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Going Digital and Staying Qualitative: Some Alternative Strategies for Digitizing the Qualitative Research Process

David Brown

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Abstract: Qualitative research is rapidly changing as a result of the deployment of Information Technologies (IT). Practices that have taken decades to evolve are being redefined by contemporary computing power. Since the 1990s one of the buzzwords in the computing, communications and technology industries has been "Digital Convergence"—the digitizing of different media forms. Digitization is an ongoing phenomenon, constantly developing and evolving the way we communicate and interact—a product of reflexive modernity, but what does it mean for the qualitative research as a process and how might we make use of it? The paper responds to these questions by making some practical suggestions for digitized strategies and processes that qualitative researchers might draw on eclectically in order to express freely their own creative abilities, which in turn facilitates the opening up of new idiographic avenues for exploring and disseminating subjective experience. In so doing the paper juxtaposes the alternative manual nature of these strategies with other developments that are increasingly orientated towards semi-automated computerized data processing.

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1. Introduction: Going Digital with Qualitative Research?

Like our participants, as qualitative researchers we are socially and historically situated agents. What we research, and how we choose to do it are inseparable from the period of reflexive modernity that we inhabit and that period happens to be one of rapid technological change (GIDDENS, 1994). Technology developments directly impact what we can achieve with qualitative research as a process. That said, it is only relatively recently, perhaps since the late 1990's, that massification and commercialization of these technologies has really begun to

make them viable options for a significant minority. As LEE and FIELDING (1996) reflect, "the advent of approaches such as narrative analysis, is historically contingent and reflects in part the impact of new technology, the tape recorder" (paragraph 2.4). Elsewhere, FIELDING (2000) reminds us, "it is only since the advent of word processors that qualitative data sets have been 'machine readable'" (paragraph 24). Reflections upon new technologies and how they impact upon our ontological, epistemological and methodological standpoints should therefore rightfully occupy our attention, not just reactively but proactively. *Digital convergence* is potentially one of the more profoundly significant technology developments that can help qualitative researchers. It represents the bringing together of a whole range of new *and* old technologies in ways that can further the traditional yet also enable new approaches to conducting qualitative enquiry. So what is digital convergence? COVELL (1999) provides the following definition:

> "The convergence of these improved computing capabilities, new digital multimedia technologies and content, and new digital communications technologies. This combination of computing power and functionality, digital networked interconnectedness, and multimedia capability enables new forms of human interaction, collaboration, and information sharing" (COVELL, 1999, http://www.digital-convergence.com/chap1a.htm; broken link, FQS, March 2003). [1]

The technology industry employs the term *digital convergence* as a wide ranging descriptor (see for example, YOFFIE, 1997; MARSDEN, 1997). However, most agree that digital convergence is having a profound impact on the lives of individuals in developed societies and beyond. Again, COVELL's (2001) synopsis is pertinent:

> "Digital convergence is reshaping the way individuals and organizations collaborate and share information. Audio, video, animations and other kinds of rich media enhance existing digital communications and enable new forms of human interaction. We're talking about a new platform for communication that will change not only how we conduct business, but how we learn and entertain" (COVELL, 2001, http://www.networkcomputing.com/). [2]

With these points in mind how might we develop a pathway towards digital convergence in qualitative research that, as COFFEY, HOLBROOK, and ATKINSON (1996) desire, *transcends* a nomothetic consciousness and, as LEE and FIELDING (1996) envision, lets "a hundred flowers bloom" in qualitative research (paragraph 4.5). Put differently, the question that needs considerable thought is how we might digitize the process in ways that enhance rather than threaten the idiographic nature of our work? Where might we explore the potential of digital convergence in ways that provide catalysts to individual creativity, plurality of thought and representation, and at the same time benefit from the obvious efficiency gains from using the computer as a digital hub for the entire research process? Therefore, this paper is fundamentally interested in what digital convergence might mean for the qualitative research process as it becomes increasingly digitized. The objective here is to consider how do we

arrive at a solution that all data are captured and processed in a range of high quality, digitized formats, without altering the fundamental characteristics of the non-foundationalist paradigm exemplified by good qualitative research. These qualities would include, according to MAXWELL (1996) open-ended processes, flexibility, and strong orientations towards inductive reasoning that are ideally suited to exploring the construction of human meanings in the context of their own making. The question we have to ask continually is does the use of any given technology enhance or restrict these goals in any way? [3]

In what follows, I endeavor to articulate one extended example of how we might *go digital and stay qualitative*. However, I readily acknowledge that there are likely be other solutions to this challenge. Moreover, any given solution is likely to be temporary given the certainty that future technologies will add new possibilities. Accordingly, this paper represents only a version of how we may progress. The underlying purpose, however, is to suggest that the challenge of digitization is an ongoing one that raises many issues and to argue that we would do well to consider the impact of technologies on the whole process of qualitative research, rather than on isolated aspects of it. For the purposes of simplicity I have chosen to break up the qualitative process practically into three overlapping stages, namely; capturing and storing digital data; analyzing digital data and representing digital data. [4]

2. Capturing and Storing Digital Data

2.1 Multimedia databases

Data storage and retrieval is the first and foremost consideration of a digitalized research process. As this discussion of digital convergence involves multimedia, we need a means to store and retrieve text, audio, video and graphics files. Almost all CAQDAS (Computer Assisted Qualitative Data Analysis Software) applications on the market are varieties of customized database solutions. Within these, there are a few CAQDAS applications that offer this multimedia storage ability, and as LEE and FIELDING (1996) point out, this is precisely how many qualitative researchers use them, as databases or "electronic filing cabinets" (paragraph 10). While there is no space here to enter a critique of their relative individual merits for the task of data storage, it is worth noting that because these databases are focused on facilitating semi-automated analyses they tend to not offer support for a wide range of file formats and platforms that other specialized storage solutions excel at. One of the primary ways of judging this is whether or not the application allows the user to retain *common* file formats rather than being forced to convert them to an application specific format, and whether additional editing is required to make the file usable in the database. These limitations, if they arise, impose far too many restrictions to be considered a viable proposition for genuine multimedia storage. The second consideration is ease of use—does the database require many (dozens of) hours of training to be able to access its more powerful features and does it impose structural restrictions on input of, and access to, data? [5]

When these issues are considered the most suitable packages for multimedia data storage are likely to be outside of the few specialist CAQDAS applications and found in the mainstream commercial database market, where the products tend to be more specifically focused on a given task. In my experience of working with a variety of solutions, the best choice for power and ease of use have been the media cataloguing type of database application, otherwise known as "asset management software" (for example EXTENSIS PORTFOLIO or iVIEWMEDIA PRO). As the names suggest these databases are capable of cataloguing a wide variety of multi-media file types and formats including text files, portable document files (PDF), image files, audio and video files. The database does not actually import or alter the original files in any way, rather, it catalogues them, by making small images (thumbnails) of each file and recording automatically all the information about what type of file it is. The file cataloguing databases also allow the original file to be opened by a chosen application for reviewing, editing or analysis. Further annotations can also be added to the files to facilitate content searches during retrieval. Furthermore, many of these applications can be made to work across a client—server based network—thereby allowing research teams to both work from and develop the same database. [6]

There are a number of good reasons why a cataloguing database is a compatible way forward for a digitized qualitative research process. First is flexibility; the database design itself imposes very few structural restrictions for the researcher. A wide range of file formats can be stored and recorded in this way, meaning researchers are free to collect and collate multimedia documents without being hampered by file compatibility restrictions. They are also open ended in that the imported documents are catalogued automatically by the computer, but can then be annotated with text or voice to create researcher defined *sets* of documents that can facilitate later searches and analysis, for example "interviews," "diaries," "observations" etc. This setting or coding can be done regardless of file type so the researcher can set a group of interview files that are a mixture of audio, text, and video, thereby significantly facilitating retrieval. Another significant advantage of the catalogue approach to data storage is the ability to open the file in the application that created or last edited it, directly from the database which means that working documents can be included at any point and analysis can be performed in the most appropriate multimedia application, a point I will return to later. The final point worth making here is that of file size—multi media databases that actually *contain* all the data soon become so large that they are often very difficult to manipulate (for backup, file sharing etc.). The cataloguing database does not suffer with this limitation because it does not actually contain the data files, indeed large data files can still be catalogued and stored elsewhere such as a CD /DVD, other networked computers or even the World Wide Web (WWW), meaning that the storage options are vast indeed. [7]

2.2 The digital research journal

With the storage database in place, we can turn our attention to the digital collection of data. For many qualitative researchers this begins with the use of a *research journal* to develop their ideas and record their interpretations of

observations, interviews etc. The research journal lies at the heart of the qualitative process and is amongst the oldest of practices for the social scientist. We might therefore, heed the advice offered by C. WRIGHT-MILLS (1959):

> "One answer is: you must set up a file, which is, I suppose, a sociologist's way of saying: keep a journal. Many creative writers keep journals; the sociologist's need for systematic reflection demands it. In such a file as I am going to describe, there is joined personal experience and professional activities, studies under way and studies planned" (C. WRIGHT-MILLS, 1959, p.196). [8]

Having experimented with a range of practices including handwritten notebooks, flat file/relational databases and linear word processors, I now consider the most flexible solution to be an interlinked series of hypertext documents that can be catalogued in the database of *any number* of given qualitative study database catalogues. Most fully featured word processors have hypertext capabilities that will substantially aid the construction and linking of notes and ideas as they are generated by the researcher. Quick hypertext links can be made to other documents in the same file or other files, storage media or the World Wide Web —allowing for a train of thought to be constructed and revisited repeatedly (for a fuller discussion of this practice see GIBBS, 2002). [9]

Journal writing in this way also allows for the easy archiving and retrieval of information. It also rationalizes the time spent in the process of analysis, and once digitized, the journal material transfers easily and provides an ideal channel for preliminary and secondary analytical exercises. Additionally, in this format, these documents can be used in tandem with handheld computers, such as a PALM or HANDSPRING machine, which can be unobtrusively taken into the field, notes added and then fed back into the main journal on the computer through a simple synchronization facility. The practice can be a very efficient one since the handheld means that the researcher always has a digital notebook on hand and the notes taken are only written once. Alternatively, many researchers prefer to record their personal memos on tape. Digital convergence means that that this is not only possible, but also a relatively simple technique. The analogue cassette or DAT recorder is plugged into the computer and the computer set up to record the incoming sound signal. The sound file is then saved into a common and flexible format such as QUICKTIME, stored, catalogued in the database and a hyperlink set up from an appropriate place in the research journal. In this way the audio recording can be accessed and listened to/edited either from within the database catalogue or the research journal ready for preliminary or main analysis. It might be added that the same process can be used for *video notes and photographic images* as well. Such a process remains very close to traditional qualitative methodology in that the recording of personal notes and observation is flexible and open-ended, yet the retrieval and reviewing of these notes is highly efficient and, of course, in multimedia formats. The other obvious advantage is that all the information is already digitized and therefore can be drawn on and manipulated quickly and easily at later stages in the research process. [10]

A multimedia research journal can also enhance the idiographic nature of the qualitative work through the use of schema. Schema, preliminary conceptual maps, models and so on, can be drawn either in the word processor or in dedicated concept drawing packages (e.g. INSPIRATION, CONCEPT DRAW, IHMC CMAP tools), the result can then either be inserted directly into the document or saved as a bitmap or jpeg (Joint Photographic Experts Group) file, catalogued and hyperlinked to the relevant point in the research journal for later review. The challenge of trying to "draw" such connections is often daunting but can often stimulate alternative, as yet unconsidered courses in the research process. For the talented, a drawing "tablet and pen" instead of a computer mouse is a far more freeform and creative mode of getting these ideas onto screen. Again, the process of adding schema allows for the research journal to begin to visually reflect on the complex interaction between intuitive hunches, observations, a priori and developing theory, without being limited by the linearity of a text document or the imposed structures of a database. [11]

2.3 Collecting digital data

It is important to qualify here that digitization of the qualitative research process does not mean we have to collect all our data directly in a digital format (although it helps). What digital convergence is doing for qualitative research data collection is *extend* the range of ways in which we can collect data. In tandem with this extension is the increasing ability to digitize old (analogue and text) formats. The possibility of digital video data collection, did not exist until very recently. Analogue video was possible and indeed made use of by many social scientists, in particular those in anthropological disciplines, which have the strongest and longest tradition of using film and image as part of data collection strategies (ZEITLYN, 2000; PINK, 2001). Notwithstanding the potentially obtrusive nature of the large video camera and its potential limitations (HAMMERSELY & ATKINSON, 1983), until very recently manipulating and digitizing analogue video required (expensive) specialized equipment and (expensive) technical expertise. Consequently, this potentially fertile realm for data collection presented so many practical and methodological problems that it led most qualitative field researchers back to their still cameras, cassette recorders, and note pads. [12]

By contrast, the digital camcorder, has the potential to make an impressive impact on how we collect a range of data. Being small yet unobtrusive (and relatively inexpensive) camcorders are able to offer high quality audio, video and still images all in one package. However, what makes this technology so attractive is digital convergence. The latest camcorders are constructed with a "direct" IEE 1394 connection, referred to by its inventors as "Firewire." Firewire allows the researcher to download all of this digital data directly (and quickly) to the computer. In tandem with the development of these technologies is a raft of digital video editing applications that allow even a novice user to quickly manipulate digital video data on a desktop computer. As above, the digital data can then be converted into a common user-friendly format such as a QUICKTIME movie, stored and catalogued in a database for later editing and analysis. As a result we are now in a position to extend, speed up and merge forms of data

collection, that previously were only possible at a financial and methodological cost. Of course, all multimedia data collection requires large amounts of computer storage space, with the most storage required for digital camcorder video footage that quickly uses up many gigabytes of hard disc space. Given these requirements, storage becomes a real issue as does computing power. In order to accommodate such file sizes the files may need compressing and storing onto a second computer hard drive or "burning" onto CD/DVD discs. [13]

Collecting digital data can, as CHEN and HINTON (1999) indicate, be extended to the World Wide Web, where the interview process can take place using the Internet as a primary channel of communication, they comment:

> "Online interviewing requires the researcher have access to frame capable-capable browser software and space on an Internet web server that supports PHP server-side scripting and an interviewee with a similar browser with access to the World Wide Web. Using a webpage as an interviewing 'screen' between the interviewer and their subject, the interviewer is able to question the subject in realtime, logging the discussion to a file that serves as a permanent transcript of the interview" (CHEN & HINTON, 1999, paragraph 4.1). [14]

As CHEN and HINTON (ibid.) qualify "the interview method has problems associated with the depth of material available from this approach and the loss of paralinguistic cues, and the limited size of the available sample" (paragraph 8.9). Nevertheless the approach offers both a resource and a challenge to qualitative researchers to collect data in new ways and it may offer particular strengths in making it much easier to retain links with existing participants allowing for longitudinal or follow up studies to become a real possibility as do extended conversations during which conversations are shared amongst a group of individuals over a period of time. Similar techniques can be employed using a web cam and even more simply through email communications. These and other techniques are discussed in more detail by MANN and STEWART (2000) who provide a detailed account of how we might engage with CMC (computer mediated communication) in qualitative research. Furthermore, as CHEN and HINTON (1999) point out all these strategies can yield qualitative data that is already digitized and, therefore, can be saved and catalogued in the research file database. [15]

The final point about collecting digital data was hinted above but that needs further qualification. Digital convergence increasingly means "old" analogue, and paper sources, can now also be digitized without great expense, technical expertise or time. Scanners are relatively cheap pieces of equipment and when combined with the latest generation of fast and accurate Optical Character Recognition technology (OCR), they allow us to digitize text and text/image sources quickly and easily. Alternatively, voice recognition software is now sufficiently well developed to allow researchers to "talk" in data to a text or audio file. This allows great flexibility in how we collect data. We can continue to use the most appropriate data collection method and yet still digitize the data. Similarly, analogue tape and video recordings can be converted with a relatively cheap

analogue to digital converter. Digital convergence can mean, therefore, that all the previous techniques and practices and techniques are still available to the researcher as well as extended or new digitized solutions. What makes digital convergence (or digitization) of data so attractive is the ease of access for analysis, the reproductive quality for representation, and the ability to archive in what are "long term" solutions, offering new potential for future re-analysis or even forms of meta-qualitative study in the future (MUHR, 2000; CORTI, 2000; KLUGE & OPITZ, 2000). [16]

3. Digital Data Analysis Without CAQDAS?

Qualitative analysis of textual data is perhaps the one area where most digitization has already occurred. It is also an area where debate concerning the use of computers in qualitative research is most vociferous (overviews are provided by KELLE, 1995; WEAVER & ATKINSON 1995; LEE & FIELDING, 1996). Often the debates seem divided between camps of advocates of CAQDAS; those who oppose the use of CAQDAS on grounds of epistemological or methodological objection; and still others (amongst whom, I would position myself), who are not opposed to the principle of computer assisted analysis but who remain to be convinced about many packages currently available. I agree with LEE and FIELDING's (1996) analysis that many qualitative researchers have "gone beyond seeing the computer either as a panacea for analytic woes or as a devil-tool of positivism and scientism" (paragraph 4.5). I also share their enthusiasm for a pluralized usage of digital technology as it presents a possible scenario where the massification of these combined technologies *could*, and I consider *should*, provide the opportunity for the proliferation and democratization of the production and dissemination of qualitative research knowledge. Nevertheless, I also share with COFFEY et al.'s (1996) concerns that a "trend towards orthodoxy" is also apparent and definitely remains a potential threat to alternative approaches to qualitative analysis. This is especially so with CAQDAS applications, in which enduring foundationalist epistemologies are clearly being drawn on in their design and programming: a concern shared, it seems, by BAPTISTE (2001) who comments:

> "Like any other analytic tool, computer programs may promote certain ways of construing and conducting QDA while precluding others. For instance because of the ease with which computers allow us to count things, it could be quite seductive for analysts to use 'frequency of occurrence' as the sole measure of meaningfulness or significance. Clearly, the number of times a particular phrase appears in a text is not a sufficient measure of its importance or significance—more semiotic and linguistic tools (I believe) are needed to make that assessment. Being one who uses computer programs, I certainly encourage their usage. However, I believe that it is important as analysts that we constantly think about how these programs are enhancing or constraining our analysis" (BAPTISTE, 2001, paragraph 20). [17]

The use of these tools, consciously or otherwise, serves as an interface to forward particular world views, embedded in the very design of the software applications, which in turn influence the research process. The underlying issues

amount to a digitized version of much older paradigm debates, in which technology usage will ultimately come to reflect a given researchers core, ontological, epistemological, methodological positions, particularly with reference to the thorny issue of "validity." In particular, these concerns would include trends toward semi-automated analyses that are pre-structured to favor a realist ontology, researcher as discoverer, as SMITH (1997) might say, and employ nomothetically orientated coding practices that lead to the de-contextualization of data sources. Also as KERLIN (2000) points out these applications are often marketed with the language of a quantitative paradigm. Therefore COFFEY et al.'s (1996) paper presents us with a scenario that we must take seriously when they comment:

> "On the one hand, a diversity of representational modes and devices is currently being celebrated, in response to various critiques of conventional ethnographic representation. On the other hand, the widespread influence of computer-assisted qualitative data analysis is promoting convergence on a uniform mode of data analysis and representation (often justified with reference to grounded theory)" (COFFEY et al., 1996 abstract). [18]

In contrast to the *either, or* situation presented in the above scenario, qualitative researchers might explore how to go digital while retaining the multitude of approaches and techniques for analyzing qualitative data (see for example, PATTON, 1990; MILES & HUBERMAN, 1994; FIELDMAN, 1995). This multiplicity might be said to champion HAMMERSLEY and ATKINSON'S (1983) often coined term of *researcher as instrument*. There is no good reason why most of these approaches and perspectives cannot be employed on the computer with digital data as well as manually through techniques so articulately documented by LOFLAND (1971). There are, however, considerable epistemological and methodological differences between *(semi) automated* computer analysis and *manual analysis* performed on a computer. This is, as PATTON points out that, "there is typically not a precise point at which data collection ends and analysis begins" (1990, p.144). In this sense, data collection and analysis have a reciprocally evolving relationship and any computer based analysis of qualitative data needs to reflect this fundamental epistemological distinction that legitimizes non-foundationalist, non-linear, overlapping, and reflexive analytical processes. In short, a manual analysis of digital data is currently the only way to get close to the participants as human beings, and the primary analysis is also required to retain the socio-cultural contours of the data. Undeniably, a manual process takes longer than an automated or semi-automated processing of data—but if closeness is important then it remains a powerful alternative strategy and perhaps the *only* strategy in some cases. [19]

Analysis effectively begins by listening to, transcribing, reading and coding the recorded interviews and observational data. The transcription process is fundamental in getting close to the data and provides immediate feedback on the effectiveness of the type of questions and the quality of data recovered. KVALE (1996) holds similar inclinations stating, "rather than being a simple, clerical task, transcription is itself an interpretive process" (p.160). For this methodological

reason, staying "qualitative" would mean resisting some automated process of transcription. However, it is possible to transcribe the imported digitized audio or audio video files on the computer. There are a number of software transcription applications on the market. The researcher simply imports the desired audio/video file into the transcription application and begins transcribing using keystrokes to instruct the recording to start, stop, go back, and so on. The final transcribed interview is then saved as a word processor file, stored and catalogued. Alternatively, the data can be transcribed using a voice recognition software application, where the audio file is opened, listened to, and then spoken into a text document by the researcher. [20]

It is possible to perform a detailed *manual* analysis of the text documents by using the review facilities on good word processors such as MS Word. The advantage of this approach is immediately apparent because of the lack of need to format transcription texts in idiosyncratic ways required for major CAQDAS applications such as WinMax, QSR NUD*IST and ATLASti (see LEWINS, 1998). The ability to perform text searches and combine these with bookmarking, highlighting, coding and commenting on specific segments or passages of the text combine to provide a powerful set of analytical tools. Additionally, and unlike some CAQDAS applications, (see for example, the comments of PLAß & SCHETSCHE, 2000, paragraph 16), the document remains in a highly flexible format, with the analysis contained in it. It is then possible to send a copy of this analysis to a colleague, fellow researcher, or a participant, so that they can add additional comments, perform further analysis, or review the analysis itself. This degree of digital flexibility, in my view, allows the researcher to perform and employ a whole range of analytical strategies on the same document, and over an extended period of time, thereby allowing the analysis to evolve organically. Furthermore, because the format is scalable, text files can be more easily read (e.g. at 150%) and analyzed on screen, offsetting some of the problems of working on screen as experienced by FORD, OBERSKI and HIGGINS (2000). Finally, using the bookmark and hypertext document linking function of the same application, links can made to a master document which is being used to compile overall notes on the analysis as it progresses (which might usefully form part of the research journal). The latter technique has the advantage of always allowing the researcher to immediately return to the place in the interview or observation where the comments were initially made. In this way, the construction of an eventual disseminated multimedia hypertext document becomes the "product" of a series of evolving documents developed through consecutive waves of data collection and analysis. [21]

When processing audio and video files it is worth remembering that the objective is not only to reduce them to text. Where this is a need the above transcription process can be used. However, in a digital converged process it is useful to retain and analyze these files for the wealth of paralinguistic, embodied and other contextual details they contain with a view to making use of these for other forms of dissemination. Indeed, in a research process that prizes itself on the ability to retain and even foreground contextual factors, the ability to analyze these files in the same medium as text, is a huge step forward. Therefore, using a multimedia

application such as QuickTime allows the easy playback and editing of audio and video clips, the clips can be viewed, notes made and extracts cut from the original. Furthermore, still images can be taken from the movie tracks where appropriate. Ultimately, these edited clips can be then imported into the developing analysis document along with the notes made about the clip extract. The degree of flexibility this strategy offers is again commensurate with developing and retaining a more detailed contextual picture. Taking the technique a little further, the *layering* potential of such applications can be exploited. For example, an audio quotation of a participant discussing an emotive picture can be merged with a still image of that picture and then represented together in the analysis document. A detailed discussion of these techniques is not possible here but is expertly provided elsewhere by PINK (2001), and BAUER and GASKELL (2000). Where the use of digital video and audio do raise concerns about anonymity, common techniques widely employed in the television industry can be mimicked easily using video and audio editing applications that allow researchers to "bend the pitch" of voices and "smudge" faces etc. With the analysis conducted and a growing hypertext-linked multimedia document emerging, the researcher can then move onto the representational stage of the digitally converged qualitative process. [22]

4. Representing Digital Data

4.1 Hypertext and qualitative multimedia representation

CHENAIL (1995) contends that the presentation of qualitative research is most successful when a "spirit of openness is built up between the researcher and the reader" (http://www.nova.edu/ssss/QR/QR2-3/presenting.HTML; broken link, September 2002, FQS). Digital convergence can aid openness by using it to preserve the original streams of consciousness that qualitative data so often reveals but is so difficult to carry through to representation. With data in common multimedia formats, it can be then edited together, quickly and easily, while retaining more, (if not all) of the original context of its production. I am not suggesting that multimedia forms of representation are a "de facto" panacea for all the concerns of de-contextualization. Nevertheless, used creatively, it can certainly help the retention of context. The linear word processed text remains a benchmark for qualitative research dissemination. However, the linking of these documents, as we know, provides a rich environment for qualitative writers. Of course, what I have just described is the strategy of using *hypertext*, a kind of writing that uses computer technologies to allow multiple pathways through a document through the use of hyperlinks. Sophisticated hypertext writing is rapidly developing into an art form in its own right, as well as legitimate publishing format (see for example: http://www.eastgate.com/index.HTML; broken link, September 2002, FQS). [23]

Both hypertext and multimedia representations offer fantastic potential for qualitative researchers in social science, who wish to represent the diversity of their interpretations of data, thereby disrupting the "fixed" interpretation that linear text can imply (even if it intellectually challenges this). However, even here we

must be cautious about over romanticizing claims about hypertext. ESS (1996) makes the point that while hypertext may fit the postmodern canons of non-linearity and plurality, it is important not to forget that the links and pathways are author imposed, the reader can only go where the author lets them, even if there are pluralized possibilities. Author imposed finitude of hypertext texts has not therefore been replaced by, unfettered multiplicity of readings; rather, authorial singularity has been replaced by the potential of authorial plurality. Authors may seek to compensate by linking everything to everything else in hypertext representations and with this comes another potential problem. As COFFEY et al. (1996) point out, if an author puts in too many links and allows too many pathways through the text it can quickly become bewildering and unnavigable. Nevertheless, alongside traditional texts, hypertext is perhaps the one area where qualitative researchers might best start to explore how to represent the complexity of the social world (see WEAVER & ATKINSON, 1995). So how might we best format our hypertext representations? There are two obvious avenues, both of these options are well served by having the output of the analysis in a multimedia word processor document format and, as such, all the elements within the analysis document are already in the appropriate formats to quickly (in technical terms) construct a text for dissemination. [24]

4.2 Using HTML and PDF for multimedia papers

Firstly, HyperText Markup Language (HTML)/Extensible Markup Language (XML) formats have the advantage of agreed standards, (MUHR, 2000) this means that the interchangeability of formats is a real possibility (good word processor applications allow export to HTML, albeit with limited functionality). The HTML text is currently the *most* practicable way of representing qualitative data because the researcher can immediately convert an MS Word document into HTML. Alternatively, a WSWYG (what you see is what you get) HTML editor can be used to craft a high quality HTML document without needing to be able to write the hypertext mark up language, and with a few hours of investment into using the tools of the editor. The second reason is compatibility. Free web browsers allow anyone with access to a moderately modern computer to read a multimedia text. XML editors will soon replace these with far more powerful options, but HTML documents should be quickly convertible, and therefore not become obsolete for some time to come. The HTML "paper" is a genuinely multimedia paper, able to represent image, text, sound and video. What is more, HTML creates small enough files so as to be able to fit multimedia papers onto a CD for distribution or presentation. With the advent of DVD heavier use of multimedia files can still be fitted onto a portable disc. Where the content is more dynamic the CD/DVD based paper can be linked to a web space where audio and video clips can be edited and updated without effecting the links created in the paper. [25]

The second possibility is that of the PDF document. PDF can now support hyperlinking and embed a wide range of multimedia formats including QUICKTIME movie files, graphics images, sound files and so on. The result, like HTML, is a relatively small document or series of documents that are highly flexible in that they can be published to the WWW and viewed though a web

browser (via a plug in) or downloaded and viewed in the free "reader" application with cross platform compatibility. An additional advantage of PDF is the security option that allows the writer/producer to lock the files in a range of ways from password protection to disabled copy, cut, paste and print options. This format, has perhaps, the even greater advantage of already being a publishing industry standard (increasingly used for online journal distribution) and, therefore, immediately compatible with publishing companies. Finally, the full Acrobat application that creates and edits PDF documents has (like MS Word) full reviewing facilities, which would allow reviewers of these documents the chance to circulate them before and after publication for commentaries to be added—thereby making the finished product interactive in terms of peer review and post publication commentary. [26]

With the formatting decisions made, qualitative writers are then free to begin constructing a multimedia paper where the text shares a co-presence with video clips, audio clips and graphics images. This can be particularly powerful for conveying the authenticity of the original data sources. Equally, multimedia representation can explore the embodied paralinguistic dimensions of human experience. The medium can be used to explore some of the more difficultly accessed areas of human experience—such as the sociology of the body, emotions, aging, pain etc. with much more powerful effect than text alone. Nevertheless, all of the developments suggested enhance rather than replace text. Moreover, hyperlinks to secondary documents can be used to keep data contextualized. For example, short extract quotations can be linked to another page containing longer extracts from an interview transcript or observation notes. Similarly, multiple interpretations can be represented in the paper through the use of links to parallel pages that explore alternative interpretations and conclusions. In short, multimedia papers provide hitherto under-explored means to represent qualitatively, the rich and multi-layered textures of social life, and human experience and symbolic interactions. [27]

Once completed these papers will have several potential dissemination avenues. If burnt onto a CD or DVD they can be cheaply distributed in this form for the reader to read and view in their own time. The distribution of research in this manner is so new, (in relative terms) that intellectual copyright issues for this kind of multimedia work are far from certain or consistent across the nation state boundaries of the likely readership (see for example BRINSON & RADCLIFFE [1996] with reference to the USA) and therefore need careful consideration by authors. Equally, the perennial issue of anonymity in qualitative research becomes more pressing as multimedia papers give the potential for far more graphic identity disclosure, fortunately, as mentioned above, the very same digital tools that allow us to edit digital video and sound also allow us to manipulate multimedia data in ways that might preserve anonymity. With these issues satisfied the CD/DVD multimedia paper can also be used as backdrop to a presentation or lecture. Given the format, the papers could also be published on the WWW or alternatively on an intranet for more exclusive viewing. At this point, the whole research cycle I have described returns to the beginning, as the multimedia paper can also be catalogued in the original database and used to

generate further future analyses or be catalogued in various other archive databases (the limitations of archiving qualitative research are highlighted by FINK 2000). However, format is nothing without outlet. Until the qualitative research community gets serious about giving value to multimedia and digitally converged modes of presenting work, the paper journal will remain dominant. This is fine, except academics are unlikely to innovate with such methods if the result is not publishable in a format that provides a status return, especially in the UK where academics are judged on the "quality" of their publication outlets. There is a need, therefore, in the qualitative research community to establish and support some multimedia journal formats where work of this nature can be disseminated and duly rewarded. [28]

5. Concluding Comments: Staying Qualitative with Digital Research

In conclusion, I have attempted to approach the use of technology in qualitative research from a slightly different angle. My main focus has been how we might move each practical phase of doing qualitative research into a digital format without loosing sight of the interpretive researcher-led qualities of more traditional forms of qualitative research. Metaphorically, the computer desktop replaces the physical desktop, filing cabinet, and the floor of the researcher's office. The advantages of the process I have outlined appear to me to be centered on keeping the research process qualitative in the sense that it remains highly flexible, open-ended, and idiographic in practical application. I have argued against the automation, or even the semi-automation, of qualitative data processing on methodological grounds, as is either implied or explicitly sought by a variety of CAQDAS advocates. I agree with BARRY (1998) who contends that any data processing tool, is merely one amongst a number of tools that might be appropriate to facilitate a given outcome. The software "tools" I have highlighted are far more generic and potentially idiographic, chosen for their ability to allow the qualitative research process to be digitized while preserving the maximum control of the researcher over the whole process. The nature of the convergence articulated has the advantage of increasing efficiency of what is a fairly traditional set of research strategies. I am extremely keen that convergence of the process, allows very traditional forms of data formats to remain viable, as they offer greater choice for the researcher at the data collection stage. Similarly, throughout the whole process the limitations of structure imposed by technologies and particular formats are lessened by the deliberate avoidance of highly structured file formats, applications, or strategies. The process articulated is also cyclical in that the final output itself gets fed back into the database and can serve as a platform for future research development or further interpretations of the original data. However, in all of this we would do well to remember FIELDING and LEE's (1998) reminder about the use of any computer technology in the qualitative research process:

> "As Bryan Pfaffenberger (1988) has astutely observed, the only protection against the power of the computer to shape work in hidden ways is critical awareness. This requires reflection on the analytic process itself, independent of the computer, as well as

awareness of what it is about the technology that operates in undesirable ways" (FIELDING & LEE, 1998, p.77). [29]

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I would like to add that I am in no way involved in the construction or promotion of any of the products or families of applications mentioned in this paper, nor have I any vested interest in the promotion of particular technology for its own sake, I merely see all of the later as a means to a qualitative end, which for me is the development of the idiographic production of knowledge.

References

Baptiste, Ian (2001). Qualitative Data Analysis: Common Phases, Strategic Differences [42 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *2*(3), Art. 22. Available at: http://www.qualitative-research.net/fqs-texte/3-01/3-01baptiste-e.htm.

Barry, Christine A. (1998). Choosing Qualitative Data Analysis Software: ATLASti and NUD*IST Compared. *Sociological Research Online* [On-line Journal], *3*(3). Available at: http://www.socresonline.org.uk/socresonline/3/3/4.html.

Bauer, Martin W. & Gaskell, George (2000) *Qualitative research with text, image and sound: A practical handbook for social research*. London: Sage.

Brinson, Dianne & Radcliffe, Mark (1996). An intenllectual property law primer for multimedia and web developers. Available at: http://www.eff.org/CAF/law/ip-primer.

Coffey Amanda & Atkinson, Paul (1996). *Making sense of qualtitative data: Complimentary research strategies*. London: Sage.

Coffey, Amanda; Holbrook, Beverley & Atkinson, Paul (1996). Qualitative Data Analysis: Technologies and representations. *Sociological Research Online* [On-line Journal], *1*(1). Available at: http://www.socresonline.org.uk/socresonline/1/1/4.html.

Chen, Peter & Hinton, S.M. (1999). Realtime Interviewing Using the World Wide Web. *Sociological Research Online* [On-line Journal], *4*(3). Available at: http://www.socresonline.org.uk/socresonline/4/3/chen.html.

Chenail, Ronald J. (1995). Presenting qualitative data. *The Qualitative Report* [On-line Journal], *(2)*3. Available at: http://www.nova.edu/ssss/qr/qr2-3/presenting.html [Broken link, September 2002, FQS].

Corti, Louise (2000). Progress and Problems of Preserving and Providing Access to Qualitative Data for Social Research—The International Picture of an Emerging Culture [58 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *1*(3), Art. 2. Available at: http://www.qualitative-research.net/fqs-texte/3-00/3-00corti-e.htm.

Covell, Andrew (1999). *Digital convergence: How the merging of computers, communications and multimedia is Transforming Our Lives*. Newport Rhode Island: Aegis Publishing Group: Available at: http://www.digital-convergence.com/chap1a.htm (broken link, FQS, March 2003).

Covell, Andrew (2001). *The survivors guide to 2001: Digital convergence*. Available at: http://www.networkcomputing.com/shared/printArticle?article=nc/1125/1125digital1.html&pub=nwc [broken link, FQS, Jan 2003].

Ess, Charles (1996). Modernity & Postmodernism in Hypertext Notes: A Call for Theoretical Consistency and Completeness. *Ejournal* [On-line Journal], *6*(3). Available at: http://www.hanover.edu/philos/ejournal/archive/v6n3/ess/ess.html.

Fielding, Nigel G. (2000). The Shared Fate of Two Innovations in Qualitative Methodology: the Relationship of Qualitative Software and Secondary Analysis of Archived Qualitative Data [43 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *1*(3), Art. 22. Available at: http://www.qualitative-research.net/fqs-texte/3-00/3-00fielding-e.htm.

Fielding, Nigel G. & Lee, Raymond M. (Eds.) (1991). *Using computers in qualitative research*. London: Sage.

Fielding, Nigel G. & Lee, Raymond M. (1998). *Computer analysis and qualitative research*. London: Sage.

Fieldman, Martha S. (1995). *Strategies for interpreting qualitative data* (vol. 33). Thousand Oaks: Sage.

Fink, Anne Sofia (2000). The Role of the Researcher in Qualitative Research [69 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *1*(3), Art. 4. Available at: http://www.qualitative-research.net/fqs-texte/3-00/3-00fink-e.htm.

Ford, Kate; Oberski, Iddo & Higgins, Steve (2000). Computer-Aided Qualitative Analysis of Interview Data: Some Rrecommendations for Collaborative Working. [45 paragraphs]. *The Qualitative Report* [On-line Journal], *4*(3/4). Available at: http://www.nova.edu/ssss/QR/QR4-3/oberski.html.

Gibbs, Graham (2002). *Qualitative data analysis: Explorations with NVivo*. Buckingham: Open University Press.

Giddens, Anthony (with Ulrich Beck & Scott Lash) (1994). *Reflexive modernisation*. Cambridge: Polity Press.

Hammersley, Martyn & Atkinson, Paul (1983). *Ethnography: Principles in practice.* London: Routledge.

Hill, Michael R. (1993). *Archival strategies and techniques*. London: Sage.

Kelle, Udo (Ed.) (1995)*Computer-aided qualitative data analysis: Theory, methods and practice.* London: Sage.

Kelle, Udo (1997). Theory Building in Qualitative Research and Computer Programs for the Management of Textual Data. *Sociological Research Online* [On-line Journal], *2*(2). Available at: http://www.socresonline.org.uk/socresonline/2/2/1.html.

Kerlin, Bobbi (2000). Qualitative Research in the United States [27 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *1*(1), Art. 3. Available at: http://www.qualitative-research.net/fqs-texte/1-00/1-00kerlin-e.htm.

Kluge, Susann & Opitz, Diane (2000). Computer-aided Archiving of Qualitative Data with the Database System "QBiQ" [36 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *1*(3), Art. 11. Available at: http://www.qualitative-research.net/fqs-texte/3-00/3-00klugeopitz-e.htm.

Kvale, Steinar (1996). *Interviews: An introduction to qualitative research interviewing*. London: Sage.

Lee, Raymond, M. (Ed.) (1995). *Information technology for the social scientist*. London: UCL Press.

Lee, Raymond M. & Fielding, Nigel (1996). Qualitative Data Analysis: Representations of a Technology: A Comment on Coffey, Holbrook and Atkinson. *Sociological Research Online* [Online Journal], *1*(4). Available at: http://www.socresonline.org.uk/socresonline/1/4/lf.html.

Lewins, Ann (1998). Transcribing evaluation data. In Jen Harvey (Ed.), *Evaluation cookbook online*, Learning technology dissemination initiative. Available at: http://www.icbl.hw.ac.uk/ltdi/cookbook/contents.html

Lofland, John (1971). *Analyzing social settings: A guide to qualitative observation and analysis*. Belmont, Ca.: Wadsworth Publishing Co.

Mann, Chris & Stewart, Fiona (2000) *Internet communication and qualitative research: A handbook for researching online*. London: Sage.

Marsden, Chris (1997). The European Digital Convergence Paradigm: from Structural Pluralism to Behavioural Competition Law. *The Journal of Information, Law and Technology (jilt)* [On-line Journal], *3*. Available at: http://elj.warwick.ac.uk/jilt/commsreg/97_3mars/.

Maxwell, Joseph A. (1996). *Qualitative research design: An interactive approach*. Thousand Oaks: Sage.

Miles, Mathew B. & Huberman, Michael A. (1994). *Qualitative data analysis* (2nd edition). London: Sage.

Patton, Michael Q. (1990). *Qualitative evaluation and research methods*. London: Sage.

Pink, Sarah (2001). *Doing visual ethnography: Images, media and representations in research*. London: Sage.

Plaß, Christine & Schetsche, Michael (2000). The Analysis and Archiving of Heterogeneous Text Documents: Using Support of the Computer Program NUD*IST 4. [21 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *1*(3), Art. 21. Available at: http://www.qualitative-research.net/fqs-texte/3-00/3-00plassschetsche-e.htm.

Scolari marketing circular 15th November, 2001.

Smith, John (1997). Learning to Live With Relativism. *Realism, Relativism, Postmodernism in Educational Research Conference*. Manchester Metroplitan University: Crewe.

Weaver, Anna & Atkinson Paul (1994). *Microcomputing in qualitative data analysis*. Akdershot: Avebury.

Weaver, Anna & Atkinson, Paul (1995). From coding to hypertext. In Robert G. Burgess (Ed.), *Computing and qualitative research: Studies in qualitative methodology* 5 (pp.141-168). Greenwich CT: JAI Press.

Weitzman, Eben A. & Miles, Matthew B. (1995). *Computer programs for qualitative data analysis. A software sourcebook.* Thousand Oaks; London; New Delhi: Sage.

Wright-Mills, Charles (1959). *The sociological imagination*. London: Oxford University Press

Yoffie, David B. (1997). *Competing in the age of digital convergence*. Harvard: Harvard Business School Press.

Zeitlyn, David (2000). Archiving Anthropology [20 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], *1*(3), Art. 17. Available at: http://www.qualitative-research.net/fqs-texte/3-00/3-00zeitlyn-e.htm.

Author

David BROWN is a lecturer in Sport and Health Sciences. His research interests involve the qualitative sociological study of the changing body-self-society complex in the area of sport, health and exercise.

Contact:

Qualitative Research Unit

School of Sport and Health Sciences
Exeter University
Devon
EX1 2LU, UK

E-mail: D.H.K.Brown@exeter.ac.uk

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