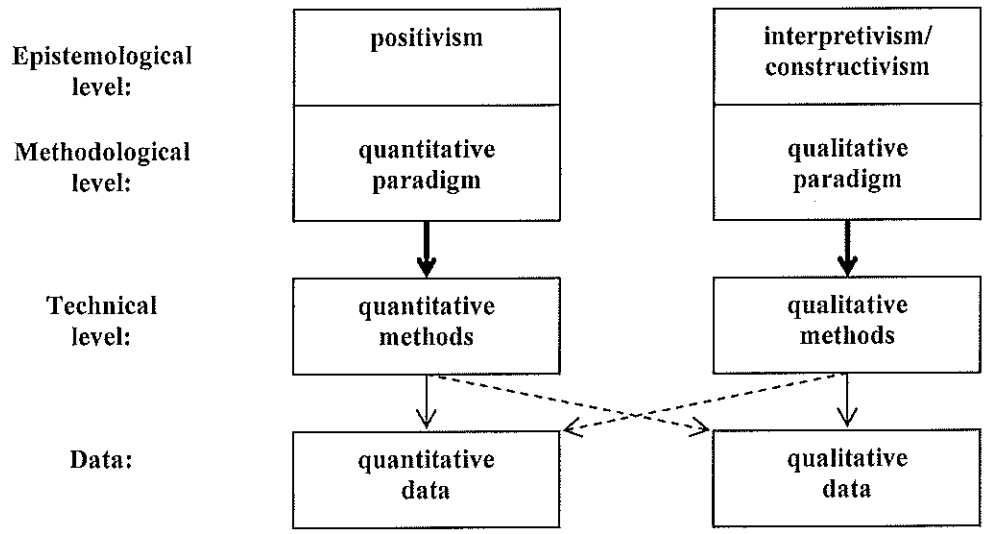

Figure 1. *Different levels of research as seen by interpretivists/incompatibilists*

Lets have a closer look at the paradigmatic viewpoint and ask what are the consequences of such radical linedrawing between different approaches for the research practice, what it really means to talk about qualitative and quantitative paradigms in the context of educational research?

If we look back to the original meaning of the term *paradigm* we can see that paradigmatic view proposes tight relationship between paradigms and the research methodologies one can use, which brings with it some inevitable features like:

* *incommensurability and incompatibility,*
  which means that qualitative and quantitative approaches could/should not be used in the context of the same study not to talk about mixing of them;
* *competition for dominance,*
  which means that finally one of these approaches will be abandoned by the research community as inappropriate way of doing research;
* *'paradigm blindness',*
  which means that every researcher can be committed to only one of these approaches and therefore use either qualitative or quantitative methods but not both in his/her research practice. Further more, researchers from one paradigm should be blinded to possible contributions from another paradigm.

The tendency to bind different epistemological positions with particular methodologies has been widely criticised in the methodological literature. Since the beginning of 1980's there have been several papers published, which argue that even if there are differences in the philosophical assumptions, quantitative and qualitative methodologies are not mutually exclusive and even that the use of the concept of 'paradigm' in educational research is not appropriate in general (see for example Bryman 1988, Eckeberg and Hill 1980, Hammersley 1992b, Howe 1988, McNamara 1979, Reichardt & Cook 1971). By drawing on examples of actual research practice and by conducting historical/theoretical analysis of relevant issues, these authors have argued that a paradigmatic view of social and educational research is true neither empirically nor historically.

First, they argue that none of differences between quantitative and qualitative methodologies outlined earlier take the form of diametrically opposite practices, but rather make up a continuous scale on which qualitative and quantitative studies are not at all simply positioned. A second point they make to support their position is that there has been and still are a lot of qualitative researchers who hold quite clearly realist ontological position as well as quantitative researchers whose ontological position is nearer to idealism and relativism than to realism (Reichardt & Cook 1979, Hammersley 1992a, 1992b, 1995, LeCompte 1990).

It is argued that there are major differences in philosophical and methodological preferences within the camp of qualitative researchers as well as within the ranks of quantitative researchers and that research practice is much more complicated than that proposed by a paradigmatic view. For example Keat and Urry (1975) argue against the common tendency to neglect the differences between realist and positivist positions. Howe (1988: 13) has argued that the two exclusive epistemological paradigms which incompatibilists seem to have to offer do not exhaust the possibilities and that pragmatists 'would clearly reject the forced choice between the

interpretivist and positivist paradigms'. Hammersley (1992a: 134) joins with the latter position writing that 'even an expansion to six paradigms would still not satisfactorily cover the potential, or even actual, range of methodological views to be found amongst educational and social researchers'.

In addition to these analytical accounts there has been some empirical work clarifying the relevant issues as well. Freidheim (1979) conducted an interesting study which took him to the conclusion that theoretical positions usually characterised as distinct paradigms in the field of social and educational research are in practice largely overlapping positions rather than distinct epistemological paradigms.

Snizek (1975, 1976) conducted in US a systematic study of 1,434 articles published in nine major sociological journals from 1950-1970 with the aim of clarifying the exact form of the relationship between those authors' theoretical approaches and their methodological techniques. His conclusion was that there is no clear relationship between theory and method and, contrary to expectations, writers with a realist theoretical position tended to use methodology which was less empirical than those with a nominalist theoretical position.

Platt (1986) reached similar conclusions while investigating the relationship between functionalism and survey method. She concluded her thorough study, consisting of interviews with leading functionalists and survey researchers and analysis of their work, with the statement that the functionalism and survey methodology 'originated independently, and that leading functionalists had no special propensity to use surveys and leading surveyors no special penchant for functionalism' (*op.cit:* 527).

The only empirical study, which seems to favour the paradigmatic view is Firestone's small-scale study where he compared two research studies and concluded that there is a rhetorical connection between method types and paradigms. But he left it open how tight or consistent this link between paradigm and method is and suggested that 'one's method is not as rigorously determined by the choice of paradigm as the purists suggest' (Firestone 1987: 20).

Design of the Study

In the light of that discussion about differences between qualitative and quantitative methodologies presented above, I set up the following research question for the small-scale empirical study presented in this paper:

- ***Is it the case in research practice today that quantitative and qualitative approaches are distinct mutually exclusive paradigms for educational research?***

As we have seen earlier in this paper the paradigm thesis implies necessary connections between philosophical positions and research strategies. Therefore, if quantitative and qualitative research are taken to represent divergent epistemological positions or paradigms, they are likely to exhibit incompatible views about the way in which social reality ought to be studied (Bryman 1988: 107). If true, this position should lead to high personal consistency and sustained choice of the same kinds of research strategies. Furthermore, the paradigmatic account should pose many problems in regard to the possibility of combining qualitative and quantitative

approaches or elements of these approaches. Following that logic I saw the way to go about answering my research question through systematic analysis of research papers in the light of different features of basic aspects usually connected with quantitative and qualitative methodologies with the aim to clarify *whether particular studies follow clearly only one of two broad methodological approaches or do they combine these approaches or mix aspects from both of them in the framework of one study.*

Overall design and strategy issues

Because of the time and resource constrains it was inevitable to define quite narrow scope for the study. It was decided to focus only on the British context and to use published reports of actual studies as a data source. From the variety of types of published research reports (dissertations, monographs, articles in edited volumes, articles in academic journals, papers presented n the conferences, etc.) I chose to study only journal articles because articles in academic journals are a significant 'part of what educational researchers get up to [and] ... they are, more than anything else, what defines us as researchers' (Tooley 1998: 9). Having considered different possible sample designs I decided not to try to make a random sample from articles of all British academic journals on educational research, but to make a systematic analysis of the articles published in British Educational Research Journal. As this journal is the organ of the British Educational Research Association (BERA), it can be considered to be of a particular importance on the field of educational research in Britain. On the other hand, we can see from recently published statistics (see Tooley 1998), that compared to some other influential educational research journals the British Educational Research Journal contains the largest proportion of empirical studies and the balance between the quantitative and qualitative studies is quite suitable for my purposes as well.

During the piloting it was decided that the sample should comprise all articles from volumes 22-25 (years 1997-99). There was altogether 84 reports published in these volumes from which 38 were categorised as non-empirical and excluded from further analysis. Thus, the final sample consists of 46 research articles, which report at least some results of empirical investigation. It is obvious, that my sample does not represent the whole body of British educational research and even not the research published during these years in all British academic serials on educational research. Therefore, the sample and the population in this study can be seen as equal and any generalisations to the wider context are inevitably tentative.

To answer my research question I undertook systematic content analytical study of chosen research papers in the light of different features of basic aspects usually connected with quantitative and qualitative methodologies. The aim was to clarify whether particular studies follow clearly only one of two broad methodological approaches or combine these approaches, mixing aspects from both of them in the framework of one study.

First I decided to take the whole article as the unit for my analysis and classify articles according to all relevant aspects either as quantitative or qualitative. After intensive piloting and several attempts to define suitable variables and categories for my analysis I formulated nine main aspects of interest, which can be seen as main variables in my content analytical study:

* Aims of the research
* Strategy of the research
* Type of sample[1]
* Data gathering methods
* Data recording and representation methods
* Data analysis methods
* Type of claims
* Validation methods

During the attempt to define main categories, *qualitative* and *quantitative*, for these variables it dawned upon me that it is not reasonable and feasible to classify *claims* by these two categories. Piloting the research instrument indicated that in order to guarantee mutually exclusive categories there was a need to use in addition to the two main categories some supplementary categories like *mixed, other/not clear/may be both*, and *not reported.*

The reliability study showed that for most of these variables the intercoder agreement was 100%. For two of these eight variables: *aims* and *validation methods*, the agreement rate was 80%, which gave quite low agreement coefficients ($\alpha \approx 0.4$) [2]. This coefficient can be interpreted as the agreement above chance is approximately 40%. But in the context of that small-scale study the agreement rate of 80% was still considered as sufficient.

For categorising the claims authors had made I used the following classification, where the terms 'generalisation' and 'description' are used in their wide sense, involving any comparisons, explanations, predictions etc.:

1) Description of the sample/cases studied involving exact numerical accounts or referring to the exact numerical accounts in related table, appendix, etc.
2) Description of the sample/cases studied involving non-exact numerical accounts
3) Description of the sample/cases studied not involving any numerical accounts
4) Empirical generalisation to population
5) Theoretical inference
6) Generalisation but not clear whether to sample or to some wider population or theoretical.

As the recording unit in my study was the whole article and not a sentence or theme, these categories form six variables for my analysis with two possible values: 'present in the text' and 'not present in the text'. This approach gives less exact data because here one claim has the same weight as any other number of claims, but is more reliable and of satisfying precision for the purposes of my small-scale study.

While working out exact definitions for categories and piloting the instrument I faced

[1] Here the term *sample* is used in its wider sense that means not only as a part of population, but whatever set of objects/subjects are under study.

[2] The *agreement coefficient for canonical data* presented by Krippendorf (1980) was calculated.

several problems with last three categories for claims. These problems were further emphasised by the low results of the first reliability study for these variables. Preliminary analysis of the articles showed that it is very hard to distinguish between empirical and theoretical generalisations. Hammersley (1990: 55) has pointed to the same phenomena while talking about the ethnographic research:

> Ethnographer are often not clear about whether they are using theoretical inference or empirical generalisation ... . Frequently, there are appeals to both strategies without the difference between them being recognised.

To overcome this problem I had to make very detailed definitions for these problematic categories and the second reliability study gave satisfactory results (agreement rate at least 80%) (see Niglas 1999 for further discussion).

Data Analysis and Findings

Having constructed my research instrument I could set up some more concrete research questions. Concentrating on eight important aspects characterising a research study the questions of main interest would be: [3]

- ✓ *Is it made clear by the authors of studies whether their research is deriving from a qualitative or quantitative 'paradigm'?*
- ✓ *Is there a consistency of a paradigmatic kind between these eight aspects of inquiry?*

or in other words:

- ✓ *Can we draw a clear line between qualitative and quantitative studies?*

If not then:

- ✓ *What is the inter-relationship between different aspects?*
- ✓ *What aspects are more commonly used in the same (consistent) way and where is there a tendency to mix quantitative and qualitative aspects in the same study or quantitative and qualitative features/methods within the same aspect of study?*

and

- ✓ *Is it possible to classify studies into some other categories than qualitative/quantitative on the basis of the selected methodological aspects?*

With these questions in mind, we can now go on to discuss the analytical techniques and the results of my analysis.

Frequencies - What is the proportion of mixed approaches within each of seven methodological aspects of interest?

To start with the simplest overview of the data I calculated the frequencies for every methodological aspect under study. The results presented in Table 3 and in Figure 2 show that there are a lot of studies in the sample which mix quantitative and qualitative features on different levels of inquiry.

[3] The eight aspects are: aims, strategy, sampling, data gathering methods, data recording methods, data analysis methods, validation methods and claims.

Table 3. *Classification of studies by methodological aspects*

	Aims	Strategy	Sampling	Data gathering	Data recording	Data analysis	Validation
quantitative	23.9	50.0	37.0	39.1	41.3	47.8	8.7
qualitative	19.6	26.1	37.0	17.4	21.7	23.9	8.7
mixed	19.6	4.3	8.7	34.8	37.0	28.3	13.0
not clear	37.0	19.6	17.4	8.7	0.0	0.0	69.6
Total	100%	100%	100%	100%	100%	100%	100%

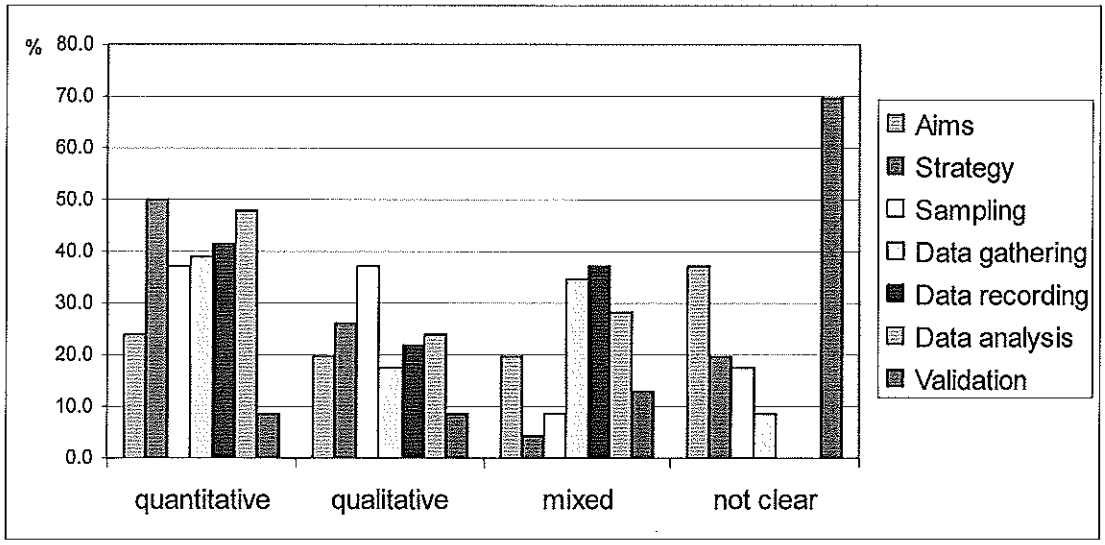

Figure 2. *Classification of studies by methodological aspects*

In the case of mixed method studies, where possible, it was additionally identified whether the main data gathering method was quantitative or qualitative. These results are presented in Table 4.

Table 4. *Classification of studies by data gathering methods*

Data gathering methods		
	Frequency	Percent
quantitative	17	37%
mainly quantitative	10	22%
mixed/not clear	8	17%
mainly qualitative	2	4%
qualitative	9	20%
Total	46	100%

From that table we can see that more than 40% of studies were mixing qualitative and

quantitative data gathering methods.[4] Considering this, it may seem surprising that, as Table 3 shows, both qualitative and quantitative data analysis methods were used in much fewer studies (28%). One reason for that is that some articles were reporting results from only one part of a larger study, describing in the beginning the overall design of the study and concentrating thereafter to the narrower aspects under the investigation. Another reason is that some studies focusing mainly on the quantitative analysis used qualitative data only as illustrations and examples, which can not be considered to be a systematic qualitative data analysis. Hence, even if systematic qualitative data analysis was undertaken during the study, it could not be decided on the basis of the report under investigation.

Thus, it is already clear from the data that in our sample it is very hard to classify studies to only two categories: qualitative and quantitative. Hence at least three categories, qualitative, quantitative and mixed, is needed.

If we look again at the Figure 2 and especially at the proportions of different approaches within strategy, sampling and data analysis methods, it is clear that there are at least some studies in our sample, in which some aspects are classified as quantitative and others as qualitative. I turn now, therefore, to the question of how consistent articles are across different aspects.

Correlations - How much consistency is there between approaches taken on different aspects of inquiry?

To clarify the relationships between the different aspects of methodology under investigation, I calculated the non-parametric ' correlations for all seven methodological aspects.[5] However, as there was a considerable number of cases where the validation methods were not reported and where the aims of study could not be classified either as clearly qualitative or as quantitative, it is reasonable to concentrate on the remaining five aspects. The results presented in the Table 5 show, that there was a high correlation between data gathering, recording and analysis methods (rho $\approx$ 0.9). Although also quite strongly correlated, the relationship of strategy and sampling to data handling methods is not so straightforward.

Table 5. *Correlations between different levels of inquiry*

Spearman's rho	Aims	Strategy	Sampling	Data gathering	Data recording	Data analysis	Validation
Aims	1						
Strategy	0.561	1					
Sampling	0.532	0.779	1				
Data gathering	0.703	0.66	0.529	1			
Data recording	0.562	0.594	0.452	0.892	1		
Data analysis	0.619	0.631	0.489	0.908	0.925	1	
Validation	0.416	0.285	0.328	0.807	0.725	0.831	1

From the correlation matrix we can see that the type of data handling procedures is

[4] This includes studies in which single data gathering method could be seen qualitative as well as quantitative and were therefore coded as not 'clear/can be both'.

[5] Correlations are based on recoded data, where the scale is: quantitative - mixed/not clear - qualitative

more strongly related to the strategy of the study than to sampling methods. Further crosstabulation of methodological aspects showed interesting tendencies: it seemed to be the case that studies using mainly qualitative data handling methods derive from qualitative strategy and use qualitative (non random) sampling as well. At the same time among the papers which reported mainly the use of quantitative data handling procedures we can find several studies, which are based on qualitative (or at least not clearly quantitative) strategies, and sampling methods.

Cluster analysis - How could the studies under investigation be classified on the basis of their methodology?

Preliminary hierarchical cluster analysis on the basis of six methodological aspects suggested that there was one group of studies clearly different from others - these were studies using qualitative features consistently on all levels of inquiry.[6] At the same time the other group consisted of studies with very different patterns of methodological aspects. Further look at the results of hierarchical cluster analysis suggested that remaining studies could be divided into three groups, which differentiate quite clearly from each other. Comparison of the results of k-means cluster analysis for 3 and 4 groups supported that assumption. Compared to cluster solution for 3 groups the solution for 4 groups resulted in cluster patterns which are better interpretable and make more exact differentiation between studies.

Table 6. *k-means cluster analysis for 4 groups – final cluster centres*

Final Cluster Centres				
	Cluster			
	1	2	3	4
Aims	4	2	3	3
Strategy	5	1	4	1
Sampling	4	2	5	2
Data gathering	5	1	2	2
Data recording	5	1	2	3
Data analysis	5	1	2	3
Proposed cluster lable:	Qualitative	Quantitative	Mixed / quantitative - case studies	Mixed - surveys, experiments

Table 6 lists the final cluster centres for four groups and suggests the labels for emerging clusters. The first cluster, consisting of 11 studies, has its cluster centres all clearly at the qualitative end of our scale (code: 5). Therefore it would be proper to call this cluster 'qualitative'. The second cluster consisting of 16 studies has it's cluster centres quite clearly at the quantitative end of the scale (code: 1) and could therefore be called 'quantitative'. The third cluster consists of 11 studies which use mixed but mainly quantitative data handling methods, but at the same time use qualitative research strategies and sampling methods. If we take a closer look at the concrete

[6] Six aspects are: aims, strategy, sampling, data gathering methods, data recording methods and data analysis methods.

studies in this group we can see that these are mostly case studies using non-random sampling yet at the same time concentrating mainly on quantitative data. The fourth cluster on the other hand consists of 8 studies which use both qualitative and quantitative data handling methods, but derive from quantitative strategies. These eight studies are mainly experiments and small-scale surveys, which integrate some qualitative analysis either on the basis of interview data or answers to open-ended questions in questionnaires.

Thus, the exploratory analysis has suggested that on the basis of six important methodological aspects we can divide the studies of our sample into four groups shown in Figure 3. The final part of data analysis will compare these clusters.

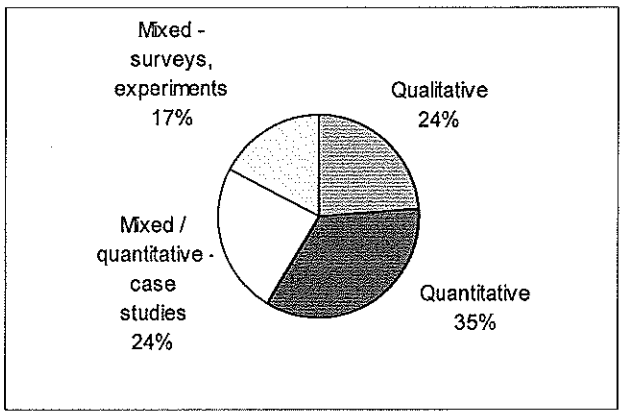

Figure 3. *Resulting clusters*

Comparing clusters

The main question on which I will concentrate in this section is whether there are differences in the pattern of claims made in papers representing divergent methodological clusters.
The attempt was made to use the cluster analysis to see whether there are clear clusters of studies by the type of claims made and to see whether the emerging clusters match with these based on the methodological aspects. Results of that analysis suggested that there are four bigger groups of studies with quite high internal consistency and seven studies, which do not match with the others very well. However, if to look at the cluster membership one could see that while the first group consisted mainly of studies which were classified by their methodological aspects as purely quantitative, all other groups had quite mixed patterns in terms of the methodological approaches of included studies. Although this kind of analysis is only exploratory, it suggests that the claims which authors of studies with different methodological approaches have made do not follow clearly different patterns.

To get a clearer picture of patterns of claims made by different studies, simple frequencies for all four methodological clusters of studies for all types of claims were calculated. Before going on to discuss the results of this analysis, we should remember that the recording did differentiate only whether a particular type of claim was present in the study or not. Thus the report with one claim of a particular type has the same weight in my analysis as the report with several claims of the same type.

Figure 4 gives an overview of the proportion of studies within each methodological cluster where specific types of claims were present. As could be expected, sample descriptions of one or another type were present in all reports while there were some studies which did not make any generalisations. It is common to methodological texts to see the empirical generalisations as the main aim of quantitative inquiry and the development of theory as the aim of qualitative research. Although empirical generalisations to specified populations were very rare in the studies with qualitative strategies (clusters 1 and 3), there was a big proportion (80%) of reports in these clusters where claims looking like empirical generalisations were present, but where the target of the generalisations was not clear as the population was not clearly defined.

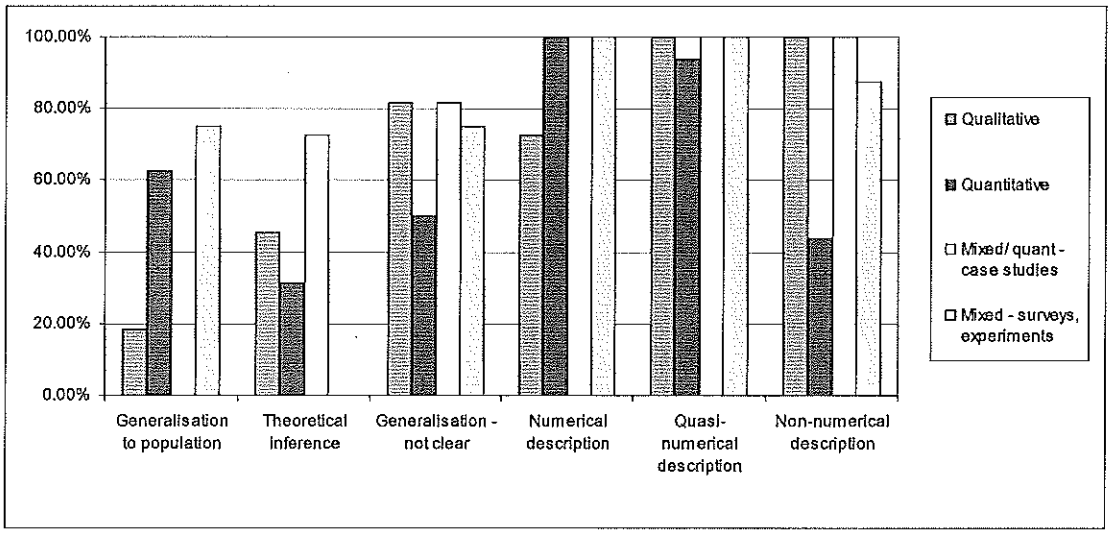

Figure 4. *Proportion of studies within each methodological cluster where specific types of claims were present*

On the other hand, not all studies with quantitative strategies had made empirical generalisations to populations, which can partly be explained by the previous discussion on sampling limitations. It has to be mentioned that interestingly it was common to large-scale studies with quantitative strategies not to use statistical significance tests or parameter estimation techniques and to stay in their claims mainly on the level of describing the sample statistics.

Theoretical generalisations were more often present in the studies with qualitative strategy, but some 30% of purely quantitative studies also made theoretical inferences. Thus, to a certain extent the findings support the view that quantitative studies focus more on empirical generalisations while qualitative studies intend to make theoretical inferences. However, as we can see from the Figure 4 there is a consistently high proportion of reports, through all the methodological clusters, which have made generalisations of unknown target. Either due to the lack of clearly defined population or even the statement from the authors that the generalisabilty of the results is limited or questionable, it was not clear whether these claims were made keeping an eye on some concrete population or were just generalisations from specific cases to the whole studied sample.

Further, if to compare descriptions of divergent numerical exactness the expected

tendency for qualitative studies to use more frequently non-numerical claims and for quantitative studies to make more often exact numerical claims can be observed. However, the differences are relatively small and quasi-numerical statements were present in the majority of reports whatever the methodological basis of the study.

Thus, although there were some differences concerning the claims present in the studies with different methodological platforms these tendencies are far from drawing clearly divergent patterns even for purely qualitative and quantitative studies – quasi-numerical descriptions were equally often present in the qualitative studies as in the quantitative ones and equally high proportions of reports from the different clusters contained generalisations with unclear targets. Studies with mixed data handling methods showed similar claim patterns with a little tendency for mixes with a qualitative strategy to be closer to purely qualitative studies and for mixes with a quantitative strategy to be closer to purely quantitative studies.

Conclusions and Discussion

As it was seen from the results of simple frequency and cluster analysis, at least in the case of our sample we have to reject the idea of the dichotomous nature of educational research – more than one third of the studies in our sample combined qualitative and quantitative aspects and/or features of inquiry. Furthermore, the aims of studies were not so fundamentally different for different types of studies as a paradigmatic view would suggest and the types of claims which authors of studies with qualitative, quantitative and mixed methodology made follow largely the same pattern and show no clear point where a line could be drawn separating the qualitative studies from quantitative ones.

Thus, keeping in mind the limitations of present small-scale study and its generalisability, the results show that there was no consistency in methodology of studies, which would give us the reason to look at qualitative and quantitative approaches as incommensurable paradigms. This leads to the conclusion that the statements made by proponents of paradigmatic view should be taken as normative rather than empirical in their nature. Hence, by that study I have made a contribution to answer the question 'whether there is ...?', but there will still remain the question 'whether there ought to be ... ?', which I guess, is not answerable by empirical research and will be the subject for debates in the future too.

Figure 1 illustrated the position that the advocates of a paradigmatic view often take towards quantitative and qualitative research methodologies. The results of the present analysis suggest a different picture of the way that research practice in the field of educational sciences works. Figure 5 attempts to capture the nature and the complexity of actual research practice. As several authors have argued, it is the concrete research problem rather than philosophical position which determines the methodology (or overall strategy) of the study whereby, depending on the nature and complexity of the problem, the strategy can be either qualitative or quantitative or a combination of both (Hammersley 1992b, Bryman 1988). In addition, within each strategy there is a possibility either to use data gathering methods 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 the research or the concrete data gathering techniques.

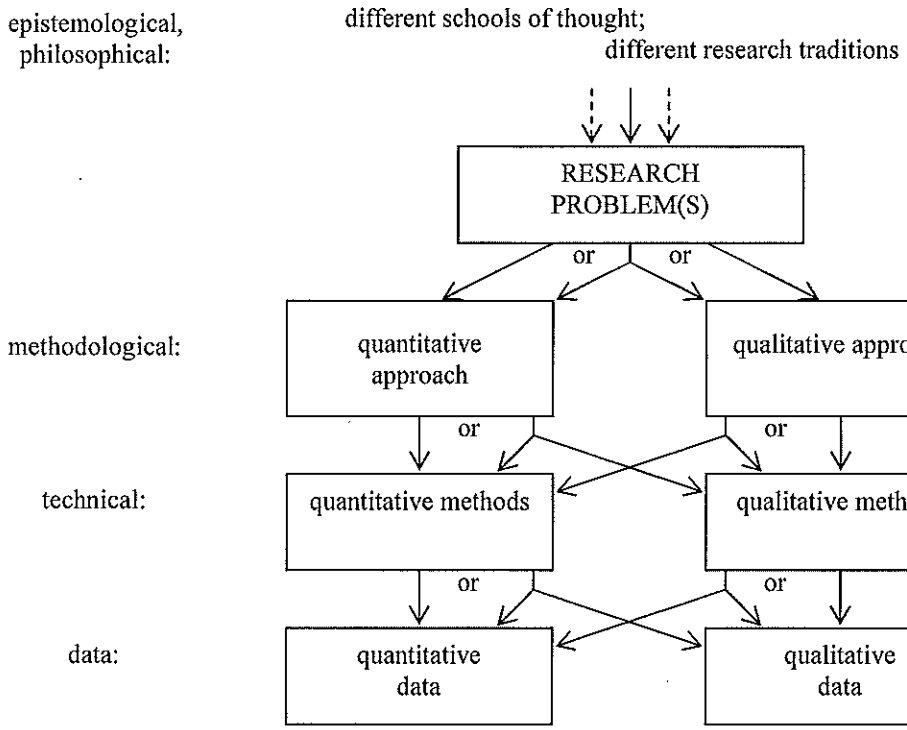

Figure 5. *Different levels of research in practice*

The new postmodern approach to educational research has questioned current foundations of both quantitative and qualitative research methodologies.[7] Dunne and Johnston (1992) argue that 'debates about quantitative and qualitative methods', which characterise the positivist/technical and interpretivist/practical dialectic are not at issue any more as the aim of the research in the new era ought not to be to represent the 'truth' no matter whether it is 'perceived as absolute or socially constructed' but to serve emancipatory interests. Similarly, Thomas (1998: 142) criticises both quantitative/positivist and qualitative/interpretivist approaches for their shared 'faith in rationalism: a faith that good, logical reflection and thinking can result in theories – of whatever kind – which will explain and predict aspects of the educational world'.

In that perspective the *content* of the debates and the 'paradigm wars' can be seen as moved away from emphasising the distinctions between qualitative and quantitative methodologies to more overall philosophical and worldview issues related to research practice. Figure 6 is attempting to illustrate that shift in debates. Following that, my tentative conclusion is that at least on the level of research practice the move has been made towards peaceful coexistence, suggesting that in the future qualitative and quantitative approaches to educational inquiry are not taken as mutually exclusive and competing paradigms, but rather as approaches which are useful in different ways and therefore have the potential to complement each other.

[7] See for example Lather 1991, Scheurich 1997, Dunne & Johnston 1992, Denzin 1994, Thomas 1998.

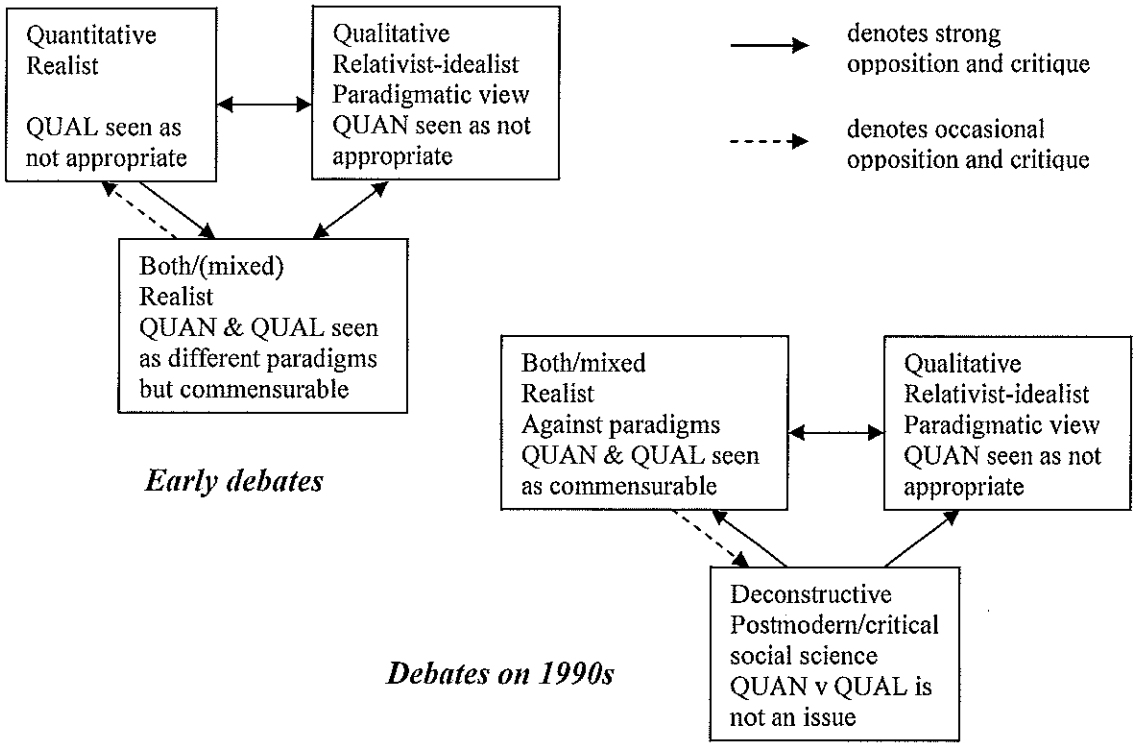

Figure 6. *Shift in methodological debates during the second half of 19th century*

However, the shift from paradigmatic difference to complementary methods is not as unproblematic and desirable as it may appear. Hammersley (1995) has criticised methodological eclecticism where the primary concern is *fitness for purpose* for several reasons. First, he argues that to look at quantitative and qualitative methodologies as simply different techniques which should be combined in order to cancel out their respective weaknesses is to neglect the 'different methodological arguments associated with qualitative and quantitative methods' as well as to confine the possibilities of either methods. Secondly, according to Hammersley (1995: 7), this is to neglect 'heterogeneity and internal inconsistency within two rather artificial categories'. Thus, while rejecting the paradigmatic view of quantitative and qualitative methodologies one has to be very careful in combining these approaches and to give full consideration to often conflicting ideas underlying different approaches. Hence, having reached the conclusion that at least in research practice quantitative and qualitative methodologies seem not to be taken as incommensurable paradigms and that they are combined in various levels of inquiry, new important methodological questions arise.

Thus, I think that the debates on issues concerning qualitative and quantitative methodologies will go on and that they have to go on, but not any more as 'paradigm wars' but on much more constructive bases. It is time to realise that the question is not between the qualitative and quantitative 'paradigms' and even not between two (or more) explicitly bound and mutually exclusive sets of basic belief systems – the reality is much more complex.

In conclusion I would like to say that the evidence gathered in this study suggests that we are too ready to use the term 'paradigm' in educational research and especially in connection with quantitative and qualitative methodologies without paying enough attention to its real meaning or to the consequences that a paradigmatic view inevitably brings with it. Instead of emphasising the differences between qualitative and quantitative methodologies we should notice that there is a wide range of strategies available to us in doing educational research and that surprisingly often the pressing problems are common to many of these strategies.

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