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SOFTWARE 'ENABLED' RESEARCH? FEARS, HOPES, AND SOME 'NEW VISTAS FOR SOCIAL SCIENCE RESEARCH IN AFRICA

Julius F. Kikooma

Abstract

Computerizing qualitative research over two decades ago transformed the way social scientists could experiment with electronic manipulation of textual data based on the application of existing programs and approaches. There is however legitimate concerns about the effects of technology on practice that help define the problems to be addressed in computerizing research. Such concerns point yet to another example of a deeper issue raising such questions as: Is the software just a tool or does it in some way drive the research? Or whether specific software favours or precludes particular research methods. While reflecting on my own experiences with using one of the software programs-namely NVivo, my second aim is to critique the typical sentiments that software is simply and innocent research tool for the social scientist all too often missing, ignoring or leaving out important debates in the research community.

The implications of the strategies adopted in this study are that unlike the situation just a decade ago, qualitative researchers now have available to them, an array of software tools to assist their research, and the use of software - including, but not limited to, word processors- seems more and more to be a regular part of the qualitative research process.

Key words: *software, qualitative research, methods, social sciences.*

1. Introduction

We might be seeing the last few generations of qualitative social researchers who still analyze their data mainly'by hand'.... pp.1 [3]. In the above quote, Fielding and Lee [3] were reflecting on how the work of social scientists is being steadily transformed by new technology. They in fact pointed out that in the present context, the major purpose of the computer is no longer literally to 'compute', that is to do numerical calculations. Instead, computers are increasingly being used by many researchers to manipulate many different forms of information, including text or audio-visual material. Referring to qualitative research practice more specifically, they argued that computerization transformed the way social scientists could experiment with electronic manipulation of textual data based on the application of existing programs and approaches. No wonder then that some scholars even argued that this trend has made academics independent of commercial software companies that "neither know what the qualitative researcher needs nor consider the market profitable enough to bother" (Tesch, [10] p. 226).

It is however important to note the historical context of these 'amazing' developments in software support for social research. In the social sciences, data analysis software has been oriented towards the needs of quantitative researchers. Traditionally, qualitative researchers have carried out the mechanics of analysis by hand: typing up fields' notes and interviews, photocopying them, and "coding" by marking them up with markers or pencils, cutting and pasting the marked segments onto file cards, sorting and shuffling cards, and typing up their analyses [15]. Moreover computer support for analyses of video or audio data was at best a fantasy. But the landscape has changed dramatically, in terms of both software and the literature devoted to it. Today, a number of different programs useful for analyzing qualitative data have been developed. Some of these programs have been developed specifically for data analysis, whereas the others had been developed for

more general-purpose applications, such as text search and storage [4]. In addition, some programs allow the researcher to create links between different points in the text (hypertext), and a small but growing handful allow the use of audio and video in place of, or in addition to, text [15]. Moreover, there are a variety of approaches to linking categorical and quantitative data (demographics, test scores, quantitative ratings) and for exporting categorical and quantitative data (e.g., word frequencies or coding summaries) to quantitative analysis programs for statistical analysis.

In parallel with growth in software, literature reporting studies and commenting on the software has begun to appear regularly. Indeed a number of scholars have developed new programs and workshops are being offered to help researchers use them, or to become acquainted with the range of programs available. In fact there are annual international conferences on "computers and qualitative research". As Weiztman [15] noted, whereas most of their early literature appeared to be designed to convince readers that computers could indeed be used to analyze qualitative data, later on discussions began to emerge about the epistemological implications of computer use, and the possible impact of Computer Assisted Qualitative Data Analysis Software (CAQDAS) programs on the craft of qualitative research. There now seems a movement away from speculation and towards discussions based on empirical analysis of program use and/or explicit evaluation of software tools. Thus, in the international community of developers, users and others interested in the technical and methodological aspects of CAQDAS, where information on computers and qualitative research was once hard to come by, there are now regular conferences, users groups, electronic bulletin boards, and a growing literature on the topic. Unfortunately however, this community seems to exclude much of social scientists in the geo-political south especially sub-Saharan Africa. Yet, as one speaker from South Africa at a recent conference on "Strategies in Qualitative Research: Methodological Issues and Practices in using QSR NVIVO and NUD*IST" pointed out, in her country one focus is on issues about transmission of ideology and marginalization of designated groups, needs analyses, development and implementation, evaluation & support of Information Technology (IT) products and processes [1]. Moreover, according to Clark [1], the growth of Africa online has been slow and partial, with 98% of Internet connectivity in extreme north/south (1:15 vs. 1:2 in North America). Worse still, gender divides crosscut racial ones. That where women lack access, time, confidence and technology resources, it is hardly surprising only 35% of IT graduates, and only 20% of IT workers in South Africa are women.

While reflecting on my own experiences with using one of the software programs-namely NVivo, my second aim in this paper is to critique the typical sentiments that software is simply an innocent research tool for the social scientist all too often missing, ignoring or leaving out important debates in the research community.

2. Problematizing the effects of technology on research praxis

While specific capabilities of software can either enhance or limit particular research activities undertaken with it [2], the leading qualitative analysis packages now provide a range of general-purpose techniques that may be used in a variety of ways to support different research approaches. There are however legitimate concerns about the effects of technology on practice that help define the problems to be addressed in computerizing research. For instance Weiztman [15] pointed out that consequent challenges for users include determining how best to use the capabilities of the software to further their research goals, and being aware of and reflecting on the impact of their use of software. Moreover, periodically, commentators have raised the concerns about whether the range of available software is dominated by a particular approach, methodology, or epistemology [2]. Whereas concerns about the effects of technology on practice are not new, as noted by Crowley and colleagues [2], they often lead to polarized debates between those for and against a technology. Such concerns need not be taken lightly as they point yet to another example of a deeper issue raising such questions as: Is the software just a tool or does it in some way drive the research? Or

whether specific software favours or precludes particular research methods.

With the identification of computing and qualitative research, it is fitting that the research community in social sciences in Africa engage in a (public) debate of these issues. But it is indeed curious and intriguing as well that these debates are only occurring at the moment mainly in conference halls in Europe, Australia, and North America! Indeed apart from some few contributions as we have noted above from users in S.A, the continent has largely not taken part in debates regarding this technological 'revolution'. This is disturbing especially if we consider that these programs are developed along developers' conceptual orientations which in many respects have ideological skews. Is it that simply, there are no researchers using these software programs? If so why not? Why the silence? One wonders. This paucity of debate, almost in a manner as if this is not Africa's pressing issue, is particularly unsettling especially when one considers that such missing contributions for Africa would help in challenging simplistic assertions of Africa's marginality, as well as representations of Africa as the passive recipient of external forces.

Elsewhere, technical changes apart, software use largely seems to have gained *social* acceptance among qualitative researchers in the social sciences. This is important to highlight especially given that, as Fielding and Lee [3] observed, in the early stages in their development computer-based methods for qualitative analysis faced resistance based on epistemological suspicion. That many qualitative researchers, through misunderstanding and/or ignorance of how computers might fruitfully be used, regarded the computer as an alien device with roots firmly based in the quantitative paradigm. So, what one notices here is that what would seem a simple software choice issue has other important social connotations as well.

In another development, albeit closer to home if you are in the academia, CAQDAS has moved from the frontier and towards the core in qualitative methodology. For instance, there are indications that the ability to use a qualitative data analysis package is increasingly seen as a marketable skill in applied research. Jobs for research assistantships often specify a need for the applicant to have or be capable of acquiring expertise in CAQDAS. But caution is needed here though. It is important to guard against assumptions that software use automatically confers credibility. Indeed researchers as well as practitioners at all levels must guard against the assumption that learning qualitative software is equivalent to learning qualitative research. As Weizman put it, new researchers begin by learning about how to do good analysis, rather than just how to use a program [15]. As a recap of this section, by now the reader appreciates that issues of software support are simply issues of choice of a good software embedded into a network, with other important social political concerns that need not be left to others that are not necessarily informed of your peculiar needs and situations.

3. Beyond software fears and hopes- Interrogating the research process

In the literature, many people apparently continue to believe that QDA software intends to do the data analysis. However, in the same way that a word processing package does not dictate whether you write a novel or a sermon, Crowley and others warned that software does not determine nor constitute a method despite some literature that links some software to grounded theory [2]. Perhaps, Weiztman put this point more succinctly when he noted that software can provide tools to help you analyze qualitative data, but it can not do analysis for you, not in the same sense in which a statistical package like SPSS or SAS can do [15]. In other words, using software cannot be a substitute for learning data analysis methods: the researcher must know what needs to be done, and do it. The software provides tools to do it. However, underlying these fears and hopes, are real implications regarding processes in research practice.

As Cassell and Symon [13] and [14] would have us believe, the real mystique of qualitative inquiry lies in the process of using data rather than in the process of gathering data. That unlike quantitative method, qualitative methods might be informed by all possible epistemological positions, including those traditionally associated with quantitative methods. In the same vein, Fielding and Lee [4] pointed out that QR is a broad church. It is represented by many schools of thought. It embraces many methods. It has many uses, many audiences and many sponsors. Therefore, projects on which researchers use qualitative analysis software are varied. To that extent therefore, issues of software use have a direct bearing on questions of good research practice which, I think, are very important and need to be continuously debated in Africa for them to be addressed.

The issue of good research practice is indeed starting to generate interest in Africa among some notable stakeholders in the research community. For instance, early this year, the Council for the Development of Social Science Research in Africa (CODESRIA), in its call for papers for the 2004 regional methodological workshop on social sciences is Africa, pointed out that while the complexity of the social dynamic involved in social research should call for an accurate interrogation of the investigation procedures, we are on the contrary witnessing a serious trivialization of research protocols, which are reduced to being a mere fetishist evocation of superficial recommendations or are simply ignored, in the name of a so-called specific immediacy that excludes African social realities from the universal debates on the validity of science. The result is that in those debates, social sciences are often portrayed as a mix of purely literary discourse without empirical anchorage or as anecdotes hidden under a "scholarly" discourse, which is not only pretentious but also vacuous. Moreover, in such a context, the knowledge produced loses all its heuristic content to become a mere element justifying, deliberately or otherwise, a relatively adapted economic policy. What this means is that it is high time we discussed the methodological foundations of our current knowledge, in order to give a new impulse to the African social sciences. The signals in that analysis have reverberations in yet another important human condition that has captured social scientists appeal and preoccupations. That is, that we need not forget that traditional social research has been for *men.* In the book Engendering African Social Sciences by Imam, Mama and Sow [7] we are indeed reminded of the limitations found in the epistemology and fundamental theory of social sciences elaborated by westerners and men. Moreover, social scientists' research on information and Communications Technology (ICT) use regarding women is not any different. For instance at a UN organized statistical workshop, Hafkin reported that in Africa, one of the most important data gaps is in the area of gender and ICT statistics and indicators [6]. Elsewhere, in the CAQDAS users' research project in the UK, Fielding and Lee found that almost all the developers were male, as were many of those who they termed 'infrastructure developers', people who have established formal means for the dissemination of information and program use [4]. They argued that men are presumably more exposed to opportunities for technical training in fields such as computer programming and may have a more technical orientation to hardware and software.

In Africa, since it's difficult to have precise data on the length of time people had been using particular packages, it will in fact be difficult to judge different rates of up-take of computer-based qualitative data analysis by men and women, or that either gender prefers one package over another. Nor that women use the packages differently than men.

4. Application of CAQDAS - An example from the field

Here I give software use experiences and examples from the author's PhD research work. In that study, I was interested in a post-modern analysis and explanation regarding how and why entrepreneurs in Uganda, through their economic activities individually and collectively, push the

boundaries of the "right cultural attitudes and beliefs" and thereby challenge social relations in their quest for wealth creation.

Qualitative methods were given priority and, as Miles and Huberman [8] suggested, were largely open and events driven. For instance, initial data came from the life story of one of the prominent entrepreneurs who had just published his autobiography. Additional data was derived from existing interviews with some of the entrepreneurs as well as notes from the literature. The choice of the autobiographical narratives was based more on a pragmatic criterion than a formal one. I pursued a pragmatic approach, taking the significant knowledge produced by a number of events and sources of relevant information as the basis for this endeavour. As a result, my research data consisted of various data types: TV videos, newspaper articles, interviews of key informants such as newspaper reporters and other business journalists, surveys, and field work with ethnographic approaches such as participant observation and unstructured interviews. In terms of the multimedia aspects of this project, I obtained five videotapes, each containing two hours length of video material from which I prepared transcripts so as to code them as documents. It is important to note here that multimedia capabilities are just beginning to emerge as a significant issue in software choice. There are now several programs in the code-based theory builders' category [4], [8] and [15] that allow you to use audio and video, as well as text, as data. On the website for Sage Publishers, there is information regarding software that allow you to code and annotate audio and video files, and search and retrieve, in ways quite similar to the way they let you manipulate text [12].

All data for my project were imported into NVivo database - a CAQDAS program designed to assist in fine-grained qualitative data coding and analysis [9]. NVivo was selected as the qualitative software tool because of its flexibility in coding, searching by attributes and modelling capabilities, an appropriateness for use with my kind of data set. As described by one of its developers, Lyn Richards on their QSR website [11], using NVivo "a project starts as soon as ideas start. NVivo enables you to take qualitative inquiry beyond coding and retrieval, supporting fluid interpretation and theory emergency" [11].

The process of pursuing conclusions and establishing their robustness were helped by software tools that provided ways of gaining rapid access to data. For instance, text searches or keyword searches were some of the processes that supported my interpretive goals by providing all relevant data for consideration. In addition, using the software I was able to log emergence of a category, date memos or other documents, and archive images of analysis at each stage. In the language of Miles and Huberman [8], log trails of this kind can provide full documentation of how a category grows in significance and is tested through the data. In this research project, in addition to the insights learned about entrepreneurship in Uganda from the research material at hand, I was also able to use 2 sensory modalities- visual and audio- in the presentation of some of the findings.

Reflections on the use of software as a tool: Earlier, I regarded NVivo as a tool. In fact one with which I could perform a number of functions given the diversity of my database in terms of data sources as well as cases, structure, diversity of entries and the actual size of the database itself. With this diversity, I realized that there were some trade-offs I had to make given the capabilities of the software. For instance, I realized that NVivo could not allow me to code and annotate audio and video files, and search and retrieve, in ways quite similar to the way it let me manipulate text. In fact with hind sight, I realize that I could have instead carried out additional analysis for such specialized tasks using visualization programs such as ATLAS/ti. Although, the possibility of importing and exporting marked-up, coded, annotated data from one program to another, is another area in software that is still not well developed [15].

Another area of reflection concerns how the use of the program affected my working methods

over time, sometimes in subtle ways. For instance there were changes in my initial working processes that could be attributed to the capabilities of the software. I realized that at the beginning, my coding had been driven by the hierarchical tree structure which resulted into codes that were not meeting my interpretive goals. After sometime, I discovered that I could instead stay with free nodes as I conceptualized and categorized my emerging codes without following the tree structure. In my later analysis, I begin by coding large chunks and organizing data so that I can reflect on it and develop more subtle categories.

5. Issues and debates in the field

Software-based formats for data analysis relate to the wider debates regarding qualitative research in that they are based on, and hence, reflect accepted approaches to social scientific research. Weiztman [15] raised four issues that need to be debated: closeness to the data; whether software drives methodology; whether new researchers should start off doing analysis by hand; and whether software really affects rigour, consistency, and thoroughness.

Closeness to the data
Although some programs still create the sense that you are staring at just a small window of text with no sense of what lies around it, there are now many programs available that provide rich contextual information (such as source of information, graphical maps of hypertext links, navigable outlines, and linked lists of codes, documents, and text segments), and may in fact help you get to know your data better than ever before. Gilbert [5] suggested that the term 'closeness to data' conflates two different constructs: knowledge of content and pleasure in handling data. She indicated that whereas access to the original data was supported by most CAQDAS programs, the question of absence of closeness to contextual information about that has methodological implications.

Does software drive methodology?
Weiztman notes that the concern here is that researchers might wind up by adapting their research to the software they use, rather than the other way round i.e. the software will impose a methodological or conceptual approach. In the same vein Crowley and colleagues [2] noted that there is sometimes a deep misgiving that in NVivo, the Node Tree structuring facility equates to a correspondingly hierarchic (and perhaps, equally worryingly, 'fixed') conceptualization, however inappropriate it might be to the investigation at hand. That is why some fears have been thrown up that while it might not necessarily impose a hierarchic approach to substantive conceptualization, the concrete representation of the tree system might lead to less independent-minded users to reflect it unquestioningly in their conceptualization. In addition, it has been pointed out that developers bring assumptions, conceptual frameworks, and sometimes even methodological and theoretical ideologies to the development of their products. That these have important implications for the impact that using a particular program will have on your analyses. Clearly, each of these programs shows you quite a different view of your data, and so each may encourage different ways of thinking about your data. To reiterate Weizman's point here, each of these assumptions is both a benefit for some modes of analysis and a constraint. The key is not to get trapped by the assumptions of the program. The programs should serve your analytic needs, goals, and assumptions, not the other way round [15].

Should researchers start off doing analysis by hand?
There are no straight forward answers but what is important here is that the new researchers begin by learning about how to do good analysis, rather than just how to use a program.

Does software really affect rigor? Consistency? Thoroughness?
Software will not pull good work out of a poor researcher [15]. I should add here that criteria may differ considerably in the extent to which such programs may seek to ape the concerns of

quantitative research or seek alternative approaches to research evaluation. However, the issue should be conceptualized not as whether the software makes the work more rigorous, but whether the researcher uses the software to do more rigorous work than he/she could do without it?

6. The future

For those in the academia, the following needs identified by Weiztman [15] are still relevant for scholarship on the topic:
Ongoing review work- regular software reviews in the same way that many journals feature regular book reviews. A call has already been made for more journals that serve qualitative research audiences to follow this lead.
Debate on methodological questions- we need to be both wary of unintended influences of software and actively participating in shaping the future development of software by constructively arguing with developers about what we need and what we do not like.
More empirical work- the kind of empirical work of the impact of software on analysis in the users' experience study that has been pioneered by Fielding and Lee [4] is important in our context.
Weiztman also identified some of the needs of researchers that are not yet met by software developers. They include:
Support for case oriented work- a few programs have features built in for explicitly tracking individual cases through multiple documents, but few programs are set up with a strong case-oriented structure.

Display building especially of matrices still needs much development. The ability to compose a summary text for an output matrix rather than switching to a word processor is still one step away.

Tools of narrative and discourse analysis are still lagging as well. Researchers need developers to create *the possibility of importing and exporting marked-up, coded, annotated data from one program to another.*

7. Conclusion

The implications of the strategies adopted in this study are that in addition to being able to use a large number of different kinds of records and documents, qualitative computing now allows exploration of meanings expressed in rich text, pictures, sound, and many ways to express diagrammatically or via hyper links the relations of ideas and data. Thus, unlike the situation just a decade ago, qualitative researchers now have available to them, an array of very good software tools to assist their research, and the use of software - including, but not limited to, word processors- seems more and more to be a regular part of the qualitative research process.

It is my hope the future will see more African social scholars engage these scholarly debates and in software development in order to give a new impulse to the African social sciences.

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