

# Quantitative and qualitative research: conflicting paradigms or perfect partners?

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## ABSTRACT

This paper will examine the use of quantitative and qualitative methods as complementary research methods. It asks the fundamental question whether these two approaches can be used jointly in a principled manner. The pressure in educational research has been towards using the two methods alongside each other. In applied research the use of the two approaches in the same project is accepted yet we still find serious objections raised to such work when it is presented in a more formal context. Evaluation studies are often multi-method in their approaches whilst doctoral students will still find examiners balking at the use of mixed methods in doctoral research. This paper tries to both investigate the source and nature of this division and to illustrate practical ways in which the division may be overcome.

## Keywords

Research methods, evaluation, quantitative methods, qualitative methods, ethnomethodology, phenomenography.

## INTRODUCTION

This paper begins by a short review of the theoretical background to the current sharp division between quantitative and qualitative methods. The division between quantity and quality rests in a long philosophical tradition but this paper will deal with the modern division between quantitative and qualitative methods in the social sciences (Winch 1958). It will begin from the background of the association of measurement with a positivist approach to social research as a science and the reaction to that in what has been called the cultural turn (Cicourel 1964, Benson and Hughes 1991). The paper sets out a case that argues that the division between quantitative and qualitative method has become overdrawn and rooted in an excessively theoretical approach to social research. The claim is set out that social research should base itself on the same kinds of standards that are set in our understanding of everyday life, that whilst the rigor of the approach may vary the basic principles of understanding do not (Lynch 1991). This general approach is illustrated by examples from phenomenography an approach that has successfully integrated a qualitative and quantitative tradition. In conclusion the paper reviews the stance taken by the full ethnomethodological critique of social sciences and offers some concluding remarks.

The incentive to write this paper came from a number of experiences in the past 12 months. I applied for a job in educational research in a post connected with networked learning and at interview expressed my wish to work with both quantitative and qualitative methods in a principled way. This suggestion provoked some vigorous questioning. I was later part of a PhD examination at which one of the examiners, having accepted a thesis that combined quantitative methods with qualitative methods, commented that though they used both methods themselves in empirical work they doubted whether they could be combined in a principled way as they amounted to different paradigms of research. Thirdly having advertised twice for a research assistant with quantitative skills we appointed an internal candidate who had just completed his PhD in another department in the university, none of the applicants from the advert having been appointable. The question that arises from this experience in theoretical terms are whether the two approaches do amount to different paradigms and in practical terms whether the apparent aversion to quantitative work being combined with qualitative work is leading to an unnecessary skill deficit in which quantitative skills are not seen as compatible with qualitative work and vice versa. This question arises at a time

when in the UK the policy drive is towards the combination of these methods and research training is being formalized that includes both aspects of research.

It is worth pausing and considering at this point what we mean by quantitative and qualitative methods. Basic Sociology textbooks contain sections dealing with methods that contain sections comparing quantitative and qualitative methods (see for example Taylor et al 1995 p632). The comparison is simply between:

- “Quantitative data is numerical in form – in the form of numbers.....Questionnaires and structured interviews are the usual research methods.....Some researchers claim that unless human behaviours can be expressed in numerical terms, it cannot be accurately measured.” (Taylor et al 1995 p632)
- “Qualitative data covers a range of material from the descriptions of social life provided by participant observation and unstructured interviews to information from written sources, such as diaries, autobiographies and novels. Some researchers argue that qualitative data provides greater depth, a richer more detailed picture of social life.” (Taylor 1995 p632)

Allowing for the simplified and introductory nature of these comments this is a fair summary of how this divide is generally understood in the social sciences.

One of the popular approaches used in qualitative work in education and networked learning is grounded theory. It may come as a surprise to some to hear how the method is viewed by one of its founders (Interview with Dr Glaser Grounded Theory Institute Web site)

Question Dr Andy Lowe “I asked Dr Glaser ‘where does grounded theory come from?’ ”.

Dr Glaser “See grounded theory came out of quantitative work, that’s all there is to it, and the whole notion of when variables vary independently as opposed to dependently relates to whether you force relevance on the subject or you discover what’s relevant to the subject and then you get variables that relate.

Question “Is grounded theory a qualitative or a quantitative method?”

Dr Glaser “Yeah it’s a general methodology it can be used on qualitative as well as quantitative data.”

Dr Glaser goes on in the interview to note that the method is used predominantly with qualitative data and he suggests that this is due to the richness of the data and the collection and analysis of qualitative data being cheaper and quicker as it avoids the rigors of statistical analysis. The question that this paper seeks to address is the nature of the divide that Glaser notes in relation to grounded theory. Is it possible to have a general methodology and what causes a slide towards the use of qualitative data rather than either quantitative data or a mix of data sources.

Within the tradition of research in networked learning there has been a preference for a particular research approaches. Most notably Tim Koschmann has expressed the view that CSCL is a new research paradigm (Koschmann 1996). In 2001 he returned to this theme and argued that:

CSCL research has the advantage of studying learning in settings in which learning is observably and accountably embedded in collaborative activity. Our concern, therefore, is with the unfolding process of meaning-making within these settings, not so-called “learning outcomes”. It is in this way that CSCL research represents a distinctive paradigm within IT. (Koschmann 2001)

This focus on meaning making suggests a root cause for the reluctance to use quantitative measures but it is by no means a complete barrier to the use of quantitative data. There is a tradition, close to the position outlined by Koschmann, of treating naturally occurring data of all types as part of the overall means to understand particular settings. In ethnomethodology for example the polarisation of debate between quantitative and qualitative methods is seen as unfortunate (Benson and Hughes 1991). The stance they take is to suggest that in order to describe, categorise or explain the activities of social actors it is first necessary to have some secure understanding of the research data and how it is produced, whatever form it takes, questionnaires, statistical outputs, observations or interviews. The criticism from this theoretical tradition is against all generalised theory not the type of data source used and the appeal is to provide an adequate description of phenomena including the use quantified data. The difference lies in their treatment of such data, as ethnomethodologists would be interested in the counting practices that people use in order to make a setting demonstrably rational or accountable. For example the work involved in

capturing and interpreting a log of computer activity used to monitor students would be of interest as a way in which the activity of networked learning was made observable and accountable to members of that setting.

Within this tradition Michael Lynch has made a particular study of measurement (Lynch 1991). The significance of this study for our purposes is that it examines the practical accomplishment of categorisation and classification, that is quantification is only one aspect of a more general phenomena that affects both quantitative and qualitative data. It is not uncommon for extensive qualitative work using observation and interview, to be reduced to a series of categories and for the illustrative quotes or examples to be used to convey a flavour of the original. The point made by ethnomethodology is that all classification and categorisation regardless of data source or whether it is rendered in a quantitative or discursive form, relies on the practical accomplishment of a reasonable fit between the phenomena and the representation. This fundamental critique is of interest to networked learning because if we are interested in meaning making we must also be interested in how researchers of networked learning make the topic available and rationally accountable.

## PHENOMENOGRAPHY

In order to explore the relationship between quantitative data and qualitative data further using a single theoretical approach the paper reflects on work undertaken using a broadly phenomenographic methodology. The phenomenographic tradition has for over thirty years included aspects that are theoretically grounded in an interpretivist tradition and informed a quantitative tradition involving large scale surveys. The work of Ference Marton has exemplified one aspect of this approach, Noel Entwistle the other (Marton et al 1997). An example of the application of this approach can be found in two studies which investigate connections between 'campus-based' undergraduates' participation in networked learning and their approaches to study using instruments developed by Noel Entwistle and his colleagues to represent aspects of students' approaches to study (Tait & Entwistle, 1996; Entwistle et al, 2000). In my own work I have used a broadly phenomenographic approach to bring together qualitative and quantitative data in a principled approach to the study of networked learning (Jones and Bloxham 2001, Goodyear et al 2003).

For those not familiar with this approach phenomenography is an approach for understanding people's ways of experiencing the world. The aim of phenomenography is to describe qualitatively different ways of experiencing phenomena, in our case to illuminate the *variations* in ways of experiencing networked learning. In order to do this phenomenographers have predominantly used individual interviews to collect qualitative data and the Approaches to Study Inventory (ASI) or its newer variants as instruments to collect quantitative data. The methods are closely related in their use of a basic structure for student learning that has been commonly applied using the terms 'deep' and 'surface' learning (For a brief summary of research in this area see Prosser and Trigwell 1999). In order to examine the work done to present a phenomenon in this framework I want to examine the collection and treatment of data and its final representation in phenomenographic work.

Early phenomenographic studies focused on the different ways in which students understood a text that they were given to read (Marton and Säljö 1976). The text was reasonably demanding 1400 words in length and contained argument and evidence. The students were then interviewed with a focus on both the content of what they had read and how they had approached the task of reading it. The researchers described four levels of outcome in relation to content:

- a) a full grasp of the author's intended meaning
- b) a partial grasp of the author's intended meaning
- c) an understanding contrary to the author's intended meaning
- d) nothing more than the words used by the author

Two distinct approaches were described:

- 1) a shallow or surface approach concentrating on the text itself and trying to memorise it (a focus on signs)
- 2) a deep approach looking for the author's argument and meaning (a focus on the signified)

In contrast to Koschmann the phenomenographic tradition is interested in both learning outcomes and meaning making, indeed it is intent on relating the two. The approaches and the relationship to outcome in terms of content were displayed in an outcome space, a matrix showing the hierarchic relationship between the two identified aspects of student's approaches in relation to outcomes.

Outcome	Surface	Unclear	Deep
A	0	0	<b>5</b>
B	1	6	<b>4</b>
C	<b>8</b>	0	0
D	<b>5</b>	1	0
Total	14	7	9

Figure 1 Outcome space relating approaches to learning and learning outcomes (Source Marton and Säljö 1976)

The table representing the outcome space is of course only one part of an explanatory text. In qualitative research it is common to have a rich description using carefully selected illustrative quotes and examples. Phenomenographic research is unusual in being rather more abstracted from the original data than most qualitative methodological approaches. It is nonetheless characteristic of all qualitative work to reduce large volumes of data to a small number of categories, the process undertaken is in many ways similar though the outcome space presents a particularly sparse representation of qualitative data.

I want to draw attention to a number of features of the process of research underpinning this reporting. This work illustrates very clearly how classification of qualitative data is of a similar character to quantitative work and can lend itself to numerical presentation. The work done by phenomenographers is to reduce the phenomena as experienced by the student to a small number of clearly described categories. These can then be displayed alpha numerically and the approaches described related to outcomes. Where do we place such arguments and analyses - as qualitative or quantitative in form? It is clear that the work done by phenomenographers is to take the phenomena, as it presents itself in relation to the students in the course of a task or activity, and to reduce it to something analytically satisfying and recognizable to the researcher. Typically controls in phenomenography rely on the inter-researcher reliability of coding. That is an independent researcher given the description of categories derived from the data can see those same categories for themselves within the data from which they were derived.

As a second example let us examine a sub-scale from the Approaches and Study Skills Inventory for Students (*ASSIST*) (Tait et al 1998). The entire instrument contains a large number of questions that are related to overall approaches to learning, as derived in earlier phenomenographic work. Students respond to items on a 1 - 5 Likert scale (5 high). Sub-scale scores are formed by adding together the responses to the items in that sub-scale. Adding together the sub-scale scores, which contribute to each approach, creates scores on the main approaches. The first three sub-scales in each approach are considered the most reliable and unlikely to vary across samples.

### *Deep Approach*

#### **Seeking meaning**

4. I usually set out to understand for myself the meaning of what we have to learn.
17. When I'm reading an article or book, I try to find out for myself exactly what the author means.
30. When I am reading I stop from time to time to reflect on what I am trying to learn from it.
43. Before tackling a problem or assignment, I first try to work out what lies behind it.

The ASSIST questions and the way in which they are answered are clearly different to the approach taken in interview based qualitative phenomenographic work. The questions are fixed, the answers constrained in a five point scale. Coding of the results is done prior to the issuing of the validated instrument. There are nonetheless some strong linking themes. The work of the researcher is in classifying and simplifying the phenomena as presented to the student. The researcher is rendering an analytic account of the phenomena and little of the original phenomena remain in that account. In my own work, although I have collected data in a manner consistent with phenomenographic practice and derived analytic categories to reduce qualitative data I have been reluctant to present the data in an outcome space relating the categories of description with each other in a way that logically relates them in a hierarchy. At the same time I have been happy to associate myself with results derived from the ASSIST instrument that report in a stark and abstract way. The following table is taken from Goodyear et al (2003) and illustrates the relationship between approaches to learning and a new scale derived from a questionnaire assessing student's judgments about networked learning.

	Approach to study (18-item ASSIST)		Approach to study (51-item ASSIST)	
	r	p	r	p
Deep	0.230	0.002	0.186	0.057
Strategic	0.289	0.000	0.171	0.077
Surface/apathetic	- 0.349	0.000	-0.188	0.057
n	175		106	

Figure 2 - Table 3: Approaches to study (after Entwistle et al., 2000) and judgements about networked learning (JNL)

The table was of course one part of a continuous text. An excerpt from that text is reproduced below:

The second part of the study moves from conceptions of learning to approaches to study. We had calculated, for each of the students in the sample, their scores on the Deep, Strategic and Surface/Apathetic approaches to study. These were based on the 18-item version of the ASSIST inventory. We calculated Pearson product-moment correlation coefficients to measure the association between the JNL score and each of these three ASI scores. We found statistically significant correlations between JNL score and each of the three measures (see the left hand half of Table 3). The correlation coefficients themselves were modest in size, with the strongest correlation being between the Surface/Apathetic Approach and JNL. Note this correlation is negative, meaning that students with a Surface/Apathetic approach to study make more negative judgements about networked learning.

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Given the volume of literature underpinning the ASI as a predictor of positive learning outcomes in conventional undergraduate courses, the uncertainty surrounding our results is worthy of some further investigation. What we can say, however, is that we have found no convincing evidence of a strong association between approach to study and judgements about networked learning. (Goodyear et al 2003)

The points I wish to emphasize here are that this account, like the qualitative data earlier relies on a postulated link between two variables. This element is also common to the earlier account provided by Glaser when discussing grounded theory. In other words both the quantitative and qualitative data are used in a similar manner. A peculiarity of the phenomenographic approach is that like most qualitative methods it claims to remain context specific yet it has led to a generalized approach to learning identifying approaches that are common enough to be available for quantitative study using an instrument shown to be reliable over a variety of different contexts. The outcomes of phenomenographic studies in particular contexts have also been used to develop a general argument that a teacher's approach to teaching can influence the students' approach to learning and that in turn can improve student outcomes (Prosser and Trigwell 1999, Jones and Asensio 2002). The problem is that whilst the qualitative research claims to

be distinguishable from the quantitative work carried out in the same tradition in terms of its close relationship to a particular context both lead to generalized conclusions.

The examples illustrate a common set of concerns in both quantitative and qualitative studies. The phenomena itself as experienced in a setting cannot be fully represented. There can be no exhaustive account provided that would reconstitute the experience for either the researcher or the reader. All research then is concerned with the same set of fundamental problems. The qualitative tradition makes a number of claims for the data it collects. The data is more meaningful and captures aspects of experience lost in quantitative research. The problem is that whilst there are differences of degree all reporting of experience, by subjects and by researchers subsequently relies on the same set of common procedures. Classifying and categorization are common features in both the quantitative and qualitative traditions.

## CONCLUSIONS

This paper is only a limited engagement with a problem that warrants a full investigation in relation to the study of networked learning. The social and situated view of learning identified by Koschmann as central to a new paradigm of research places meaning-making at its core and invites a review of methods from an ethnomethodological perspective. The ethnomethodological criticism of the quantitative-qualitative divide is that it hides a common framework of measurement, classification, categorisation and a generalisation that obscures the specific conditions of social action and makes individual cases appear as instances of general theory. The case made by ethnomethodologists that the divide between different techniques in social sciences hides a fundamental similarity is well made. The divide between quantitative and qualitative methods is not fundamental and hides many of the common features between the two. Social science relies on categorisations of the topics in question that are themselves reliant on a prior common sense view of the topic. An over emphasis on the techniques of research can be an outcome of pursuing a divide of research paradigms in terms of method.

In one way this conclusion is a release from the qualitative and quantitative divide. There isn't a principled difference that separates the two broad approaches and many of the criticisms made of one technique could equally well be applied to the other. For practical research purposes there is not an automatic preference for one technique above another, it would depend in part on the purpose of the study which technique was most appropriate. Phenomenography for example is explicitly evaluative in its approach and can lend itself well to studies with an evaluative purpose. Ethnomethodology claims to respecify many problems in relation to social action. Ethnomethodologists would claim that their work aims to produce an adequate description of social phenomena, to discover the structure of social phenomena not impose it. The methods they use aim to examine the materials at hand in a setting and in an unmotivated way ask questions that might be thought of as reasonable in the circumstances. The aim is to produce formal descriptions that 'preserve and display the features of the machinery that produced them' (Benson and Hughes 1991 p131). The techniques employed become subject to the question of whether they are fit for this particular purpose.

The question then arises whether this exempts ethnomethodology from the same problems that ethnomethodologists identify in other approaches to social research. In part an answer to this may rest on particular understandings of what is meant by theory. Ethnomethodologists set themselves in a distinct relationship to theory claiming that they are concerned with description and not theory. In this they echo the general claim made for qualitative research, that it is a modest enterprise and concerned only with the local and particular. Claims that are made in terms of generalisability are that findings are illuminative and not representative. The criticism made by ethnomethodologists is that qualitative research in general is nonetheless a theoretically driven activity. This tension is present in the character of phenomenographic research. Whilst many of the particular research reports comment on the restriction of the findings to particular local settings the findings have been generalized by phenomenographers themselves and by others using phenomenographic research to inform advice for staff and students and the development of policy in education.

When networked learning analysts describe their topic in terms of networked learning they are in some sense constituting the topic itself. Steve Woolgar (1997) has argued that there is a reflexive tie between machines and their

users. He goes on to suggest that machines make their purpose available to a user in a similar way to the way that a text makes a reading available to a reader. In the context of networked learning he could be read as suggesting that some uses are more likely than others rather than that any particular use is inevitable. This would imply that networked learning is not simply out in the world, a fixed set of characteristics waiting to be found. To a certain extent the practice of networked learning relies on common sense understandings for its meaning and it is constituted in relation to course design and the affordances of the available technology. Researchers of networked learning are not simply researching a defined user group they actively constitute the user group itself. The research designs contain within them implicit definitions of how teachers and students will or ought to be in a networked learning setting. The conclusion of this paper is that qualitative research and quantitative research are not competing paradigms. In important ways they reflect a single research paradigm, they may not be perfect partners as they represent both different ends of this spectrum of activity but they are intimately connected.

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