



## USE OF ICT IN QUALITATIVE RESEARCH PROCESS

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### ABSTRACT

*The present paper explores the nature of qualitative data and the uneasy relationship it holds with computer-aided analysis. Qualitative research produces data that are rich and voluminous, shedding light on the lived experience of the "being-in-the-world" and the interactions inherent in complex social phenomena. Analysis of such data, however, is complex and time consuming in addition to which there is a lack of specific guidance on how to carry it out. The authors note that the philosophy underpinning information and communication technology (ICT) is not wholly compatible with that which underpins qualitative research. ICT is based largely on logical, objective and quantifiable procedures whereas qualitative research requires a more subjective, interpretative stance and seeks to explore meaning. On this understanding of the philosophies involved it is argued that the role of computer software in qualitative data analysis is limited. The adoption and use of ICT to enhance and facilitate Research Management has brought to focus the urgent need to come out with new methods, tools and techniques in the development of RM systems frameworks, knowledge processes and knowledge technologies to promote effective management of knowledge for improved service deliveries in higher education. To succeed in RM, higher education institutions must endeavor to effectively link KM initiatives and processes with their ever-changing needs to advance their goals. In addition, the paper identifies several research issues to bridge the gap that currently exists between the requirements of theory building and testing to address the different emerging challenges in using ICT to enhance RM in higher education.*

*It is accepted that the mechanistic tasks of qualitative data analysis, for example, organizing, storing, reproducing and retrieving data, can be undertaken more efficiently and systematically using ICT than manually. It is the creative and interpretive stages of qualitative data analysis, requiring human reflection and understanding, which are most difficult to reconcile with the application of ICT.*

**Keywords :** *ICT, Research process, qualitative data, computers*

### I. INTRODUCTION:

It has long been the custom to make use of new technological developments in easing the burden of complex or routine tasks. This is as true for research as it is for any other aspect of human activity. Thus one finds, for example, that over the years typewriters, word processors and computers generally have come to be adopted as part of the essential hardware of research.

By and large this is a process to be welcomed. If a labor or time saving technological artifact is available then there seems little to be gained by eschewing its use. Nevertheless, in the field of qualitative research, which for



the purposes of this paper we are taking to mean research utilizing linguistic data derived from interviews or similar conversational settings, there are areas, we feel, where the untrammled use of computer technology, specifically qualitative data analysis software, may do little to enhance the quality and value of the findings they produce. In elaborating on this position we consider the philosophical foundations that underpin the practice of qualitative research. These, we argue, make use of a worldview that is contrary to the philosophical orientation of the positivistic science that has helped develop computer technology. Qualitative research aims to uncover meanings as they are apparent to an individual respondent; quantitative research relies on aggregation, quantification and categorization as an adequate method to arrive at a scientific truth. In quantitative research there is congruence between the underlying philosophies of the research and its analysis and the computer technology employed to assist with this. For example, statistical analysis in quantitative research has become a fast and routine process with many different pieces of software available to support this. Software packages are now available to assist with the analysis of qualitative data which on the surface promise the same routinisation and speed benefits for the user as those available for quantitative analysis. Our argument is that qualitative data are derived from language and allow for the detailed exploration of feelings, drives, emotions and the subjective understanding a respondent had of a certain social situation at a particular point in time. They are indexical and context bound. The data are fuzzy, with slippery boundaries between meanings, and not ideally suited to categorization and classification using digitally based software. Employing a digital tool of this type on qualitative data has the potential to distort any understanding arrived at.

## **II. QUALITATIVE DATA:**

There are fundamental differences between the philosophies which on the one hand underpin information and communication technology (ICT) and on the other the philosophical thinking behind qualitative research. Computing technology assumes a positivistic approach to the natural world that sees it as being composed of objects that humans can study, understand and manipulate. It is a view that finds acceptance amongst quantitative researchers. Within sociology, generally, this positivistic orientation encompasses the idea that everything in society is amenable to being numbered, counted, measured or otherwise quantified and that there is a particular process (copied largely from the natural sciences) that allows true understanding to be arrived at. When looked at from this perspective, society comes to be seen as something external to the people who inhabit it and who in turn find their behaviour controlled and influenced by it. Human behaviour, the complex patterns of social interaction, then becomes a reflection of the macro level structure. All observed phenomena, when aggregated together and quantified, can be related back to the macro structure for analysis and understanding. Qualitative research, and qualitative researchers, approaches the world from a different perspective and set of understandings from quantitative researchers. Qualitative research is largely rooted in an understanding of the social world that sees human action as being the force that creates what we perceive to be society; it is grounded in a humanist, phenomenological understanding of social action. The humanistic approach, common to much qualitative research, gives primacy to action over structure. It becomes the goal of qualitative researchers



therefore to try and see things from the perspective of the human actors. This is in direct contrast to the thinking of the positivistic schools where the external society is seen to shape human action.

Generally, in qualitative research there is less acceptance of the argument that it is the existence of an objectified society that constrains, shapes and governs how people think and act. Because of this reduced emphasis on structure good understanding of the social world is not going to be achieved through the objective classifying and quantifying of observed phenomena; understanding social phenomena can only be achieved by accessing the meaning as it existed for the participants. This is not necessarily to say that there is some kind of absolute prohibition on using qualitative methods if one takes the view that an external society is responsible for patterning and constraining actions and human behaviour. It is more that there is for those undertaking research an elective affinity between the adoption of a perspective on the location of the causal forces in society and the research paradigm to be employed in investigating them. For researchers of a phenomenological bent it follows more naturally to incline to qualitative research methods because of their focus on the individual. One consequence of this phenomenological approach is a greater sensitivity on the part of qualitative researchers to the ambiguities and subtle shades of interpretative meaning that social interaction can have for its participants. There is a recognition of the richness and complexity in human social interaction and an acceptance that this may not be amenable to quantification.

A qualitative approach may be used when little is known about a subject and the researcher may have few pre-conceived ideas about the subject or about the data which will be gained. The aim is more likely to be inductive (that is, moving towards theory) rather than testing theory. Within the qualitative approach to social research and evaluation there are many different methods of collecting data resulting in many different types of qualitative data. With the focus on the lived experience of the individual, qualitative approaches are most suitable when the aim of the research is to understand and explore people's views, beliefs and experiences. To address such an aim, data are primarily linguistic; they may be textual or audiovisual and can be derived from, for example, interviews, observation, documents, diaries, field notes, which in turn may come from both primary and secondary sources. Interviews, of different levels of structure, are widely used methods and it is interview data and its analysis that this paper addresses. The discussion also has application to the more in-depth and less structured approaches of narrative and (audio) conversation analysis. Indeed, narrative and conversation analyses are approaches which illustrate the inductive, interpretive nature of qualitative data. [9]

### **III. ANALYSIS OF QUALITATIVE DATA:**

The characteristics and heterogeneity of qualitative data translate into challenges in analysis particularly when viewed in stark contrast to the structured, numerical nature of quantitative data. That there are differing ontological and epistemological assumptions between qualitative and quantitative research does have profound implications for data analysis. Quantitative data can be subjected to statistical analysis (contingent upon adequate knowledge of which tests to perform and how to interpret the results) and clearly displayed in tabular or graphical form to address pre-determined hypotheses. Contrast this with qualitative data analysis which is essentially although not entirely a hermeneutic enterprise, attempting to interpret the expressed experiences, views and beliefs of people in social situations and then making that interpretation available to the research



community. For both quantitative and qualitative researchers it is important that the manner and techniques of analysis do not, to a greater extent than can be avoided, distort or corrupt the data. Although not addressed here, it is acknowledged that both qualitative and quantitative data can be collected in a single study.

One particular analytical challenge in qualitative research which involves the spoken word is posed by the centrality of language, its meaning and context. Making sense of a speech utterance is more than just effecting a mental translation of the words. In much of everyday social interaction and the speech that it generates there is a high degree of indexicality, that is, a determination of the meaning given to speech utterances by the context in which they are uttered. For a speech utterance to retain the meaning that it had at the time it was uttered (assuming that it is possible to ascribe a single meaning to a piece of speech with any degree of absolute certainty) then it must be seen in the context of the surrounding speech and comments (and ideally the body language and non-verbal communication as well). Attempting to make sense of an utterance in isolation, without seeing it as part of a wider whole, will be to lose an essential part of its meaning. Whilst there is a multitude of data collection methods and sources of qualitative data, the focus here on the management and analysis of qualitative interview data can be simplified to a number of common activities and processes. A further key feature of qualitative research and evaluation is that rather than preceding analysis, data collection is concurrent and interactive with data management and analysis.

#### **IV. USE OF COMPUTERS IN QUALITATIVE DATA ANALYSIS:**

The first and foremost point to make about the use of computers in qualitative analysis is that computers do not and cannot analyse qualitative data. The fact that we have seen a development of computer-aided qualitative data analysis software (CAQDAS) should not be surprising given the widespread development and accessibility of ICT. However the use of ICT for the analysis of qualitative data remains a contentious issue and one which has not been universally and unquestioningly embraced. Computer techniques of logic and precise rules are not compatible with the unstructured, ambiguous nature of qualitative data and so it may distort or weaken data or stifle creativity. The nature of qualitative research in terms of the volume and complexity of unstructured data and the way in which findings and theory emerge from the data also makes software packages, developed to manage and analyse such data, difficult to become familiar with and use adequately.

The argument here is that it is not realistic, nor true to the purpose of qualitative research, to expect a social phenomenon, described in language by the participants themselves, to be broken up, quantified and analysed in a meaningful way by a tool based on a positivistic orientation to the social and natural worlds. Of course, quantifying, categorizing, and breaking up the data is possible and is a legitimate part of the analysis process at least insofar as some general high level sorting is concerned. The issue is more the extent to which the researcher is going to lose or distort the meaning that the social phenomenon had by attempting the interpretative process in the same way. Computer technology and programs are, we would argue, philosophically suited to analyzing inanimate objects and matter, but not social phenomena expressed through the medium of language and uncovered by qualitative research techniques. If one takes technological artifacts, such as computers and computer programs, and then applies them to research and data analysis, this grounding



in a positivistic philosophical background is going to fit them to certain tasks more than others. For research activities where measuring and counting are deemed to be essential to the analysis, as in quantitative research (itself an expression of a positivistic orientation to the social world), a device that can assist with that activity is going to be well matched.

It would be foolish and almost Luddite to argue that in the 21st century computers has no part to play in the process of qualitative data analysis. However, interpreting the complex meanings that social interactions and language can have, where they are coloured into many shades of grey, is not going to be achieved by forcing the analysis into using pre-defined analytical categories. Qualitative data, i.e. the conversational/linguistic material that we are concerned with here has what could be described as almost an "analogue" feel to it inasmuch as it is, when first encountered by the researcher, essentially formless raw material. By subjecting it to a process of quantitative digitization, to square off its shape and straighten its rounded edges through pushing it into a set of pre-defined categories it is inevitable that part of the original meaning is going to be either lost or changed. The argument here is that automated searching facilities using ICT should only be used to support, rather than replace manual handling, reading and re-reading and gaining familiarity with the data which is the essence of qualitative data analysis. Reading data on screen and not handling whole parts of the data set can be argued to distance the researcher from their data. CAQDAS searching also risks overly mechanizing the process and marginalizing the reflection of the researcher thereby encouraging prescriptive analytical methods which inhibit interpretation and .

The centrality of coding to subsequent stages of analysis requires the thorough and accurate categorization of all appropriate data. Getting to know the data thoroughly and coding according to human understanding are key elements of this process. Automated searching will not take the place of additional searches and checking undertaken by another member of the research team. At all stages qualitative data can be organised, managed and manipulated effectively using ICT for example, storing and retrieving coded data and systematically searching patterns between categories. However, the emphasis on coding and the ease with which it can be undertaken pose a threat to the richness of qualitative data and the nuances of language and meaning. Coding data manually before using CAQDAS gains the advantage of applying human understanding to the raw data coupled with the efficiency of computer storage and retrieval. The problem with computer aided coding, the ease and simplicity with which it can be undertaken, is the opportunities and temptations it offers to create more and more codes, more discrete categories into which elements of the data are to be forced, without necessarily retaining sight of the larger whole. Creating and applying codes is not the same as analysis and indeed may only serve to break up and segment the data, fracturing the meaning that the integrated whole would have had. Vivo can also encourage and enable more complex manipulation and retrieval of data than is likely to be possible manually. Again, this is only the case once data has been thoroughly coded manually. However, it cannot give meaning to the data and is no substitute for gaining full familiarity with the data and for the researcher to adopt a questioning and exploratory approach. Extending possibilities, for example around larger data sets and more coding, should perhaps not be welcomed unquestioningly. The aim and purposes of the research must be the primary focus and the guide in data collection and analysis.



## V. CONCLUSION

Analyzing qualitative material that is based on speech or texts derived from interviews and conversations must have regard for the context and the integrated whole. Computer based systems to aid with analysis are, we would argue, based on the natural scientific view of the world that sees social phenomena as reflections of the higher level ordering of an objective social structure. The ideal data type here is one which is amenable to quantifying and segmentation into discrete categories as this allows for numerical manipulation and analysis. It is a worldview that is not, we feel, sympathetic to the types of qualitative data that we are discussing here.

Speech derived data is rich data in the sense that it can encompass many meanings and requires careful reading with regard to the whole from which it is taken. CAQDAS packages possess features that reflect their quantitative and positivistic heritage, particularly their facilities for creating and adding coding categories. Over-reliance on these features could lead to a fracturing of the data whole and a loss of meaning. Researchers who make use of these packages must remain alert to the need to preserve the integrity and context of the original material and not lose sight of this during the process of coding and subsequent analysis.

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